Integrated Natural Resources Management Plan
Defense Fuel Support Point San Pedro

Final
July 2014

Integrated Natural Resources Management Plan

Defense Fuel Support Point
San Pedro, California

Final
July 2014

Prepared for Naval Weapons Station Seal Beach and Defense Logistics Agency

Under Contract with Naval Facilities Engineering Command Southwest
Contract #N68711 00 D 4413/0030

Prepared by Tierra Data Inc.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Defense Fuel Support Point San Pedro

Approval

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (as amended), DoDI 4715.03, and OPNAV M-5090.1. This document was prepared and reviewed in coordination with U.S. Fish and Wildlife Service and California Department of Fish and Wildlife in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

Approving Official: U.S. Navy, Naval Weapons Station Seal Beach

Martin Hardy III
Captain, U.S. Navy
Commanding Officer
Naval Weapons Station Seal Beach
Seal Beach, California

Date

This Page Intentionally Blank

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Defense Fuel Support Point San Pedro

Approval

This Integrated Natural Resources Management Plan (INRMP) was prepared and reviewed in coordination with the U.S. Department of the Navy and California Department of Fish and Wildlife in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations. The U.S. Department of the Interior, Fish and Wildlife Service concurs that the INRMP will provide a framework to manage natural resources on Naval Weapons Station Seal Beach.

Concurring Agency: U.S. Fish and Wildlife Service

Jim Bartel
Field Supervisor
U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
Carlsbad, California

Date

This Page Intentionally Blank

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Defense Fuel Support Point San Pedro

Approval

This Integrated Natural Resources Management Plan (INRMP) was prepared and reviewed in coordination with the U.S. Department of the Navy and the U.S. Department of the Interior, Fish and Wildlife Service in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations. The California Department of Fish and Wildlife concurs that the INRMP will provide a framework to manage natural resources on Naval Weapons Station Seal Beach.

Concurring Agency: California Department of Fish and Wildlife

Ed Pert, Regional Manager
California Department of Fish and Wildlife
South Coast Region
San Diego, California

Date

This Page Intentionally Blank

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Defense Fuel Support Point San Pedro

Approval

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (as amended), DoDI 4715.03, and OPNAV M-5090.1. This document was prepared and reviewed in coordination with U.S. Fish and Wildlife Service and California Department of Fish and Wildlife in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

Approving Official: U.S. Navy, Naval Weapons Station Seal Beach

David Baillie
Installation Environmental Program Director
Naval Weapons Station Seal Beach
Seal Beach, California

Date

This Page Intentionally Blank

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Defense Fuel Support Point San Pedro

Approval

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (as amended), DoDI 4715.03, and OPNAV M-5090.1. This document was prepared and reviewed in coordination with U.S. Fish and Wildlife Service and California Department of Fish and Wildlife in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

Approving Official: U.S. Navy, Naval Weapons Station Seal Beach

Robert Schallmann
Conservation Program Manager
Naval Weapons Station Seal Beach
Seal Beach, California

Date

This Page Intentionally Blank

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Defense Fuel Support Point San Pedro

Approval

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (as amended), DoDI 4715.03, and OPNAV M-5090.1. This document was prepared and reviewed in coordination with U.S. Fish and Wildlife Service and California Department of Fish and Wildlife in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

Approving Official: U.S. Navy, Naval Facilities Engineering Command Southwest/ Commander, Navy Region Southwest

Doug Powers
Natural Resources Program Manager
Naval Facilities Engineering Command Southwest/
Commander, Navy Region Southwest
San Diego, California

Date

This Page Intentionally Blank

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Defense Fuel Support Point San Pedro

Approval

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (as amended), DoDI 4715.03, and OPNAV M-5090.1. This document was prepared and reviewed in coordination with U.S. Fish and Wildlife Service and California Department of Fish and Wildlife in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

Concurring Agency: Defense Logistics Agency

Norman Stiegler, Site Director
Defense Logistics Agency Installation Support for Energy

Date

This Page Intentionally Blank

Executive Summary

This Integrated Natural Resources Management Plan (INRMP) is to provide Naval Weapons Station Seal Beach (NAVWPNSTA Seal Beach) and the Defense Logistics Agency (DLA) with a basis and criteria for sound land use and management of natural resources at Defense Fuel Support Point (DFSP) San Pedro ("installation" or "facility") that is integrated with the military mission. The Sikes Act (as amended) committed the U.S. Department of Defense (DoD) to develop INRMPs for installations such as DFSP San Pedro.

This INRMP provides for:

- Conservation and rehabilitation of natural resources
- Sustainable, multipurpose use of resources
- Public access to facilitate their use, subject to safety requirements and military security
- Specific natural resources goals and objectives, and time frames for acting on them
- Fish and wildlife management, land management, and habitat enhancement
- Integration of and consistency among various activities conducted under the INRMP
- Enforcement of natural resources laws and regulations
- No net loss in the capability of the installation lands to support the military mission

The U.S. Department of the Navy (Navy) is the landowner of DSFP San Pedro. The installation is comprised of two locations: a tank farm located on the Palos Verdes Peninsula in Los Angeles County, California; and a marine terminal facility located on the former Navy mole at Pier 12 in the Port of Long Beach, California. Underground and aboveground storage tanks, pipelines, a fuel-loading facility, and administrative buildings are the primary facilities on this Navy-owned property.

Operation of this facility is the responsibility of the DLA, which is a tenant on the property. The DLA is a DoD agency reporting to the Under Secretary of Defense for Acquisition, Technology and Logistics through the Deputy Under Secretary of Defense (Logistics and Material Readiness). The DLA provides worldwide logistics support for the missions of the Military Departments and the Unified Combatant Commands under conditions of peace and war. It also provides logistics support to other DoD Components and certain federal agencies, foreign governments, international organizations, and others, as authorized.

Because all Class 1 and Class 2 property at DFSP San Pedro has been assigned to NAVWPNSTA Seal Beach, the Seal Beach Commanding Officer is responsible for all aspects of natural resources management and stewardship at this installation. The Commanding Officer has designated in writing a Natural Resources Media Manager who is responsible for overseeing implementation of this INRMP. The Natural Resources Media Manager reports to the Commanding Officer via the Installation Environmental Program Director, who is charged with overall management and coordination of the Navy's environmental programs. Pursuant to the Host Tenant Real Estate Agreement, a Memorandum of Agreement has been developed that fully expresses roles and responsibilities of both the Navy and DLA commands, and provides a cooperative framework within which environmental programs are managed by the DLA with executive oversight by the Navy.

DLA Energy manages the operations and maintenance of the DFSP San Pedro fuel facility. The DLA's mission is to provide the DoD and other government agencies with comprehensive energy solutions in the most effective and economical manner possible. The facility at DFSP San Pedro is a government-owned, contractor-operated facility.

The INRMP fulfills the requirements of DoD Instruction 4715.03 (Natural Resources Conservation Program; March 2011) and Chief of Naval Operations OPNAV M-5090.1 (Environmental and Natural Resources Program Manual; July 2011). The INRMP's goals are addressed in separate chapters. The goals for this INRMP are:

- Achieve no net loss to the DLA's military mission at DFSP San Pedro (Chapter 3.0: Environmental Management Strategy and Mission Sustainability).
- Conserve, protect, and enhance natural ecosystems and biodiversity (Chapter 4.0: Program Elements).
- Provide the organizational capacity and support necessary for effective implementation of this INRMP (Chapter 5.0: INRMP Implementation).

The INRMP contains a number of subject matter objectives. Consistent with INRMP management goals, this 2014-2018 INRMP Update proposes best practices and projects to implement in the following resource management categories:

- Military Mission and Sustainable Land Use
- Invasive Species
- Ecological Sustainability and Climate Change
- Pest Management
- Land Management
- National Environmental Policy Act Compliance
- Soils
- Beneficial Partnerships and Collaborative Resource Planning for Managing Encroachment
- Water Resources
- Public Access and Outdoor Recreation
- Landscaping and Water Use
- Public Outreach
- Threatened and Endangered Species Management
- Geographic Information System and Database Management
- Riparian Areas
- Outdoor Recreation for DFSP Personnel
- Natural Resource Law Enforcement
- Wildland Fire
- Fish and Wildlife Management
- Training Natural Resource Personnel
- Vegetation and Plant Communities
- Adaptive Implementation
- Migratory Birds

Cooperative management of DFSP San Pedro's wildlife is required under the federal Sikes Act. INRMPs are to be developed in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the state fish and wildlife agency, in this case the California Department of Fish and Wildlife (CDFW). Signatures on the document reflect the mutual agreement of all parties. Under the Tripartite Agreement (Appendix C), USFWS and CDFW agree to cooperate in the development of the INRMP and to review the INRMP as to operation and effect at least once every five years. DoD policy calls for annual INRMP reviews conducted in coordination with the Sikes Act partners.

DoD and Navy Instructions and manuals mandate an ecosystem framework and approach for the INRMP (DoD Instruction 4715.03 and M-5090.1). Ecosystem management shall include (M-5090.1):

- A shift from single-species to multiple-species conservation
- Best available science
- Partnerships for ecosystems that cross boundaries

- Adaptive management

The ecosystem management mandate is reflected in this INRMP's emphasis on partnerships with other agencies and the public, and a call for long-term monitoring to support an effective, adaptive management approach.

Navy and DLA managers met with their agency and non-agency partners in a Working Group at the beginning of this INRMP's development to determine key issues to address in the INRMP. The INRMP Working Group was composed of representatives from NAVWPNSTA Seal Beach, DFSP San Pedro, DLA, USFWS, CDFW, Palos Verdes Peninsula Land Conservancy, Urban Wildlands Group, San Diego State University Soil Ecology Research Group, and Naval Facilities Engineering Command Southwest. The Working Group identified the following issues:

- Native habitats and wildlife populations of the Palos Verdes Peninsula are highly fragmented due to the intensive urbanization of the area. Coastal sage scrub has experienced a 70 to 90 percent loss in southern California. Undeveloped patches, such as those on DFSP San Pedro, have an increasingly important role to play in the conservation of rare and endangered species historically associated with this plant community, including the Palos Verdes blue butterfly (*Glaucopsyche lygdamus palos-verdesensis*; PVB) and the coastal California gnatcatcher (*Polioptila californica californica*; CAGN).
- DFSP San Pedro requires a fire-safe condition. However, coast locoweed (*Astragalus trichopodus lonchus*) and deerweed (*Lotus scoparius*), host plants for the PVB, are early seral species that appear to require some kind of disturbance to maintain their position in the plant community. Historically, that disturbance was probably fire, but could also be shallow soil sites such as on ridges, animal burrowing, or erosion.
- DFSP San Pedro requires assurances, stability, and certainty regarding its current and future operations on the property under any habitat enhancement activities that could take place for listed species on the property.
- Restoration of habitat at DFSP San Pedro is most effectively done in a regional context, so habitats can be linked up to ease dispersal, territory development, buffer both natural and anthropogenic disturbance, and other needs of sensitive species.
- If the sub-population of CAGN at DFSP San Pedro is to be secure, there is a need to maintain practices that avoid and minimize disturbance to the species or its habitat. This is also necessary to avoid Critical Habitat designation on the installation.
- Non-native, invasive species on DFSP San Pedro threaten native biodiversity because invasives can out-compete and usurp the ecological position of natives in the ecosystem.
- Chance disturbance (fire, drought, erosion, landslides, etc.) can result in local extinction of organisms at DFSP San Pedro because of the small size of its natural habitats and its discontinuity with similar habitats. Maximizing the natural habitat acreage or connectivity (corridors) is key to organism survival and functioning, diversity, and resilience to chance disturbance.

During and related to this INRMP's development, formal consultation under the Endangered Species Act between the Navy, DLA, and USFWS took place to address the effects to the federally endangered PVB and the federally threatened CAGN. As a result, a Biological Opinion on Routine Operations and Maintenance (FWS-LA-08B0606-08F0704, 02 July 2010; USFWS 2010) was issued. The results of this consultation are fully integrated into this INRMP.

As part of this Biological Opinion and now the INRMP, a Management Emphasis Area (Refer to Map 4-1) for the PVB and the CAGN was identified with habitat-based disturbance thresholds for each species. Consultation must be reinitiated if these PVB and CAGN habitat disturbance thresholds are exceeded:

1. Temporary disturbance of up to 0.5 acre (0.2 hectare) of PVB or CAGN habitat per year during routine operations and maintenance;
2. Temporary disturbance of up to 1 acre (0.4 hectare) of PVB or CAGN habitat over any three-year period during routine operations and maintenance; and
3. Disturbance from habitat restoration is tabulated separately, temporary disturbance of up to 1 acre (0.4 hectare) of PVB or CAGN habitat per year during habitat restoration activities.

In compliance with the Biological Opinion, this INRMP requires the following, with details described in Chapter 4 management strategies and based on management areas described on Map 4-1.

- Continue maintaining a captive breeding program to support PVB protection and recovery.
- Continue monitoring the PVB in the wild.
- Minimize and avoid impacts to PVB eggs, larvae and adults, within potentially occupied habitat as defined in a Management Emphasis Area for the butterfly. An Operations Emphasis Area is also identified within which mowing and most routine maintenance takes place, as well as a buffer "Avoidance Area" where mowing protocols are adjusted as less intensive so that these areas might provide at least temporary habitat for the PVB.
- Minimize and avoid impacts to CAGN within potentially occupied habitat, as defined in Map 4-1.
- Minimize impacts to PVB and CAGN habitat.
- Minimize risk of habitat degradation from the invasion of non-native vegetation within designated habitat areas, as defined in Map 4-1.
- Restore PVB habitat.
- Minimize and avoid impacts to PVB and its habitat, within the designated mowing areas, as shown in Map 4-1.

This INRMP contains a budgeting plan for the above and other subject matter of the INRMP. The Navy and DLA intend to implement recommendations in this INRMP within the framework of regulatory compliance, national Navy mission obligations and DLA 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 U.S. Code § 1341, et seq.

Table of Contents

This Page Intentionally Blank

INRMP Cross-Walk to the U.S. Department of Defense Template

DFSP San Pedro INRMP Table of Contents	DoD Template
Title Page	DoD Title Page
Signature Page	DoD Signature Page
Executive Summary	DoD Executive Summary
Table of Contents	DoD Table of Contents
1.0 Introduction	DoD 1 - Overview
1.1 Purpose of this Plan	DoD 1.a - Purpose
1.2 INRMP Scope and Goal	DoD 1.b - Scope
1.3 Real Estate Summary	DoD 2.a.1 - General Description
1.4 INRMP Goals and Objectives	DoD 1.c - Goals and Objectives
1.5 Responsibilities	DoD 1.d - Responsibilities
1.5.1 Internal Stakeholders	DoD 1.d.1 - Installation Stakeholders
1.5.1.1 Installation Stakeholders	DoD 1.d.1 - Installation Stakeholders
1.5.2 External Stakeholders	DoD 1.d.2 - External Stakeholders
1.6 Authority	DoD 1.e - Authority
1.7 Stewardship and Compliance Discussion	DoD 1.f - Stewardship and Compliance Discussion
1.8 Review and Revision Process	DoD 1.g - Review and Revision Process
1.9 Management Strategy Approach	DoD 1.h - Management Strategy
1.10 Other Plan Integration	DoD 1.i - Other Plan Integration
	DoD 3.a.3 - Describe Relationship to Range Complex Management Plan or Other Operational Area Plans
1.11 Key Issues—Natural Resources Management	DoD 1.c - Goals and Objectives
2.0 Current Conditions and Use	DoD 2 - Current Conditions and Use
2.1 Installation Information	DoD 2.a - Installation Information
2.1.1 General Description	DoD 2.a.1 - General Description
2.1.2 Regional Land Uses	DoD 2.a.2 - Regional Land Uses
2.1.3 History and Pre-Military Land Use	DoD 2.a.3 - Abbreviated History and Pre-Military Land Use
2.1.4 Military Mission	DoD 2.a.4 - Military Mission
2.1.5 Operations and Activities	DoD 2.a.5 - Operations and Activities
2.1.5.1 Routine Maintenance	
2.1.5.2 Emergency Response and Maintenance	
2.1.5.3 Endangered Species Recovery and Habitat Restoration	
2.1.6 Land Use Constraints Summary	
2.1.7 Opportunities Map	DoD 2.a.7 - Opportunities Map
	DoD 2.a.6 - Constraints Map
2.2 General Physical Environment and Ecosystems	DoD 2.b - General Physical Environment and Ecosystems
2.2.1 Climate	DoD 2.b - General Physical Environment and Ecosystems
2.2.2 Geology	DoD 2.b - General Physical Environment and Ecosystems
2.2.3 Topography and Groundwater	DoD 2.b - General Physical Environment and Ecosystems
2.3 General Biotic Environment	DoD 2.c - General Biotic Environment
2.3.1 Threatened and Endangered Species and Species of Concern	DoD 2.c.1 - Threatened and Endangered Species and Species of Concern
2.3.2 Special Status Plant Species	DoD 2.c.1 - Threatened and Endangered Species and Species of Concern
2.3.3 Sensitive Wildlife Species on DFSP San Pedro	DoD2.c.1 - Threatened and Endangered Species and Species of Concern

DFSP San Pedro INRMP Table of Contents	DoD Template
2.3.4 Wetlands	DoD 2.c.2 - Wetlands and Deep Water Habitats
2.3.5 Fauna	DoD 2.c.3 - Fauna
2.3.6 Flora	DoD 2.c.4 - Flora
2.3.6.1 Vegetation Communities	
2.3.6.2 Landscaping	
2.3.6.3 Non-Native Invasive Plants	
2.4 Marine and Coastal Resources	
3.0 Environmental Management Strategy and Mission Sustainability	DoD 3 - Environmental Management Strategy and Mission Sustainability
3.1 Military Mission and Sustainable Land Use	DoD 3.a - Supporting Sustainability of the Military Mission and the Natural Environment
	DoD 3.a.1 - Integrate Military Mission and Sustainable Land Use
	DoD 3.a.2 - Define Impact to the Military Mission
	DoD 5.b - Achieving No Net Loss
3.2 Sustainability of the Natural Environment	DoD 3.a - Supporting Sustainability of the Military Mission and the Natural Environment
3.3 Natural Resources Consultation Requirements	DoD 3.b - Natural Resources Consultation Requirements
3.3.1 NEPA Assessment and Compliance	DoD 3.c - NEPA Compliance
3.4 Integrating Other Navy Plans and Programs	
3.4.1 Integrated Cultural Resources Management Plan	
3.4.2 Installation Restoration	
3.4.3 Sustainability in the Interface between the Built and Natural Environments	
3.4.4 Integrated Pest Management Plan	
3.5 Collaborative Resource Planning, Ecosystem Management, and Beneficial Partnerships for Achieving INRMP Goals	DoD 3.d - Beneficial Partnerships and Collaborative Resource Planning
	DoD 3.f - Encroachment Partnering
	DoD 3.g - State Comprehensive Wildlife Plans
3.6 Public Access and Outreach	DoD 3.e - Public Access and Outreach
	DoD 3.e.1 - Public Access and Outdoor Recreation
3.6.1 Public Access	DoD 3.e.1 - Public Access and Outdoor Recreation
3.6.2 Public Outreach	DoD 3.e.2 - Public Outreach
4.0 Program Elements	DoD 4 - Program Elements
4.1 Threatened and Endangered Species Management and Species Benefit, Critical Habitat, and Species of Concern Management	DoD 4.a - Threatened and Endangered Species Management and Species Benefit, Critical Habitat, and Species of Concern Management
4.1.1 Sensitive and Endangered Wildlife Species	
4.1.1.1 Palos Verdes Blue Butterfly	
4.1.1.2 Coastal California Gnatcatcher	
4.1.1.3 Habitat Restoration for Sensitive Species Support	
4.1.2 Criteria for Selecting Habitat Restoration Sites	
4.2 Riparian Areas and Wetlands Management	DoD 4.b - Wetlands and Deep Water Habitats Management
4.3 Fish and Wildlife Management	DoD 4.d - Fish and Wildlife Management
4.3.1 Mammals	
4.3.2 Amphibians and Reptiles	
4.3.3 Invertebrates	
4.3.4 Pest, Feral Animal, and Invasive Wildlife Management	DoD 4.h - Invasive Species Management
	DoD 4.i - Pest Management
4.4 Vegetation Management	DoD 4.f - Vegetative Management
4.4.1 Plant Communities	

DFSP San Pedro INRMP Table of Contents	DoD Template
4.4.2 Special Status Plants	
4.5 Migratory Birds Management	DoD 4.g -Migratory Birds Management
4.6 Invasive Species Management	DoD 4.h - Invasive Species Management
4.6.1 Invasive Weed Control	DoD 4.h - Invasive Species Management
4.7 Land Management	DoD 4.j - Land Management
4.7.1 Soil Erosion Prevention and Runoff Control	
4.7.2 Water Resource Management	
4.7.3 Landscaping and Water Use	
4.7.4 Mowing	
4.8 GIS and Data Management	DoD 4.l - Geographical Information Systems (GIS) Management, Data Integration, Access, and Reporting
4.9 Outdoor Recreation	DoD 4.m - Outdoor Recreation
4.10 Wildland Fire Management	DoD 4.o - Wildland Fire Management
4.11 Training of Natural Resources Personnel	DoD 4.p - Training of Natural Resources Personnel
5.0 INRMP Implementation	DoD 5 - Implementation
5.1 Introduction	
5.1.1 Responsibility	
5.1.2 Achieving No Net Loss	DoD 5.b - Achieving No Net Loss
5.1.3 Use of Cooperative Agreements	DoD 5.c - Use of Cooperative Agreements
5.1.4 Funding Sources	DoD 5.d - Funding
5.2 Funding and INRMP Implementation	
5.3 Environmental Readiness Program Assessment Database	
5.4 Navy Assessment Levels for Budget Prioritization	
5.4.1 DoD Funding Classifications	
5.4.2 Implementation Schedule	
5.4.3 External Assistance	
5.5 Funding Sources	
5.5.1 Use of Cooperative Agreements and Partnerships	
5.5.2 Research Funding Requirements	
5.5.3 Non-DoD Funding Sources	
5.6 INRMP Implementation Summary and Schedule	
6.0 References	
Appendices	
A. Acronyms and Abbreviations	DoD Appendix 1 - List of Acronyms
B. Natural Resources Manager Designation Letter	
C. Applicable Agreements and Biological Opinions	
D. Species Lists and Surveys	DoD Appendix 4 - Surveys
E. Plant Species Lists	
F. Landscape Plant List	DoD Appendix 6 - Migratory Bird Management
G. Reporting on Migratory Bird Management	DoD Appendix 6 - Migratory Bird Management
H. Critical Habitat Designation Concerns—Benefits for Endangered Species	DoD Appendix 7 - INRMP Benefits for Endangered Species DoD Appendix 8 - Critical Habitat Issues
I. Implementation Summary Table	DoD Appendix 2 - Natural Resources Management Prescriptions DoD Appendix 3 - List of Projects
J. Natural Resources Metrics	
K. Applicable Reports	

This Page Intentionally Blank

1.0 Introduction

1.1 Purpose of this Plan

The purpose of this Integrated Natural Resources Management Plan (INRMP)[1] is to provide Naval Weapons Station Seal Beach (NAVWPNSTA Seal Beach) and the Defense Logistics Agency (DLA) with a basis and criteria for sound land use and management of natural resources at Defense Fuel Support Point (DFSP) San Pedro that is integrated with the military mission. This INRMP will include objectives and strategies for management of natural resources within the boundary of DFSP San Pedro. The Sikes Act (as amended) committed the U.S. Department of Defense (DoD) to develop INRMPs for installations with significant natural resources, such as DFSP San Pedro.

The mission of NAVWPNSTA Seal Beach and its detachments is to provide shore-based infrastructure support to the Navy's ordnance mission and other fleet and fleet support activities. The Station achieves its mission through mastery of ordnance management, maintenance and technical support.

The DLA's mission is to provide the DoD and other government agencies with comprehensive energy solutions in the most effective and efficient manner possible. DFSP San Pedro receives, stores, and distributes diesel and jet fuels for military use in California, Arizona, and Nevada.

1.2 INRMP Scope and Goal

The Sikes Act stipulates that this INRMP provides for:

- Conservation and rehabilitation of natural resources
- Sustainable, multipurpose use of resources
- Public access to facilitate their use, subject to safety requirements and military security
- Specific natural resources goals and objectives, and time frames for acting on them
- Fish and wildlife management, land management, and habitat enhancement
- Integration of, and consistency among, various activities conducted under the INRMP
- Enforcement of natural resources laws and regulations
- No net loss in the capability of the military installation lands to support the military mission

[1] For a list of acronyms and abbreviations used in this INRMP, please refer to Appendix A.

This INRMP's scope is further defined by DoD Directive 4700.4 Natural Resources Management Program, DoD Instruction (DoDI) 4715.03 (Natural Resources Conservation Program; March 2011) and the Chief of Naval Operations (CNO) OPNAV M-5090.1 (Environmental Readiness Program Manual; July 2011 Chapter 24).

The goals and objectives of this INRMP integrate regional ecosystem, military, social (community), and economic concerns. It establishes planning and management strategies; identifies natural resources 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 DFSP San Pedro actions; and provides guidance for annual natural resources management reviews, internal compliance audits, and annual budget submittals.

1.3 Real Estate Summary

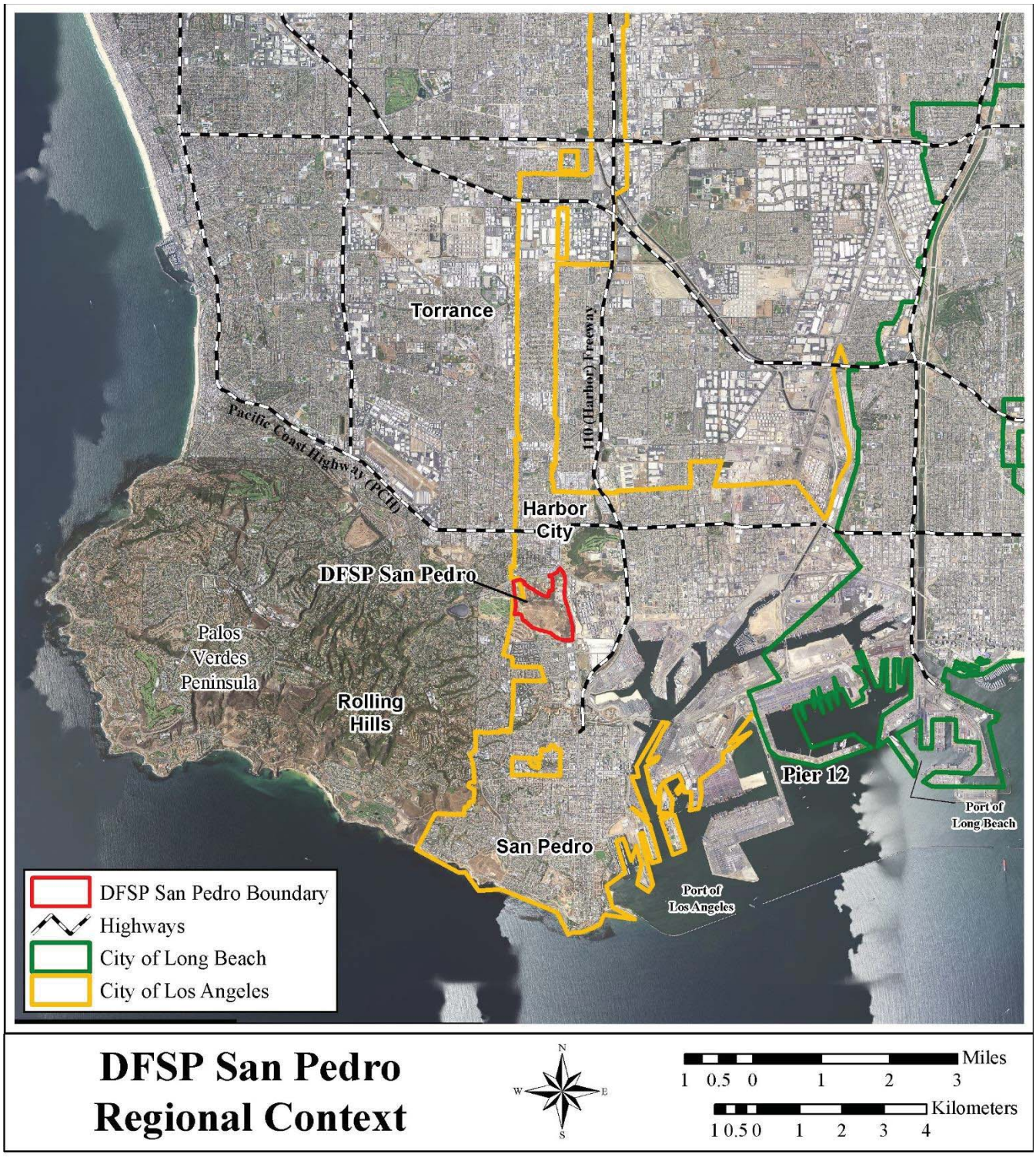
The U.S. Department of the Navy (Navy) is the landowner of this property located on the Palos Verdes Peninsula on the eastern slope of the Palos Verdes Hill in southern Los Angeles County, California, west of the City of Long Beach and south of Torrance, within the limits of San Pedro (Map 1-1). Under a Host Tenant Real Estate Agreement between the Navy and the DLA, DLA operates and maintains the DFSP San Pedro fuel facility which includes: underground and aboveground storage tanks, pipelines, fuel loading rack, administrative buildings, and a marine terminal. Under this Host Tenant Real Estate Agreement, the DLA operates 334.3 acres (135.3 hectares [ha]) at DFSP San Pedro.

Marine Terminal

The Marine Terminal of DFSP San Pedro includes Pier 12 of what was formerly part of Naval Station Long Beach (Map 1-2). Naval Station Long Beach was operationally closed on 30 September 1994, pursuant to round II of the Base Realignment and Closure (BRAC) Act of 1990, as amended. Pier 12 remained under Navy ownership after the remaining piers were reverted to the City of Long Beach. Pier 12 is located on the south side of Terminal Island within Los Angeles and Long Beach Harbor Districts, approximately 3 miles (4.8 kilometers [km]) west of downtown Long Beach, Los Angeles County, California. Pier 12 and its submerged lands remain in use by the Navy as an active fuel facility.

Main Terminal

DFSP San Pedro receives, stores, and distributes petroleum products (JP5 and JP8 jet fuels and diesel marine fuel) for military use in California, Arizona and Nevada. Fuels are delivered to DFSP San Pedro via tanker, pipeline or tank trucks. Fuels are stored in large underground storage tanks prior to shipment.



Map 1-1. Defense Fuel Support Point San Pedro regional view, showing urbanized context and strategic harbor location.

Map 1-2. Defense Fuel Support Point San Pedro, the JP5/JP8 fuel pipeline, and Pier 12.

Other Leases and Easement

The tank farm located on Gaffey Street is primarily a fuel facility, but various leases and easements have been granted for portions of the property. A utility line lease is granted to the City of Los Angeles and runs along Gaffey Street. Easements are held by the County and the City of Los Angeles for sanitation and water. A number of licenses have been issued for use of the property. One is to the Los Angeles Police Department for use of a 10.91-acre (4.42-ha) firing range. The softball field, totaling 10.91 acres (4.42 ha) has been licensed to several neighborhood organizations: San Pedro Bobbie Sox League, San Pedro Softball Inc., Holy Trinity, Mary Star of the Sea High School, and Harbor City Little League. Two former Navy housing complexes adjacent to the property have been sold or redistributed to public organizations under the DoD BRAC program. Map 1-3 shows the locations of easements, rights-of-way, license agreements, and leased property on DFSP San Pedro.[2] Table 1-1 provides a summary of leases, easements, and other agreements related to natural resources on DFSP San Pedro.

Table 1-1. Real estate leases, easements, and other agreements related to natural resources at Defense Fuel Support Point San Pedro.

Lease, Agreement, or Permit Number	Use
City of Los Angeles	Utility line lease
Palos Verdes Water Company	Water line easement
County of Los Angeles Sanitation District No. 12477 (Perpetual)	Sewer/pipeline easement
County of Los Angeles Easement No. 59528	Easement for slope and drainage rights for widening of Western Ave.
Los Angeles Police Department	Training range license
San Pedro Bobbie Sox League	Softball field license
San Pedro Softball Inc.	Softball field license
Holy Trinity	Softball field license
Mary Star of the Sea High School	Softball field license
Harbor City Little League	Softball field license
Standard Oil of California	Easement

1.4 INRMP Goals and Objectives

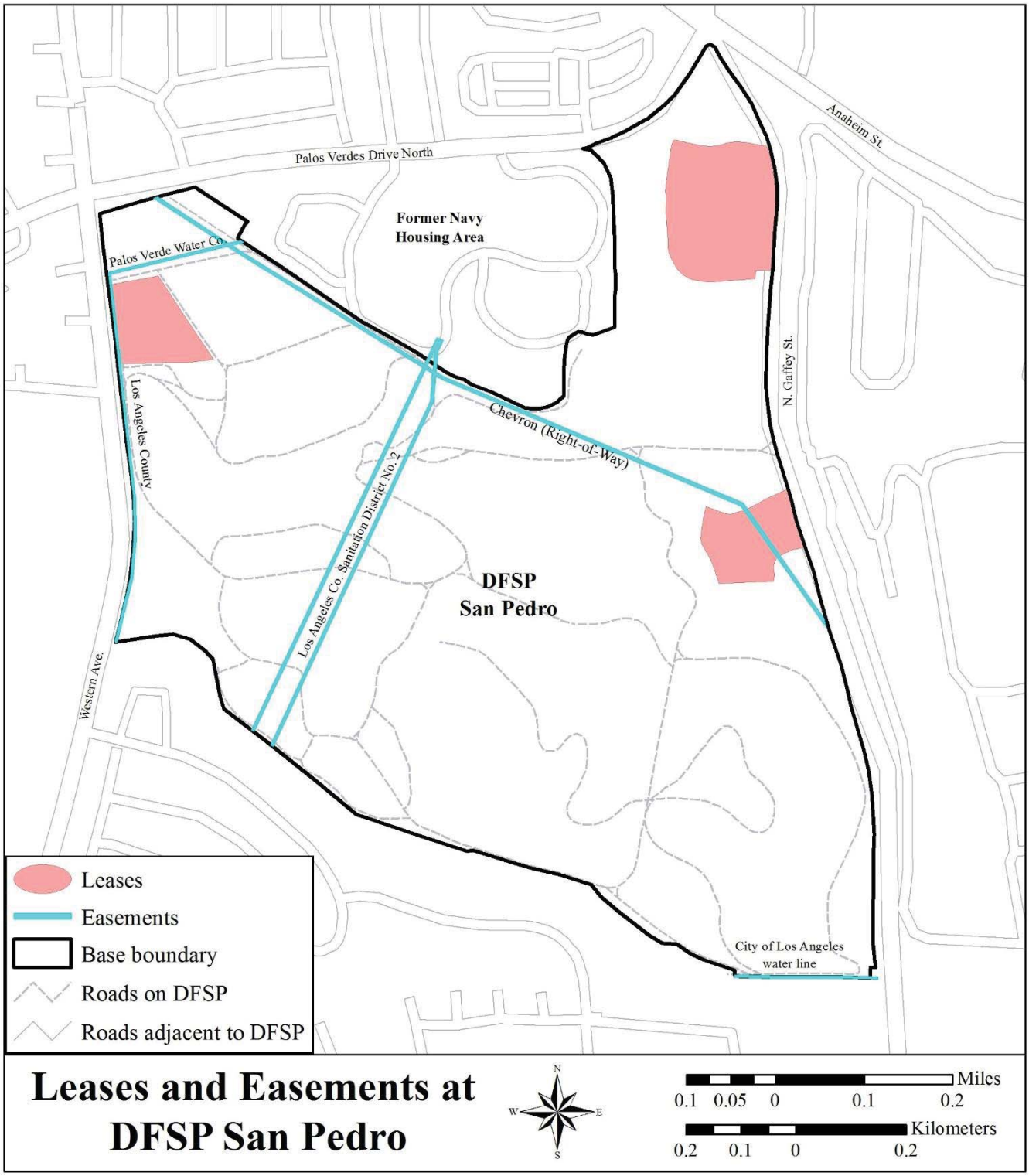
A goal defines an end outcome or result rather than an activity or process. A goal statement is necessary for setting the course towards a successful INRMP. It is not necessarily completely achievable. Each of the following goals applies to a different chapter of this INRMP.

Goal: Maintain environmental compliance and minimize environmental impacts while supporting DLA's operational mission at DFSP San Pedro, and accommodating increased military mission requirements.

Goal: Manage DFSP San Pedro's natural resources using an ecosystem management approach.

Goal: Provide the organizational capacity, support, funding, and communication linkages necessary for the effective strategic planning and administration of this INRMP and DFSP San Pedro's natural resources.

[2] An additional City of Los Angeles utility line lease along Gaffey Street is not shown.



Map 1-3. Location of easements, rights-of-way, license agreements, and leased property on Defense Fuel Support Point San Pedro. An additional City of Los Angeles utility line lease along Gaffey Street is not shown.

In contrast to a goal, an objective should be achievable within five years or so. It describes a desired outcome that supports the goal statement. It includes a metric for attaining the objective and should be as quantifiable as possible. It should avoid saying how the objective is to be achieved.

Table 1-2 summarizes the goals and objectives of this INRMP. The 2013 DoD Template for INRMPs (Office of Under Secretary of Defense [OUSD] Memorandum, 25 November 2013) assigns certain program elements to be discussed in Chapter 4; however, certain of these elements, such as forestry management, agricultural outleasing, and bird/animal aircraft strike hazard do not apply to DFSP San Pedro.

Table 1-2. Goals and objectives. Strategies for attaining goals and objectives are described in the text.

Topic Area	Objective
Goal 1: Maintain environmental compliance and minimize environmental impacts while supporting DLA's operational mission at DFSP San Pedro, and accommodating increased military mission requirements.	
Military Mission and Sustainable Land Use	• Achieve no net loss of military value by aligning current and future land use with environmental value protection. • Safeguard military readiness by maintaining installation facilities. • Anticipate and plan for responses to emergency infrastructure problems to include minimizing damage to sensitive resources.
Beneficial Partnerships and Collaborative Resource Planning for Managing Encroachment	▪ Prevent and minimize encroachment pressures through partnerships with regional land managers and planners.
Public Access and Outdoor Recreation	▪ Ensure public access is compatible with the military mission, natural resources responsibility, and security.
Public Outreach	▪ Promote education and awareness of the unique environmental setting and history of DFSP San Pedro.
Goal 2: Manage DFSP San Pedro's natural resources using an ecosystem management approach.	
Ecological Sustainability and Climate Change	▪ Maintain habitat structure and function within its historic range with allowances for actions required to address global climate change. ▪ Identify and implement means and metrics to promote environmental sustainability.
Sensitive Species Management	▪ Minimize conflict with DFSP San Pedro mission activities while maximizing the potential for successful endangered species recovery. ▪ Maximize the recovery and stability of the Palos Verdes blue butterfly and the coastal California gnatcatcher by complying with the 2010 Biological Opinion. ▪ Conduct monitoring of DFSP San Pedro habitats as a whole to support Palos Verdes blue butterfly recovery and habitat restoration decisions. ▪ Support and facilitate research that will benefit the recovery of the Palos Verdes blue butterfly and the coastal California gnatcatcher. ▪ Provide habitat conditions for continued occupation of DFSP San Pedro by the coastal California gnatcatcher. ▪ Provide for the recovery, enhancement and protection of all sensitive plant species and their respective habitats.
Riparian Areas	▪ Protect riparian areas by avoiding direct and indirect impacts to them and removing invasive and exotic species from them.
Natural Resources Law Enforcement	▪ Take measures to prevent use of the property by unauthorized personnel and activities.

Topic Area	Objective
Fish and Wildlife Management	▪ Seek to maintain populations of native mammals, reptiles, and invertebrates for ecosystem integrity and protection of special status species. ▪ Conduct periodic wildlife surveys at DFSP San Pedro. ▪ Support the South Coast regional objectives of the California Wildlife Action Plan with regard to preventing introduction of and controlling invasive species, cooperative management of habitat core areas and corridors, and collaborative conservation and recovery strategies.
Vegetation and Plant Communities ▪ Coastal Sage Scrub ▪ Native Grassland ▪ Non-Native Grassland ▪ Non-Native Trees ▪ Sandy Scrub Series ▪ Willow Riparian Scrub	▪ Conserve a mosaic of plant communities to support biodiversity and ecosystem health. ▪ Restore, enhance, and offset losses of vegetation communities.
Migratory Birds	▪ Conserve viable habitat for migratory birds and raptors that use DFSP San Pedro.
Invasive Species	▪ Control the introduction and spread of noxious plant species with priority on those that have the greatest potential to degrade sensitive species or their habitat. ▪ Reduce the impact of Argentine ants, as feasible.
Pest Management	▪ Protect DFSP San Pedro, its inhabitants, and native species from risk or loss due to wild or feral animal predation or damage.
Land Management ▪ Soils ▪ Water Resources ▪ Landscaping and Water Use ▪ Mowing	▪ Prevent degradation of DFSP San Pedro facilities and native habitats by soil erosion or sedimentation. ▪ Implement Best Management Practices to prevent and control soil erosion. ▪ Reduce use of water for landscaping while continuing to provide a quality environment to DFSP San Pedro personnel and visitors. ▪ Conduct mowing in accordance with the 2010 Biological Opinion.
Geographic Information System and Database Management	▪ Use library and computer technology to manage, analyze, and communicate natural resources information in support of management decisions.
Outdoor Recreation	▪ Promote compatible, sustainable outdoor recreation opportunities.
Wildland Fire	▪ Reduce the risk of wildfire ignition, control wildland fire damage, and reduce liability of wildland fire occurrence.
Training Natural Resources Personnel	▪ Provide natural resources training to personnel in support of the implementation of this INRMP.
Goal 3: Provide the organizational capacity, support, funding, and communication linkages necessary for the effective strategic planning and administration of this INRMP and DFSP San Pedro's natural resources.	
Facilitating Adaptive Implementation	▪ Ensure that the natural resources program is appropriately staffed. ▪ Ensure that funding is sought for all natural resources program projects included in the Program Objective Memorandum.

1.5 Responsibilities

The following is a list of internal stakeholders and their role in supporting the installation and the development, revision, and implementation of this INRMP. Internal stakeholders are individuals and/or groups that have a direct contribution to the installation. Policy leadership and liaison with non-Navy partners is provided by the Commander, Navy Region Southwest (CNRSW) N40, Naval Facilities Engineering Command (NAVFAC) Southwest, and NAVWPNSTA Seal Beach, in coordination with DLA Energy.

1.5.1 Internal Stakeholders

DFSP San Pedro is operated by the DLA. The DLA reports to the Under Secretary of Defense for Acquisition, Technology and Logistics through the Deputy Under Secretary of Defense (DUSD). The DLA provides worldwide logistics support for the missions of the Military Departments and the Unified Combatant Commands under conditions of peace and war. It also provides logistics support to other DoD Components and certain federal agencies, foreign governments, international organizations, and others as authorized.

DLA Energy is responsible for the operation and maintenance of the fuel facility at DFSP San Pedro. The facility is a government-owned, contractor-operated (GOCO) facility.

Naval Weapon Station Seal Beach

Because all Class 1 and Class 2 property at DFSP San Pedro has been assigned to NAVWPNSTA Seal Beach, the Seal Beach Commanding Officer (CO) has overall responsibility for natural resources management and stewardship at this installation. The CO has designated in writing a Natural Resources Media Manager who is responsible for providing oversight and cooperating with DLA in implementation of this INRMP (Refer to Appendix B). His duties also include ensuring that the CO is informed regarding all natural resources issues, conditions of natural resources, objectives of the INRMP and potential conflicts between mission requirements and natural resources mandates. The Natural Resources Media Manager reports to the CO via the Installation Environmental Program Director who is charged with overall management and coordination of the Navy's environmental program.

Chief of Naval Operations

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

Commander, Navy Installations Command

Commander, Navy Installations Command (CNIC) reviews the entire INRMP. Their role is to ensure that installations comply with DoD, Navy, and CNO policy on INRMPs and their associated National Environmental Policy Act (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 (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 and DLA Energy maintain close liaison with the INRMP signatory partners (U.S. Fish and Wildlife Service [USFWS] 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, manuals 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. For DFSP San Pedro, all of these activities are closely coordinated with DLA Energy as specified in the Host Tenant Real Estate Agreement and the Memorandum of Agreement between the Navy and DLA (Appendix C).

Public Affairs Office

The Seal Beach Public Affairs Officer works in cooperation with the DLA Public Affairs Officer in managing any media aspects of the environmental program at DFSP San Pedro. This includes being informed of any public notice required in the NEPA process.

Office of General Counsel

The Office of the General Counsel, CNRSW, provides legal services to NAVWPNSTA Seal Beach on a variety of environmental matters. Particularly pertinent to natural resources management, are their legal interpretations involving compliance with natural resources laws, as they pertain to base operations.

Naval Facilities Engineering Command Southwest

Public Works Department

The NAVWPNSTA Seal Beach Facilities Planning Office, Public Works Department is responsible for the comprehensive oversight and planning of all land use issues relating to DFSP San Pedro and coordinates all decisions with DLA. Their role for this INRMP is to provide document review to confirm that this INRMP describes compatible land uses.

Environmental Division

The NAVWPNSTA Seal Beach Environmental Programs and Services Office (EPSO), as delegated by command directive, is responsible for implementation of this INRMP and has worked cooperatively with the DLA in its preparation. Acting through the Natural Resources Manager and in close coordination with the DLA, EPSO is responsible for the management of natural resources as part of the overall NAVWPNSTA Seal Beach Environmental Program. NAVWPNSTA Seal Beach and DLA natural resources staff cooperates in providing technical support. This INRMP is the direct vehicle for accomplishment of many of the responsibilities of the CO. The Installation Environmental Program Director reviews the entire INRMP and endorses the INRMP with his signature.

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 the natural resources program at DFSP San Pedro when requested. In cooperation with DLA Energy, NAVFAC Southwest personnel, such as the NEPA and INRMP coordinators, have natural resources programming and/or technical support roles in developing this INRMP. The Business Line Team Leader also reviews the INRMP and endorses the INRMP with his signature.

Tenant Command

Defense Logistics Agency. The DLA is a major tenant at DFSP San Pedro. The DLA manages the operation of the fuel support point at San Pedro, which also includes Pier 12. The fuel facility is operated and maintained by a contractor. The DLA is responsible for conducting all aspects of its military fuel mission while complying with application federal and state laws and regulations and DoD directives and guidance. The DLA accomplishes the military fuel mission, while ensuring environmental compliance and maintaining agency and public trust, through responsible land stewardship practices. The DLA has maintenance responsibilities for all Class 2 properties. This includes grounds maintenance and pest management in operational areas.

The Defense Logistics Agency Installation Support for Energy. The DLA Installation Support Division is responsible for the management of the DFSP San Pedro fuel facility. The division includes the Site Director; Real Property, Plant and Equipment; and Environmental, Engineering (Installation Management) and Safety. There are three DLA staff located on site at DFSP San Pedro; these include an engineer, environmental protection specialist, and a facility manager.

The DLA and Navy installation staff work in close association to ensure that necessary coordination, information sharing, and collaboration occur between commands to ensure environmental compliance and mission success. An understanding of the chain of command and the responsibilities of each organization is important for land use planning and the decision-making process.

1.5.2 External Stakeholders

INRMPs are to be developed in cooperation with and the concurrence of USFWS and the state fish and wildlife agency, in this case the CDFW. Both USFWS and CDFW serve as signatories on the INRMP and their signatures reflect the mutual agreement of each party.

Under Sikes Act requirements, USFWS and CDFW are required to cooperate in the development of the INRMP and to review the INRMP as to operation and effect at least once every five years. In addition to the formal five-year review, DoD policy calls for annual INRMP reviews conducted in coordination with the Sikes Act partners.

1.6 Authority

The Sikes Act committed the DoD to develop INRMPs for installations such as DFSP San Pedro. Designed to facilitate compliance with natural resources protection laws, this INRMP integrates the military mission and natural resources components of existing DFSP San Pedro plans, and meets the requirements of the Sikes Act and all applicable DoD, Navy, and installation regulations.

The INRMP fulfills the requirements of DoDI 4715.03 and OPNAV M-5090.1. The Navy Manual is applied to this INRMP because the Navy is the landowner of the property.

1.7 Stewardship and Compliance Discussion

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 Endangered Species Act (ESA), Clean Water Act (CWA), or Migratory Bird Treaty Act (MBTA). Alternatively, a project may be considered good land stewardship but is not considered an obligation for the Navy to be in compliance with environmental laws. Projects considered necessary to comply with the law are generally funded within budget constraints.

The INRMP budget is based on programming and budgeting for conservation programs described in DoDI 4715.03. Program funding comes from two sources: DLA and Navy. In accordance with the Facilities, Environmental, and Public Affairs Memorandum of Agreement signed May 2013, the DLA will continue to fund the natural resources programs until Fiscal Year 2016. This INRMP covers natural resources conservation commitments from Fiscal Year 2014 to 2018, and will be funded by both agencies. In general, the DLA provides funding to the Navy via Military Interdepartmental Purchase Requests. A full discussion of funding priorities is given in Chapter 5 of this INRMP.

1.8 Review and Revision Process

DoD policy requires installations to review INRMPs annually in cooperation with the two primary parties to the INRMP (USFWS and CDFW). Annual reviews allow 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 (16 U.S. Code [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.

The five-year review would not require an INRMP revision; this would occur only if deemed necessary. The Annual Review process is guided by OPNAV M-5090.1. Policy memoranda in 2002, and supplemented in 2004 (listed below), clarified procedures for INRMP reviews and revisions.

- DUSD for Installations and the Environment (I&E) Policy Memorandum 10 October 2002.
- Assistant Deputy Under Secretary of Defense (ADUSD) for Environment, Safety and Occupational Health (ESOH) Policy Memorandum (01 November 2004).
- ADUSD for ESOH 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.

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.

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. The outcome of these joint reviews should be documented in writing and should be jointly executed to 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 memorandum, installation COs may delegate authority to perform natural resources management actions; however, ultimate responsibility remains with the CO of the host installation and the INRMP must address natural resources management on any such lands.

Public Comment on INRMP Reviews (Legislative Language Section 2905 of the Sikes Act) required the Secretary of each Military Department to provide the public an opportunity for the submission of comments on the initial INRMPs, prepared pursuant to new Section 101(a) (2) of the Sikes Act. The Environmental Readiness Program Manual (OPNAV M-5090.1) also requires that the public have the opportunity to comment on initial INRMPs.

There is no legal obligation to invite the public to review or comment upon the parties' decision to continue implementation of an existing INRMP without revision. If the parties determine that substantial revisions to an INRMP are necessary, public comment shall be invited in conjunction with any required NEPA analysis.

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.

1.9 Management Strategy Approach

DoD and Navy Instructions and manuals mandate an ecosystem framework and approach for the INRMP (DoDI 4715.03 and OPNAV M-5090.1). Ecosystem management shall include (OPNAV M-5090.1):

- A shift from single-species to multiple-species conservation
- Best available science
- Partnerships for ecosystems that cross boundaries
- Adaptive management

The goal of ecosystem management is to maintain and improve the sustainability and native biological diversity of ecosystems while supporting human needs, including the military mission (OPNAV M-5090.1).

An adaptive management approach is also a separate requirement for INRMPs under DoDI 4715.03, which states: "Incorporate a dynamic, continuous process for decision-making, including future changes or additions to the INRMP."

Cooperative management of DFSP San Pedro's wildlife is required under the Sikes Act and Fish and Wildlife Coordination Act.

1.10 Other Plan Integration

This INRMP's scope is defined in DoDI 4715.03 and OPNAV M-5090.1. To be comprehensive, all of the existing planning-related documents should become integrated and missing planning components should be added. The DoD policy seeks to ensure that all current and planned installation activities are coordinated and consistent with the INRMP.

This INRMP references sections from each planning document for DFSP to assure integration. Land use and natural resources decisions are supported by existing emergency response and routine maintenance guidelines, Installation Restoration (IR) work plans, and current Biological Opinions (BOs). Federal legislation and regulations and DoD and Navy policy further guide land use management.

Planning should also be integrated with the Environmental Quality Assessment process. This annual review, required by OPNAV M-5090.1, is meant to assist COs in identifying and correcting compliance gaps.

The following plans and BO are intended to be integrated with this INRMP. A 2005 BO regarding mowing within DFSP (FWS-LA-1-6-06-RF-4022) was previously in effect, and those measures are now subsumed into the 2010 BO (below). Refer to Appendix C for a copy of the BOs.

BO on Routine Operations and Maintenance (FWS- LA-08B0606-08F0704, 02 July 2010; USFWS 2010). A Management Emphasis Area for the Palos Verdes blue butterfly (PVB) (*Glaucopsyche lygdamus palosverdesensis*) was identified with habitat-based take thresholds in this BO, and guidelines for management of coastal California gnatcatcher (CAGN) (*Polioptila californica californica*) and PVB habitat. Consultation must be reinitiated if these PVB and CAGN habitat disturbance thresholds are exceeded:

1. Temporary disturbance of up to 0.5 acre (0.2 ha) of PVB or CAGN habitat per year during routine operations and maintenance;
2. Temporary disturbance of up to 1 acre (0.4 ha) of PVB habitat or CAGN habitat over any three-year period during routine operations and maintenance; and
3. Temporary disturbance of up to 1 acre (0.4 ha) of PVB or CAGN habitat per year during habitat restoration activities.

The 2010 BO requires the following, with details described in Chapter 4 management strategies and based on management areas described on Map 4-1.

- Continue the captive breeding program to support PVB protection and recovery.
- Continue monitoring PVB in the wild.
- Minimize and avoid impacts to PVB eggs, larvae, and adults within potentially occupied habitat as defined in a Management Emphasis Area for the PVB.
- Minimize and avoid impacts to CAGN within potentially occupied habitat, as defined in Map 4-1.
- To minimize impacts to and restore PVB and CAGN habitat.
- To minimize and avoid impacts to PVB and its habitat, within designated mowing areas, shown in Map 4-1.

Chevron BO (Formal Section 7 Consultation for the Chevron 1-8" Pipeline and Associated Government Pipeline Projects, Defense Fuel Support Point, San Pedro, Los Angeles County, California [1-6-96-F-09];

USFWS 1996). The original Chevron project that precipitated the 1995 Biological Assessment and 1996 BO included replacing corroded sections of pipe in Chevron's El Segundo-San Pedro No. 1-8" trunkline at 12 identified replacements sites located within DFSP San Pedro. The Chevron Pipe Line Company previously maintained and operated an 8-inch (20-centimeter [cm]) trunkline that connects Chevron's El Segundo Refinery to DFSP San Pedro and continues on to Chevron's San Pedro Marine Terminal. This pipeline is currently out of service.

Internal Plans

While other plans influence management decisions at DFSP San Pedro (DFSP San Pedro Main Terminal Storm Water Pollution Prevention Plan, DFSP San Pedro Marine Terminal Storm Water Pollution Prevention Plan) the following internal plans guide day-to-day management at DFSP San Pedro by the DLA.

Operations, Maintenance, Environmental, and Safety Plan. The Operation, Maintenance, Environmental, and Safety Plan provides guidance for the operations, maintenance, environmental and safety of the fuel facility.

Integrated Pest Management Plan. DoDI 4150.07. The DoD Pest Management Program requires an approved Integrated Pest Management Plan (IPMP) for each installation. Currently, the DLA has an approved IPMP.

Oil and Hazardous Substance Integrated Contingency Plan. Emergency response planning is an integral part of DFSP San Pedro's mission and a plan exists for such a contingency. The Integrated Contingency Plan provides emergency response planning, including spill response planning.

Integrated Cultural Resources Management Plan. The Integrated Cultural Resource Management Plan identifies a Historic District at DFSP San Pedro that is eligible for listing on the National Register of Historic Places. However, this assessment has recently been called into question and a new assessment is underway to evaluate the status of these facilities.

External Plans

Natural Community Conservation Planning. As part of the CDFW's Natural Communities Conservation Program (NCCP), the City of Rancho Palos Verdes' lands are subject to all requirements of the NCCP process. DFSP San Pedro lands are viewed as an important, connecting satellite to conservation lands in Rancho Palos Verdes. The NCCP will ensure that future land uses in this sub-region will be evaluated for their impacts to species covered under the Implementing Agreement between that city and CDFW and USFWS. The DLA is a cooperating, not a signatory, agency. It is anticipated that the NCCP will eventually lead to a viable solution for both the CAGN and the PVB (USFWS 1996).

1.11 Key Issues—Natural Resources Management

The INRMP Working Group, established to guide development of the INRMP in 2006, was composed of representatives from the NAVWPNSTA Seal Beach, Defense Energy Support Center, DFSP San Pedro, USFWS, CDFW, Palos Verdes Peninsula Land Conservancy (PVPLC), Urban Wildlands Group, San Diego State University Soil Ecology Research Group, and NAVFAC Southwest. The Working Group identified the following issues:

- Native habitats and wildlife populations of the Palos Verdes Peninsula are highly fragmented due to the intensive urbanization of the area. Coastal sage scrub has experienced a 70 to 90 percent loss in southern

California. Undeveloped patches, such as those on DFSP San Pedro, have an increasingly important role to play in conservation of rare and endangered species historically associated with this plant community, including the PVB and CAGN.

- DFSP San Pedro requires a fire safe condition for fuel facility operations and maintenance.
- DFSP San Pedro requires some assurances, stability, and certainty regarding its current and future operations on the property under any habitat enhancement activities for listed species on the property.
- Restoration of habitat at DFSP San Pedro is most effectively done in a regional context, so habitats can be linked up to ease dispersal, territory development, buffer both natural and anthropogenic disturbance, and other needs of sensitive species.
- If the sub-population of CAGN at DFSP San Pedro is to be secure, there is a need to maintain practices that avoid and minimize disturbance to the species or its habitat. This is also necessary to avoid Critical Habitat designation on the installation.
- Non-native, invasive species on DFSP San Pedro threaten native biodiversity because invasive species can out-compete and usurp the ecological position of natives in the ecosystem.
- There is a need to identify which plants and wildlife are high priorities for re-introduction.
- Chance disturbance (fire, drought, erosion, landslides, etc.) can result in local extinction of organisms at DFSP San Pedro because of the small size of its natural habitats and its discontinuity with similar habitats. Maximizing the natural habitat acreage or connectivity (corridors) is key to organism survival and functioning, diversity, and resilience to chance disturbance.

2.0 Current Conditions and Use

2.1 Installation Information

2.1.1 General Description

DFSP San Pedro includes a fuel facility, which is located on the Palos Verdes Peninsula on the eastern slope of the Palos Verdes Hills in southern Los Angeles County, California, and the Pier 12 marine terminal facility, located in the Port of Long Beach (POLB).

The community of San Pedro is in the city of Los Angeles (Refer to Map 1-1), west of the city of Long Beach, and south of Torrance, California. DFSP San Pedro is approximately 10 miles (16 km) east and 5 miles (8 km) north of the Pacific Ocean, and less than 1 mile (1.6 km) from the Los Angeles-Long Beach Harbor complex. Primary access is by Gaffey Street, south of Pacific Coast Highway.

The Pier 12 facility is located on the former Navy mole[1] in the POLB. Primary access is via the 710 Freeway.

2.1.2 Regional Land Uses

DFSP San Pedro Main Terminal

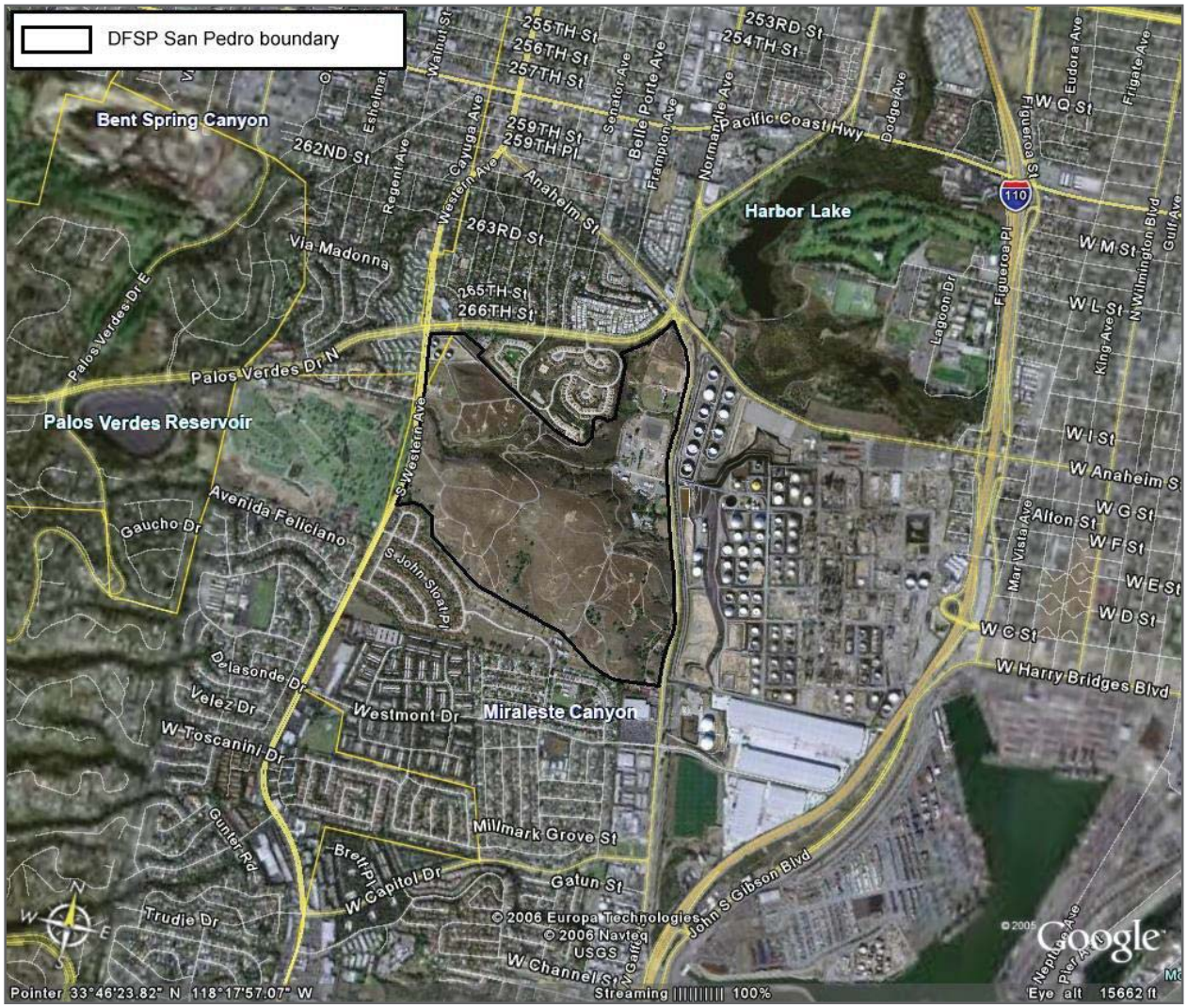
The approximately 330-acre (134-ha) property is bordered by dense urban, suburban, commercial, and industrial uses (Map 2-1). The neighboring communities of Harbor City, Rolling Hills, and San Pedro are to the north, west, and south, respectively. On the north and south sides are former Navy family housing areas, closed under the BRAC Act. DFSP San Pedro is also proximate to the Los Angeles/Long Beach Harbor complex, one of the largest harbors in the world and key to DFSP San Pedro's mission of receiving and distributing petroleum products.

DFSP San Pedro provides rare open space for plants and wildlife of the Palos Verdes Peninsula. However, this habitat is diminished in its potential to fully support natural resources, due to small area, isolation, and fragmentation from other natural areas.

Pier 12 Marine Terminal

The marine terminal is located in a heavily industrialized area in the POLB. While the facility is not completely paved, the ground is very compacted and supports weedy vegetation that tends to die off in summer months. Surrounding uses include other marine terminals and a railroad spur. The pipeline traverses developed areas and there is no natural resources management required along this easement.

[1] A mole is a massive work formed on masonry and large stones of earth laid in the sea as a pier or breakwater.



Map 2-1. Defense Fuel Support Point San Pedro, showing local context. Aerial image 2006 from Google Earth.

2.1.3 History and Pre-Military Land Use

Natural resources management decisions are facilitated by understanding the property's land use history.

Pier 12 Marine Terminal

The POLB was originally a large wetland area. In 1899, construction of the San Pedro breakwater began, which was the first step of port development. Over the years, various dredging projects were completed and shipping terminals were established. By 1940, large landfill projects were completed and the Port took on much of its current configuration. In that same year, the Navy acquired 100 acres (40 ha) of land on Terminal Island and established a naval station that included the Long Beach Naval Shipyard. The Navy continued operations in the POLB until the 1990s. In 1994, Naval Station Long Beach was closed, followed by the closure of the shipyard in 1997. The Navy retained the small Pier 12 facility, but all remaining Navy land was redeveloped, primarily into container terminals.

Gaffey Street Tank Farm

The earliest written descriptions and historic photos available of the peninsula depict rolling, grassy hills (presumably perennial bunchgrasses [*Nassella* sp.]) with sparse shrub cover, and annual forbs and grasses in the interspaces. This was typical of the California coastal prairie before European settlement. Shrubs were probably relegated to cliffs and hotter, steep slopes without clay soils. The extent of coastal sage habitat is apparently much greater today on DFSP San Pedro than it was before development of the property. The property was grazed by livestock on the bluffs and farmed in the flat Gaffey Valley, where administration facilities are now located. This area was periodically disturbed by flooding. There was a well-developed riparian element in lower George F. Canyon, which discharged into a large slough, the remnant of which is now Harbor Lake. Early photographs show the steep-sided George F. Canyon and several smaller side canyons ("barrancas") covered with heavy scrub (Mattoni 1996a).

Fire undoubtedly played a much more prominent role in sustaining the pre-European biotic community assemblage than it does today. During at least 8,000 to 9,000 years of habitation by the Gabrieleño people, it can be assumed that residential fires occasionally escaped, and that these aboriginal land managers probably also set fires systematically to favor certain plant and wildlife conditions. Prehistoric manipulation of the botanical environment has been clearly demonstrated in the results of archaeological, ethnographic, ethnohistoric, and paleobotanical research in the American Southwest. Evidence of these activities by California tribes has been compiled by Blackburn and Anderson (1993). For instance, the Gabrieleño used fire as a tool to enhance seed yields from plants important to them, and frequently burned selected vegetation communities to facilitate hunting small game or foraging for seeds and roots.

In 1827, Don Dolores Sepulveda received a land grant from the Governor of Mexico. As the site of one of the first large Spanish land grants, the Palos Verdes Peninsula was first grazed by cattle and then sheep for many years. The 75,000-acre Rancho de los Palos Verdes supported several thousand heads of cattle and a flourishing hacienda. However, through misfortune from 1862 to 1882, much of this land passed from the Sepulveda family through various mortgage holders to Jotham Bixby of Rancho los Cerritos. Rising land values led Bixby to lease the land to Japanese farmers for farming in the valley bottoms. By 1913, a consortium of New York investors owned most of the Bixby land. Their interest eventually changed to the real estate market. The first homes began to appear in 1924. See Photo 2-1 for an example of early Palos Verdes.

In early 1942, following the outbreak of World War II, the Navy acquired 478 acres (193 ha) to support twenty 50,000-barrel underground fuel storage tanks. Since 1943, the DFSP has been used to receive, store, and distribute diesel and jet fuels for military use in California, Arizona, and Nevada. In 1954, seven more underground and three aboveground tanks were installed on the bluff top north of the largest canyon. In the late 1950s, 160 acres (65 ha) were separated for Navy housing and Little League baseball diamonds. In 1972 and 1973, an area near the southeast corner of the property was completely filled in with approximately 60 feet (18 meters [m]) of construction rubble. Most of the surface has been rough graded since then, and piles of concrete and asphalt debris were dumped on the surface of the site. The eastern extent of this fill was graded and contoured into an engineered slope (Chambers Group 1995). In 1980, the Defense Fuel Supply Center branch of the DLA assumed operations from the Navy, and DFSP San Pedro became a joint supply facility for all branches of the military at this time.

Photo 2-1. Palos Verdes peninsula scene circa 1927. (Photo courtesy San Pedro Bay Historical Archives.)

2.1.4 Military Mission

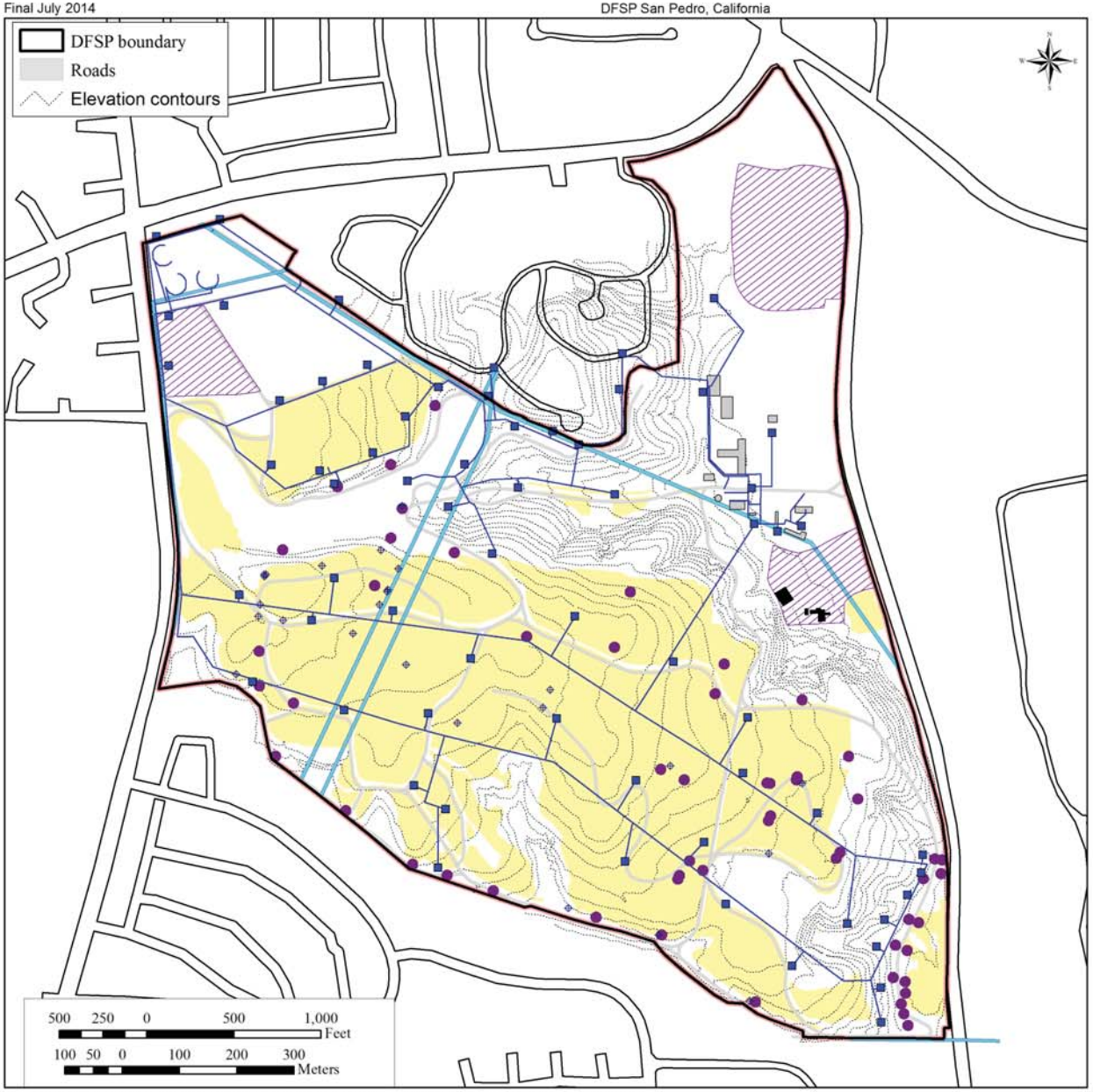
Since 1980, the DLA Energy has used DFSP San Pedro to receive, store, and distribute fuel to military customers in the region in accordance with DoD Directive 4140.25. The DFSP San Pedro fuel facility consists of the Main Terminal and the Marine Terminal. The Main Terminal encompasses approximately 331 acres (134 ha). The Marine Terminal is approximately 4.5 acres (1.8 ha). The facility receives fuel by tankers at the Marine Terminal and by pipeline. Fuel is distributed to customers by pipeline and by trucks. The facility is currently operated by a contractor.

2.1.5 Operations and Activities

This section describes operations and activities at DFSP San Pedro that may affect the natural environment. Map 2-2 depicts the fuel storage tanks, pipelines, utility lines, buildings, and other facilities and management areas.

2.1.5.1 Fuel Facility Operations and Maintenance

The GOCO is responsible for the operations and maintenance of the fuel facility. Their work is coordinated and reviewed by DLA Energy staff. Operations activities consist of receiving fuel by pipeline or by tankers at the Marine Terminal. Fuel is stored in underground and aboveground storage tanks at both the Main Terminal and the Marine Terminal. Fuel is then issued, via pipeline or trucks, to DLA Energy customers. Maintenance responsibilities at the Main Terminal include: storage tanks, pipelines, operations center, pump houses, valve pits and vaults, truck loading rack, roads, landscaping, buildings, etc. Maintenance responsibilities at the Marine Terminal include: tanks, pipelines, operations center, pump house, valve pits, pier loading arms, roads, buildings, landscaping, etc.



Operations Areas and Facilities at DFSP San Pedro

- 25 ft buffers around infrastructure
- Hydrants
- Water lines
- Wells
- Leased areas
- Easements
- Mowed areas
- Perimeter security buffer (10-ft to either side of perimeter fence line)
- Buildings (DFSP)
- LAPD pistol range

Map 2-2. Operation areas and facilities at Defense Fuel Support Point San Pedro, California.

This Page Intentionally Blank

Roads and other infrastructure traverse sensitive environmental and cultural habitats. Routine maintenance is affected by the need to comply with requirements to protect these resources. With foresight and proper planning, delays and impacts can be avoided or minimized.

Chevron Trunkline Operations

The Chevron trunkline is currently out of operation but maintains the capacity to be put back into use.

Normal operational activities for the No. 1-8" Chevron trunkline are conducted in accordance with 49 Code of Federal Regulations Part 195 and the California Pipeline Safety Act (Chambers Group 1995). These activities include: system surveillance, both visually and through a remote leak detection system; pipeline patrol every three weeks or less (at least 26 times annually); and a Damage Prevention Program wherein the trunkline and its associated equipment are operated in accordance with state Assembly Bill 73.

In addition to normal operational activities associated with the No.1-8" Chevron trunkline, there are a number of other operations that may take place. These additional operations are termed "abnormal" in that they occur irregularly and can include (but are not limited to) the following (Chambers Group 1995):

- Unintended valve closure or system shutdown
- Any change in flow rate and/or pressure falling outside of normal operating limits
- Loss in communication
- Operation of any safety device
- Any malfunction of a component, deviation from normal operation, or personnel error that could cause a hazard to persons or property

Such abnormal operations are also handled in accordance with 49 Code of Federal Regulations Part 195 and the California Pipeline Safety Act.

Mowing for Fire Protection and Security

Mowing for fire control, weed abatement, and security reasons takes place between the months of March and August. Brush and grassland are mowed using a small tractor with a mower attached to the back. To avoid mowing coast locoweed (*Astragalus trichopodus lonchus*), the known locations of locoweed are staked, and these areas are shown to the mower operator in advance. Additionally, the designation of areas not to be mowed ensures the avoidance of all sensitive riparian resources. The National Fire Protection Association 30, Flammable and Combustible Liquids Codes, and the DoD Petroleum Fuel Facilities MIL-HNDB-1002 do not provide any specific clearance requirements for mowing around storage tanks. The current 25-foot (8-m) clearance rule was established several years ago as a general safety clause for government-owned, contractor-operated facilities (D. Whitney, pers. com. 1998).

The following portions of the Operations Contract call for fire hazard weed abatement:

- All grass will be kept to four inches or less in specific locations.
- Weed and brush control shall be maintained in all terminal drainage ditches.
- All hillsides throughout the terminal shall remain in a natural state.
- The contractor shall coordinate any work which may disturb the habitat area with the NAVWPNSTA Seal Beach Conservation Program Manager prior to conducting the maintenance or repair action.

Perimeter Fenceline Repair and Maintenance

Security and perimeter buffer requirements are the responsibility of DLA. The requirements are implemented through the Grounds Maintenance Contract. In general, physical barriers are established along the designated perimeter of all restricted areas. An unobstructed area or clear zone should be maintained on both sides of the restricted area fence for security purposes.

2.1.5.2 Emergency Response and Maintenance

Emergency maintenance activities for major leaks, hazardous materials spills, fires, critical repairs, or other emergencies require immediate response from DFSP San Pedro personnel. Emergency repairs need to be anticipated so environmental damage, which is typically worse in an emergency than during a planned repair, can be reduced. Specific emergency response plans are given in the facilities Integrated Contingency Plan.

Because of the location of the facility, it is subject to natural disasters, such as earthquakes (the Palos Verdes fault is located immediately south of DFSP San Pedro), which would have a great potential to impact facility operations. Southern California is laced with major fault zones with interconnecting, cross-cutting fault sprays; therefore, the area is vulnerable to greater than normal seismic risk. Two systems of active faults generate earthquakes in the Los Angeles region: northwest-trending, chiefly horizontal-slip faults such as the San Andreas, and west-trending, chiefly vertical-spill faults, such as those of the Transverse Ranges (Kiersch 1991). The closest fault line to DFSP San Pedro is the Palos Verdes Fault, an active fault that runs through the western portion of the Los Angeles Harbor through southwest Los Angeles County.

2.1.5.3 Endangered Species Recovery and Habitat Restoration

An organizational framework for sensitive species recovery has been active at DFSP San Pedro since the rediscovery of the PVB. Under the cooperative leadership of NAVWPNSTA Seal Beach and the DLA, restoration and species recovery activities have been implemented by a consortium of public and government interested parties.

Captive Rearing of the Palos Verdes Blue Butterfly

A PVB captive breeding program is underway for three purposes: 1) to provide insurance against chance loss of the DFSP and peninsular populations of this species; 2) to increase population size; and 3) to produce sufficient numbers of individuals to reintroduce the species into revegetated sites at which it has been extirpated. The program was initially funded to offset disturbance from the Chevron pipeline project (USFWS 1996).

The on-site captive rearing program was initiated shortly after discovery of the DFSP San Pedro population, but was not considered completely successful until the 1999 season when over 600 pupae were obtained (Mattoni et al. 2000). Captive breeding under permit from the USFWS started in 1995 with the capture of five females. PVB from the captive rearing program have since been released in restored habitat at DFSP San Pedro and off-site at: the Chandler Preserve in Rolling Hills Estates, Friendship Park in San Pedro and Trump National Golf Course in Rancho Palos Verdes.

Native Plant Nursery

The PVPLC has a Cooperative Agreement with DLA Energy for the operation of a native plant nursery on site. Conservancy staff collects native seeds from the Palos Verdes Peninsula and propagates native species for use in DFSP San Pedro restoration areas and other peninsula natural areas suitable for PVB.

Habitat Restoration

Restoration work is documented in Table 2-2 with most numbered polygons referring to Map 2-3. The polygon numbering system has been in use since 1994 to identify all areas in which some kind of restoration activity either has been accomplished or may be in the future, and is continued here for consistency. Ten additional polygons were since added to the inventory (labeled R1 through R4 and 20-25 in the table).

Restoration projects started in 2003 are shown on Map 2-3 as blue polygons. After four years of restoration work on the five areas depicted, the reestablishment of native vegetation is progressing, and exceeded established target levels (Navy 2007). In 2007, the percent cover of native plant species ranged from 15 percent (Polygon #7) to 78 percent (Polygon #9) (Navy 2007).

Restoration efforts at DFSP San Pedro have continued in accordance with the BOs acting as guidance for the efforts. Recent restoration efforts in 2011-2012 prioritized the removal of invasive species and weeds from sites with known PVB to create openings for deerweed (*Lotus scoparius*) establishment (PVPLC 2011). Targeted invasive species control in 2012 included the removal of ice plant (*Carprobrotus* spp.), castor bean (*Ricinus communis*), and pampas grass (*Cortaderia jubata*).

Installation Restoration Program

In 1980, DoD initiated the Installation Restoration Program (IRP) to identify, investigate, and clean up or control the release of hazardous substances from past waste disposal operations and hazardous material spills at military facilities. Concurrent with formation of the IRP, Congress passed Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in December 1980, which directed the U.S. Environmental Protection Agency to develop and implement a comprehensive national program to manage past disposal sites on private property. The Superfund Amendments and Reauthorization Act expanded CERCLA to cover federal facilities under the Defense Environmental Restoration Program. Table 2-1 contains a summary of DFSP San Pedro's IRP sites.

Table 2-1. Installation Restoration Program site summary.

Site Number	Description	Material Disposed	Date of Operation	Status	Further Action
1A, 1B, 2	Ship Disposal Area	Waste oils, paints, solvents, scrap metal, cables, gas masks, radium dials, and metal drums.	1940s	Site Complete	Operations & Maintenance
31	Central Ravine	Concrete rubble, asphalt, brick, wood, and rebar.	1940s	Extended SI will be conducted	To be determined.
32	Southeast Ravine	Concrete rubble, asphalt, brick, wood, rebar, and fuel spills.	1940s	Extended SI will be conducted	To be determined.
4	Oil Spill Area	Bunker C, Navy Special Fuel Oil	1940s	Site Complete	None
5	Firefighter's School	Waste fuels, flammable materials	1940s	Site Complete	None
6	South Ravine	Concrete, wood, furniture, brush, vehicle tires, fuel spills	1940s	Extended SI will be conducted	To be determined.

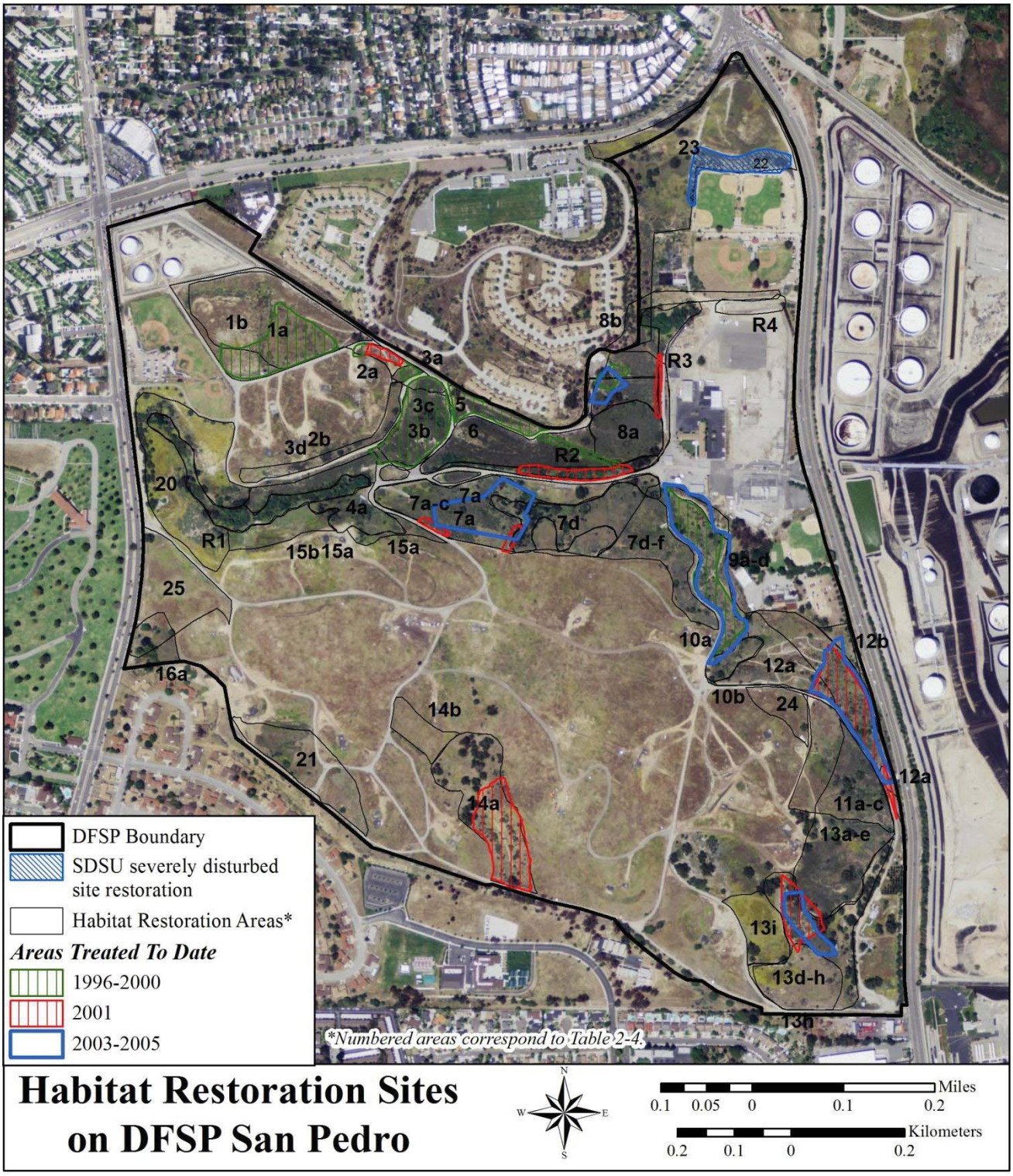
SI=Site Investigation

A Preliminary Assessment of DFSP San Pedro and the housing areas was conducted in 1990. The assessment and a later field inspection led to the listing of six potentially contaminated sites. Most of the sites contain solid debris from area construction and wastes from ships and their associated maintenance practices.

Table 2-2. Restoration accomplished on Defense Fuel Support Point San Pedro in years 1994-2012 .

Polygon	Acres	Clear[1]	Scrape	Weed	Irrigation	Seeded	Plant
1	9.71	1999					1999
1B		1995-2001		1996-2001	1996 (partial)	1996, 1997	1996-2001
2	2.41						1999, 2000
2A		1996		1996, 1998, 2001	1996	1996	1996, 1998
2B		1996		1996, 1997	1996		
3A		1996, 1997		1996, 1997	1997	1996	1997
3	2.54						
3B		1997		1997	1997	1997	1997
3C		1997		1997, 1998	1997	1997, 1998	1997, 1998
4	0.52						1999
4 (Dune)				1997	1997	1996-2001	
5	1.21	1996, 1999		1996	1996	1996, 1997	1996, 1997, 1999
6 (Riparian)	4.08						1999, 2000
6A							2000
7	15.60	1999-2001		2000	1999		2000
7A		2000 (partial)		2000-2001 (partial)	2000		2000-2001 (partial)
7B							2001, 2003, 2005
7C		1999				1999	
8	5.93	2000					1999, 2000
8A		1998-2001		1998-2001	2000 (partial)		1998-2001
8B		1998-2001		1998-2001	2000 (partial)		1998-2001 (partial), 2003-2004
9	4.16	2000					1999, 2000
9A (Riparian)		1995-2001		1995-2001	1999	1995-2001	1995-1999, 2004
9B		1996-1998		1996, 1999	1998, 1999	1996	1996-2000, 2004
9C		1999, 2000		2000	1999, 2000		1999, 2000, 2004
9D		1999, 2000		2000	1999, 2000		1999, 2000, 2004
10	5.30			2000			
10A						1999	
11	2.20	2000					
11A				1996-1999		1996-2000	2000
11B		1999 (partial)					
11C		1999 (partial)					
12	3.20	2000			2000		2001
12A		2001		2001	2001		2001, 2005
13	18.70	2000					
13F		2000, 2001		2001	2000, 2001		2000, 2001, 2003-2004
14A	7.00	2000, 2001		2001	2000, 2001		2000, 2001
14A	1.00		2011				
15A	5.00			1999, 2000 (partial)			
16A	1.60						
20	10.03						
21	3.89						
22	11.42						
23	1.06						
24	1.43						
25	3.13						
R1-4	6.96						
9A				2011, 2012			
9B				2011, 2012			
12B				2011			
13A				2011			
1A		2012		2012			
1B		2012		2012			
10A		2012		2012			
10B		2012		2012			
23				2012			

[1]Clearing is categorized as the removal of non-native and invasive vegetation.



Map 2-3. Habitat restoration areas on Defense Fuel Support Point San Pedro.

There are three remaining active IRP sites at DFSP San Pedro (Map 2-4). Each of the three sites was used between 1940 and 1983 by the Navy as landfills. The type of material dumped varied but included construction debris, office furniture, pesticides, hydrocarbons, and heavy metals.

- Site 31 (central ravine). This site encompasses the western portion of the central ravine that served as the major stormwater runoff drainage channel before the DFSP San Pedro was developed. Currently, the ravine is heavily vegetated in parts.
- Site 32 (southeast ravine). This site is located near the southeast corner of DFSP San Pedro. Site 32 was completely filled in with as much as 60 feet (18.4 m) of construction rubble during 1972 and 1973. Currently, most of the surface has been rough graded, and piles of concrete and asphalt debris have been dumped on the surface. The eastern extent of the fill has been graded and contoured into an engineered slope.
- Site 6 (south ravine). Site 6 was discovered during the site investigation as a former disposal area for paint, rusted 55-gallon drums and 5- and 1-gallon cans with varying amounts of unidentified liquids. Much of the debris is now overgrown with vegetation.

In addition to the IRP sites established above, the DLA currently conducts remediation of two sites at DFSP San Pedro. For both sites, the Regional Water Quality Control Board holds regulatory oversight and monitors all efforts (Map 2-4).

- Pump House Area. The Pump House Area remediation system entails total fluid recovery wells (extracting both floating hydrocarbon product and contaminated groundwater), bioventing wells, and vapor extraction wells located throughout the Pump House Area. Treated groundwater is re-injected into the shallow aquifer in the Pump House Area through a series of infiltration wells. The current remediation system became fully functional in 1996 and has been modified and expanded in the intervening years. The principal remediation objective was the recovery of floating product from areas with pre-remedial thicknesses ranging up to 15 feet (4.5 m). To date, 20,500 gallons of product recovered in liquid state and an additional 31,000 gallons have been destroyed via vapor extraction and bioremediation. Product thickness reduction is nearly 95 percent in all Pump House Area monitoring and recovery wells.
- Administration Area. The Admin Area remediation system, which consists of soil vapor extraction and groundwater sparging, was installed in late 2007, tested in early 2008, and is now fully operational. To date, the remediation system has treated soil and groundwater both in the vicinity of Buildings 113 and 108. In this time, over 30,000 pounds of hydrocarbons have been extracted and treated.

2.1.5.3 Non-Native and Invasive Plant Species

DoDI 4150.07 (DoD Pest Management Program; May 2008) mandates that all DoD installations have an approved IPMP. Currently, DFSP San Pedro has an approved plan that will be incorporated into the NAVWPNSTA Seal Beach plan, when it is next updated. While much of the removal of invasive species, such as ice plant, is done by hand, use of herbicides for control of weeds and invasive plant species must be conducted in accordance with the IPMP.

2.1.6 Natural Resource Land Use Constraints

Map 2-5 depicts a land use constraints summary based on fuel tank safety and other operational requirements, as well as certain of the sensitive natural resources. Another Constraints Map that fulfills the requirement for such a map under the DoD Template for INRMPs (OUSD Memorandum, 14 August 2006) with respect to possible limitations to the military mission emanating from natural resources, may be found in Chapter 4 (Refer to Map 4-1).

Map 2-4. Navy Installation Restoration Sites and Defense Logistics Agency Remediation Sites at Defense Fuel Support Point San Pedro.

2.1.7 Opportunities Map

The DoD Template for INRMPs requires the depiction of an Opportunities Map to support the search for ecosystem partners in land management that may prevent or minimize encroachment on military mission needs present and future. Given the need to stabilize listed species populations that occupy DoD lands, and the extreme scarcity of available open space in the region to accomplish this, it supports the DFSP San Pedro mission to identify opportunities for enhancing habitat for listed species off of its own property but on the Palos Verdes Peninsula. Map 2-6 depicts areas of remaining open space in the vicinity of DFSP San Pedro that could provide such opportunities (as that already in use for butterfly reintroduction). Ecosystem partners may also benefit DFSP San Pedro for other land uses unrelated to sensitive habitats.

2.2 General Physical Environment and Ecosystems

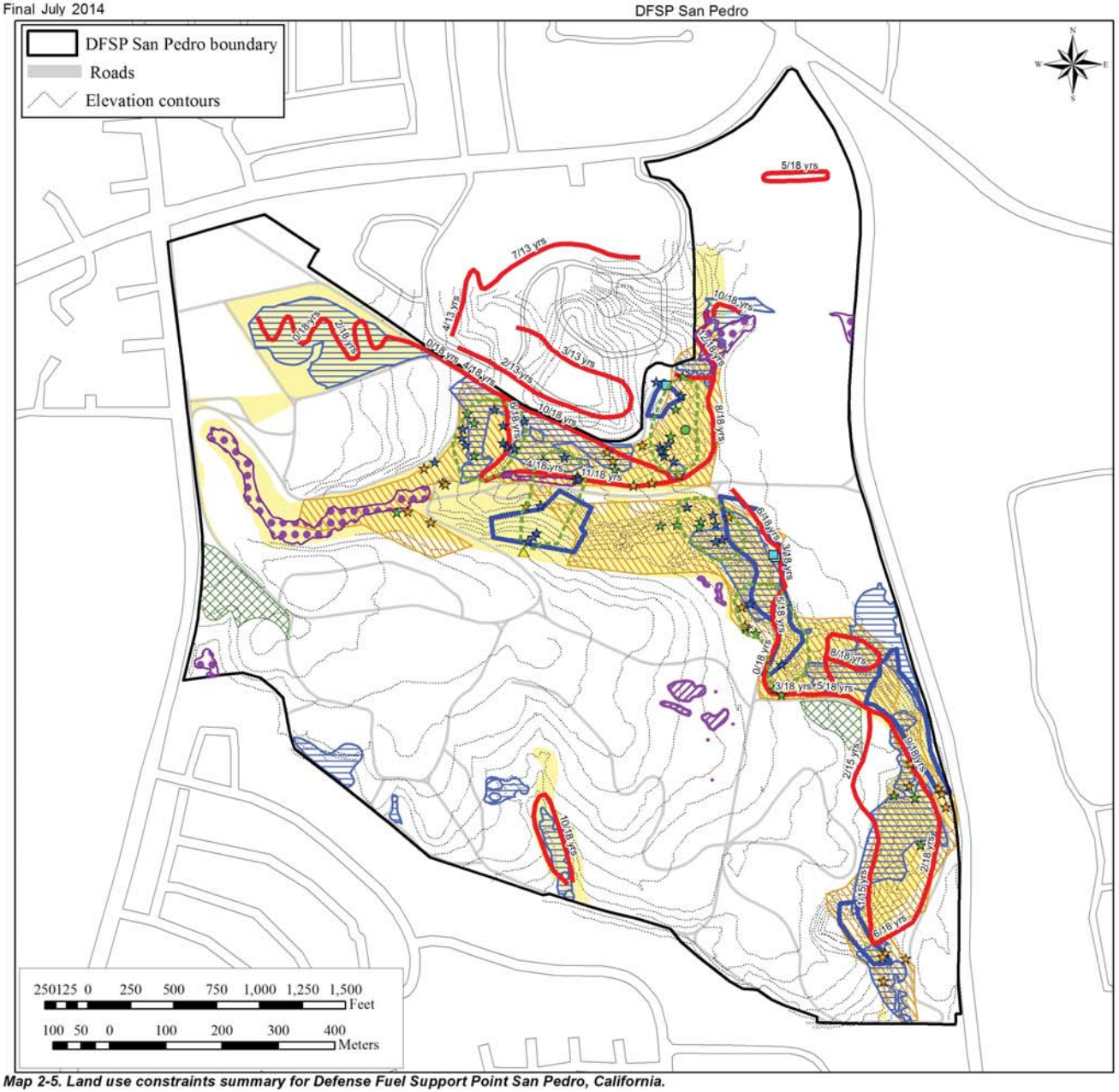
2.2.1 Climate

The climate of DFSP San Pedro is Mediterranean though generally cooler than inland areas of California, as the site is located near the Pacific Ocean coastline. In comparison to inland regions, this results in narrow daily and seasonal temperature changes, elevated humidity, and fog during the summer months. Temperatures range from 35 to 100 degrees Fahrenheit (°F), with average winter and summer temperatures of 52°F and 68°F, respectively. DFSP San Pedro is nearly frost-free year round. Hot, dry, northeast Santa Ana winds blow periodically between September and December, creating hazardous fire conditions. Annual rainfall averages approximately 12 inches (30 cm) and nearly all precipitation occurs between November and April. Cool wet winters, and warm dry summers predominate. The climate is characterized by periodic drought-flood cycles.

2.2.2 Geology

The island-like speciation of Palos Verdes Peninsula biota, in which evolution occurs independently of other populations due to isolation, can be explained by past geologic processes. In the Middle Miocene, 12 to 15 million years ago, landslides, and alluvial wash carried rock debris eastward from a large island on the western side of the Newport-Inglewood fault, just east of the peninsula. At the interior of the island there was a region of deep marine water where the Los Angeles Basin is currently located, thus isolating the Palos Verdes Peninsula. This rock debris, originally deposited underwater, is presently located along the shoreline of the peninsula, where it has become exposed by more recent uplift. This distinctive rock of cemented landslide material is known as San Onofre Breccia. There is also an island of exposed Catalina Schist on the peninsula (Schoenherr 1992).

The DFSP San Pedro property has a northeastern exposure with sedimentary, well-drained soils, and heavy clay or clayloam subsoils. Patches of wind-blown sand are occasionally visible on the soil surface. There is considerable micro-variation in soil depth on both flat areas and slopes. Large-scale surface displacement from both the underground storage tanks and Navy housing construction complicates the natural soil profile (Mattoni 1996b). Some sites are severely eroded with much of the upper soil profile missing.



Map 2-5. Land use constraints summary for Defense Fuel Support Point San Pedro, California.

Land Use Constraints at DFSP San Pedro

Natural Resources Summary

Palos Verdes blue butterfly host plants

- Astragalus (2004-05)
- Lotus (2004-05)
- Other Lotus locations*

**These locations were not revisited in 2004-05 surveys. The 2004-2005 mapping efforts were focused on grassland areas subject to mowing and did not include the indicated canyon and scrub areas.*

- Palos Verdes blue butterfly monitoring transects occupied in 2004-11**

***Text labels indicate number of years (out of total number of sampling years per segment) each transect segment was occupied by PVB. Data source: Longcore et al 2004, 2005, 2011.*

- Palos Verdes blue butterfly habitat restoration areas
- Palos Verdes blue butterfly Management Emphasis Areas

California gnatcatcher locations

- 1993-97 (Atwood)
- 2003 (NAVFAC Southwest)
- 2011 (NAVFAC Southwest)
- Gnatcatcher territories (2011)
- California gnatcatcher habitat

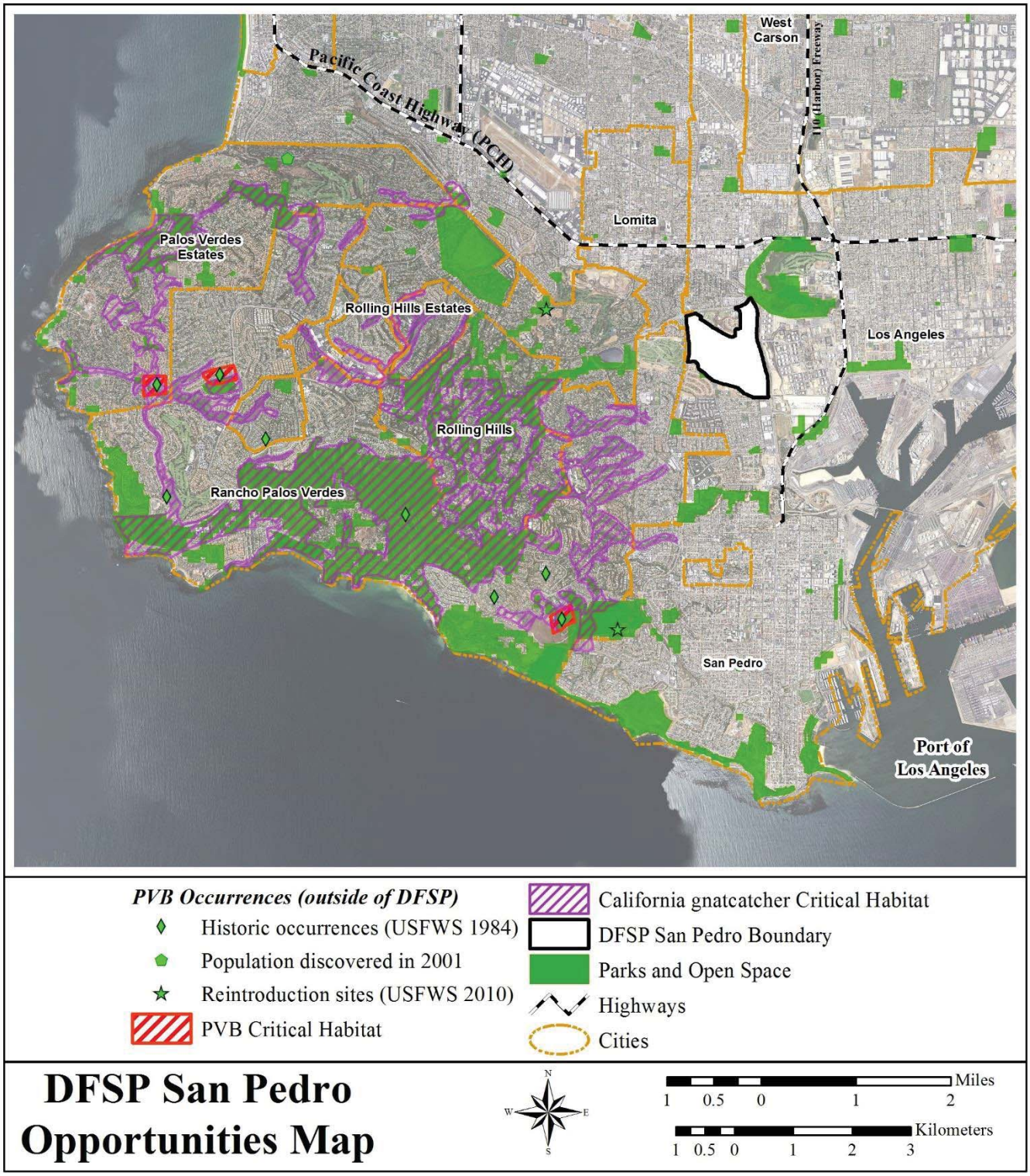
Rare Plants (2003)

- *Calystegia peirsonii*
- *Horkelia cuneata sericea*
- *Juglans californica californica*

- Habitat Buffer Avoidance Areas (Biological Opinion July 2, 2010)
- Riparian vegetation/Jurisdictional Waters and Wetlands (TEC Draft 2003)***

****Estimated boundary locations, based on vegetation mapping only, not ordinary high water mark.*

This Page Intentionally Blank



Map 2-6. Opportunities map for Defense Fuel Support Point San Pedro, California.

The San Pedro area is characterized primarily by Ramona-Placentia soil association, which occurs on gently sloping terraces near the coast of the Los Angeles Basin. The association is made up of about 65 percent Ramona soils, 30 percent Placentia soils, and the remaining five percent Hanford soils. This soil association occurs between near sea level and 1,300-foot (400-m) elevations with the general profile described in U.S. Department of Agriculture (1973).

2.2.3 Topography and Groundwater

The DFSP San Pedro tank farm is located along the eastern edge of the Palos Verdes Peninsula, which is formed by the Palos Verdes Hills extending south and east between Redondo Beach and Los Angeles Harbor. The Palos Verdes Peninsula is an uplifted marine terrace lying on the western edge of the Los Angeles Basin, a northwest trending alluvial plain approximately 50 miles (80 km) long and 20 miles (32 km) wide, just west of the Newport-Inglewood fault (Schoenherr 1992). The lowland surface of the basin is a broad, aggraded coastal plain of low relief, sloping gradually seaward in a southwest direction to the Pacific Ocean.

The DFSP San Pedro Pier 12 terminal is located in the POLB on the former Navy mole. The entire port complex is heavily developed and much of the land area is fill that was created by dredging adjacent water areas to construct shipping channels and berthing areas.

Southern California is laced with major fault zones making the area vulnerable to greater than normal seismic risk. The closest active fault line to DFSP San Pedro is the Palos Verdes fault, running through the western portion of the Los Angeles Harbor through southwest Los Angeles County. Given this location, DFSP San Pedro is subject to earthquakes that could potentially impact its operations.

Fuel spills and the three IR sites at the fuel facility may be water quality issues for the subbasin. Additionally, there is a suspected tar dump in the lower portion of the central ravine scheduled to be investigated for possible water quality issues.

Groundwater monitoring wells are located throughout the DFSP San Pedro facility. Depth to first encountered groundwater ranges from 10 to 35 feet (3−11 m) below ground surface in the areas of lower elevation and up to 134 feet (41 m) below ground surface in the tank farm area located at the top of the hill. Groundwater beneath the facility is not used for any municipal or industrial purposes although the Regional Water Quality Control Board has included it in the beneficial use aquifer. Based on the lack of suitable water bearing sediments future water production within DFSP San Pedro is not practical.

2.3 General Biotic Environment

2.3.1 Threatened and Endangered Species and Species of Concern

Palos Verdes Blue Butterfly

The PVB (Photo 2-2) is an endemic of the Palos Verdes Peninsula. Historically, it is believed to have been restricted to cool, seaward slopes distributed across most of the Peninsula (Mattoni 1996b; USFWS 1984). The PVB population at DFSP San Pedro was unknown in 1980, when the species was federally listed as endangered and Critical Habitat was designated (45 Federal Register 44935-44939, 02 July 1980). This may have reflected the absence of a population, or was simply due to a lack of systematic surveys or documented sightings. The species was feared to have gone extinct when no butterflies were seen on the peninsula in over a decade between

1983 and 1994. In 1994, the DFSP San Pedro population was discovered, and from 1994 to 1999 represented the only known PVB population in existence. During surveys in 1999, PVB were also confirmed for the first time in habitat on the former Palos Verdes Naval Housing Area on the north end of the DFSP San Pedro.

Photo 2-2. Palos Verdes blue butterfly (photo courtesy of Rudi Mattoni).

DFSP San Pedro had been the only known locality of the PVB until 2000. A colony has since been repeatedly reintroduced at nearby Chandler Preserve, and in 2001, a small colony was discovered at Malaga Dunes. The Critical Habitat designated in 1980 mirrored the areas containing the four known populations in existence at the time (Map 2-7). Most of this Critical Habitat was within the vicinity of DFSP San Pedro, but in the absence of a known population, DFSP San Pedro was not included in that designation.

In 2009 and 2010, PVB from the captive rearing program were released into restored habitat at (Map 2-7), the Linden H. Chandler Preserve in the city of Rolling Hills Estates and Deane Dana Friendship Community Regional County Park (USFWS 2010). The success of these re-introduction efforts are being evaluated through surveys.

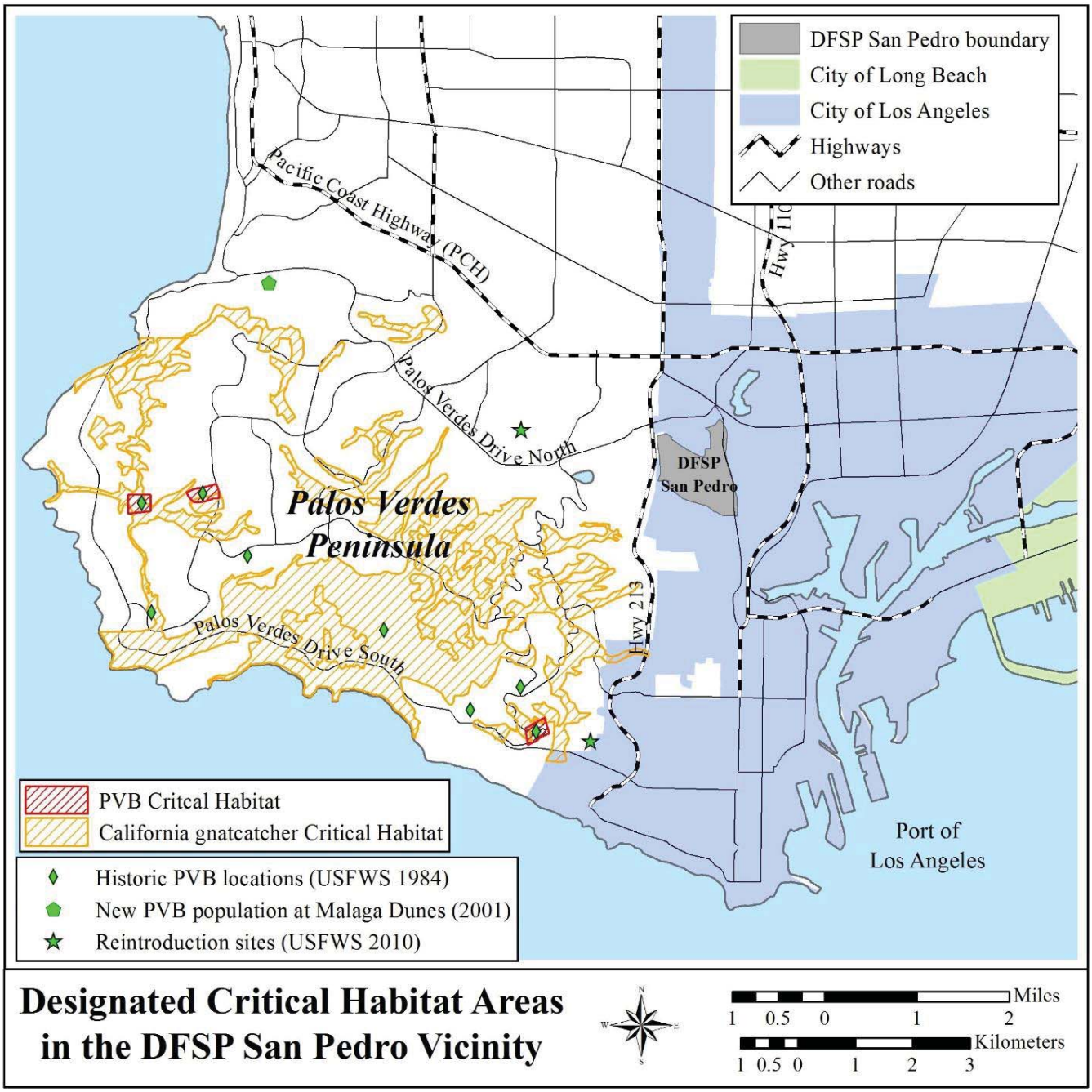
Palos Verdes Blue Butterfly Life History

Successful conservation efforts to enhance the population of the endangered PVB require an understanding of the life history of the species (Refer to Photo 2-3 for a depiction of an adult). The following sections detail the current understanding of the PVB's life history.

Larval Stage

The PVB has four to five, larval instars (T. Longcore, pers. com. 2007) (Photo 2-4 and Photo 2-5).

Larvae of the PVB feed upon deerweed and coast locoweed with deerweed the predominant food source. First larval instars feed largely on pollen and flower buds of deerweed and milk vetch (Pratt 2004; G. Pratt, pers. com. 2007). In the last two larval stages, the larvae appear to form an important association with native carpenter ants in the genus *Camponotus* and sometimes the exotic Argentine ant (*Linepithema humile*) (Photo 2-5) (Lipman et al. 1999; Mattoni et al. 2003; Pratt 2004).



Map 2-7. Designated Critical Habitat for the Palos Verdes blue butterfly and coastal California gnatcatcher in the vicinity of Defense Fuel Support Point San Pedro.

Photo 2-3. Palos Verdes blue butterfly (photo courtesy of Gordon Pratt).

Photo 2-4. Varied colorations of larval instars of the Palos Verdes blue butterfly (photo courtesy of Travis Longcore).

Photo 2-5. The fourth larval instar of the Palos Verdes blue butterfly showing association with carpenter ants (*Camponotus* spp.). (Photo courtesy of Gordon Pratt.)

Pupae and Eclosion

Larvae feed through the spring for about one, to one and one half months and then pupate entering diapause until suitable conditions occur for eclosion. Presently, there are no studies that investigate the ideal micro-site conditions for pupation, but the PVB seems to prefer the micro-crevasses in the litter beneath its deerweed and locoweed food plants (Mattoni et al. 2003).

At DFSP San Pedro, the PVB usually begins eclosion in late January and into February, depending upon the year's weather conditions. In recent years, eclosion has stretched into late February and early March. The timing and rate of eclosion amongst pupae is tied to both rainfall (drought leading to fewer eclosions) and the length of the cool period during diapause (Pratt 2004). As with many other related species, the PVB can remain in diapause for multiple years.

Adult Stage

The PVB is single brooded. Researchers have recorded, in field cages, that the PVB lifespan is short; lifespans are similar to findings for the Miami blue in the wild with males living two to three days, and females three to five days. In the laboratory, with artificial nectar provided, longevity is just over 30 days.

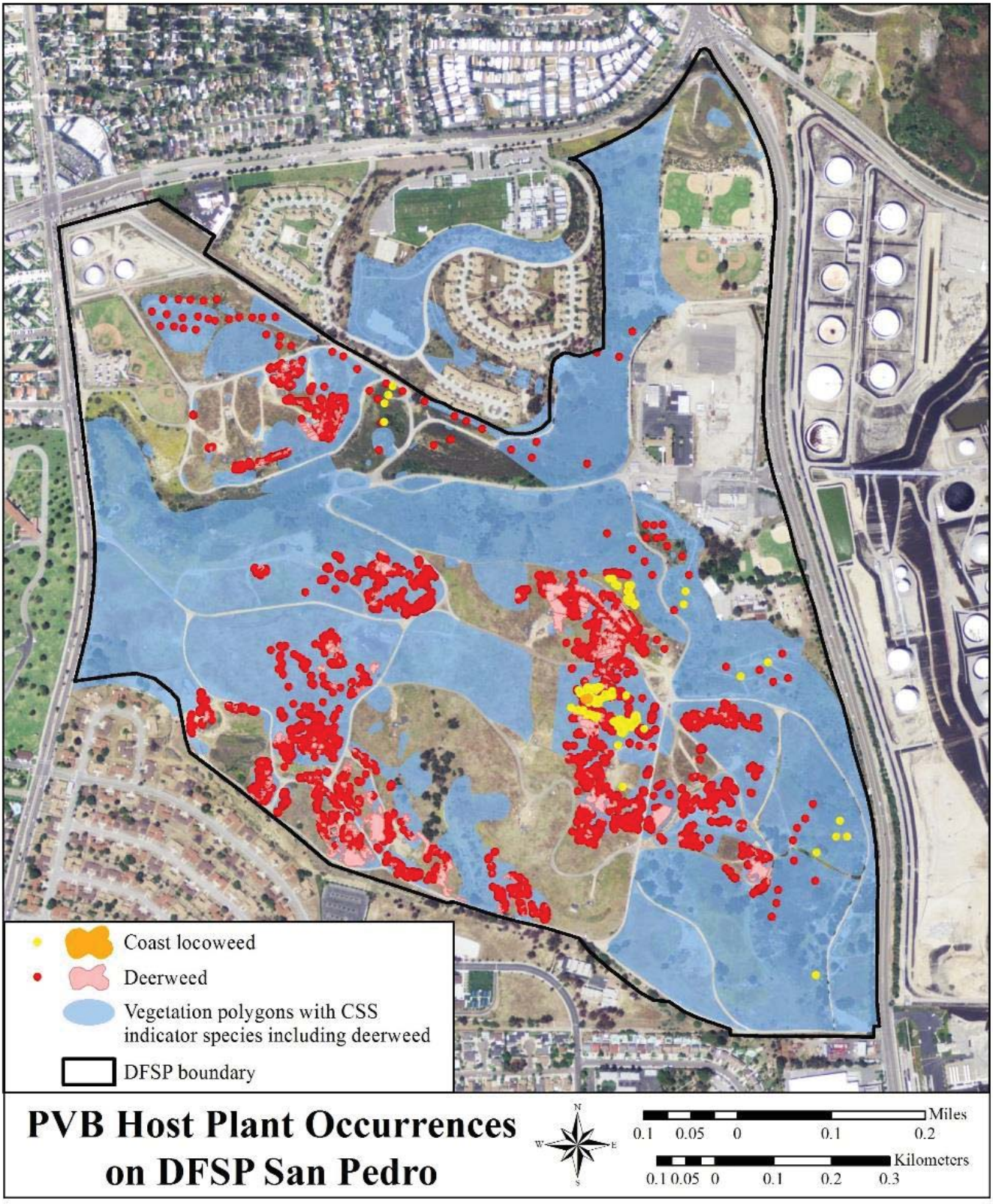
Current Status at DFSP

The population size at DFSP San Pedro has fluctuated over the years (Mattoni and George 2001; Osborne 2002; Longcore and Mattoni 2003; Pratt 2004; Longcore et al. 2005). Map 2-8 depicts the distribution of PVB host plants at DFSP San Pedro, while Map 2-9 shows the locations of the PVB at DFSP San Pedro and the neighboring former housing area. In 2003, the lowest population size on record was observed, with an estimated population of only 30 adults. However, the following year saw the highest population estimate of approximately 282 adults (Pratt 2004). Pratt hypothesized that the low estimate for 2003 was a result of poor weather conditions causing a large number of PVB to remain in diapause, producing a below average adult flight season that year. Population numbers rebounded to over 200 again in 2009. As of 2012 (the most recent survey year), the PVB population at DFSP San Pedro is estimated at 104 wild adults; an improvement of the 2011 population of 46 adults (Longcore and Osborne 2012).

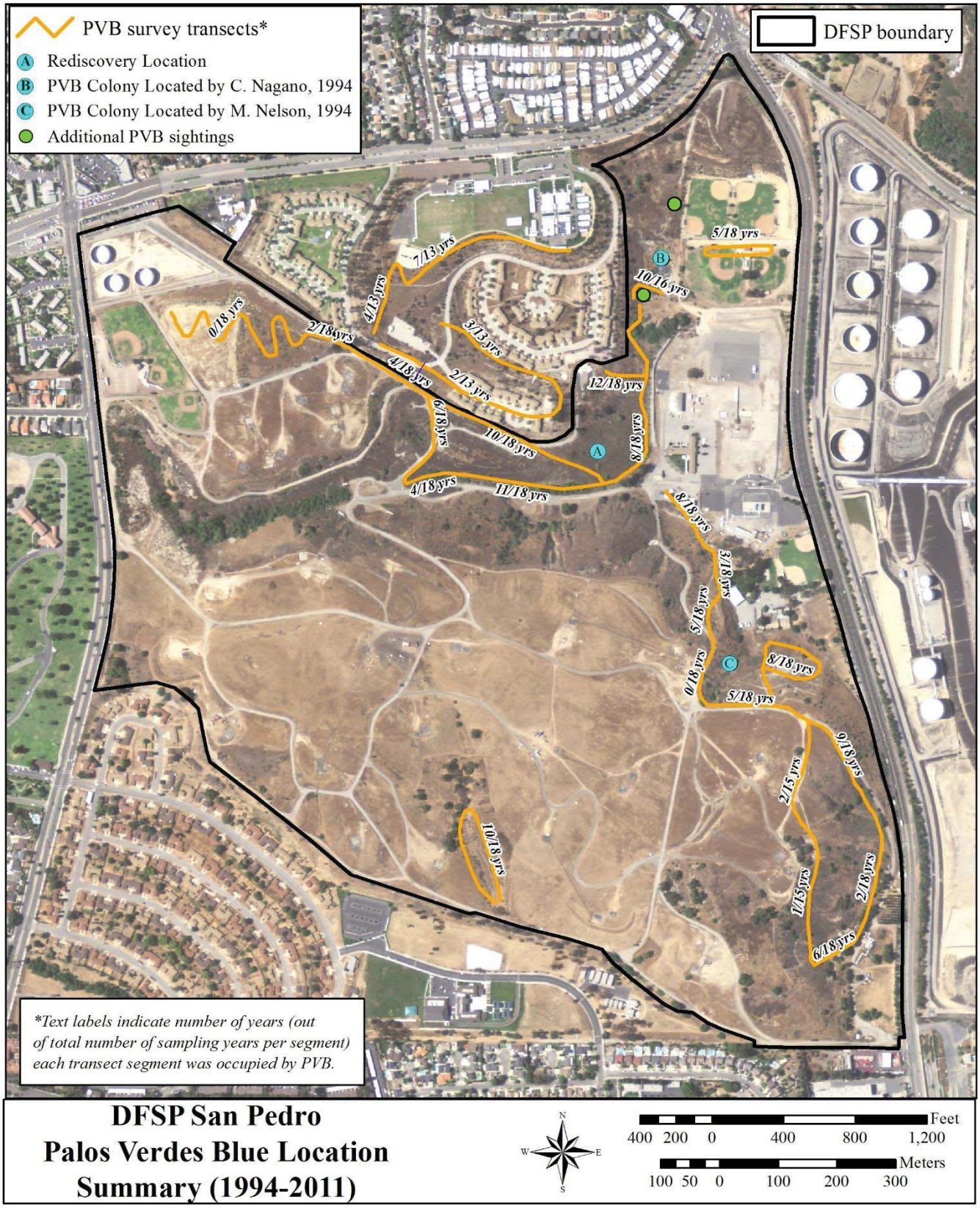
Coastal California gnatcatcher

The CAGN was listed as federally threatened on 30 March 1993, and has nested in the coastal sage scrub plant community on DFSP San Pedro (Map 2-10).

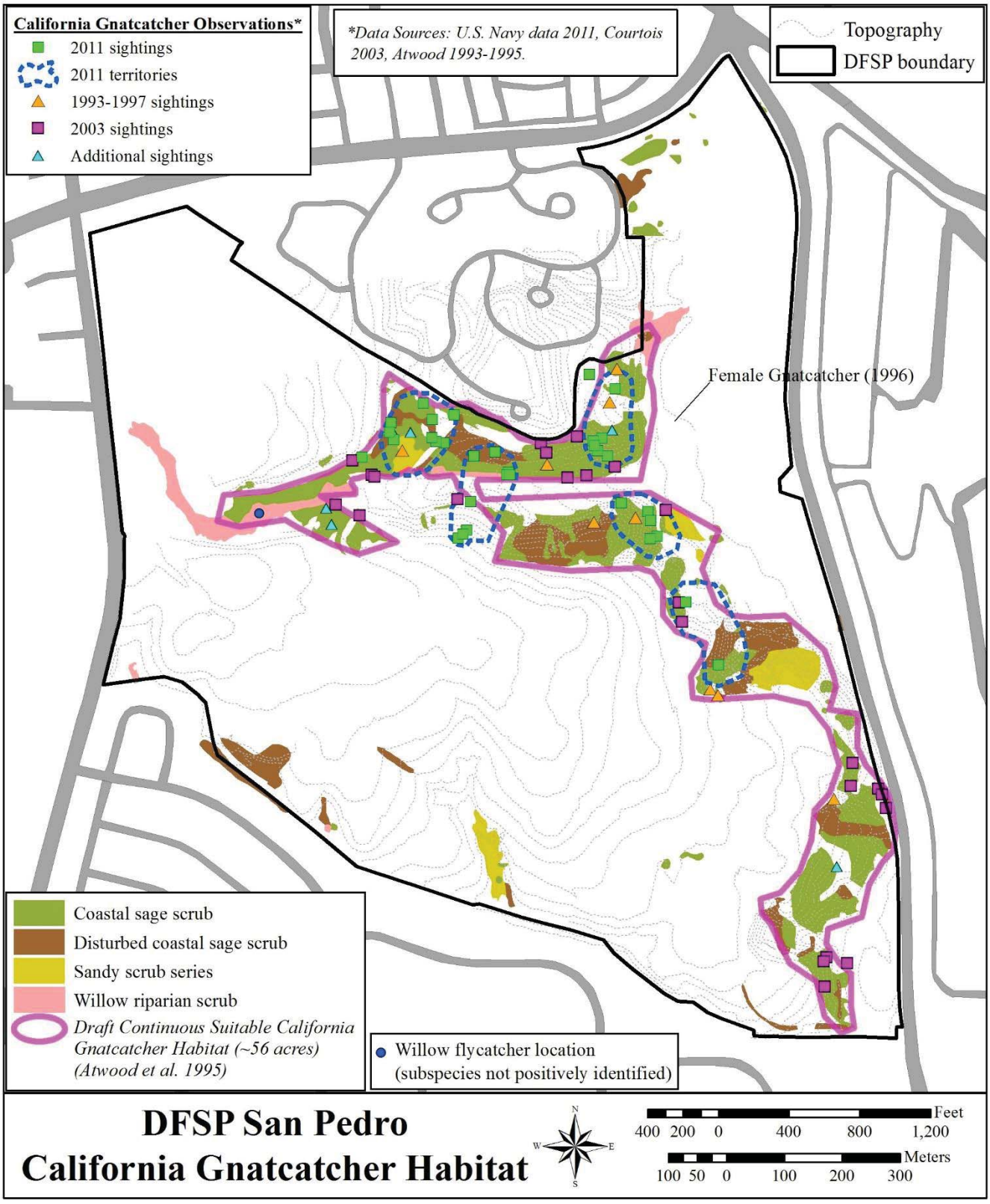
The CAGN prefers California sagebrush (*Artemisia californica*) scrub. Fifty-one pairs were located within the Palos Verdes Peninsula during the 1993 breeding season. A majority of the pairs (76%) were located within cactus scrub or sagebrush scrub sub-associations, although these habitats only made up 51 percent of the total coastal sage scrub habitat on the peninsula. These two habitat types are important to gnatcatchers. CAGN nest sites in the Palos Verdes Peninsula area were characterized as located on moderate slopes with an average bush height of 4.6 feet (1.4 m) and at an average nest height of 2.7 feet (0.83 m). Most nests were preferentially placed in California sage, which is also the most available shrub species. These values are similar to those obtained for CAGN by Ogden (1992) and Atwood (1994).



Map 2-8. Palos Verdes blue butterfly host plant habitat locations on Defense Fuel Support Point San Pedro in 2004.



Map 2-9. Locations of Palos Verdes blue butterflies at Defense Fuel Support Point San Pedro.



Map 2-10. Defense Fuel Support Point San Pedro habitat for coastal California gnatcatcher.

Current Status at DFSP

The population of CAGN on the Palos Verdes Peninsula has declined to critically low levels (Atwood et al. 1998). In 1994, there were 56 breeding pairs, decreasing to 26 breeding pairs in 1995 and increasing to 30 pairs in 1996. Similarly, at DFSP San Pedro, the population of CAGN decreased: five breeding pairs in 1993 and 1994, two unpaired females in 1995, and one female in 1996. The isolated birds observed at DFSP San Pedro likely belong to a single, peninsula-wide population, based on observations of banded birds (Atwood 1993). In 1997 surveys, the species was observed on 26 March, 12 April, and 11 May. Nesting during the 1997 season was not confirmed. A pair was never confirmed, only a solitary male was sporadically observed in the coastal sage scrub of the major drainage (Aigner and Koehler 1997).

In 2003 there were a total of 37 CAGN observations at DFSP San Pedro (Map 2-10), but these observations cannot be used as an estimate of the population as they likely represent a certain number of multiple sightings of the same individuals over an extended period (Courtois 2003). There were at least four pairs present, and three to six sightings of fledglings, or adults feeding fledglings, indicating at least some level of breeding success.

In the most recent 2011 basewide surveys, 37 CAGN observations occurred from 01 April–15 June 2011 (ICF 2011). Based on observations during the surveys, the DFSP San Pedro population appears to consist of the following: at least two pair (one pair observed with one to three fledglings, and the other exhibiting nesting behavior) and two to three single males (ICF 2011).

In 2012, CAGN surveys were conducted across ten reserves covering 1,225 acres of PVPLC-managed land (PVPLC 2013). These surveys found declining numbers in the number of pairs occupying PVPLC lands. Compared to 2006 (64) and 2009 (40), surveys in 2012 found only an estimated 33 territories occupied by CAGN. This data, however, is not a full update to the Peninsula-wide numbers, established in the early 1990s.

2.3.2 Special Status Plant Species

Project-specific rare plant surveys were conducted in 2003 (The Environmental Company [TEC] and David Magney Environmental Consulting [DMEC] 2003) in support of several maintenance and repair projects at the facility. The survey footprint covered all perimeter fencing, roads, drainage, and power lines in a corridor approximately 200 feet (61 m) wide. Three special status species were observed during these surveys:

- Peirson's morning glory (*Calystegia peirsonii*)
- Southern California black walnut (*Juglans californica*)
- Kellogg's horkelia (*Horkelia cuneata* ssp. *sericea*)

Peirson's Morning Glory

The sighting of Peirson's morning glory, a California Native Plant Society (CNPS) List 4 species, was previously known. It occurs in the coastal sage scrub directly west of the DFSP San Pedro office facilities and south of the housing development (Navy 1994a). Presently, this habitat is not heavily impacted; however, there is evidence of encroachment into the scrub community by invasive ornamental and weedy species from the nearby housing development. In addition, several pathways have been cut into the scrub, some running close to the sensitive population.

Southern California Black Walnut

Southern California black walnut, a CNPS List 4 species, occurs in coastal sage scrub, chaparral and woodlands (CNPS 2012). It was found growing in two previously undocumented locations, near associate species, including California sagebrush, deerweed, coast locoweed, black sage (*Salvia mellifera*), and California buckwheat (*Eriogonum fasciculatum*) (TEC and DMEC 2003).

Kellogg's Horkelia

Kellogg's horkelia, a CNPS List 1B species, occurs in a variety of habitats including coastal dunes, coastal scrub and chaparral, and coniferous forests. It was believed by the surveyors as accidentally planted, since it occurred in a restoration site, and is generally known to be native from Santa Barbara County north to Marin County (TEC and DMEC 2003).

2.3.3 Sensitive Wildlife Species on DFSP San Pedro

Potentially Occurring but Undetected Sensitive Species

Willow Flycatcher

Willow flycatchers (*Empidonax traillii*) were observed in the riparian habitat on DFSP San Pedro on 11 May 1997 (three individuals) and 10 June 1997 (one or two individuals). None were observed on 16 June, despite the use of broadcast calls to elicit responses, nor were any detected on 02 July 1997, when vocal imitations were attempted to elicit a response. This suggests that the flycatchers detected were migratory transients. Because they are impossible to identify reliably to subspecies while in migration, it could not be determined if the birds observed were *Empidonax traillii extimus* (on the federal endangered list since 29 March 1995) or the more common northern species *E.t. brewsteri*, which is not federally listed. Because the extant population of *E.t. extimus* in California is believed to be very small, chance alone suggests that most willow flycatchers encountered were *E.t. brewsteri* (Aigner and Koehler 1997). Given the small, fragmented nature of the existing habitat on DFSP San Pedro, occupation by a breeding pair is unlikely.

Least Bell's Vireo

The least Bell's vireo (*Vireo bellii pusillus*), a state and federal endangered species, has been expanding its range over the last few year,s due to the implementation of successful brown-headed cowbird (*Molothrus ater*) trapping programs. The least Bell's vireo has not been observed at DFSP San Pedro (J. Lovio, pers. com. 1997). The lack of least Bell's vireo occupancy is most likely attributable to the fragmentation of the least Bell's vireo historical habitat in the surrounding region and the isolation of the habitat that currently persists at DFSP San Pedro.

Coastal Cactus Wren

The coastal cactus wren (*Campylorhynchus brunneicapillus*) breeds locally on the Palos Verdes Peninsula. Fifty-seven breeding pairs were documented on the peninsula during the 1996 season, and 50 in the 1993 breeding season (Atwood et al. 1994, 1996). A breeding pair of cactus wrens has not been documented on DFSP San Pedro; however, a single adult was heard calling from a patch of prickly pear (*Opuntia littoralis*), during December 1993 avian surveys. The closest breeding pair to DFSP San Pedro was about 3 miles (5 km) south-southwest, during the 1996 breeding season. The balance of the breeding locations on the peninsula occurs to the west and north, making the core of the cactus wren habitat further away from DFSP San Pedro. Breeding pairs of this species are invariably

associated with patches of prickly pear (Atwood 1996), which are sparse on DFSP San Pedro. It is not known if DFSP San Pedro ever supported a large population of prickly pear (J. Atwood, pers. com. 1997).

Pacific Pocket Mouse

An additional federally listed species, the Pacific pocket mouse (*Perognathus longimembris pacificus*), was thought to have potential to occur on DFSP San Pedro. The property is within the historical range of the species, and the appropriate habitat type, although limited in extent, may occur on the site. However, this species has not been documented in the vicinity of DFSP San Pedro since 1931. Habitats occupied by the Pacific pocket mouse have included coastal strand and sand dunes, ruderal vegetation on river alluvium, and open coastal sage scrub growing on marine terraces (USFWS 1998).

A trapping survey was conducted in June 1994 by O'Farrell Biological Consulting to determine whether the Pacific pocket mouse presently occurs at DFSP San Pedro. None were found. Furthermore, it was concluded that DFSP San Pedro lacks potential to support the Pacific pocket mouse.

Other Wildlife of Interest

A total of eight special status avian species have been noted from DFSP San Pedro and two additional species, the cactus wren and the western burrowing owl (*Athene cunicularia hypogea*), have potential to occur (Table 2-3). The cactus wren has been confirmed at DFSP San Pedro, while there is only potential habitat for the western burrowing owl and no sightings have been recorded. In addition to the CAGN and willow flycatcher noted above, two species that were formally endangered, but are now delisted, have been noted on the base or flying overhead, the peregrine falcon (*Falco peregrinus*) and brown pelican (*Pelecanus occidentalis*). The peregrine falcon remains a state endangered species. Additional species have been noted as Birds of Conservation Concern (BCC) by the USFWS or as a California Species of Special Concern (CSSC) by the CDFW, including two birds that breed on the property, the loggerhead shrike (*Lanius ludovicianus*) and Allen's hummingbird (*Selasophorus sasin*).

Table 2-3. Special status bird species known from Defense Fuel Support Point San Pedro.

Common Name	Scientific Name	Status	Breeding Status
brown pelican	*Pelecanus occidentalis*	FD, SD	
peregrine falcon	*Falco peregrinus*	FD, SE	
Vaux's swift	*Chaetura vauxi*	BSSC	
Allen's hummingbird	*Selasaphorus sasin*	BCC, CSSC	PB
Willow flycatcher	*Empidonax traillii*	SE	
loggerhead shrike	*Lanius ludovicianus*	BCC, CSSC	CB
cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	BCC, CSSC	
Coastal California gnatcatcher	*Polioptila californica californica*	FT	CB
yellow warbler	*Dendroica petechia*	BCC, CSSC	

Status: FT - Federally Threatened, FD - Federally Delisted, SE - State Endangered, SD - State Delisted, BCC - USFWS Bird of Conservation Concern, CSSC - California Species of Special Concern. Breeding Status: CB - Confirmed Breeder, PB - Presumed Breeder

Other species that may be of interest are: 1) locally rare species that have been, or are near to, extirpated; 2) species that only exist in low numbers at DFSP San Pedro and require habitat enhancement to avoid extirpation; and 3) species that are thought to have been extirpated at DFSP San Pedro, but are common elsewhere. The first category includes the San Diego horned lizard (*Phrynosoma coronatum blainvillii*) as well as two plants: Lyon's pentachaeta (*Pentachaeta lyonii*) and crossosoma (*Crossosoma californicum*). Nearly local extirpated species include the PVB, CAGN, and the coastal cactus wren. The third is a large category, including several butterflies, mammals, birds, reptiles and amphibians, and many plants (Mattoni 1996a).

Since there are no comprehensive or reliable data, prior to wide-scale habitat destruction, it is difficult to assess species turnover. There are very few extirpated species known from voucher specimens. Instead, the historic occurrence of most species is inferred, based on their occurrence in adjacent areas on the peninsula with similar habitats (Mattoni 1996a). In Table 2-4, the number of species extant at DFSP San Pedro in 1995 is compared with the hypothesized historic community. Groups not listed, including all other insects, arachnids, birds, etc., are too poorly inventoried, both on DFSP San Pedro and/or nearby habitat, for meaningful analysis.

Table 2-4. Comparison of speculated historic and current species assemblages (Mattoni 1996a).

Group	No. Historic Species	No. Still Extant	No. Exotic Species
Mammals	25	7	8
Herpetofauna	22	6	0
Butterflies	40	30	1
Beeflies	35	21	0
Total	122	64	9

2.3.4 Wetlands

A reconnaissance-level wetland delineation was conducted in 2003 (TEC and DMEC 2003) across the entire DFSP San Pedro property. Map 2-11 depicts the wetland areas of DFSP San Pedro. However, since that time, Supreme Court decisions have limited the definition of jurisdictional wetlands. The following water features were found, but they are not jurisdictional waters.

- 2.05 acres (0.83 ha) potential wetlands, mostly seasonally flooded arroyo willow or mule fat scrub.
- 0.36 acres (0.15 ha) other water areas consisting of intermittent or ephemeral channels which are predominantly unvegetated.

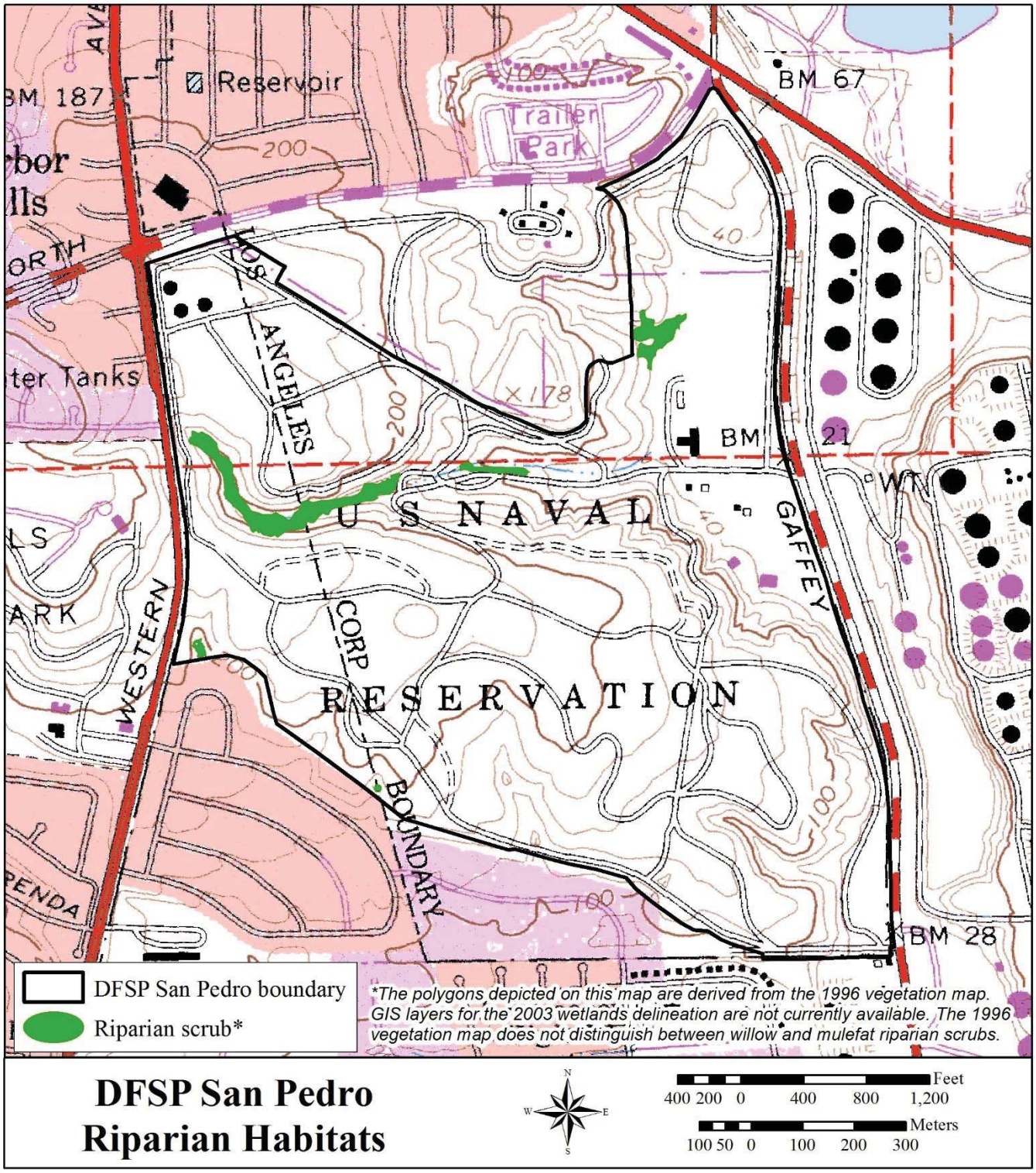
There are no floodplains located at DFSP San Pedro.

2.3.5 Fauna

Invertebrates

No baseline inventories of invertebrates have been conducted at DFSP San Pedro. Many large insects that share deerweed as host plants with the PVB were commonly encountered during transect walks. These include the green hairstreak (*Callophrys affinis perplexa*), common hairstreak (*Strymon melinus*), marine blue (*Leptotes marina*), and funereal skipper (*Erynnis zarucco funerealis*). The Diego beefly (*Bombylius diegensis*) flies synchronously with the PVB and is a parasite on the young of ground dwelling bees. Additionally, the European earwig has been a problem predator of PVB pupae in the captive breeding program (Mattoni and George 2001).

An invertebrate survey conducted on the neighboring, former housing area to the north in 1996 documented 83 invertebrate species, including four arachnids (spiders and mites), 77 insect species, and two molluscs (land snails and slugs). The insects collected represented 13 insect Orders and 65 Families, including 14 beetles, 12 flies, 12 bees and wasps, and 11 moths and butterflies. The invertebrate fauna seen at the housing area can be assumed as present at DFSP. Given the greater area and diversity of vegetation at DFSP San Pedro, there is likely a greater variety of invertebrates present as well.



Map 2-11. Wetland areas of Defense Fuel Support Point San Pedro.

Amphibians and Reptiles

No sensitive or endangered herpetological species were observed or captured on the study site during the 1997 survey conducted by Hertel and Maldonado. Western fence lizards (*Sceloporus occidentalis*) and side-blotched lizards (*Uta stansburiana*) were commonly observed in the study area. Southern alligator lizards (*Gerrhonotus multicarinatus*) were not commonly seen, but this species is less outward in its behavior than the other two species. Three California kingsnakes (*Lampropeltis getulus*) and one gopher snake (*Pituophis melanoleucus*), which are considered common, were also observed.

The western skink (*Eumeces skiltonianus*) was found incidentally by Travis Longcore of Urban Wildlands Group (see Photo 2-6). During surveys in 2006, a young red racer (*Masticophis flagellum*) snake was detected on the habitat property managed by the BRAC office, immediately adjoining DFSP San Pedro property to the north.

Photo 2-6. Western skink located on Defense Fuel Support Point San Pedro.
Photo courtesy of Travis Longcore.

Birds

In 1987, RECON noted 60 species of birds on DFSP San Pedro. A survey done by Chambers Group, Inc. in 1994 showed findings of 28 species of birds in the winter, and 23 species in June. Aigner and Koehler (1997) recorded 62 bird species during surveys of upper and lower riparian routes, in which 14 were confirmed breeders, and 18 were presumed breeders. There were only three additional species observed during additional surveys, believed to be winter visitors or migrants. While conducting presence/absence surveys for CAGN, ICF biologists observed 47 bird species on-site. Two of these species are special status: CAGN (federally threatened and CSSC) and yellow warbler (*Dendroica petechia*) (CSSC).

Residents

The numerically dominant avian species at DFSP San Pedro are those typical of the urban interface: house finch (*Carpodacus mexicanus*), European starling (*Sturnus vulgaris*), and mourning dove (*Zenaida macroura*). However, the open space at DFSP San Pedro also provides valuable resident and migratory habitat for rare species of the scrub and riparian communities. During surveys conducted by Aigner and Koehler in 1997 (Appendix D), most spring migrating birds concentrated in areas of riparian scrub. The highest bird densities were associated with an area that supports a large population of willows, where exotic trees and shrubs are absent, and that is bordered in some locations by relatively undisturbed coastal sage scrub (Aigner and Koehler 1997).

Current conditions at DFSP San Pedro support a few birds of prey. The most numerous and abundant species are the American kestrel (*Falco sparverious*), followed by the great horned owl (*Bubo virginianus*), and the red-tailed hawk (*Buteo jamaicensis*). Kestrels, red-tailed hawks, and great horned owls were also reported during the 1993 avian surveys. Many kestrel fledglings were seen during the June 1997 small mammal surveys. The kestrel is extremely adaptable and is found in a wide variety of habitats, including farmlands, open country, cities, and woodland edges. Great horned owls nest in trees in riparian areas. Other birds of prey appear as migrants or casual visitors, including Cooper's hawk (*Accipter cooperi*), sharp-shinned hawk (*Accipter striatus*), and the peregrine falcon.

In May 2006, at the northern housing area, Tierra Data Inc. biologists observed the Vaux's swift (*Chaetura vauxi*) (CSSC), Allen's hummingbird (Partners in Flight [PIF] Watchlist), and the yellow warbler (CSSC). About 30 other bird species were also detected. Smaller raptors are most likely feeding on the abundance of exotic small mammals, the native harvest mouse (*Reithrodontomys megalotis*), the valley pocket gopher (*Thomomys bottae*), and possibly the few reptile species that occur on DFSP San Pedro. The occurrence of larger mammals, such as the desert cottontail (*Sylvilagus audubonii*), Virginia opossum (*Didelphis virginiana*) and feral cats offer the larger raptors numerous feeding opportunities. Accipters feed mainly on small birds, but will occasionally take small mammals.

During the 1994 summer avian surveys at DFSP San Pedro, tracks of the greater roadrunner (*Geococcyx californianus*) were observed in the grasslands located in the northwestern corner. Roadrunners were seen on DFSP San Pedro in 1997 (J. Morton, pers. com. 1998). The roadrunner favors dry, open country with scattered brush, mainly in the deserts of the southwest but can be found in coastal sage scrub and coastal sage scrub/grassland mix. This makes DFSP San Pedro, although suitable, not an ideal habitat for the roadrunner. It mainly feeds on insects, with its diet also consisting of lizards, snakes, rodents, and birds. DFSP San Pedro supplies the foraging requirements of the roadrunner; however, the abundance of prey is absent. Herpetological surveys at DFSP San Pedro, conducted by Hertel and Maldonado in 1997, documented three species of lizard, only the western fence lizard appeared relatively common or abundant. However, exotic small mammals occur in large numbers, and the population of small birds that the roadrunner could prey on seems to be healthy.

Neotropical Migrants

Nesting by neotropical migratory birds has not been well-documented on the DFSP San Pedro. Nearly all native species of birds are protected under the Migratory Bird Treaty Act (MBTA) and Executive Order (EO) 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds; 10 January 2001), whether or not they migrate. Several habitat conservation plans have recently been released for southern California under the aegis of PIF, a national bird conservation program of which the Navy is an active collaborator with other federal, state, and private partners. A fundamental concept of all plans is managing for healthy and diverse bird communities by providing diverse habitat conditions representing the spectrum structural conditions characteristic to those plant communities over the long term. The plans most applicable to the DFSP San Pedro are the conservation plans for birds in coastal scrub and chaparral, grassland, and riparian habitats (all published in 2000 and available on the web at www.prbo.org/CPIF/Consplan.html).

Mammals

Mammals are well represented on DFSP San Pedro by smaller species, such as the opossum, desert (Audubon's) cottontail, Botta's pocket gopher, house mouse (*Mus musculus*), black rat (*Rattus rattus*), and striped skunk (*Mephitis mephitis*). California ground squirrels (*Spermophilus beecheyi*) were not observed during the small mammal survey; however, workers observed them in residence under the headquarters building in 1997, and more recently in the newly planted Gaffey Street beautification corridor. Larger animals, such as the raccoon (*Procyon lotor*), coyote (*Canis*

latrans), and feral dogs and cats, are included in the survey count. Navy personnel at DFSP San Pedro observed a non-native red fox (*Vulpes fulva*) in 1997 and a gray fox (*Urocyon cinereoargenteus)* has also been reported.

2.3.6 Flora

The Palos Verdes region and surrounding areas are an extreme example of human pressure on a natural community. Almost complete replacement of habitat by human settlement has occurred; the remaining elements are disturbed, fragmented, and competing with non-native species. Due to the geography of the peninsula and the history of agricultural and urban development in the surrounding Los Angeles Basin, the tracts of coastal sage scrub remaining on the peninsula have been largely or completely isolated for many years from similar tracts of habitat located in Los Angeles and Orange Counties (Atwood 1994). Furthermore, the patches of coastal sage scrub that remain within the Palos Verdes Peninsula are isolated from each other.

See Appendix E for lists of native plant and plants found elsewhere on the peninsula, but not on DFSP San Pedro.

2.3.6.1 Vegetation Communities

The vegetation of DFSP San Pedro is primarily non-native grasslands with some small patches of native sage scrub, oak woodlands, and riparian corridors, as well as groves of eucalyptus and other non-native trees. The current vegetation map for DFSP San Pedro was developed in 1996 (Map 2-12). Table 2-5 lists the vegetation communities and other land cover types on DFSP and their respective acreages.

Table 2-5. Vegetation communities and land cover types at Defense Fuel Support Point San Pedro.

Vegetation and Land Cover	Area	% of Total
Non-native grasslands*	187.9	56.2
Needlegrass grasslands	0.2	<0.1
Sparse sandy scrub	4.6	1.4
Sparse coastal sage scrub	2.1	0.6
Coastal sage scrub	48.7	14.6
Coast live oak woodlands	1.5	0.5
Willow riparian scrub	4.9	1.5
Eucalyptus woodland	6.0	1.8
Other non-native woodlands	3.7	1.2
Other Land Cover Types		
Bare ground	4.2	1.2
Pond	<0.1	<0.1
Roads and developed area	70.3	21.0
Total	334.3	
*Includes areas of ruderal weed species.		

Non-Native Grasslands

The majority of wildland areas remaining on the Palos Verdes Peninsula can be classified as disturbed grassland (approximately 2,242 acres [907 ha], or 60% of the total). However, it is important to note that these non-native grasslands also support some coastal sage scrub species, and in some areas encompass small patches of true

coastal sage scrub. These areas may be important dispersal corridors for birds or butterflies, or potential sites for coastal sage scrub restoration.

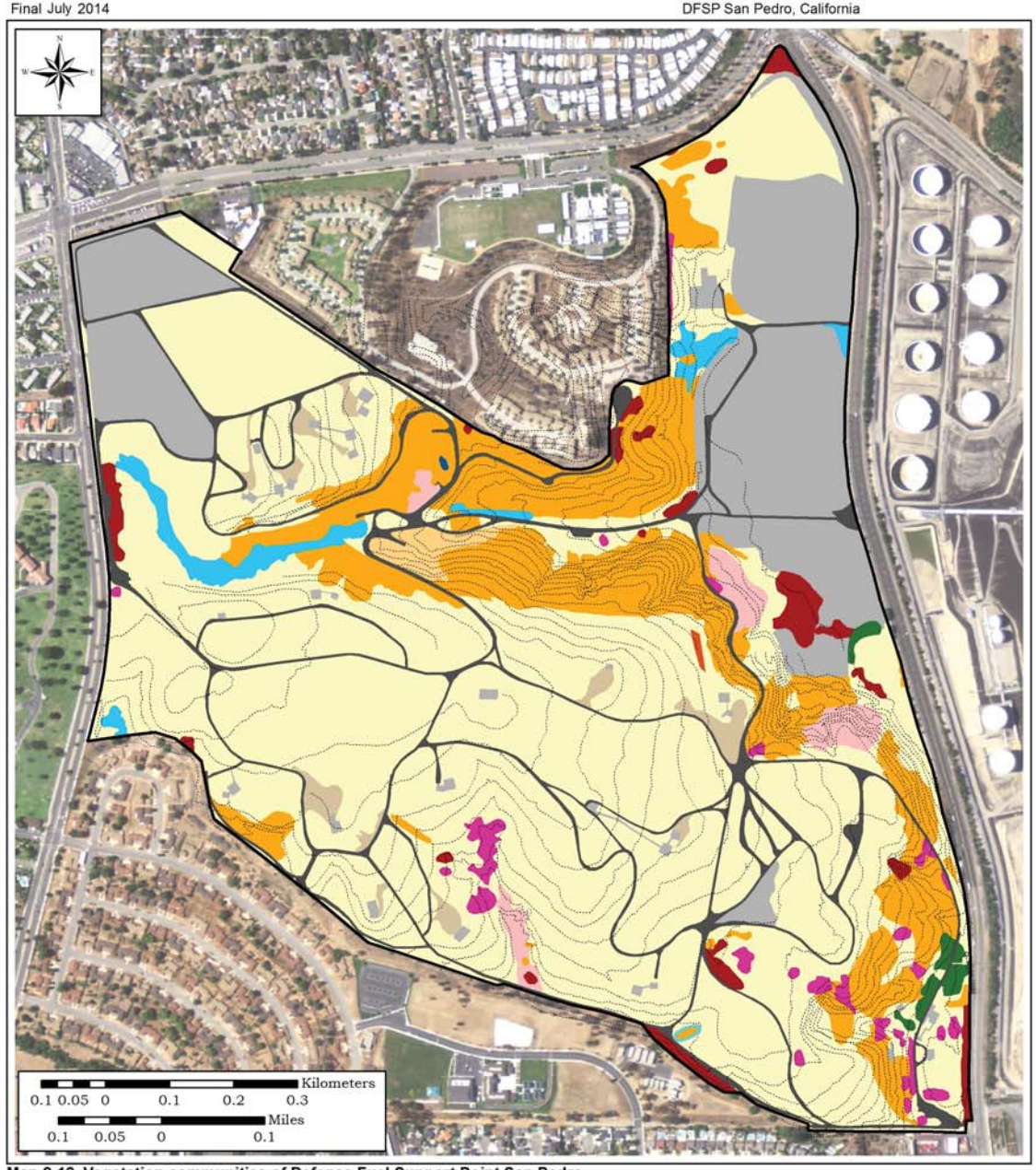
Most of the vegetation on DFSP San Pedro is non-native grassland (approximately 188 acres [76 ha]). These grasslands contain a mixture of native and non-native species, primarily non-native annual grasses (e.g. bromes [*Bromus* spp.] and wild oats [*Avena* spp.]), although some native needlegrasses (*Stipa* spp.) are present. Several non-native (often invasive) annual herbs are predominant as well, including: Italian thistle (*Carduus pycnocephalus*), tocalote (*Centaurea melitensis*), broadleaf and redstem filaree (*Erodium* spp.), hedypnois (*Hedypnois cretica*), summer mustard (*Hirschfeldia incana*), bur clover (*Medicago polymorpha*), white sweetclover and sourclover (*Melilotus* spp.), wild radish (*Raphanus sativus*), and milk thistle (*Silybum marianum*) (TEC and DMEC 2003).

In addition to the predominant invasive exotics, several native species were observed competing against the non-native, often invasive species, including: beach bur *(Ambrosia chamissonis*), annual bursage (*Ambrosia artemisiifolia*), western ragweed (*Ambrosia* spp.), narrowleaf milkweed (*Asclepias fascicularis*), horseweed (*Conyza canadensis*), fasciculed tarplant (*Deinandra fasciculata*), dove weed (*Eremocarpus setigerus*), telegraph weed (*Heterotheca grandiflora*), and Spanish lotus (*Acmispon americanus* var. *americanus*). Deerweed, the PVB host plant, is scattered throughout the grasslands, while coastal locoweed occurs less frequently. The majority of these grassland areas are mowed to provide for fire control and weed abatement. The Operations Contract calls for fire hazard weed abatement (see section 2.1.5.1 for additional discussion):

- All grass will be kept to four inches or less in specific locations.
- Weed and brush control shall be maintained in all terminal drainage ditches.
- All hillsides throughout the terminal shall remain in a natural state.
- The contractor shall coordinate any work that may disturb the habitat area with the NAVWPNSTA Seal Beach Conservation Program Manager, prior to conducting the maintenance or repair action.

Coastal Sage Scrub

Coastal sage scrub is dominated by California sagebrush, and characterized by low-growing (less than 6 feet [2 m]), soft-leaved, largely drought-deciduous, grayish and green shrub and subshrub species. It occupies shallow or heavy soils of dry, gentle to steep, moderately rocky, predominantly southern-facing slopes and it generally occurs at lower elevations. Emergent, large, evergreen shrubs such as laurel sumac (*Malosma laurina*), toyon (*Heteromeles arbutifolia*), sugar bush (*Rhus ovate*), lemonade berry (*Rhus integrifolia*), and Mexican elderberry (*Sambucus nigra*) are often found within stands of this alliance. Important shrub canopy associates within this alliance, observed throughout most of the scrub areas on site, include: coyote bush (*Baccharis pilularis*), California bush sunflower (*encelaia californica*), thickbracted goldenbush (*Ericameria palmeri* var. *pachylepis*), ash coast buckwheat and leafy California buckwheat (*Eriogonum* spp.), chaparral bedstraw (*Galium angustifolium* ssp. *angustifolium*), black sage (*Salvia* nigra) and purple sage (*Salvia leucophylla*), sawtooth goldenbush (*Hazardia squarrosa*), giant wildrye (*Elymus condensatus*), deerweed, sticky bush monkeyflower (*Mimulus* sp.), coast prickly pear, and coastal cholla (*Opuntia prolifera*)(TEC and DMEC 2003). Common understory native annual and perennial herb and grass species observed on site include: California croton (*Croton californicus var. californicus*), coyote melon (*Cucurbita foetidissima*), long-stemmed buckwheat (*Eriogonum elongatum*), green everlasting (*Pseudognaphalium californicum*), cudweed-aster (*Corethrogyne filaginifolia*), and foothill needlegrass and purple needlegrass (*Stipa* spp.). In addition to deerweed, coastal locoweed occurs in this habitat type, but less frequently. Escaped ornamental species are often observed invading the California sagebrush habitat. For example, sea fig and hottentot fig (*Carpobrotus* spp.) occur as thick mats within the shrublands (TEC and DMEC 2003).



Vegetation Communities

Integrated Natural Resources Management Plan DFSP San Pedro

Plant Communities

- Sparse sandy scrub
- Sparse coastal sage scrub
- Coastal sage scrub
- Needlegrass grassland
- Non-native grasslands
- Willow riparian scrub
- Oak woodlands
- Eucalyptus groves
- Other non-native woodlands
- Bare ground
- Pond
- Roads
- Developed areas

- DFSP San Pedro boundary
- Elevation contours

Map 2-12. Vegetation communities of Defense Fuel Support Point San Pedro.

This Page Intentionally Blank

In some areas California sagebrush is co-dominant or even subdominant to other shrub species such as California buckwheat, coyote brush, California bush sunflower, coast prickly pear, or deerweed. On DFSP San Pedro, the deerweed patches are allowed to persist by periodic vegetation management (in the form of disturbance) in order to maintain the host plant source for the PVB.

Sparse Sandy Scrub

These sites contain seral or fringe coastal sage scrub components such as croton and deerweed. They tend to be on a sandier substrate and steeper grassland slopes on DFSP San Pedro. Since no one species dominates these areas they cannot be readily assigned to a more conventional vegetation community. They are identified here as a separate mapping unit, due to the belief they offer favorable habitat restoration sites for PVB recovery.

Willow Riparian Scrub

Riparian vegetation occurs on approximately 7 acres (3 ha) of the Palos Verdes Peninsula (Atwood 1994). Most of this vegetation is located in only a few, small islands. On DFSP San Pedro, there are approximately 4.6 acres (1.9 ha) of mixed willow riparian woodlands in a continuous strip along the canyon. It consists of an assemblage of willows (Goodding's black willow [*Salix gooddingii*], red willow [*S. laevigata*] and arroyo willow [*S. lasiolepis*]), coyote bush, and other species. Since information on the exact species composition of these woodlands is unavailable, they cannot be assigned to a California Vegetation Classification and Mapping Program (VegCAMP) alliance and are instead grouped together here as a single mapping unit.

Coast Live Oak Woodlands

These woodland stands are dominated by coast live oak (*Quercus agrifolia*), occasionally with other non-native tree species such as pepper trees (*Schinus* spp.). Toyon, laurel sumac, and lemonade berry may be present at low density. The understory is generally composed on non-native grasses and forbs, although some natives may also occur.

Eucalyptus Groves

Approximately 6 acres (2.4 ha) of eucalyptus groves occur at DFSP, dominated by gum trees (*Eucalyptus* spp.). The understory of these woodlands is generally sparse, composed of non-native grasses and forbs and some native shrubs.

Other Non-Native Woodlands

These areas are dominated by non-native trees such as Peruvian pepper tree (*Schinus molle*), Brazilian pepper tree (*S. terebenthifolia*), and acacias (*Acacia* spp.). The understory of these woodlands is generally sparse, composed of non-native grasses and forbs and some native shrubs.

2.3.6.2 Landscaping

No inventory has been conducted of plant species at DFSP San Pedro; however, the areas around the administrative buildings, ball fields, and the entry were landscaped with both native, and non-native plant species. It is to be noted, that while landscaping does occur adjacent to the ball fields and the firing range, both areas are classified as developed areas. The landscaped area of DFSP is less than 0.1 acres (0.04 ha) and is located around the administration building.

Plants incidentally observed in landscaped areas during visits in 2001 include the following preliminary list: magnolia (*Magnolia* sp.), eucalyptus (*Eucalyptus* sp.), daylily (*Hemerocallis* sp.), Joshua tree (*Yucca brevifolia*), quince (*Chaenomeles* sp.), stone crop (*Sedum* sp.), oleander (*Nerium oleander*), loquat (*Eriobotrya japonica*), California fan palm (*Washingtonia filifera*), king palm (*Archontophoenix cunninghamiana*), juniper (*Juniperus* sp.), jade plant (*Crassula argentea*), orchid tree (*Bauhinia* sp.), and Brazilian pepper tree.

Refer to Appendix F for plant lists intended to give guidance to landscape planning for DFSP San Pedro.

2.3.6.3 Non-Native and Invasive Plants

The locations of non-native and invasive species were identified during field work in 1999 for the purpose of setting priorities for habitat restoration, establishing a baseline from which to measure successful restoration. Refer to Appendix E for lists of non-native plants found on DFSP San Pedro.

2.4 Marine and Coastal Resources

DFSP San Pedro manages the Pier 12 facility located within the POLB. The Navy does not currently conduct surveys as no natural resources management activities are conducted at the facility. The POLB conducts natural resources surveys of the entire harbor on a regular basis. The most recent baseline surveys were conducted in 2008 for both the POLB and POLA, and detail the physical characteristics of the Harbor, kelp and micro algae, eelgrass and fish, ichthyoplankton, benthic invertebrate and riprap associated populations. For more detailed information on the survey results, please refer to Final 2008 Biological Surveys of Los Angeles and Long Beach Harbors (April 2010). The survey results from the entire POLB are not expected to differ in any way from what is specifically found at Pier 12, given the fact the Pier is located within the POLB. All information below was taken from: Final 2008 Biological Surveys of Los Angeles and Long Beach Harbors (April 2010).

Physical conditions and community elements did not change much between the 2000 and 2008 baseline studies. Water quality conditions measured during July 2008 were consistent with values previously reported from the Port and indicative of well-mixed and well-oxygenated waters. Kelp and macroalgae surveys found increased kelp canopy cover in the Ports than in previous studies. Macroalgae species were found to be more diverse than in the 2000 surveys, with five to 11 species per sample. Eelgrass communities were found throughout the Ports, and the areas found to house eelgrass communities were consistent with findings from the 2000 baseline study.

A total of 62 taxa, representing a total of 59 unique species of fish, were sampled. These samples included both juvenile and adult fish and were conducted using three different survey methods. Fish appeared healthy, and given the fact that there was not much difference between pelagic fishes at the inner and outer harbor areas, it appears fish move freely within the Ports. Ichthyoplankton surveys observed a total of 71 larval fish with species composition varying throughout different parts of the Ports. However, the dominant species in both the 2000 and 2008 surveys were gobies.

Benthic invertebrates and large macroinvertebrates were sampled during the 2008 study. A total of 204 species were documented. The three tidal zones were also surveyed for this study. In these three areas a total of 334 species of invertebrates were identified with crustaceans being the numerically dominant phyla.

Avian species rely heavily upon the Harbor for foraging, roosting and reproductive habitat. A total of 96 families representing 30 families were observed within the Ports during the 2008 study. Species numbers were highest in the West Basin of the POLB, where Pier 12 resides.

Pier 12 is of negligible size and impact in regard to the vast size and impact of the Harbor. The Navy does not have natural resources activities or projects projected to take place at, or near, Pier 12. Given these two parameters and the management of the Harbor as one entity by the POLB and POLA, there will be no management efforts by the Navy for the limited marine resources at Pier 12.

3.0 Environmental Management Strategy and Mission Sustainability

3.1 Military Mission and Sustainable Land Use

One purpose of this INRMP is to provide guidance to support the military mission, while achieving environmental compliance. Strategies are sought that set a course for excellence in environmental stewardship and compliance at improved efficiency, timeliness, and reduced cost. Environmental compliance is driven at DFSP San Pedro by the handling of fuel as a hazardous substance, and the presence of the critically endangered PVB, and federally threatened CAGN.

The Navy and DLA are achieving no let loss to the military mission of the installation by adopting the strategy below. An impact to the military mission would include:

- Conflicting land use
- Restricted access to tanks and pipelines for routine operations and maintenance
- Encroachment from the surrounding community

Strategy for Military Mission and Environmental Compatibility

Objective: Achieve no net loss of military value.

I. Continue to use NEPA documentation and avoidance measures, best practices to minimize impacts, and mitigation policies to evaluate and guide specific projects.

II. Maintain and update databases and maps of land use and environmental resources as needed to support sound land management decisions.

III. Due to the value of DFSP San Pedro lands for endangered species support, ensure that any restoration and measures of success are written in formal agreements, and that progress in achieving agreement objectives is closely tracked.

IV. As a first priority, use existing BOs, permits, agreements, or programmatic consultations to guide management.

V. Monitor land condition to document management effectiveness using long-term monitoring, remote sensing, and the health of PVB habitat, CAGN habitat, riparian habitat, and other management focus areas.

VI. Seek appropriate partnerships with agencies, academic institutions, and other organizations to achieve sound and sustainable environmental decisions.

3.2 Sustainability of the Natural Environment

Sustainability is the capacity to achieve the mission of the Navy into the future without decline to the natural resource assets that support the mission, and without compromising the growth of future natural resources assets. As treated in this INRMP, the topic of sustainability incorporates the conservation of habitat in the face of long-term threats, including climate change.

Sustainability of Natural Resources with Climate Change

Climate change and its assessment are now recognized by the Navy as threats to national security (The CNA Corporation 2007; National Research Council [NRC] 2010).

Regional and Local Changes in Climate

By 2100, southern California is predicted to have increasing temperatures that mirror larger scale warming patterns across the globe. Local estimates range from 1.5-4.5°F (Messner et al. 2009). Correspondingly, there will be a greater number of days above 95°F (i.e., heat waves), and summers will last longer with spring occurring earlier. Additionally, summer temperatures are predicted to increase relatively more than winter temperatures (Messner et al. 2009). Due to the proximity of DFSP to the ocean, temperature extremes will be moderated somewhat in comparison to areas farther inland. Predicted changes in precipitation are less clear, as current global climate models are less able to model rainfall patterns with the consistency that they are able to model other climate parameters (Messner et al. 2009). Nonetheless, current data suggest that in the next 25 years, California will experience longer dry periods. More specifically, the California Climate Change Center (2006) predicts that California could witness 1-1.5 times more critically dry years; and a 10-55 percent increase in the expected risk of wildfires.

Sea level changes could impact operations at DFSP San Pedro if the marine terminal operations were compromised. Additionally, while not directly impacting DFSP San Pedro, sea level rise will likely affect the nearby strategic and commercially important POLA and POLB. Cayan et al. (2009) present data that estimate sea level rise by the end of the 21st century to fall within 5.3 feet (1.6 m). A recent study for the San Diego area, funded by the California Energy Commission (Messner et al. 2009), found that by the year 2050 common daily tidal inundation will be 1.1-5.3 feet (0.3 to 1.6 m) above 2006 levels, with moderately common levels at 5.3-9.5 feet (1.6-2.9 m). Rare inundations due to storm surge could pass 11 feet (3.4 m) above 2006 levels (Cayan et al. 2008). These predicted climatic changes will most likely confer impacts to the natural resources at DFSP San Pedro. Examples include direct physiological impacts to the PVB through temperature increases and seasonal shifts, as well as indirect impacts associated with vegetation responses to changing climate.

Addressing Climate Change

Addressing climate change poses a new challenge for natural resources managers who will need to anticipate future changes in ecosystem structure and function (Government Accounting Office 2007).

With the exception of Navy facilities on the island of Guam and Diego Garcia, adaptation on coastal DoD installations is generally considered a mid-term, rather than immediate, issue (NRC 2010). In the next 20 to 30 years, investments will have to be made for the adaptation of many Navy coastal installations, and those investments may have implications for decisions made today (NRC 2010).

Important concepts in adaptation to climate change are: resilience (can something rebound from a disturbance [fire, flood] or extreme climatic event [drought]) and sustainability (does the long-term rate of regeneration equal the rate of mortality or loss [as in terms of living organisms or resources like soils]). Under a stable climate we manage for resilience and sustainability; but climate change adds another stressor that can have direct and indirect impacts.

Regulatory drivers for climate change work on military bases include:

- The Conservation Programs on Military Reservations Act (Sikes Act; 16 USC 670) requires preparation of INRMPs in cooperation with the USFWS, a service within the U.S. Department of Interior (USDI).
- The Council on Environmental Quality draft administrative guidance addresses the treatment of climate change impacts within NEPA documents (Council on Environmental Quality Chairman Memorandum for Heads of Federal Departments and Agencies-Draft NEPA Guidance on Consideration of the effects of Climate Change and Greenhouse Gas Emissions; 18 February 2010).

Objective: Adapt and mitigate the adverse impacts of climate change through annual goal setting based on science-based targets, collaborative planning, and adaptive management.

I. Identify species and communities resilient/vulnerable to climate change impacts by collaborating, as feasible, with partners in conducting climate change vulnerability assessments.

II. Improve application models through data collection and validation (as feasible and needed) and by using such science based models in environmental and natural resources planning.

III. To the extent necessary, improve the graphical depiction of the potential impacts of climate change scenarios for DFSP San Pedro to address anticipated shifts in species ranges and population abundances in climate change vulnerability assessments.

IV. 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.

V. Establish partnerships for collaboratively addressing climate change issues, as needed and when feasible.

VI. Address the anticipated shifts in species distribution ranges and population abundances through adaptive management supported by environmental monitoring.

3.3 Natural Resources Consultation Requirements

For DFSP San Pedro, the dominating environmental compliance responsibilities and liabilities are: routine maintenance of the fuel storage facility, emergency response planning, CERCLA cleanup at IR sites, and the groundwater remediation project.

The current endangered species protections, provided by the 2010 BO, cover the entire installation with a programmatic consultation on routine and emergency activities. Covered are all activities associated with routine and emergency operations that are foreseeable:

- Road and drainage repair
- Electrical system upgrades
- Perimeter fenceline repair and maintenance
- Uncovering the tops or sides of hillside tanks for repair and maintenance

- Pipe and valve repair and replacement
- Driving vehicles on established roads to conduct periodic maintenance checks (daily, weekly, monthly, etc.) and for security patrols
- Mowing for fire hazard abatement
- Valve repair and replacement
- Other operations that support the maintenance, safety, and operation of DFSP San Pedro as defined by the facilities and public works manager, including emergency response to significant threats such as fuel or water leaks

DoDI 4715.03 requires INRMPs to include procedures "to comply with federally-listed threatened and endangered species management and recovery efforts on DoD lands and waters…and shall emphasize military mission requirements and interagency cooperation during consultation, species recovery planning, and management activities."

No take of adult PVB was identified in the 2010 BO, due to the potential for adult PVB to be observed, and thus take to be avoided. In order to account for take of the species, a Management Emphasis Area was identified with take thresholds by habitat area (as opposed to take thresholds for individuals) for both the PVB and the CAGN (Map 4-1). These are outlined in the BO, which can be found in Appendix C.

3.3.1 NEPA Assessment and Compliance

Background

NEPA requires federal agencies to assess, in detail, the potential environmental impacts of their actions that could significantly affect the quality of the environment. 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. NEPA documentation for DFSP San Pedro projects is currently prepared by NAVWPNSTA Seal Beach.

Strategy for NEPA Planning

Land Use and Environmental Planning for Mission Sustainability

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. This INRMP's scope is defined in DoDI 4715.03 and OPNAV M-5090.1. To be comprehensive, all existing planning-related documents should become integrated and missing planning components should be added.

This INRMP seeks to reference sections from each planning document for the DFSP to assure integration. Land use and natural resources decisions are supported by existing emergency response and routine maintenance guidelines, IR work plans, and the 2010 BO. Federal legislation and regulations, and DoD and Navy policy further guide land use management (see OPNAV M-5090.1 for a summary of relevant laws).

Planning should also be integrated with the Environmental Quality Assessment process. This annual review, required by OPNAV M-5090.1, is meant to assist COs in identifying and correcting compliance gaps. This evaluation takes place during the annual INRMP Metrics Review with DFSP's interagency partners.

Objective: Ensure that land use planning decisions are consistent with all applicable planning documents, including this INRMP, and do not impede the mission of DFSP San Pedro.

I. Develop and sustain the land use planning capability.

- **A.** Assign appropriate land use and natural resources personnel.
- **B.** Prevent degradation of habitat areas that support the PVB or the CAGN that could result in sustainability concerns for these species.

II. Ensure that the decision-making process is flexible to changing mission requirements and site-specific problems. Implement adaptive management to accommodate new strategies resulting from monitoring, scientific findings, or new management policies.

III. Conduct mitigation planning to avoid or minimize effects on special status resources.

3.4 Integrating Other Plans and Programs

INRMPs are to be prepared in coordination with installation range plans, training plans, Integrated Cultural Resources Management Plans, IPMPs, IR plans that address contaminants covered by CERCLA, Resource Conservation and Recovery Act, and related provisions, and other appropriate plans and offices (OPNAV M-5090.1). Navy guidance states that an INRMP must coordinate with mission claimants to ensure that the current and future management strategies reflected in these missions are reflected in the INRMP. This INRMP is not intended to function as a comprehensive compilation of details on all related topics, but to briefly summarize the key interrelationships with these plans, and reference where detailed information can be found. The plans listed below are immediately related to natural resources management and are discussed at greater detail. Other plans, such as: Oil and Hazardous Substances Integrated Contingency Plan; Operations, Maintenance, Environmental and Safety Plan; Public Awareness Plan; and Main Terminal Stormwater Pollution Prevention Plan, while important in their related fields, do not play a large part in natural resources decisions at DFSP San Pedro.

DoD guidance (DoDI 4715.03) requires the integration of "the DoD 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, installations requirements, GIS, Environmental Management Systems (EMS), the Readiness and Environmental Protection Initiative, project planning programs, and range and training area management and sustainment programs."

3.4.1 Integrated Cultural Resources Management

The Integrated Cultural Resources Management Plan identifies what natural resources activities require project consultation on cultural resources laws, and the required steps for consultation. It also identifies which natural resources actions will be classified categorically as No Adverse Effect. Such actions will be documented and that documentation provided to the State Historic Preservation Office.

Jointly with the Station Cultural Resources Media Manager, the Natural Resources Media Manager will, as needed, conduct surveys prior to new land disturbance activities, and conduct briefings for personnel working in endangered and sensitive habitat areas, and any cultural areas (operations, Public Works Department, customers).

3.4.2 Installation Restoration

Navy guidance limits the treatment of IR sites in INRMPs. Information on the IRP is limited to maps that show the locations of IR sites and a specific citation of, or reference to, the most up-to-date IRP documents and their location(s). Chapter 2 contains a map (Map 2-5) and table (Table 2-1) of IR sites and their status.

The installation recognizes that adverse impacts to natural resources may result from the release of hazardous substances, pollutants, and contaminants into the environment. The Navy's IRP is responsible for identifying CERCLA releases; considering risks and assessing impacts to human health and the environment, including impacts to endangered species, migratory birds, and biotic communities; and developing and selecting response actions when a release may result in an unacceptable risk to human health and the environment.

Strategy for Integrating the Installation Restoration Program

Objective: Reduce potential adverse impacts to natural resources from historic contamination of DFSP San Pedro by supporting the IRP.

I. When appropriate, the natural resources management staff will help the IRP Remedial Project Manager identify potential impacts to natural resources caused by the release of contaminants.

II. Regional or installation natural resources staff will also participate, as appropriate, in the IRP decision-making process by communicating natural resources issues on the installation to the Remedial Project Manager, attending Restoration Advisory Board meetings, reviewing and commenting on IRP documents (e.g. Remedial Investigation, Ecological Risk Assessment), and ensuring that response actions, to the maximum extent practicable, are undertaken in a manner that minimizes impacts to natural resources on the installation.

III. When appropriate, the regional or installation natural resources staff will make recommendations to the IRP (Remedial Project Manager) regarding cleanup strategies and site restoration. During initial monitoring protocols, the natural resources manager may suggest that sampling and testing is accomplished so as not to impact sensitive or critical areas. Also, during site restoration, the natural resources manager has the opportunity to recommend site restoration practices that are outlined within the INRMP. Examples include landfill caps restored to grasslands, excavation areas restored to wetland/pond areas, and treated water located to enhance a pond area.

IV. Comply with the procedural and substantive requirements of CERCLA as amended by the Superfund Amendments and Reauthorization Act, and related state laws.

V. Follow regulations set out in the National Contingency Plan to identify, assess, and remediate past releases that pose a significant risk to human health or the environment.

3.4.3 Sustainability in the Interface between the Built and Natural Environments

Facilities planning interfaces with natural resources planning for this INRMP at the building exterior and through site selection. There is a need to coordinate among the roles and responsibilities of those executing the EMS at DFSP, those planning new construction, those responsible for pollution prevention, and natural resources managers to achieve mutually interdependent program goals.

EO 13148 (Greening the Government through Leadership in Environmental Management; 21 April 2000) directed federal agencies to establish an EMS to achieve internal pollution prevention goals through repeatable and consistent control of operations at all appropriate facilities. The Navy implements this through CNO policy (06 December 2001) Navy EMS Policy. The EMS is a formal management framework that provides a systematic way to review and improve operations, create awareness, and improve pollution prevention performance. The Navy EMS conforms to the International Organization for Standardization 14001:2004 EMS standard. This EO required that each federal agency conduct a self-audit of pollution prevention practices, using an accepted EMS framework.

In the Navy much of sustainability planning occurs within the Regional Shore Infrastructure Plan process which evaluates facility needs and siting options. One of the stated Navy goals of the Regional Shore Infrastructure Plan process pertaining to natural resources sustainability principles is: "Recognizing the environmental association of all planning recommendations and providing ecologically sustainable solutions that support and enhance the regional shore establishment" (NAVFAC Instruction 11010.45).

The National Governors Association checklist for better land use smart-growth approaches is the second set of standards used by the Navy.

For water use, low impact development is a site design strategy with a goal of maintaining or replicating the pre-development hydrologic regime through the use of designs to create a functionally equivalent hydrologic landscape. Hydrologic functions of storage, infiltration, and ground water recharge, as well as the volume and frequency of discharges are maintained through the use of integrated and distributed micro-scale water retention and detention areas, reduction of impervious surfaces, and the lengthening of flow paths and runoff time. This contrasts with conventional approaches that typically convey and manage runoff in large facilities located at the base of drainage areas.

Sustainability indicators are developed through the expert opinions of scientists, management agency personnel, non-governmental organization representatives, practitioners, and other stakeholders. Many opportunities exist for the construction of infrastructure in a way that promotes the achievement of the Navy's mission in an environmentally integrated way. For example, the use of landscape designs that benefit wildlife close to human use areas, and bioengineering techniques can promote favored wildlife, while excluding undesirable species, such as rats. The following strategies are designed to improve sustainability of both projects and habitat. Many are adapted from EO 13423 (Strengthening Federal Environmental, Energy, and Transportation Management; 26 January 2007).

Objectives and Guidelines for Sustainability in the Interface between the Built and Natural Environments

Objective: Sustain natural resources and Navy institutional missions into the future without decline or compromise to natural resources assets.

I. Use the Regional Shore Infrastructure Plan and site approval processes to bring in interdisciplinary support to decisions early in the project planning phase.

3.4.4 Integrated Pest Management Plan

Objective: Support the IPMP's framework for meeting the DoD's annual goals or measures of merit, per DoDI 4150.07.

I. Continue to integrate INRMP activities with guidelines of the IPMP.

II. Ensure that one hundred percent of all DoD installation pesticide applicators are appropriately certified. See Section 2.4 of the IPMP for training and certification requirements.

III. Maintain regulatory compliance. 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.

3.5 Collaborative Resource Planning, Ecosystem Management, and Beneficial Partnerships for Achieving INRMP Goals

DoD and Navy policy call for its installations to expand involvement in regional ecosystem management, biodiversity management, and restoration initiatives (DoDI 4715.03 and OPNAV M-5090.1). These represent a way to address biological and hydrological needs on natural scales instead of political ones, which are based on artificial boundaries.

Ecosystem management in 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. The goal is to preserve and enhance ecosystem integrity, and to sustain both biological diversity and continued availability of those resources for military readiness and sustainability, and other human uses (as defined in OPNAV M-5090.1). The ecosystem mandate emphasizes partnerships, public outreach, long-term monitoring and adaptive management, based on the best available scientific information.

Mitigation planning seeks to set aside lands for non-development or non-use through a network of wildlife preserves, when development projects impact natural resources. The Navy does not want its lands to be viewed by others as the "solution" for regional land use requirements due to the perceived minimal economic and political cost of using military lands. However, the Navy and DLA have a keen interest in the recovery of a butterfly once thought to be extinct, and should participate in regional conservation efforts, along with other partners.

The Sikes Act provides a mechanism whereby the DoD and USDI 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 a Memorandum of Understanding between the DoD and USDI. Cooperative and collaborative management of DFSP San Pedro's wildlife is required under the Sikes Act and the Fish and Wildlife Coordination Act. Establishment of populations elsewhere on the Palos Verdes Peninsula will dramatically decrease the possibility of extinction.

Palos Verdes Peninsula Natural Communities Conservation Program

The Palos Verdes Peninsula has been identified by CDFW as one of approximately 13 major NCCP planning subregions for southern California. Over 2,300 acres (930 ha) of land remain undeveloped on the peninsula with the majority of the open space areas located in and around the city of Rancho Palos Verdes (PVPLC 1997). The presence of sensitive species, the decline in plant communities (e.g. coastal sage scrub), and potential development conflicts on the peninsula led to Rancho Palos Verdes' enrollment in the NCCP program in 1996.

The DLA is a cooperating, but not signatory, agency in the NCCP agreement. It is anticipated that the NCCP will eventually lead to a viable solution for both the CAGN and the PVB (USFWS 1996).

DFSP San Pedro is considered an important satellite area for core NCCP preserve areas. However, the BOs for DFSP San Pedro will take precedence over any NCCP agreement. DoD policy in southern California has been to participate in such planning processes, yet not sign any formal agreements. Regardless of the Navy and DLA's participation, the biological reserves of the NCCP and DFSP San Pedro will interact and mutually enhance viability.

California Wildlife Action Plan

The South Coast region of California is recognized as one of the world's hotspots of biological diversity and is home to a total of 476 vertebrate animal species, approximately 38 percent of all the vertebrate species found in California (California Department of Fish and Game 2008). It is also distinguished by the tremendous population growth and urbanization that have transformed the landscape since the 1940s. This intersection of biological resources and urbanization has made the South Coast the most-threatened biologically diverse area in the continental United States (U.S. Geological Survey 2003).

On the outskirts of Los Angeles, DFSP represents a conservation island within an industrial and urban matrix. The California Wildlife Action Plan (California Department of Fish and Game 2008) identifies key threats for this region, such as:

- Incursion by invasive species, including predatory Argentine ants, Brazilian fire ants, and Mediterranean annual grasses. Conversion of native vegetation communities to non-native annual grasslands.
- Loss of remaining habitats to development.
- Loss of landscape connectivity important for the stability and resilience of rare butterfly and other species.
- Altered fire regimes.
- Recreational pressures.

The Wildlife Action Plan calls for federal land managers, such as DoD, to sufficiently protect sensitive species and important wildlife habitats with adequate funds and staff to do so. Finally, the Wildlife Action Plan states that federal and state agencies and non-governmental partners should collaborate to institute appropriate fire management policies and practices to restore the ecological integrity of the region's ecosystems, while minimizing loss of property and life.

Community Volunteer Support

Considerable community volunteer support has been, and should continue to be, engaged at the DFSP San Pedro. Ongoing volunteer efforts at DFSP San Pedro already include exotic plant removal and support of native plant nursery operations.

3.6 Public Access and Outreach

3.6.1 Public Access

DoD installations are to provide for sustained public access and use of natural resources for educational or recreational purposes, when such access is compatible with mission activities, and with other considerations, such as security, safety, or resource sensitivity (DoDI 4715.03). Although DFSP San Pedro accommodates community softball teams in controlled locations, hosts a community nature walk once per year, and welcomes volunteers to work on habitat enhancement in a supervised setting, DFSP San Pedro is not open to the general public. The softball fields are licensed to community groups, and local non-profit organizations are granted access for organized, volunteer habitat restoration activities, under the guidance of the PVPLC. Because of its small size, requests for recreational access are not anticipated.

3.6.2 Public Outreach

There are many opportunities available on DFSP San Pedro to provide interpretive programs for DFSP San Pedro personnel and visitors, including displays or fact sheets on natural and cultural resources. DFSP San Pedro already has a beautiful entry-way display on its natural resources program that welcomes visitors to its administrative headquarters. It includes photography of the PVB, nature walks and volunteer activities, a wildlife painting, and insect collection display.

Strategy for Public Outreach

Objective: Build a strong conservation ethic and personal commitment to natural and cultural resources stewardship by personnel through the promotion of education and awareness of the unique environmental setting and history of DFSP San Pedro.

I. Continue previously successful outreach activities that benefit the public and brought local community appreciation.

II. Identify conservation requirements and best practices to educate personnel on the protection of DFSP San Pedro's resources and building a conservation ethic.

4.0 Program Elements

4.1 Threatened and Endangered Species Management

4.1.1 Sensitive and Endangered Wildlife Species

The Navy and DLA are responsible for the protection and management of species listed as endangered or threatened under the federal ESA. Besides the two listed species known to occur on DFSP San Pedro, the federally threatened CAGN and the federally endangered PVB, other sensitive species, such as state-listed or species of special concern, may inhabit DFSP San Pedro. The Navy encourages cooperation with state protection programs. DFSP San Pedro should be prepared to implement appropriate strategies to protect sensitive species and habitat.

Conservation of the PVB is important in its own right as a rare and endemic species, but additionally it may play a role as an umbrella species in protecting the habitat of other rare and threatened species (Mattoni 1996a).

The 2006 DoD Guidance for INRMPs requires a Constraints Map that shows all areas on the installation where restrictions on training or mission occur due to natural resources related issues, or where encroachment exists. This is to comply with the DoD Template for INRMPs. Map 4-1, which is the same figure used in the 2010 BO, functions as the Natural Resources Constraints Map for military mission activities.

4.1.1.1 Palos Verdes Blue Butterfly and Coastal California Gnatcatcher

Pursuant to the requirements of the 2010 BO Section 7, a habitat restoration plan is under development to cover restoration activities over the next three to five years. The plan will specifically address activities at DFSP San Pedro but will also provide a general background on Palos Verdes Peninsula-wide recovery programs for these two species. The plan will be submitted to the USFWS for approval and evaluated and revised as needed as part of the annual INRMP metrics review. After approval of the Restoration Plan, specific annual work plans will be prepared and submitted to the USFWS for approval.

4.1.1.2 Palos Verdes Blue Butterfly

PVB management is a multi-pronged approach at DFSP San Pedro. The installation conducts annual surveys, and estimates the current population to make management decisions, and manages DFSP San Pedro in a conscientious way to promote the establishment of additional, and maintenance of the current, PVB population. Refer to Section 2.3.1 Threatened and Endangered Species and Species of Concern for details on the current status of the PVB and annual survey and population estimates. Section 2.1.5.3 Endangered Species Recovery and Habitat Restoration discusses current and historic restoration efforts that maintain and/or increase habitat suitable for use by PVB.

These management actions, in concurrence with the PVB captive breeding program are essential to manage the population at DFSP San Pedro, while simultaneously working to establish a regional population of PVB. The PVB captive breeding program is underway for three purposes: 1) to provide insurance against chance loss of the single remaining population of this species; 2) to increase population size; and 3) to produce sufficient numbers of individuals to reintroduce the species into revegetated sites from where it was extirpated. Based on the most recent survey data, it is estimated that there are 144 adult PVB in the wild (Longcore and Osborne 2012). The captive rearing program released 500 adult butterflies, 500-1,000 larvae, and 100 pupae into the wild, and at the close of the season 2,048 pupae remained in captivity (Johnson et al. 2013).

Strategy for Palos Verdes Blue Butterfly

Captive breeding under a permit from the USFWS started in 1995 with the capture of five females. These yielded 68 eggs that produced 17 viable pupae. In 1996, five wild females were confined, producing 280 eggs that yielded 65 pupae. With improved laboratory facilities, including an outdoor flight/mass mating cage using caged and potted food plants, several-fold increases in PVB production occurred. Recently, the natural population appears to be in decline. Currently, there is more lab stock of pupae than exist in habitat areas (Johnson et al. 2013).

Objective: Maximize the recovery and stability of the PVB by complying with the 2010 BO.

I. Comply with the 2010 BO on Routine Operations and Maintenance, including with respect to when to reinitiate consultation with the USFWS (See Section 3.3 Natural Resources Consultation Requirements).

II. Improve continued captive rearing of the PVB.

- **A.** Continue operation of a native plant nursery for providing PVB host plants and other native vegetation for habitat restoration.
- **B.** Continue to share information with others who are trying to establish habitat and PVB populations.

III. Monitor PVB habitat in compliance with the 2010 BO.

IV. Implement measures to minimize the risk of habitat degradation from the invasion of non-native vegetation within designated Management Emphasis Areas as defined in Map 4-1.

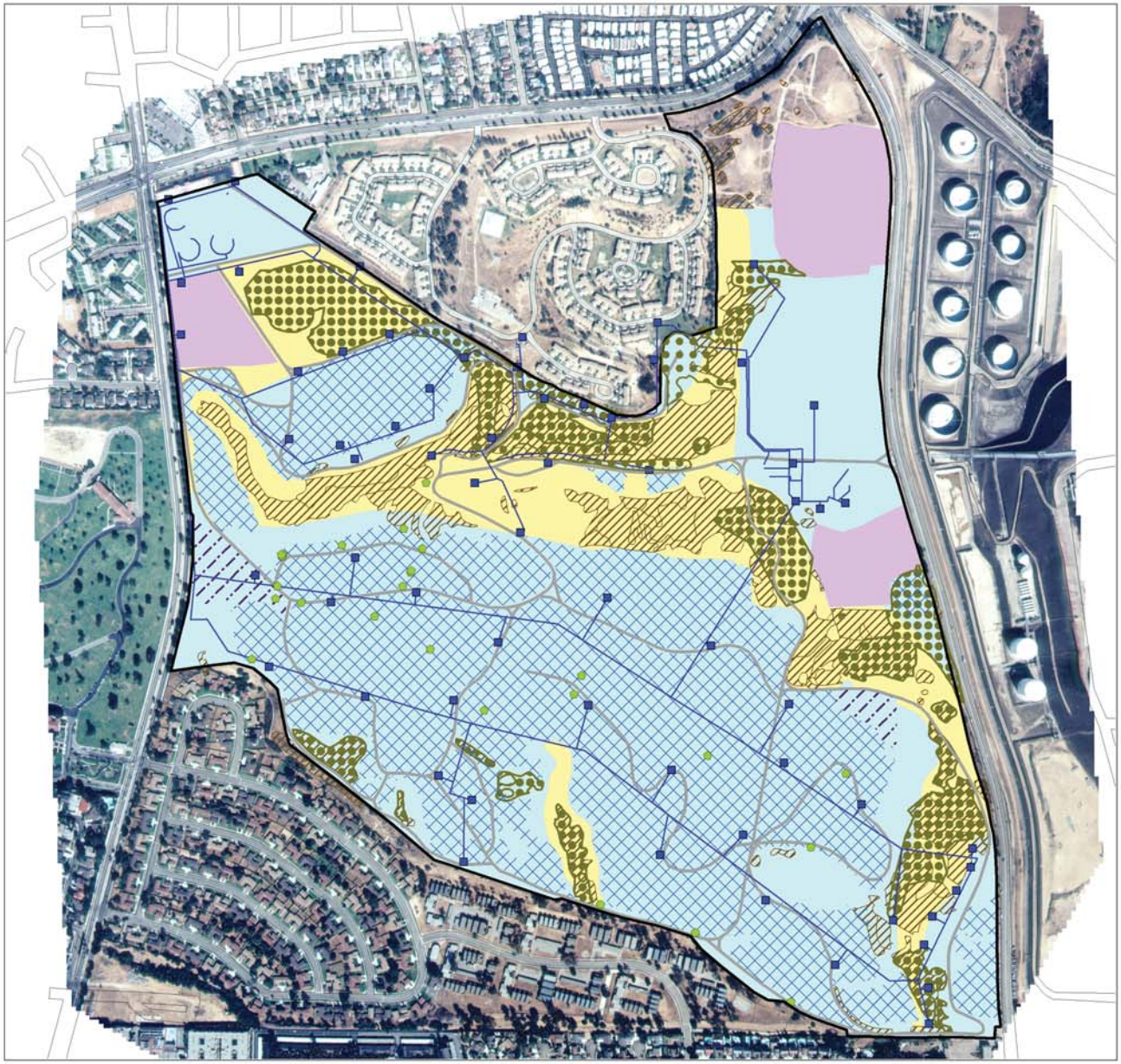
V. Support research on means to enhance successful recovery of the PVB.

4.1.1.3 Coastal California Gnatcatcher

The population of CAGN at DFSP San Pedro has fluctuated from a maximum of five pair to single individuals since surveys began in 1993 (Aigner and Koehler 1997; Courtois 2003). Years with no breeding at DFSP San Pedro occurred in the mid to late 1990s (Aigner and Koehler 1997), but surveys in 2003 found a total of four pair with at least two of these successfully breeding (Courtois 2003). The most recent surveys, conducted in 2011, found two pair and two to three single males (ICF International 2011).

About 45.8 acres (18.5 ha) of habitat exists for CAGN at DFSP San Pedro, much of which broadly overlaps suitable PVB habitat. However, whereas PVB require open coastal sage scrub, CAGN require denser sage scrub for nesting. A maximum of five pairs of CAGN can exist within the current habitat extent.

The BO issued by the USFWS in July 2010 contains measures to minimize and avoid impacts to the resident CAGN population and its habitat. In addition, periodic monitoring should be conducted to track the population on DFSP San Pedro.



Management Emphasis Areas at DFSP San Pedro

(Biological Opinion FWS-LA-08BO606-08F0704, 02 July 2010)

- DFSP boundary
- Operations Emphasis
- PVB Management Emphasis
- Lease areas
- Mowed areas
- Avoidance areas (4.4 ac)
- Wells
- Hydrants
- Water lines
- Roads
- Palos Verdes blue butterlfy potentially occupied habitat (35.5 ac)
- California gnatcatcher potentially occupied habitat (45.8 ac)

N W E S

0.1 0.05 0 0.1 0.2 Miles

0.2 0.1 0 0.2 0.4 Kilometers

Map 4-1. DFSP San Pedro management emphasis areas from the 2010 Biological Opinion.

This Page Intentionally Blank

Strategy for the Coastal California gnatcatcher

Objective: Protect the existing CAGN population on DFSP San Pedro by complying with the 2010 BO.

I. The following measures will be used to minimize and avoid impacts to CAGN, within potentially occupied habitat as defined in Map 4-1.

A. Eliminate disturbance impacts to active CAGN nests.

B. If vegetation needs to be cleared outside of the breeding season, follow protocols in BO to minimize impacts to CAGN.

II. Protect CAGN habitat on DFSP San Pedro as defined on Map 4-1.

III. Comply with PVB and CAGN habitat disturbance thresholds described in the 2010 BO.

IV. See Section 4.1.1.2 Palos Verdes Blue Butterfly, Strategy IV, for measures to implement to minimize the risk of habitat degradation from the invasion of non-native vegetation, within designated Management Emphasis Areas as defined in Map 4-1.

V. Monitor the CAGN population on DFSP San Pedro periodically.

4.1.1.4 Habitat Restoration for Sensitive Species Support

Success criteria for revegetation should result in a net benefit to the PVB, the CAGN, or other sensitive species identified as at risk by conservation organizations. Increases in abundance and dispersal of the butterfly are measures of success, albeit potentially difficult to detect. A surrogate for measuring the functional benefit derived from listed species is to base success on the relative cover of native and non-native perennial plants. Because the dominant non-native annuals (grasses, tocalote, and filarees [*Erodium* spp.]) are difficult to control, they are most successfully displaced by native shrubs. Non-native perennials (iceplant, castor bean, horehound [*Marrubium vulgare*], pepper trees, and tree tobacco [*Nicotiana glauca*]) can be simply controlled, if not eradicated.

Objective: Restore habitat and minimize the risk of habitat degradation from the invasion of non-native vegetation within the Management Emphasis Areas designated for the PVB in the 2010 BO, through achieving the standards described in that document.

Strategy for Successful Habitat Restoration

I. Comply with the measures in the 2010 BO.

II. For situations not in defined Management Emphasis Areas as identified in Map 4-1, or otherwise not covered under the 2010 BO, adopt a general vegetation planting priority system to improve secondary and rare plant diversity and enhance the structure and function of each plant community.

III. Adopt plant composition targets that support multi-species biodiversity.

4.1.2 Criteria for Selecting Habitat Restoration Sites

Strategy for Siting Habitat Restoration

Objective: Minimize conflict with DFSP San Pedro mission activities while maximizing successful endangered species recovery.

I. Habitat restoration activities shall be sited so as not to interfere with accomplishment of DFSP San Pedro's mission. See Management Emphasis Areas on Map 4-1.

II. DFSP San Pedro is considered an important satellite to the core reserve area for the Palos Verdes Peninsula as defined by the NCCP program. Habitat restoration site selection will follow basic tenets of reserve design as supported by NCCP.

A. Prior to having a remedy in place, there will be no new restoration on IR sites or in areas that may be needed for access to an IR site to conduct studies or clean-up activities. During the Remedial Investigation/Feasibility Study phase, consideration of habitat enhancement opportunities for PVB and CAGN will be included in the analysis of remedial alternatives.

B. Consider formalizing an agreement with USFWS to declare any new habitat established on IR sites as temporary benefit only, due to the possible need for maintenance of remedies such as a landfill cap.

4.2 Riparian Areas Management

Riparian areas provide many vital ecological functions that support the many uses of water, including for resident and migratory wildlife. They are among the most impacted habitats in the world. A key to improving riparian habitat value for avian species is to link it up with the most available and suitable nearby habitats, such as at Harbor Park to the immediate northeast of DFSP San Pedro (Refer to Map 2-2). Because of its small size and isolation, the riparian habitat at DFSP San Pedro is probably unsuitable for nesting by the willow flycatcher or least Bell's vireo, as well as several other birds that are characteristically less restricted and less sensitive. Enhancement of the willow canopy or undergrowth on this site would probably be of limited success in attracting sensitive riparian species because the drainage is only a few hundred meters long and is constricted within a small, narrow canyon. Much of it contains only herbaceous vegetation rather than trees or shrubs. Furthermore, this drainage is apparently isolated from source populations, thus reducing the possibility of successful colonization.

The most recent mapping of wetlands was at the reconnaissance scale (that is, not using the three-parameter U.S. Army Corps of Engineers 1987 method) for the entire installation, and appears in a draft Biological Assessment (TEC and DMEC 2003). No GIS files are available from this report. This area is not considered to be a Jurisdictional Water of the U.S.

- 2.05 acres (0.8 ha) of riparian area, consisting mostly of seasonally flooded arroyo willow or mulefat scrub.
- 0.36 acre (0.15 ha) of other wetland areas, consisting of intermittent or ephemeral channels that are predominantly unvegetated. This channel is no longer present on the property.

Riparian Areas Management Strategy

Map 2-12 depicts the riparian areas of DFSP San Pedro.

Objective: Protect riparian areas by avoiding direct and indirect impacts to them or a buffer around their catchment area.

I. Monitor the condition and trend of riparian and wetland communities.

II. Use plant canopy cover and structure, and presence or absence of non-natives as primary indicators of a need to adjust management. Remove non-native trees and shrubs from drainages.

III. Ensure the ravine maintains the capacity to absorb and process large, flash flows without undercutting stream banks or delivering sediment overflow.

4.3 Fish and Wildlife Management

4.3.1 Mammals

Strategy for Mammals

Objective: Seek to maintain populations of native mammals for ecosystem health and protection of special status species.

I. Assess and evaluate the baseline status and trend of mammals periodically.

II. Ensure that pest management of mammals minimizes harm to native species.

4.3.2 Amphibians and Reptiles

Strategy for Reptiles

Objective: Seek to maintain populations of native reptiles for ecosystem health and protection of special status species.

I. Assess and evaluate the baseline status and trend of reptiles and amphibians periodically.

II. Determine the population status of any special status reptiles to support management decisions with respect to these species.

4.3.3 Invertebrates

Strategy for Invertebrates

Objective: Seek to maintain populations of native invertebrates for ecosystem health and protection of special status species, reducing invasive ants that may affect native species, and targeting beneficial pollinator species.

I. Determine the abundance and diversity of invertebrate species on DFSP San Pedro periodically.

II. Identify beneficial pollinator species and develop best practices for their population and habitat management.

4.3.4 Pest, Feral Animal, and Invasive Wildlife Management

If wildlife species can find food, water or shelter in areas populated by humans, many will adapt to and even thrive in the new environment. Conflicts with humans can arise and range from simple nuisance cases, to damage to buildings or dwellings, or serious issues of disease transmission to people. Coyotes, ground squirrels, rats, swallows, sparrows, and feral dogs and cats can become nuisances and occasionally a health hazard.

Animal damage control shall be implemented as justified by sound ecosystem management, health and safety considerations, conflicts with the military mission, and the requirements of federal and state laws. Control based on habitat management is the preferred method. Other approaches of control include: deliberate removal of animals by shooting, or trapping; biological control by natural predators; chemical control by keeping animals away with a repellent; or, physical control by scaring away animals with various devices or excluding them from a site with fences. Potential predation of the PVB or its food supply may be occurring, especially by starlings or grackles.

Strategy for Predator, Feral Animal, and Invasive Wildlife Management

Objective: Protect the DFSP San Pedro, its inhabitants, and native species from risk or loss due to wild or feral animal predation or damage.

I. Minimize the risks and potential losses and liabilities from wild or feral animal damage.

II. Conduct a predator hazard assessment, as needed, for listed and sensitive species to target predator management.

III. If feral animals are identified as a problem at DFSP San Pedro, provide information to installation personnel on methods to limit and/or discourage feral populations.

4.4 Vegetation Management

4.4.1 Plant Communities

Plant communities are a fundamental component of ecosystems. Their composition and status are indicators of ecosystem health and wildlife habitat. DFSP San Pedro is recovering from past use of soils and vegetation including past agriculture and grazing, as well as a military use history of over half a century. There are areas of soil erosion and vegetation type conversion resulting from this history. The current program has provided a baseline description of the composition of vegetation on DFSP San Pedro and documenting the occurrence of less common species through DFSP San Pedro's partnership with local members of the CNPS, Audubon Society, and local universities. A botanical survey was conducted in 1999 to identify plant species and delineate plant communities on DFSP San Pedro. A plant list can be found in Appendix E.

Of the recognized threats to terrestrial vegetation (such as climate change, soil erosion, altered fire regime, and invasive species), the most urgent to address at DFSP San Pedro is thought to be invasive species. However, natural resources program objectives may be compromised by the broad, conceptual vegetation classification that currently exists for DFSP San Pedro. Vegetation structure and floristics are, along with soil substrate, the building blocks of habitat. The current vegetation map is based on broad classes of vegetation that are too coarsely mapped, thereby missing much

information needed to develop specific objectives for species and habitats that are the focus of management. It also makes it difficult for DFSP San Pedro to participate in regional planning with other agencies that are, increasingly, working with the U.S. National Vegetation Classification System, which is the federal standard. By developing quantitative vegetation descriptions, key habitat for numerous targeted rare plants and wildlife can be better described.

The classification system that DFSP San Pedro managers may consider using is VegCAMP. The U.S. National Vegetation Classification System and VegCAMP systems comply with requirements of the federal geodetic data standard, and thus with DoD requirements. The DoD has signed a Memorandum of Understanding for its use.

Objective and Strategies for Plant Communities

Objective: Conserve a mosaic of plant communities to support biodiversity and ecosystem health. Restore, enhance, and offset losses of native vegetation in habitat areas shown in the Management Emphasis Areas Map.

I. Conduct vegetation mapping to the U.S. National Vegetation Classification System and VegCAMP standard.

II. Comply with the provisions of the 2010 BO regarding disturbance to PVB and CAGN habitat.

III. Continue to implement and revise the invasive non-native plant species management and eradication program, consistent with the long-term protection of native plant communities.

IV. Increase secondary and rare plant diversity through reduction of invasive and non-native plants and management of native plant communities.

V. Monitor the condition and trend of plant communities.

4.4.2 Special Status Plants

The California Natural Diversity Database, maintained by CDFW, contains information on observations of sensitive resources in California. A search of the Torrance quadrangle of the California Natural Diversity Database to determine the potential for occurrence of rare plants revealed that two had been reported near DFSP San Pedro. Mexican flannelbush was found about 5 miles (8 km) away, while Lyon's pentachaeta was last reported in 1920 on Palos Verdes Mountain, about 1.5 miles (2.4 km) away. The three plants below are included in the CNPS Inventory of Rare and Endangered Plants (see locations on Map 2-6).

- Peirson's morning glory (CNPS List 4.2 Limited Distribution).
- Kellogg's horkelia (CNPS List 1B.1Rare, threatened, or endangered in California and elsewhere).
- Southern California black walnut (CNPS List 4.2 Limited Distribution).

Strategy for Special Status Plant Management

Objective: Provide for the recovery, enhancement, and protection of all special status plant species and their respective habitats, as a proactive strategy to prevent federal listings of plants.

I. Continue to confirm the absence on DFSP San Pedro property of each special status plant species with potential to occur by conducting rare plant surveys in conjunction with vegetation mapping.

II. Implement a management program upon the discovery of a special status plant on DFSP San Pedro.

4.5 Migratory Birds Management

Many native birds are neotropical migratory species. As a result of obvious population declines, neotropical migratory birds are the subject of an international conservation effort. The MBTA provides protection for nearly all bird species inhabiting DFSP San Pedro, whether they are migratory or year-round residents. As an important biological resource and a good indicator of ecosystem health, the bird population of DFSP San Pedro should be managed effectively and in accordance with applicable resource laws.

Previous surveys on either DFSP San Pedro or its immediate vicinity identified eight species that currently have a special status from either the state of California or the federal government, including three that are confirmed breeders. See Appendix D for surveys by Aigner and Koehler in 1997 from which bird observations and habitat associations are derived. Among species that breed at DFSP San Pedro, management strategies for the federally threatened CAGN were discussed in Section 4.1.1.3 Coastal California Gnatcatcher. Other breeding species include the loggerhead shrike, which is common in open grassland and sage scrub; and Allen's hummingbird, found mostly in woodland and riparian scrub on the property. Both of these species are listed as a USFWS BCC and a CDFW CSSC. Three other special status species that are not known to breed at DFSP San Pedro have been noted on the property, including the peregrine falcon, which has been delisted by the USFWS but is still listed as endangered by the CDFW. The state endangered willow flycatcher has been observed in the riparian areas during migration, and the USFWS BCC, Lawrence's goldfinch, was noted once flying over DFSP San Pedro. Two additional species were noted at adjacent land, formerly the Palos Verde Navy Housing Area (Navy 2007). These species, Vaux's swift and yellow warbler, are both CSSCs and Vaux's swift is also a USFWS BCC.

See Appendix G for Migratory Bird Management on DFSP San Pedro in accordance with the MBTA of 1918 (16 USC 703-711), EO 13186, and DoD policy, with use of the PIF Program.

See below for the DFSP strategy details for management of bird species on the property.

Strategy for Migratory Birds

Objective: Conserve viable habitat for avian species that use DFSP San Pedro for stopover resting, feeding, and nesting.

I. Determine the status, health, and habitat use of avian species, including the distribution and abundance of sensitive species periodically.

II. Protect the sustainability of these bird populations and their habitat.

III. Provide information to DFSP personnel on migratory bird stewardship strategies.

IV. Preserve and maintain habitat for migratory birds.

V. Participate in the DoD-PIF program.

4.6 Invasive Species Management

4.6.1 Invasive Weed Control

EO 13112, signed in February 1999, directed federal agencies to identify and control invasive species. The order stipulates that agencies will prevent the introduction of invasive species, monitor for their presence, and respond rapidly to eliminate them. The DoD subsequently issued a memorandum of compliance with this EO. An effective way to implement these actions is through the Federal Noxious Weed Act of 1975 that requires federal land managers cooperate with state and federal agencies to manage undesirable plants.

Many non-native species are already so abundant and widely established that control efforts would be fruitless, or they lack the aggressiveness to cause great concern. An example throughout is California wild oats (*Avena barbata*), introduced from Europe with the Spanish discovery of California. This grass, along with filaree (*Erodium* sp.), is so ubiquitous in the modern California landscape that they must be considered permanently naturalized components of the community. These and other introduced annuals can change ecosystem dynamics by changing soil nitrogen cycling, out-competing natives for water, and predisposing an area to wildfire by providing fuel where there otherwise might not be enough to carry a fire. Several non-native species have the ability to completely change the structure of the vegetation, making it unsuitable to most native wildlife species. Sensitive and declining wildlife and plant species are particularly at risk from these weeds.

Certain specific invasive plant management guidelines are contained as Conservation Measure Number 6 in the 2010 BO. This measure includes annual vegetation monitoring, a list of species to be eradicated, identification and prioritization of more highly invasive species and methods for controlling non-native vegetation. They are incorporated into the outline below.

Strategy for Invasive Weed Control

Objective: Control the introduction and spread of invasive plant species with priority on those with the greatest potential to degrade sensitive species or their habitat. This measure includes annual vegetation monitoring, a list of species to be eradicated, identification and prioritization of more highly invasive species and methods for controlling non-native vegetation.

I. Implement Conservation Measure 6 of the 2010 BO.

II. Herbicide application will be done in accordance with the IPMP and the 2010 BO. Use of herbicides will be minimized and used only when other means of weed control are not feasible.

III. Prior to revegetation, sites will be cleared and kept clear of all non-native perennials and weeds.

4.7 Land Management

4.7.1 Soil Erosion Prevention and Runoff Control

Federal land managers are required to control and prevent erosion by conducting surveys and implementing conservation measures (Soil Conservation Act [Public Law 74-46; 16 USC 5901]). This includes both point

source (originating from a single location such as a culvert) and non-point source (originating from a dispersed area) erosion, especially that which may affect water quality.

Strategy for Soil Erosion Prevention and Runoff Control

Objective: Protect and restore soil stability, watershed functioning, water quality, and wildlife habitat through effective implementation of Best Management Practices to prevent and control soil erosion.

I. Continue to implement the DFSP San Pedro Main Terminal and Marine Terminal Stormwater Pollution Prevention Plans.

II. Utilize Best Management Practices for construction and other project sites where soil is disturbed.

4.7.2 Water Resource Management

There are no apparent issues with water supply or water rights for DFSP San Pedro. Since water is purchased in a treated form and surface water is ephemeral, no issues exist for drinking water quality.

4.7.3 Landscaping and Water Use

DFSP San Pedro has a minimal amount of landscaped area and much of the landscaped area is not irrigated. Therefore, issues regarding landscaping and water use are insignificant.

A list of recommended plants for landscaping use can be found in Appendix F. These species were selected by Navy landscape architects for use on installations. Guidelines for ratios of native species verses non-native species are given.

Strategy for Landscaping

Objective: Conserve water, protect water quality, reduce runoff and erosion, and decrease plant nutrient loss by reducing the demand for water in landscaped settings.

I. New landscaping should consist mainly of drought-tolerant and locally-adapted native species, combined with rock mulches and boulders.

II. New lawns are not encouraged, except where functionally essential.

III. Reduce use of water for landscaping, while continuing to provide a quality working environment to DFSP personnel.

4.7.4 Mowing

Strategy for Mowing

Objective: Conduct mowing in accordance with the 2010 BO and based on Management Emphasis Areas and the mowing area as shown in Map 4-1.

I. Consistent with the 2010 BO regarding mowing within DFSP San Pedro (USFWS 2010), the following measures will be implemented to minimize and avoid impacts to the PVB and its habitat within the designated mowing areas as shown on Map 4-1:

A. No mowing will be conducted between February 15th and May 31st, when PVB eggs, larvae, or adults are likely to be present; and

B. No heavy equipment will be used for vegetation clearing in the 4.4 acres (1.8 ha) of Avoidance Areas shown in Map 4-1, and no clearing or mowing will occur between February 15th and May 31st.

4.8 GIS and Data Management

GIS and image-interpretation software help in the efficiency and effectiveness of environmental analysis and review. They have allowed managers to become more adaptive in their decision-making, providing a means to organize and update many types of resource data, as well as to test assumptions and play out management scenarios. They can play a critical role in helping land managers conceptualize problems at landscape or ecosystem levels.

Strategy for GIS and Data Management

Objective: Ensure the technically sound, practical and appropriate use of library and computer technology to manage, analyze, and communicate natural resource information in support of management decisions.

I. Facilitate better natural resources decisions by improving the capability to access, organize, and analyze maps, inventories, remotely sensed data, and other natural and cultural resources planning documents.

II. Strengthen the scientific basis for natural resources management by integrating research and management (DoDI 4715.03).

4.9 Outdoor Recreation

As a DoD landowner, the NAVWPNSTA Seal Beach and its tenant, DLA, are obligated to provide outdoor recreation and interpretive programs when it is compatible with the military mission, safety, and security. Relevant laws include the Sikes Act and amendments, National Historic Preservation Act, NAVFAC Instruction MO-100.4 (Guidance on Special Interest Areas), and OPNAV M-5090.1.

Due to the presence of federally threatened and endangered species, the restricted nature of the facilities, and safety and security issues, DFSP San Pedro is unable to sustain outdoor recreation opportunities for the public, except for licensing the ball field area to local organizations. The preparation of a recreational plan is not necessary for DFSP San Pedro because of its limited resources and open space.

4.10 Wildland Fire Management

The National Fire Protection Association 30, Flammable and Combustible Liquids Codes, and the DoD Petroleum Fuel Facilities MIL-HNDB-1002 do not provide any specific clearance requirements for mowing around storage tanks. National Fire Protection Association 30, Section 4-7.4, recommends that storage areas are protected against tampering or trespassers where necessary and are kept free of weeds, debris, and other combustible materials not necessary for storage. The current 25-foot (8-m) clearance rule was established several years ago as a general safety clause for government-owned, contractor-operated facilities (D. Whitney, pers. com. 1998).

The following portions of the Operations Contract calling for fire hazard weed abatement should remain the same.

- All grass is to be kept to four inches or less in specific locations.
- Weed and brush control shall be maintained throughout the entire area of all terminal drainage ditches.
- All hillside areas throughout the terminal shall remain in a natural state.

Strategy for Wildland Fire Abatement

Objective: Reduce the risk of wildfire ignition, control wildland fire damage, and reduce liability of wildland fire occurrence.

I. Vegetation management for fire control will be done in accordance with the Operations, Maintenance, Environmental and Safety Plan; GOCO Performance Work Statement; and the 2010 BO.

4.11 Training of Natural Resources Personnel

The Sikes Act requires "sufficient numbers of professionally trained natural resources management and natural resources enforcement personnel to be available and assigned specific responsibility" to implement an INRMP. Staff should also have opportunities to receive training specific to their job to ensure effective management of natural resources (DoDI 4715.03; OPNAV M-5090.1).

Objective: Provide sufficient technical support to staff as well as training and networking opportunities to achieve INRMP goals and objectives.

I. In order to support compliance with environmental laws, ensure environmental staff receives ongoing training and professional development through attendance at workshops, classes, training, and conferences.

5.0 INRMP Implementation

5.1 Introduction

Implementation of this revised INRMP will be realized through the accomplishment of specific goals and objectives as measured by the completion of projects described herein. A summary list of objectives and associated projects to be implemented under this INRMP is provided in Appendix I and includes an implementation schedule, legal drivers, and funding classifications. An INRMP is considered implemented when the installation performs the following:

- Actively requests, receives, and uses funds for must fund projects and activities (See Section 5.2 Funding and INRMP Implementation for a description of must fund projects);
- Ensures that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP;
- Coordinates annually with cooperating agencies;
- Documents specific INRMP action accomplishments undertaken each year.

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 DFSP San Pedro for integrating environmental considerations into day-to-day activities, across all levels, and functions of the Navy and DLA enterprise. DFSP San Pedro depends on natural resources for the sustainability of many mission-related programs (i.e. aesthetics and recreation for military personnel, stormwater collection and transport, etc.) and natural resources will be managed to ensure sustainable use. This INRMP is not intended to impair the ability of DLA to perform its mission. The INRMP does identify usage restrictions on sensitive attributes, such as environmentally sensitive habitat areas. See Map 4-1 for the natural resources constraints map for DFSP San Pedro.

5.1.1 Responsibility

The responsibility for development, revision, and implementation of INRMPs is shared at every level among many different command elements. The Secretary of the Navy Instruction 6240.6E assigns responsibility for establishing, implementing, and maintaining the natural resources programs under the jurisdiction of the Secretary of the Navy to 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 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.

The installation CO(s) are responsible to act as the natural resources steward of lands under their jurisdiction and to 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, COs 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 (OPNAV M-5090.1).

Formal adoption of an INRMP by the CO 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, 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 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).

Further, a Secretary of the Navy 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 resources personnel is important to the success of military sustainability and land management. The OPNAV M-5090.1 requires that the 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 resources management job training activities and professional meetings."

The Sikes Act (Section 670g) also addresses this need, as well as DoDI 4715.03 (18 March 2011).

5.1.2 Federal Anti-Deficiency Act

The Navy, with cooperative support from DLA, intends to implement recommendations in this INRMP within the framework of regulatory compliance, national Navy and DLA 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.).

5.1.3 Staffing

The Sikes Act specifically requires that there is "sufficient numbers of professionally trained natural resources management and natural resources enforcement personnel available and assigned responsibility" to implement an INRMP.

NAVWPNSTA Seal Beach is responsible for identifying personnel requirements to accomplish the INRMP goals and objectives. The CO, via his Environmental staff and Conservation Program Manager and with cooperative support from DLA, is responsible for providing input into budgeting and staffing processes. CNRSW and higher authority endorse these requests and allocate budgetary and personnel resources. Personnel assigned to natural resources management, such as the installation Environmental Director and the installation Conservation Program Manager, are the core staff responsible for overseeing implementation of the INRMP. In accordance with the DLA and Navy Memorandum of Agreement (Appendix C), these personnel coordinate closely with DLA staff, who are both on-site at DFSP San Pedro and in DLA headquarters. This ensures that a constant conservation program is carried out by using strategies outlined in this plan to support the Navy and DLA mission and achieve INRMP goals and objectives.

5.1.4 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. The Navy Natural Resources Metrics is a guide for addressing annual INRMP review. 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 for Public Use
4. Partnership Effectiveness
5. Team Adequacy
6. INRMP Project Implementation
7. INRMP Impact on the Installation Mission

A review and explanation of the Natural Resources Metrics evaluation is presented in Appendix J.

Section 101(b)(2) of the Sikes Act [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 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 Natural Resources Conservation Program (DoDI 4715.03 [DoD 2011]) and by OPNAV M-5090.1, Environmental and Natural Resources Program Manual (11 July 2011). 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.
- ADUSD for ESOH Policy Memorandum (01 November 2004).
- ADUSD for ESOH 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 EPR-web.

The 2002 INRMP Implementation 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 INRMP. 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 is 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 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 lands for which the subject installation has real property accountability, including lands occupied by tenants or lessees or 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 resources management actions. This does not, however, obviate the need to address natural resources management on any such lands in the INRMP.

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. If the parties determine that substantial revisions to an INRMP are necessary, public comment shall be invited in conjunction with any required NEPA analysis.

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.

5.2 Funding and INRMP Implementation

As stated in Section 5.1.2, the Navy and DLA intend to implement recommendations in this INRMP within the framework of regulatory compliance, mission obligations, anti-terrorism and force protection limitations, and funding constraints. 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.

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 DFSP San Pedro 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 Appendix I. The budgeting plan for the INRMP is based on programming and budgeting priorities for conservation programs described in OPNAV M-5090.1.

5.3 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, DoD Instructions, Manuals and Directives, and applicable international and overseas requirements (OPNAV M-5090.1). All natural resources requirements are entered into the EPR-web, and are available for review/approval by the chain of command by the dates specified in the guidance letter, 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 Environmental Readiness Level (ERL) capabilities used in producing programming and budgeting requirements for the various processes, within the budget planning system.

5.4 Navy Assessment Levels for Budget Prioritization

The budget programming hierarchy for this INRMP is based on both DoD and Navy funding level classifications. 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 OPNAV M-5090.1, 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 must fund projects, which the Navy INRMP guidance identifies as ERL 3 and ERL 4 projects. The Navy funding programming hierarchy of recurring and non-recurring projects consists of the four ERLs, described below.

Environmental Readiness Level 4 (must fund).

- Supports all actions specifically required by law, regulation, or EO.
- Supports all DoD Class 0 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.
- Supports minimum feasible Navy executive agent responsibilities, participation in Office of the Secretary of Defense (OSD) sponsored inter-department and interagency efforts, and OSD mandated regional coordination efforts.

Environmental Readiness Level 3 (must fund)

- Supports all capabilities provided by ERL 4.
- Supports existing level of Navy executive agent responsibilities, participation in OSD sponsored inter-department and interagency 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.

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.

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 DFSP San Pedro'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).

5.4.1 DoD Funding Classifications

Funds will be requested for tasks within this INRMP. The guidance on DoD funding classifications has been updated and Enclosure 4 of DoDI 4715.03 defines the four classes of conservation programs. The projects recommended in this INRMP have also been prioritized based on compliance and stewardship criteria provided in the hierarchy, described below.

Definition of Must Fund Implementation

Formal adoption of an INRMP constitutes a commitment to seek funding and execute, subject to the availability of funding, all must fund projects and activities in accordance with the INRMP. Under the Sikes Act, any natural resources management activity that is specifically addressed in the INRMP must be implemented, subject to availability of funds. Implementation includes the execution of all must fund projects. Since the Sikes Act requires implementation of the INRMP, there is a clear fiscal connection between INRMP preparation, revision, implementation and funding.

This INRMP will serve as a planning tool for CNRSW. As opportunities become available to seek funding for environmental projects or as mitigation for future activities, this INRMP will serve as a priority list to better enable the Natural Resources Department to practice effective ecosystem management. This INRMP is not meant as a definitive list of projects that will be automatically funded upon enactment. It provides guidance to the resource managers on strategies to employ for the next five years. The Navy will implement recommendations in the 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 § 341, et seq.).

DoD Funding Classification

The guidance on DoD funding classifications has been updated and Enclosure 4 of DoDI 4715.03 defines the four classes of conservation programs. The projects recommended in this INRMP have also been prioritized based on compliance and stewardship criteria provided in the hierarchy below. The first three listed below are considered must fund under Navy funding criteria as they are needed to maintain compliance with applicable laws and regulations.

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

5.4.2 Implementation Schedule

This INRMP will become effective upon the acceptance and signatory release described in Section 5.1.1 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 EPSO, in cooperation with DLA environmental staff, 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 EPSO, in cooperation with DLA environmental staff, 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.

5.4.3 External Assistance

Opportunities for external assistance with natural resource programs at DFSP San Pedro are identified below.

Other Agencies

The Navy and DLA recognize the importance of cooperating with federal and state agencies in addition to private organizations. These organizations, in particular the INRMP signatory partners (USFWS and CDFW), will continue to assist with implementation of various aspects of this INRMP.

University Assistance

Universities are an excellent source of assistance for research and provide resource specific expertise, as well as assistance with implementation of restoration activities. Collaborative investigations performed in conjunction with EPSO biologists provide the most likely and cost effective sources of assistance with implementation of this INRMP.

Contractors

Most projects can be carried out with Navy staff. Some projects, such as targeted surveys, may require contractor services or other federal agency services, because of a need for expertise or for necessary personnel. In accordance with Circular No. A-76, the federal government is mandated to use commercial sources to supply the products and services the Government needs. Contractors are able to provide a wide variety of specialties to aid the Navy and DLA with implementation of this INRMP. Specialties range from NEPA documentation, vegetation surveys, vertebrate and invertebrate surveys, vegetation surveys, water quality surveys, production of management plans, and similar activities. Contractor supported projects require preparation of a request for proposal to acquire services, which should be considered during project planning, to ensure appropriate funding can be obtained.

5.5 Funding Sources

In order to implement the various research, surveys, and programs necessary to fulfill the mission of the Navy and DLA at DFSP San Pedro, funding must be identified and acquired. There are several avenues of funding available to the installation command to plan and implement projects and activities listed in Appendix I. These funding sources are discussed below in general terms, as this process is dynamic and is dependent annual budget fluctuations and the INRMP's continuously developing program.

These programs will be implemented using Navy and DLA personnel and program resources as much as possible; however, it is likely that contractors will accomplish many projects. The EPSO 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 can be collected via sales of licenses to hunt or fish (Navy 2005a). They are authorized by the Sikes Act and may be used only for fish and wildlife management on the installation where they are collected. DFSP San Pedro generates no fish and wildlife fees, and none are anticipated as hunting is prohibited and there are no water bodies for fishing.

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, and input into the Navy 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., Navy Level ERL 4 projects). It is the responsibility of EPSO to manage the natural resources program budget and funding. Once Operations and Maintenance Navy 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, DFSP San Pedro has no forestry program or agricultural outleasing.

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 organizations 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.

5.5.1 Use of Cooperative Agreements and Partnerships

Cooperative agreements are legal relationships between the Navy and states, local governments, institutions of higher education, hospitals, non-profit organizations, or individuals. The principal purpose of the relationship is to transfer a thing of value to the state, local government, or other recipient to carry out a public purpose of support or stimulation authorized by a law of the United States instead of acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the U.S. Government. Cooperative agreements may be entered into for inventories, monitoring, research, minor construction and maintenance, and public awareness to provide for the maintenance and improvement of natural resources or conservation research on DoD installations (DoDI 4715.03). 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. Authorization for cooperative agreements is arranged through NAVFAC.

The Navy and DLA recognize the importance of cooperating with federal and state agencies, in addition to private organizations. The current cooperative agreements are listed below.

Cooperative Agreements

- Cooperative Agreement between the Navy and the Urban Wildlands Group (Appendix C)
- Cooperative Agreement between the Navy and the PVPLC (Appendix C)

Memorandum of Agreement

- Memorandum of Agreement between DLA and Navy (Appendix C).

Cooperative Ecosystem Studies Units

The Cooperative Ecosystem Studies Units program is a working collaboration among federal agencies, universities, state agencies, non-governmental organizations, and other non-federal 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 USDI, one of the participating agencies is DoD.

5.5.2 Research Funding Requirements

Environmental program funding in the Navy is primarily based upon federally mandated requirements. 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 non-profit organizations with an interest in achieving the goals and objectives of this INRMP in partnership with Detachment Norco. 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 must fund items, tied directly to immediate regulatory compliance. Examples are watershed management, habitat enhancement, or wetland restoration.

5.5.3 Non-DoD Funding Sources

There are a number of grant programs available for natural resource management projects such as watershed management and restoration, habitat restoration, and wetland and riparian area restoration. When federally funded, these programs typically require non-federal matching funds. However, installations may be able to partner with other groups to propose eligible projects. One example grant program is listed below, but many more are available.

The National Association of Counties, National Association of Service and Conservation Corps, National Fish and Wildlife Foundation, and Wildlife Habitat Council sponsor the Five Star Restoration Challenge Grants program, in cooperation with the U.S. Environmental Protection Agency, National Marine Fisheries Service, and other sponsors. This program provides modest financial assistance ($5,000 to $20,000) on a competitive basis to support community-based wetland and riparian restoration projects that build diverse partnerships and foster local natural resource stewardship. Installations would need to partner with other groups to be eligible for this type of program. Applications are due in March. Information is available on the web at http://www.epa.gov/owow/wetlands/restore/5star/.

5.6 INRMP Implementation Summary and Schedule

The objectives and strategies that support INRMP implementation are identified in detail in Chapter 4 and a list of projects is provided in Appendix I. The implementation schedule identified in Appendix I is suggested for long-term planning purposes and is reviewed annually. The schedule may be modified based on need, available funding, resources, seasonal requirements, and the results of the annual metrics evaluation.

6.0 References

Personal Communications

Atwood, Jonathan.1997. 1998. Biologist. Department of Environmental Studies. Antioch New England Graduate School. Keene, New Hampshire.

Longcore, Travis. 2007. Urban Wildlands Group. Los Angeles, California.

Morton, Jess. 1998. Palos Verdes Audubon Society.

Pratt, Gordon. 2007. University of California at Riverside. Riverside, California.

Whitney, D. 1998. Program Safety Manager. Defense Energy Support Center. Los Angeles, California.

Documents

Aigner, P.A., and C.E. Koehler. 1997. Breeding Season Bird Survey, Defense Fuel Support Point, San Pedro, California. Prepared under contract with Tierra Data Systems. Reedley, California.

Atwood, J.L. 1993. California gnatcatchers and coastal sage scrub: The biological basis for endangered species listing, in Interface between Ecology and Land Development in California (J.E. Keeley, ed.), pp. 149-169. S. Calif. Acad. Sci., Los Angeles.

Atwood, J.L. 1994. Endangered small landbirds of the western United States. In: J.R. Jehl, Jr. and N.K. Johnson, eds. A century of avifaunal change in western North America; Proceedings of an international symposium at the centennial meeting of the Cooper Ornithological Society. 1993 April 17; Sacramento, CA. Studies in Avian Biology No. 15. [Place of publication unknown]: Cooper Ornithological Society: 328-339.

Atwood, J.L., S.H. Tsai, and A.M.L. Miller. 1996. California gnatcatchers, cactus wrens, and conservation of coastal sage scrub on the Palos Verdes Peninsula: progress Report No. 4. 20 November 1996. Manomet Observatory for Conservation Sciences, Manomet, Massachusetts.

Atwood, J.L., S.H. Tsai, C.R. Reynolds, and M.R. Fugagli. 1998. Distribution and population size of the California Gnatcatcher on the Palos Verdes Peninsula, 1993-1997. Western Birds 29: 340-350.

Blackburn, T.C. and K. Anderson. 1993. Introduction: managing the domestic environment. In: T.C. Blackburn and K. Anderson. Before the Wilderness: Environmental Management by Native Californians. Ballena Press, Menlo Park, California.

California Climate Change Center. 2006. Our Changing Climate: Assessing the Risks to California: A Summary Report Produced by the California Climate Change Center in Collaboration with the Union of Concerned Scientists.

California Department of Fish and Wildlife. 2013. California Natural Diversity Database (CNDDB). Accessed online at: https://www.dfg.ca.gov/biogeodata/cnddb/. 28 March 2014.

Cayan, D.R., E.P. Maurer, M.D. Dettinger, M. Tyree and K. Hayhoe, 2008: Climate change scenarios for the California region. *Climatic Change*, 87, (Suppl 1):S21-S42. *(99*

Cayan, D. R, M. Tyree, M. D. Dettinger, H. Hidalgo, T. Das, E. P. Maurer, P. D. Bromirski, N. Graham, and R. E. Flick. 2009. Climate Change Scenarios and Sea Level Rise Estimates for the California 2009 Climate Change Scenarios Assessment. California Climate Change Center.

Chambers Group Inc.1995. Biological Assessment Defense Fuel Support Point San Pedro, California. Final. December 1995. Contract N68711-94-M-1640. Prepared for Southwest Division Naval Facilities Engineering Command, San Diego, California.

Center for Naval Analysis (CNA). 2007. National Security and the Threat of Climate Change. Alexandria, Virginia.

Courtois, B.O. 2003. California gnatcatcher presence/absence summary: Defense Fuel Support Point, San Pedro. Submitted to Carlsbad Fish and Wildlife Office September 23, 2003.

The Environmental Company (TEC) and David Magney Environmental Consulting (DMEC). 2003. Wetlands Reconnaissance Report, DFSP San Pedro. Prepared by Environmental Company and David Magney Environmental Consulting, Solana Beach CA. Prepared for Naval Facilities Engineering Command, Southwest Division, San Diego, Ca.

Government Accounting Office. 2007. Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources. United States Government Accountability Office. Report to congressional requesters. GAO-07-863.

ICF International. 2011. Coastal California Gnatcatcher Presence/Absence Surveys at Defense Fuel Support Point, San Pedro, CA. NAVFAC SW Contract Number: N62473-06-D-2401.

Johnson, J., Q. Sweeney, D. Flannery, J. Jones, N. Wilson, T. Wilson, T. Regan, E. Lopez, L. Clopp, N. Arringer, M. Miller, S. Jabas, R. Brehm, D. Werner, K. Virun, and T. Longcore, 2012. Final Report for Palos Verdes Blue Butterfly Year 2012 Captive Rearing for Defense Fuel Support Point, San Pedro, California. Los Angeles: The Urban Wildlands Group (NAVFAC SW Agreement No.: N62473-12-2-2101).

Lipman, A., T. Longcore, R. Mattoni, and Y. Zhang. 1999. Habitat evaluation and reintroduction planning for the endangered Palos Verdes blue butterfly, Final Technical Report to California Department of Fish and Game. UCLA Department of Geography, Los Angeles.

Longcore, T., R. Mattoni, and A. Mattoni. 2005. Salvage of individual pupae as a mitigation measure for loss of Palos Verdes blue butterfly habitat. Journal of the Lepidopterists' Society 59(1):10–11.

Longcore, T., and R. Mattoni. 2003. Final report for 2003 Palos Verdes blue butterfly year 2002 adult surveys on Defense Fuel Support Point, San Pedro, California. The Urban Wildlands Group (Defense Logistics Agency Agreement #N68711-03-LTC3003), Los Angeles.

Longcore, T., and K. H. Osborne. 2012. Final Report for 2012 Palos Verdes Blue Butterfly Adult Surveys on Defense Fuel Support Point, San Pedro, California. Los Angeles: The Urban Wildlands Group (Defense Logistics Agency Agreement # N62473-12-2-2101).

Mattoni, R. 1996a. Palos Verdes coastal sage scrub at the DFSP history, biology, degradation, and restoration. Guide of volunteers and visitors for 1996.

Mattoni, R. 1996b. Captive breeding program for the Palos Verdes blue butterfly at the Defense Fuel Supply Point, San Pedro, California. Department of Geography, UCLA, Los Angeles, California.

Mattoni, R., T. Longcore, Z. Krenova, and A. Lipman. 2003. Mass rearing of the endangered Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*: Lycaenidae). Journal of Research on the Lepidoptera 37:55-67.

Mattoni, R., and J. George. 2001. Annual Report: Palos Verdes blue butterfly habitat revegetation and ecological data collection, Defense Fuel Support Point, San Pedro, CA October 1, 2000-September 30, 2001. Department of Geography, University of California, Los Angeles, CA, and Palos Verdes Peninsula Land Conservancy.

Mattoni, R., M. Vergeer, and Y. Marlin. 2000. Release of captive-reared Palos Verdes blue butterflies (*Glaucopsyche lygdamus palosverdesensis*) at Site 1, DFSP. Department of Geography, University of California, Los Angeles, CA, and Palos Verdes Peninsula Land Conservancy.

Messner, S., S.C. Miranda, K. Green, C. Phillips, J. Dudley, D. Cayan, and E. Young. 2009. Climate Change-Related Impacts in the San Diego Bay Region by 2050. A Final Paper (August 2009) from the California Climate Change Center.

National Research Council (NRC). 2010. Committee on National Security Implications of Climatic Change for U.S. Naval Forces: Letter Report. Washington, D.C.

Ogden Environmental and Energy Services. 1992. Ecology of the California Gnatcatcher at Rancho San Diego. Technical Appendix for the Rancho San Diego Habitat-Conservation Plan.

Osborne, K. 2002. Laguna Mountain Skipper: Cleveland National Forest, Laguna and Palomar Mountains, 2001. Prepared for the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, U.S. Department of Interior.

Pratt, G.F. 2004. Final report for Palos Verdes Blue Survey 2004 on Defense Fuel Support Point, San Pedro, California. Prepared for Southwest Division Naval Facilities and Engineering Command.

Schoenherr, A.A. 1992. A natural history of California. University of California Press, Berkeley, CA.

The CNA Corporation. 2007. National Security and the Threat of Climate Change. Alexandria, Virginia.

U.S. Department of Agriculture. 1973. Soil Survey, San Diego Area, California. Soil Conservation Service and Forest Service. Roy H. Bowman, ed. San Diego, California.

U.S. Fish and Wildlife Service (USFWS). 1984. Palos Verdes blue butterfly recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS). 1996. Biological Opinion on the Formal Section 7 Consultation for the Chevron 1-8" Pipeline and Associated Government Pipelines Project, Defense Fuel Support Point, San Pedro, Los Angeles County, California. (1-6-96-F-09) 19 June 1996. Ecological Services Carlsbad Field Office, Carlsbad, California.

U.S. Fish and Wildlife Service (USFWS). 1998. Pacific Pocket Mouse (*Perognathus longimembris pacificus*) Recovery Plan. Portland, OR. ll2pp.

U.S. Fish and Wildlife Service (USFWS). 2010. Biological Opinion on the Formal Section 7 Consultation for Routine Maintenance Operations, Defense Fuel Support Point, San Pedro, Los Angeles County, California. (08B0606-08F0704). 2 July 2010.

Websites

Palos Verdes Peninsula Land Conservancy. 1997. Undeveloped Palos Verdes 1996. http://www.pvplc.org/undpv.htm.

Palos Verdes Community Association history accessed October 2006 at http://www.pvca.net/history/index.html.

Appendix A: Acronyms and Abbreviations

Table A-1. Acronyms and abbreviations used in this Integrated Natural Resources Management Plan.

Acronym or Abbreviation	Definition
°F	degrees Fahrenheit
ADUSD	Assistant Deputy Undersecretary of Defense
BCC	Bird of Conservation Concern
BO	Biological Opinion
BRAC	Base Realignment and Closure
CAGN	Coastal California Gnatcatcher
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cm	centimeter(s)
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CNPS	California Native Plant Society
CNRSW	Commander, Navy Region Southwest
CO	Commanding Officer
CSSC	California Species of Special Concern
CWA	Clean Water Act
DFSP	Defense Fuel Support Point
DLA	Defense Logistics Agency
DMEC	David Magney Environmental Consulting
DoD	U.S. Department of Defense
DoDI	U.S. Department of Defense Instruction
DUSD	Deputy Under Secretary of Defense
EMS	Environmental Management System
EO	Executive Order
EPR	Environmental Program Requirements
EPSO	Environmental Programs and Services Office
ERL	Environmental Readiness Level
ESA	Endangered Species Act
ESOH	Environment, Safety and Occupational Health
GOCO	Government-Owned, Contractor-Operated
ha	hectare(s)
I&E	Installations and the Environment
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
IR	Installation Restoration
IRP	Installation Restoration Program
km	kilometer(s)
m	meter(s)
MBTA	Migratory Bird Treaty Act
NAVFAC	Naval Facilities Engineering Command

NAVWPNSTA	Naval Weapons Station
Navy	U.S. Department of Navy
NCCP	Natural Communities Conservation Planning
NEPA	National Environmental Policy Act
NRC	National Research Council
OPNAVINST	Naval Operations Instruction
OSD	Office of the Secretary of Defense
OUSD	Office of the Under Secretary of Defense
PIF	Partners in Flight
POLB	Port of Long Beach
PVB	Palos Verdes Blue Butterfly
TEC	The Environmental Company
USC	U.S. Code
USDI	U.S. Department of Interior
USFWS	United States Fish and Wildlife Service
VegCamp	Vegetation Classification and Mapping Program

Appendix B: Natural Resources Manager Designation Letter

This Page Intentionally Blank

DEPARTMENT OF THE NAVY
NAVAL WEAPONS STATION SEAL BEACH
800 SEAL BEACH BOULEVARD
SEAL BEACH, CA 90740-5000

CANC FRP: Sep 14
IN REPLY REFER TO:
NAVWPNSTASBNOTE 1301
N00
15 NOV 2013

NAVWPNSTA SEAL BEACH CA NOTICE 1301

Subj: ASSIGNMENT OF PERSONNEL TO PRIMARY COLLATERAL DUTIES

Ref: (a) OPNAVINST 3120.32D
(b) U. S. Navy Regulations, 1990

Encl: (1) List of Duty Assignments
(2) Collateral Duty Assignments

1. Purpose. To publish the assignment of Naval Weapons Station Seal Beach personnel primary and collateral duties.

2. Cancellation. NAVWPNSTASBNOTE 1301 of 18 Apr 13.

3. Background. Reference (a) is the basis for assignments of primary and collateral duties. Reference (b) vests in the Commanding Officer (CO) the authority to assign personnel under his or her command primary duties based on the individual's capabilities and command manpower requirements. For positions requiring designation in writing, this notice fulfills that requirement. Enclosures (1) and (2) constitutes official notification of primary duties, collateral duties, and assignments to boards, councils, and committees.

4. Responsibility. All initial assignments and subsequent changes must originate from the Executive Officer in consonance with the desires of the CO. Installation Program Directors (IPDs) submit recommended changes to enclosures (1) and (2) to the Command Admin IPD. IPDs will review turnover files in instances where officers in their departments are relieved. The Executive Officer will review the files for relief's involving IPDs or senior board members.

5. Action. The primary and collateral duties contained in enclosures (1) and (2) are effective this date. No additional directives will be issued unless specifically required for the duty assigned. It is the responsibility of each person assigned duties by this notice to review applicable references, maintain required records, files, and submit required reports to the Commanding Officer and Executive Officer. Periodic review (i.e., three monthly collateral duty programs) of collateral duties will

be conducted and an internal command self-assessment audit completed. A memorandum of internal audit completion will be routed to the Commanding Officer via the Executive Officer and Command Admin IPD for review.

6. Cancellation Contingency. This notice will remain in effect until superseded by another notice of the same subject matter.

M. H. HARDY

Distribution:
Electronic only, via NAVWPNSTA Seal Beach Web site

COLLATERAL DUTY ASSIGNMENTS

Collateral Duty Governing Instruction	Name	PRD	Loc
Lead Program			
OPNAVINST 5100.23G	Mr. Hector Romero		SB/FB/NOR
***Legal Program/Non Judicial Punishment**			
JAG 5800.7F	YNC Kiona Gilbert	Mar-15	SB
Military Whistleblower Reprisal Coordinator			
SECNAVINST 5370.7C	Ms. Karen Burrows		SB
Military Volunteer Coordinator			
SECNAVINST 5720.44C	MC1 Eli Medellin	Oct-15	SB
Mishap Investigations, Reporting and Records Keeping			
OPNAVINST 5100.23G	Mr. James Olinger		SB/FB/NOR
	Mr. Evan Risorto		SB/FB/NOR
Motor Accident Investigation Crime Prevention			
OPNAVINST 5102.1D	MA1 Christopher Daniel	Oct-14	SB
	MA2 Hernandez Cruz	Nov-14	
	MA2 Robert Craven	Aug-16	
	MA3 Deven Highland	Apr-16	
***Motorcycle Safety Representative**			
OPNAVINST 5100.12J	MA1 Christopher Daniel	Oct-14	SB/FB/NOR
	MA3 Deven Highland	Apr-16	
National Environmental Policy Act Program			
OPNAVINST 5090.1C	Ms. Lisa Bosalet		SB/FB/NOR/SP
Natural Resources Manager			
OPNAVINST 5090.1C	Ms. Christy Wolf		FB
	Mr. Robert Schallmann		SB/NOR/SP
NAVOSH Councils and Committees Programs			
OPNAVINST 5100.23G	Mr. James Olinger		SB/FB/NOR
***Navy Family Ombudsman Program**			
OPNAVINST 1750.1G OPNAVINST 1740.4D	Mrs. Erika Phillips		SB

COLLATERAL DUTY ASSIGNMENTS

Collateral Duty Governing Instruction	Name	PRD	Loc
***Navy Pride & Professionalism Coordinator**			
LOCAL REQUIREMENT	CMDCM Pedro Gines	Dec-13	SB
	NC1 Antonia Diaz	Oct-14	
	MAC Ronnie Ray	Apr-17	
Navy-Marine Corps Relief Officer			
SECNAVINST 5760.14D	MC1 Eli Medellin	Oct-15	SB
SECNAVINST 5340.7			
Officer Candidate Programs			
OPNAVINST 1530	CAPT Martin Hardy	Jun-15	SB
OPNAVINST 1500	CDR Paul Werring	Nov-14	SB
MILPERSMAN			
OPSEC Coordinator			
OPNAVINST 3432.1A	MA1 Jonathan Prichard	Jul-16	SB/FB/NOR
Quality of Life Advisory Board			
OPNAVINST 1700.7E	Mr. John Clingan		SB
OPNAVINST 1700.13B	CMDCM Pedro Gines	Dec-13	SB
DODD 1015.2	Departmental Rep		
DODD 1015.6			
BUPERSINST 1710.11C			
Pest Management Coordinator			
OPNAVINST 5090.1C	Ms. Christy Wolf		FB
OPNAVINST 6250.4C	Mr. Robert Schallmann		SB/NOR
Pistol Range Officer			
OPNAVINST 3591.1F	Mr. Nick Traviglia		SB
NAVFAC DM-27	Mr. Estaban Rodriguez		SB
NAVEOOTRA J-041-0418			
FM 23-335			
***Privacy Act Coordinator**			
SECNAVINST 5211.5E	Mr. John Schweitzer		SB/FB/NOR
COMNAVREGSWINST 5211.1A	Ms. Linda Tagami		

Enclosure (2)

COLLATERAL DUTY ASSIGNMENTS

Collateral Duty Governing Instruction	Name	PRD	Loc
Agricultural & Rancher Outlease Media Coordinator			
OPNAVINST 5090.1C	Mr. Robert Schallmann		SB
	Ms. Christy Wolf		FB
***Apprenticeship Program Coordinator**			
OPNAVINST 1560.10C	MA1 Purcell Tabron	Jun-16	SB
Asbestos Control Program			
OPNAVINST 5100.23G	Mr. Leon Williams		SB/FB/NOR
Auxiliary Security Force Coordinator			
NAVPERSCOMINST 5530.4A	MACS Kelly Hallmark	Jul-15	
	MA1 Jose Cenuse	Oct-16	
Base Clean-up/Material Condition			
COMNAVREGSWINST 3120.3A	CAPT Martin Hardy	Jun-15	SB
	CDR Paul Werring	Nov-14	
***Base/Region Indoctrination**			
COMNAVREGSWINST 3120.3A	CMDCM Pedro Gines	Dec-13	SB
Beneficial Suggestion Awards Program			
DOD 1400.25M	Ms. Tara Banks		SB
***BEQ Advisory Board**			
COMNAVREGSWINST 11103.1B	CDR Paul Werring	Nov-14	SB
Bachelor Housing Ref Guide Series	CMDCM Pedro Gines	Dec-13	SB
	Mr. Keith Perry BQ Residence Rep		
***Career Development Board**			
BUPERSINST 1040.5A	CMDCM Pedro Gines	Dec-13	SB
	NC1 Antonia Diaz	Oct-14	SB
	YNC Kiona Gilbert	Mar-15	SB

COLLATERAL DUTY ASSIGNMENTS

Collateral Duty / Governing Instruction	Name	PRD	Loc
***Family Advocacy Representative Program**			
OPNAVINST 1754.1B	CMDCM Pedro Gines	Dec-13	SB
OPNAVINST 1752.2B			
Freedom of Information Act (FOIA) Coordinator			
SECNAVINST 5720.42F	Ms. Linda Tagami		SB/FB/NOR
COMNAVREGSWINST 5720.1			
***General Military Training (GMT)**			
OPNAVINST 1500.22F	MA1 Mark Schlom	Jan-15	SB
Geographic Bachelor Review Board			
COMNAVREGSWINST 11103.1B	CDR Paul Werring	Nov-14	SB
	Mr. Keith Perry		SB
Geographic Bachelor/Resident Advisory Board			
	CDR Paul Werring	Nov-14	SB
COMNAVREGSWINST 11103.1B	Mr. Keith Perry		SB
Bachelor Housing Ref Guide Series	CMDCM Pedro Gines	Dec-13	SB
Hazardous Material Control and Management (HMC&M) Program			
	Mr. Jeff McGovern		SB/FB/NOR
	Mr. James Olinger		SB/FB/NOR
	Mr. Thomas Beck		SB/FB/NOR
Hazardous Substances and Oil Spill Response Qualified Individual			
OPNAVINST 5090.1C	Mr. David Baillie		SB/FB/NOR
	Mr. Robert Schallmann		SB/FB/NOR
Information Assurance Manager (IAM)			
DODI 8500.2	Mr. Steven Schmidt		SB
Information Assurance Officer (IAO)			
DODI 8500.2	Ms. Imelda Vargas		SB
Installation Restoration Program (IRP) Coordinator/Munitions Response Program Coordinator			
OPNAVINST 5090.1C	Ms. Pei-Fen Tamashiro		SB/FB

Enclosure (2)

Appendix C: Applicable Agreements and Biological Opinions

This Page Intentionally Blank

HOST-TENANT REAL ESTATE AGREEMENT
BETWEEN
DEPARTMENT OF THE NAVY (DON)
AND
DEFENSE LOGISTICS AGENCY (DLA)

I. This Host-Tenant Real Estate Agreement (hereinafter called AGREEMENT) between the Department of the Navy (DON), Naval Facilities Engineering Command Southwest (hereinafter called HOST) and the Defense Logistics Agency (DLA) (hereinafter called TENANT) provides for the use of real estate as land and facilities located at San Pedro and Long Beach, California and known as Defense Fuel Support Point (DFSP) San Pedro located on the Navy-owned Special Area assigned to Naval Weapons Station Seal Beach, California (hereinafter called INSTALLATION.

II. Therefore, the following clauses represent the common understanding and agreement as between HOST and TENANT and grant to the TENANT certain rights and privileges in accordance with this AGREEMENT:

1. TENANT shall have exclusive use of approximately 331 acres more or less known as Defense Fuel Support Point (DFSP) San Pedro (hereinafter called PREMISES), as shown on Exhibit A attached hereto and made a part hereof. This area contains several structures, a list of the buildings and structures on PREMISES are shown on Exhibit B attached hereto and made a part hereof. The TENANT will have exclusive use of, and the PREMISES shall include also the Fuel Pier and interconnecting pipelines to DFSP San Pedro.

2. TENANT facilities shall conform to the HOST's Station Master Plan except as otherwise provided in writing by HOST. Standards of design and construction shall conform to criteria and directives of HOST. The land and improvements, existing and to be constructed, shall be carried on the Inventory of Military Real Property of the HOST. Prior to the initiation of any major structural changes in a building and/or demolition or removal of a structure, TENANT shall obtain written authorization from the HOST.

3. TENANT shall have the right to use in common with HOST, and with such other parties as HOST may authorize all roads, water,

electric power, and phone lines in connection with the use of the PREMISES.

4. TENANT shall be assigned the Maintenance Unit Identification Code (UIC) for the PREMISES. As such, the TENANT will provide real property maintenance of the facility.

5. INSTALLATION and TENANT financial responsibilities occurring under this AGREEMENT, shall be subject to a separate and specific Inter-Service Support Agreement (ISSA), in accordance with DODINST 4000.19, Interservice and Intragovernmental Support. The jointly developed ISSA shall prescribe the respective operations and services, including facility construction, alteration, maintenance and repairs, facilities planning, environmental requirements and other base operating support services to be performed and reimbursement provided.

6. The TENANT is responsible for compliance with all applicable laws and is solely responsible for costs and other liabilities that arise from TENANT's activities.

7. This AGREEMENT affirms and incorporates the shared environmental management program functions to be performed by TENANT pursuant to Department of Defense (DoD) 4140.25-M, Volume II-Petroleum Management Chapter 8 Management of Storage and Distribution Facilities and any subsequently published guidance and versions.

8. Recognizing that shared environmental and facilities management responsibilities accrue to both INSTALLATION (by and through the Commander, Navy Region Southwest)and TENANT, the INSTALLATION and TENANT shall jointly develop for implementation a separate and specific Memorandum of Agreement (MOA) for respective responsibilities, operations and services to be performed by the INSTALLATION and the TENANT. This Facilities and Environmental MOA will contain environmental program management elements delegated to the TENANT associated with the use of Special Area DFSP San Pedro and recite that:

A. The INSTALLATION Commanding Officer, as both Installation CO and landlord, is responsible for all aspects of environmental, natural resources and cultural and historic

preservation compliance on the INSTALLATION, to include this Special Area. INSTALLATION Commanding Officer will perform executive oversight for all aspects of the implementation of the Department of the Navy's Environmental Readiness Program as defined by OPNAVINST 5090.1C Change 1.

B. This facilities and Environmental MOA delegates, under the authority of the Commander, Navy Region Southwest, certain and specific facilities and environmental program management authority to TENANT. Recognizing shared environmental management between INSTALLATION and TENANT, the Facilities and Environmental MOA fully expresses roles and responsibilities, as well as controlling authority, by which TENANT and INSTALLATION will work within the defined cooperative framework expressed in the Facilities and Environmental MOA.

C. All INSTALLATION and TENANT civilian, military, and contractor personnel shall comply with all applicable Federal, State and local environmental statutes and regulations, as well as the requirements of Presidential Executive Orders, Department of Defense (DoD) and DoN policies, regulations and requirements.

D. Land use management decisions shall be guided by the INSTALLATION's Cultural and Historic Resources Management Plan (ICHRMP) and Natural Resources Management Plan (INRMP), regularly updated as iterative versions of each Plan are instituted. TENANT's current protected resource management plans for Cultural and Historic Resources and also Natural Resources, will be integrated into and aligned with the INSTALLATION's ICHRMP and INRMP.

E. INSTALLATION and TENANT shall align and integrate their Environmental Management Systems (EMS), conforming with Executive Order 13423, Strengthening Federal Environmental, Energy and Transportation Management of 24 Jan 2007, and ODUSD Memorandum of 05 Apr 02, Department of Defense EMS. This aligned EMS shall be implemented at DFSP San Pedro in accordance with all applicable law.

F. TENANT shall obtain at its sole cost any required environmental permits and shall be listed as "operator" on such permits.

G. TENANT shall manage hazardous waste, hazardous materials and Petroleum/Oil/Lubricants (POL) in accordance with all applicable requirements.

9. Upon revocation, termination or expiration of this Agreement, if requested by the HOST, TENANT shall remove all alterations, improvements, additions and betterment of the PREMISES made or installed by the TENANT and restore the PREMISES to a condition equivalent to that at the time of TENANT's initial occupancy, reasonable wear and tear excepted.

10. This Agreement shall be effective on the latest date of execution by the authorized HOST official herein below and shall remain in effect unless sooner terminated by mutual agreement or in the event of base closure or unilaterally by the authority of Headquarters, Naval Facilities Engineering Command in accordance with the Navy Real Estate Procedural Manual (P-73), or successor publications, policies, or procedures for HOST-TENANT Agreements.

THE DEPARTMENT OF THE NAVY

Karen P. Ringel
KAREN P. RINGEL
REAL ESTATE CONTRACTING OFFICER

DATE: 3/9/12

DEFENSE LOGISTICS AGENCY HEADQUARTERS

Marvin Wenberg II
MARVIN WENBERG II
Acting Director.
DLA Installation Support (DS)

DATE: June 22, 2012

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008

June 19, 1996

Mr. Michael Stroud
Southwest Division; Attention: D. Lawson
Naval Facilities Engineering Command
United States Navy
1220 Pacific Highway, Code 231
San Diego, California 92132-5190

Subject: Biological Opinion on the Formal Section 7 Consultation for the Chevron 1-8" Pipeline and Associated Government Pipelines Project, Defense Fuel Support Point, San Pedro, Los Angeles County, California (1-6-96-F-09)

Dear Mr. Stroud:

This responds to your December 14, 1995, request for formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your consultation request was received on December 14, 1995. At issue are the effects of the proposed Chevron 1-8" pipeline and associated government pipelines project (pipelines project) at the Defense Fuel Support Point in San Pedro, Los Angeles County, California, on the federally listed endangered Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*) (butterfly), endangered Pacific pocket mouse (*Perognathus longimembris pacificus*), and the threatened coastal California gnatcatcher (*Polioptila californica californica*) (gnatcatcher).

This formal consultation is based on a letter from your office dated December 14, 1995; *Final Biological Assessment Defense Fuel Support Point, San Pedro, California*, dated December 1995, prepared by Chambers Group; two field meetings between Dawn Lawson of your office, Lt. Col. Charles Gross, Rudi Mattoni of the University of California at Los Angeles, and Chris Nagano of my staff on November 5, 1995, and January 7, 1996; a memorandum from Dawn Lawson to Chris Nagano, dated December 14, 1995; two meetings between Dawn Lawson, and Marjorie Nelson and Chris Nagano of my staff on December 7, and 14, 1995; the draft biological opinion on this project that was submitted to your office on January 17, 1996; a meeting between Lt. Col. Gross, Dawn Lawson, Marjorie Nelson, and Chris Nagano on February 1, 1996; a memorandum from Dawn Lawson to Chris Nagano and Marjorie Nelson dated May 31, 1996; a telephone conversation between Chris Nagano and Dawn Lawson on June 12, 1996; and other information available to the U.S. Fish and Wildlife Service (Service).

Based on the information provided in the documents, meetings and telephone conversations listed above, and as further described in the Species Account section, the Service does not

believe that this project will adversely affect the endangered Pacific pocket mouse, and therefore it will not be included in the effects analysis or incidental take statement.

BIOLOGICAL OPINION

It is our biological opinion that the Chevron 1-8" pipeline and associated government pipelines project at the Defense Fuel Support Point in San Pedro, Los Angeles County, California, as proposed, is not likely to jeopardize the continued existence of the endangered Palos Verdes blue butterfly, endangered Pacific pocket mouse, or the threatened coastal California gnatcatcher. Based on the information provided in the biological assessment and otherwise available to the Service, the Service does not believe this project will adversely affect the Pacific pocket mouse. Critical habitat has not been designated or proposed for the gnatcatcher or the mouse, therefore none will be modified or destroyed. Although critical habitat has been designated for the butterfly, none is found within the project area, therefore, none will be damaged or destroyed by the proposed project.

DESCRIPTION OF THE PROPOSED ACTION

Please refer to the following documents for a detailed description of the proposed project: 1) *Final Biological Assessment Defense Fuel Support Point, San Pedro, California*, dated December 1995, prepared by Chambers Group (biological assessment); and 2) Memorandum from Dawn Lawson to Chris Nagano dated December 14, 1995 (memo).

In brief, the proposed project involves the subsurface Chevron 1-8" pipeline and associated government pipelines located at the Defense Fuel Support Point at 3171 North Gaffey Street, San Pedro, Los Angeles County, California. The project involves digging a trench to expose the existing Chevron 1-8" pipeline, replacing the pipeline, and then covering the pipeline with soil. The work will be conducted by the Chevron Corporation and the Defense Logistics Agency. The Chevron Corporation maintains and operates the 8-inch pipeline that connects their El Segundo Refinery to the Defense Fuel Support Point. The Chevron 1-8" pipeline transports military jet fuel from their El Segundo Refinery to the Defense Fuel Support Point. Future activities include routine maintenance, repair, and emergency work on the Chevron 1-8" and associated government pipelines.

The length of the pipelines on the Defense Fuel Support Point that are proposed for replacement, maintenance, and other activities are approximately 4,250 feet long. Starting on the north side of the base where they enter the Defense Fuel Support Point from Palos Verdes Drive North, the first 600 feet of disturbance resulting from the project will be located entirely on an asphalt road and does not contain habitat for the Palos Verdes blue butterfly or the coastal California gnatcatcher. The next section of the pipelines will impact an area 1,300 feet long by 20 feet wide (0.60 acres). This area contains habitat for the butterfly. The third section of the pipelines will impact an area 1,340 feet long by 40 feet wide (1.23 acres). This area contains habitat for the butterfly and the gnatcatcher. The fourth section of the pipelines will impact an area 317 feet by

20 feet (0.15 acre). This area contains habitat for the butterfly and was not included in the biological assessment. The final section of the pipelines will be located entirely within a gravel-covered area and does not contain habitat for either of the two species.

The biological assessment also discussed the potential impacts to the butterfly and the gnatcatcher caused by on-going operations (weed abatement and fire hazard reduction) and an installation restoration program (removal of buried potentially toxic materials). The U.S. Navy will be initiating formal consultation pursuant to section 7 for these projects at a later date (Dawn Lawson, pers. comm. to C. Nagano and M. Nelson, 1995). Both of these projects are neither interrelated or interdependent with the pipelines project that is the subject of the formal consultation discussed herein.

To offset adverse impacts to the butterfly, the gnatcatcher, and their habitats, the pipelines project includes a mitigation plan. This plan includes the following provisions (summarized from the biological assessment and the memo):

1. The Chevron Corporation will secure and guarantee funding to fulfill all of the mitigation for the Palos Verdes blue butterfly described in the biological assessment.

2. The Chevron Corporation will fund the first year of the captive breeding program for the Palos Verdes blue butterfly. This includes the acquisition of a environmental growth chamber. A qualified entomologist who possesses a valid permit from the Service will be retained to conduct all activity involving the pupae.

3. The Chevron Corporation will restore/revegetate areas located on the Defense Fuel Support Point for the Palos Verdes blue butterfly. Habitat that is occupied by the butterfly will be restored/ revegetated at a 5:1 ratio, and habitat that is not occupied by the animal will be revegetated/ restored at a 3:1 ratio. The habitat for the gnatcatcher will be restored at a 2:1 ratio and will be included in the restoration for the butterfly. The restoration/revegetation program includes a five year monitoring program with success criteria of 48 percent native plants. Invasive iceplant (*Carprobrotus* sp.) and gazania (*Gazania* sp.) will be reduced to less than 1 percent after five years. A sprinkler system will be established on six (6) acres of habitat with a high density of deerweed to insure sufficient foodplants for the 1996 flight season. do we still want this?

4. The Chevron Corporation will provide for annual monitoring of the Palos Verdes blue butterfly and the plant community on the mitigation areas. Weedy exotic plant species, such as ice plant and gazanias with the potential to degrade the plant community will be removed annually by the monitors. Contingency funding will

be provided to conduct periodic enhancement activities to ensure the habitat remains suitable for the Palos Verdes blue butterfly.

5. All deerweed and locoweed located within the impact zone of the replacement of the pipeline that have the potential to support the Palos Verdes blue butterfly will be removed prior to the flight season. A 4-inch deep soil layer extending to 6 inches beyond the dripline will be excavated and screened for butterfly pupae.

6. A three phase investigation of potential avian predators, especially starlings (*Sturnus vulgaris*), of the Palos Verdes blue butterfly will be completed. An appropriate control program will be implemented if birds are determined to be an adverse impact.

7. Several mitigations will be undertaken for the coastal California gnatcatcher including pre-construction nesting surveys, fencing placed at least 100 feet from active nests, and monitoring by a qualified biologist of any nests to assure that the animals are not harassed by construction-related disturbance.

SPECIES ACCOUNTS/ENVIRONMENTAL BASELINE

Coastal California Gnatcatcher

The coastal California gnatcatcher (gnatcatcher) is the nominate subspecies of the California gnatcatcher (*Polioptila californica*). The gnatcatcher, a small, gray songbird, is an obligate resident of the coastal sage scrub plant community from Ventura County, California, south to about 30° north latitude in Baja California, Mexico (AOU 1983, 1988, 1990, 1991; Atwood 1980, 1988, 1990, 1991; Grinnell and Miller 1944; Garrett and Dunn 1981; Loren Hays, USFWS, pers. comm. to C.D. Nagano, 1995).

Although the gnatcatcher is strongly associated with coastal sage scrub habitat, not all subassociations of this community appear to be used. The bird appears to be most abundant in areas dominated by coastal sagebrush (*Artemisia californica*). Other important plant species include California buckwheat (*Eriogonum fasiculatum*), laurel sumac (*Malosma laurina*), encelia (*Encelia farinosa*), Mexican elderberry (*Sambucus mexicana*), and lemonadeberry (*Rhus integrifolia*). Not all these species occur in all habitats where the gnatcatcher is found.

The breeding season of the gnatcatcher extends from mid-February through mid-August, with the peak of nesting activity occurring from mid-March through mid-May. The gnatcatcher nest is a small, cup-shaped basket usually found one to three feet above the ground in a small shrub or cactus. Clutch size is usually three or four eggs. Incubation takes 14 to 16 days. Fledging takes 11 to 13 days, and the fledglings are dependent upon their parents for as little as three to four weeks or up to several months (Braden and Powell 1994). Little data exists on the success rate of fledglings; however, breeding studies are currently in progress. Evidence suggests that the

gnatcatcher has a medium to high susceptibility to nest predation by various animals such as scrub jays (*Aphelocoma coerulescens*), snakes, and rodents (Atwood 1990) and brood parasitism by the brown-headed cowbird (*Molothrus ater*) (Unitt 1984; Braden and Powell 1994).

Home ranges/territory sizes of gnatcatcher pairs vary depending upon the quality of the habitat available and, likely, the time of year. Home range/breeding territory sizes for gnatcatcher pairs have been found to vary from 2 acres to greater than 40 acres (Braden and Powell 1994; RECON 1987). Anecdotal evidence suggests that home ranges may be smaller in coastal areas as compared with inland areas.

The key to gnatcatcher survival is not just the total amount of acreage of appropriate available coastal sage scrub habitat, but also the distribution of that habitat. Loss of coastal sage scrub habitat to increased agriculture and urbanization has been dramatic in southern California during the last 50 years. The majority of the remaining sage scrub vegetation in Los Angeles County, especially on the Palos Verdes peninsula, has been eliminated or highly fragmented by development and agricultural activities. Coastal sage scrub vegetation occurs on the slopes and bluff tops in this region of California. This topography offers prime locations for agriculture and development. Overall, it is estimated that between 1945 and 1990, 60% of the coastal sage scrub habitat within the geographic range of the gnatcatcher has been lost (58 **Federal Register** 16742; Westman 1981a, 1981b; Barbour and Major 1977). The evidence suggests that fragmentation of habitat results in very poor long-term survival for native species (Soule *et al.* 1988).

The exceedingly restricted range of the coastal California gnatcatcher has resulted in anthropogenic conflicts that were noted as early as the 1920s (Grinnell and Miller 1944; Atwood 1980). Suitable habitat had become somewhat reduced during the period from the 1920s to the 1940s, and by the 1960s researchers were considering the species very rare (Pyle and Small 1961; Atwood 1980; Unitt 1984). Atwood (1980) estimated that only 1,000 to 1,500 pairs of *Polioptila californica californica* remained and suggested that even this figure was a gross overestimate. The remnant populations, such as the one located on the Palos Verdes peninsula, not only face a continued loss of habitat but are also severely fragmented, leading to difficulties in dispersal and the ability to find mates as well as genetic isolation (Atwood 1980).

Exotic mammals, such as free-roaming and feral cats (*Felis domesticus*), red foxes (*Vulpes vulpes*), Norway rats (*Rattus norvegicus*), and black rats (*Rattus rattus*) likely are predators on the young and adult gnatcatchers at the Defense Fuel Support Point. Churcher and Lawton (1987) studied predation by house cats in an English village and found that birds constituted 28 percent of the cat's diet. In the United States, cats are estimated to kill 20 million birds a year (Harrison 1992); however, Graham (1995) estimated that house cats may kill even more songbirds in this country: 4.4 million songbirds each day. Soule et al. (1988) noted that coyotes (*Canis latrans*), a species that is not present at the Defense Fuel Support Point, rarely prey on birds, but instead feed on avian predators, such as foxes and cats. Coyotes play an important role in controlling the numbers of bird predators.

Coastal California gnatcatchers may be subject to parasitization by the brown-headed cowbird (Woods 1930; Friedman 1934; Hanna 1934; Taylor 1986; Atwood 1980; Unitt 1984). Nest predation in the remaining habitat further reduces chances of survival (Atwood 1980, Unitt 1984). Although the documented decline of the gnatcatcher undoubtedly is the result of nest depredation and brood parasitism by the non-native brown-headed cowbirds, habitat destruction, fragmentation or modification is considered to be the principal reason for the gnatcatcher's current, precarious status (Garrett and Dunn 1981).

The coastal California gnatcatcher was listed as threatened on March 30, 1993 (58 **Federal Register** 16742). Critical Habitat was not proposed or designated for this species. The State of California, under the Natural Community Conservation Planning Act of 1991 (NCCP), initiated a program to conserve populations of California native animal and plant species, and their habitats, in areas large enough to ensure their long-term viability. The NCCP is initially focusing on coastal sage scrub in a pilot project intended to eventually serve as a model for similar approaches with other habitat types. The Service, in recognition of the NCCP program, published a special rule under section 4(d) of the Act on December 10, 1993 (58 **Federal Register** 65088). Under this special rule, gnatcatchers associated with a limited amount of coastal sage scrub can be lost while regional conservation plans are being developed, provided that such losses do not preclude planning options for viable long-term preserve system. The City of Rancho Palos Verdes has signed the planning agreement for beginning the preparation of a subregional NCCP permit.

The population of the coastal California gnatcatcher on the Palos Verdes peninsula has dramatically declined in size to critically low levels (Atwood *et al.* 1994, 1995a, 1995b). There were 56 breeding pairs of the birds in 1994 which decreased to 26 breeding pairs in 1995 and then slightly increased to 30 pairs in 1996. The Defense Fuel Support Point was inhabited by 5 breeding pairs of gnatcatchers in 1993 and 1994, two unpaired females were present in 1995 (Atwood *et al* 1995), and one female in 1996. The two females associated with each other and built a nest together later that season. They laid eight eggs which were later taken by an unknown predator. A single female was present at the base in 1996, however, she left the site potentially as a result of activities associated with a bird banding program and is now in residence in the vicinity of the Rancho Palos Verdes City Hall.

Atwood *et al.* (1994, 1995a, 1995b) noted that the population size of the gnatcatcher on the Palos Verdes peninsula is extremely small. He concluded that several tracts of coastal sage scrub which are separate from the larger, semi-contiguous blocks of this habitat located on the south side of the peninsula, including the Defense Fuel Support Point, are important to the long term survival of the gnatcatcher and, therefore, NCCP subregional planning. There are approximately 1103 acres of coastal sage scrub remaining on the Palos Verdes peninsula and according to Atwood *et al.* (1994), much of the habitat in these outlaying areas are of very high quality. The 1993 movement of a banded gnatcatcher from near Klondike Canyon to the Defense Fuel Support Point indicate that all of the birds on the peninsula comprise a single population (Atwood *et al.* 1994). The loss of this population in the near future is a likely event. The

population level of the gnatcatcher on the Palos Verdes peninsula is at a seriously low level and the recovery of this species in this geographically isolated area likely will require not only the protection of all major, extant tracts of costal sage scrub, but also restoration of this habitat in areas that currently support disturbed grasslands (Atwood *et al.* 1994, 1995a, 1995b).

Palos Verdes Blue Butterfly

The Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*) was listed as an endangered species on July 2, 1980 (45 **Federal Register** 44939). Critical Habitat was designated for the species. At the time of listing, the animal was known from three locations on the Palos Verdes peninsula. Twelve populations of the butterfly were subsequently located prior to 1984 (Arnold 1981, 1987a, 1987b); the Defense Fuel Support Point was not one of these sites. Urban development was believed to have reduced the animal to a single population at Hesse Park by 1983. In 1983, the City of Rancho Palos Verdes constructed a softball field on this location; this action was believed to have caused the extinction of the species (Arnold 1987b, Wines 1984). In 1994, the butterfly was discovered at the Defense Fuel Support Point (Mattoni 1995, Cone 1994). The only known extant population of the Palos Verdes blue butterfly is located at this site. The probability of the survival and recovery of the species has been substantially increased by actions initiated by the Defense Logistics Agency. However, the extinction of this animal in the foreseeable future remains a likely event due to anthropogenic or natural events, such as butterfly collectors, disease, unnaturally high levels of predation, or other adverse environmental conditions, including unseasonably cold winter storms.

The Palos Verdes blue butterfly is one of 11 subspecies of the silvery blue butterfly (*Glaucopsyche lygdamus*)(Langston 1969, Miller and Brown 1981). *Glaucopsyche lygdamus palosverdesensis* was described from specimens collected on the Palos Verdes peninsula (Perkins and Emmel 1977). The historic range of likely extended over much of the Palos Verdes peninsula in Los Angeles County, California.

The Palos Verdes blue butterfly is single brooded with a flight period extending from late January to mid-April. Eggs are usually laid in the flowerheads of deerweed (*Lotus scoparius*) and locoweed (*Astragalus trichopodus lonchus*), the foodplants of the caterpillar. Eggs may be laid over the entire plant. Larvae that utilize locoweed usually feed entirely within the seedpods, using the seeds for nutrition as this plant is very high in protein and fat, although they also will feed on the leaves. The presence of a larvae within a seedpod is indicated by the entry hole made by the caterpillar. The last two instars of the larvae are tended by ants. When the larvae are mature, they crawl into the leaf litter at or near the base of the foodplant and pupate. The adults then emerge the following year.

Unknown

The single known population of the Palos Verdes blue butterfly is extremely small in size. According to Mattoni (undated), the 1994 total population size was likely greater than 100 individuals, but less than 500; the effective population size was believed to be somewhat less. Mattoni (undated) used the following assumptions in analyzing the data from the walk-count

transects: the average adult life span was assumed to be four days with a search efficiency of 20 percent, the flight period was assumed to extend from March 8 to April 8, 1994, there was an equal frequency of sexes, and females were less likely to be sighted than males. The total population size for 1995 was likely between 300 and 500 individuals based on the assumptions used for the 1994 population estimate (Mattoni undated). The adults were on the wing from February 27 to March 26, 1995. A storm that extended from March 9-11 resulted in a significant population crash. The maximum total population size of the butterfly was similar to 1994, but the effective population size likely was smaller in 1995. The 1996 flight season extended from February into at least mid-April. The population size was larger in 1996 than in 1994 or 1995 (Rudi Mattoni, pers. comm. to C. Nagano 1996). The population size of the Palos Verdes blue at the type locality, which has been eliminated by urban development, was at least an order of magnitude larger than the population at the Defense Fuel Support Point (R. Mattoni, pers. comm. to C. Nagano, 1995).

The Palos Verdes blue butterfly at the Defense Fuel Support Point represents the only population of this species known to utilize deerweed in addition to locoweed as a larval foodplant. Adults of all silvery blue butterfly subspecies are closely associated with their legume larval foodplants. Mattoni (1992) recorded foodplants for the species in at least nine genera in the family Fabaceae. In general, a silvery blue population at any one locality is restricted to a single foodplant (Mattoni 1995). This specificity may be the result of local adaptation of the larvae to particular alkaloid suites that each plant species is presumed to produced for defense against herbivores. The success of Palos Verdes blue butterfly larvae who feed on *Lotus* in reaching adulthood is unknown.

However, the use of multiple foodplant species at the Defense Fuel Support Point may have benefited the Palos Verdes blue butterfly. Carey (1994) found that weather-induced disturbances are common in the population dynamics of the oro blue butterfly (*Glaucopsyche lygdamus oro*), a Colorado Rocky Mountain taxa. Whether these events are the result of phenological alterations or due to inflorescence mortality, they have the potential to be catastrophic for populations of this animal. When multiple foodplant species, all growing in slightly different habitats and flowering at slightly different times, are present at a site, they have the potential to buffer the negative effects of weather-induced disturbances on the butterfly. Sites with low foodplant diversity may build up populations during favorable years, but in years unfavorable for the foodplant, butterfly populations would crash and be slow to build up again because of the poor vagility of the oro blue butterfly. Such phenological disruptions have been reported for other butterfly species (Cappucino and Kareiva 1985; Ehrlich 1983). In any event, the long-term ecological, biological, and genetic implications resulting from the use of a "new" foodplant by the Palos Verdes blue butterfly is unknown. Singer *et al.* (1993) describe the human-induced changes in foodplant use of the Mono checkerspot butterfly (*Euphydryas editha monoensis*).

Many bird taxa, including some species that are common at the Defense Fuel Support Point, are significant predators of all life history stages of butterflies. However, no detailed studies of the impact of these predators on the Palos Verdes blue butterfly have been completed. The house

sparrow (*Passer domesticus*) was documented to take eggs and young larvae of the cabbage butterfly (*Pieris rapae*), whereas older larvae and pupae were eaten by chickadees (*Parus* sp.)(Baker 1970). Larger larvae of this species were taken by a range of ground-feeding birds during the time they left the foodplants in search of pupation sites. Baker (1970) also found that bird predation was the main cause of larvae mortality in a garden habitat, although it was replaced in importance by arthropod predation in a field crop. The starling, a species present at the Defense Fuel Support Point, will feed on ground dwelling insects (Kimball Garrett, Natural History Museum of Los Angeles County, pers. comm. to C.D. Nagano, 1996) and these birds could eat Palos Verdes blue butterfly caterpillars that are in search of sites to form their pupae. There are few studies of other vertebrate predators on other butterfly taxa. Small mammals likely are important predators of the pupae of some species, such as the European swallowtail butterfly (*Papilio machaon*)(Dempster *el al.* 1976) and the British brown hairstreak butterfly (*Thecla betulae*)(Thomas 1974). There have not been any adequate investigations of the impact of domestic cats (*Felis domesticus*), rats (*Rattus* sp.), and red foxes (*Vulpes vulpes*) and other introduced mammalian predators on the Palos Verdes blue butterfly.

The larvae of many species of blue butterflies (Lycaenidae) possess specialized glands which produced sweet fluids which are highly sought out by a number of ant taxa (Fiedler et al 1992). The ants protect the caterpillars from predators and parasites (Downey 1962, Fiedler *et al.* 1992, Pierce and Mead 1981). The importance of ants in protecting lycaenid caterpillar was demonstrated by Pierce and Easteal (1986) using the oro blue butterfly, who found 45-84 percent lower levels of parasitism among ant-tended larvae. The potential invertebrate parasites and predators at the project site and their impact on the Palos Verdes blue butterfly have not been fully examined. Three species of ants were recorded by Ballmer and Pratt (1992) tending the silvery blue butterfly. Ants specific to the Palos Verdes blue butterfly are unknown, but there is unquestionably an ant-caterpillar association (Mattoni 1992). At least ten species of ants have been found at the Defense Fuel Support Point (Mattoni 1992) including two (*Iridomyrmex humilis* and *Formica pilicornis*) that are known associates of the silvery blue butterfly (Mattoni 1992; Ballmer and Pratt 1991).

The importance of specific ant taxa to a number of lycaenid butterflies is demonstrated by the large blue butterfly (*Maculinea arion*), a Palearctic species. This animal inhabits "warm," well-drained grasslands in intimate association with the larvae foodplant, wild thyme (*Thymus drucei*) and a single species of ant (*Myrmica sabuleti*)(Thomas 1977, 1980a, 1980b, 1991). Due to a sweet secretion from their glands, caterpillars in their fourth instar are taken by worker *Myrmica* ants into their nests where the caterpillars feed on ant eggs, larvae, and pupae. The caterpillars hibernate and pupate only inside *Myrmica* nests. There are areas that contain significant amounts of wild thyme, however, the large blue butterfly is unable to survive if large numbers of *Myrmica sabuleti* are absent (Thomas 1976, 1977). This species of *Myrmica* ant inhabits only short turf grasslands that have been heavily grazed by cattle (*Bos taurus*), sheep (*Ovis aries*), or rabbits (*Lepus capensis*). The change in traditional range management and a decline in the rabbit populations caused by the spread of myxomatosis led to the decline of *Myrmica sabuleti* and as a result, the extinction of the large blue butterfly in Great Britain. The loss of the large blue

butterfly may have been prevented had the ecological needs of the early stages and the *Myrmica* ant been understood earlier (Thomas 1976, 1977, 1980a, 1980b).

The Service is aware of a substantial illegal trade in listed and protected butterflies. Several butterfly poachers/smugglers recently have been convicted of collecting and selling a number of protected species (Williams 1996). Collecting of some rare butterfly taxa, such as the Palos Verdes blue butterfly, that exist in small colonies or repeated handling and marking (particularly of females and in years of low abundance) can seriously damage the populations through loss of individuals and genetic variability (Gall 1984a, 1984b; Murphy 1989; Singer and Wedlake 1981). Collection of females dispersing from a colony also can reduce the probability that new colonies will be founded. Butterfly collectors pose a threat because they may be unable to recognize when they are depleting colonies below the thresholds of survival or recovery, especially when the area is visited for a short period of time (Collins and Morris 1985). Although collectors generally do not adversely affect the healthy, well-dispersed populations of many butterfly species, a number of rare taxa, including the Palos Verdes blue butterfly, which are highly valued by collectors are vulnerable to extirpation or extinction from collecting. Species with small populations at only a few sites may be adversely affected by the cumulative effects of removal of only one or a very few individuals from a site by a few collectors. Unscrupulous collectors who take every specimen they can find on successive days could easily eliminate populations of some species in just a few years. The Service has listed several butterfly species due to imperilment by collectors.

Pacific Pocket Mouse

The Pacific pocket mouse (*Perognathus longimembris pacificus*) is endemic to the immediate coast of southern California from Marina del Rey in Los Angeles County south to the Mexican border in San Diego County (Hall 1981, Williams et al. 1993). The animal has been recorded inland from the coast for approximately 2 miles (3 kilometers). Until recently, the species was believed to be extinct. Rediscovered in 1993, after a twenty year period during which time the animal was not detected, the mouse is currently known to occur at the Dana Point Headlands in Orange County, and two areas at Marine Corps Base Camp Pendleton in San Diego County (Loren Hays pers. comm. to C.D. Nagano October 1995). This imperiled rodent is known to occur on fine-grained, sandy substrates in open coastal sage scrub habitats. The animal formerly occurred in coastal strand, coastal dunes, and river alluvium habitats. The three known extant populations occur within open coastal sage scrub habitats.

The Pacific pocket mouse was listed on an emergency basis on February 3, 1994 (59 **Federal Register** 5306) following the discovery of a population at the Dana Point Headlands in 1993. The animal was listed as an endangered species on September 29, 1994 (59 **Federal Register** 49752). The Pacific pocket mouse is imminently endangered by habitat destruction and fragmentation, documented predation by house cats, and recreational activities (U.S. Fish and Wildlife Service 1994).

The live trapping for the Pacific pocket mouse at the Defense Fuel Support Point consisted of 350 "trap nights" at five areas of the base from June 10-13, 1994 (O'Farrell (1994). Two of the areas surveyed are located in the immediate vicinity of the proposed pipelines project. A single juvenile black rat was captured. The survey did not locate any endangered Pacific pocket mice. Based on the biological assessment and other available information, the Service concurs with the U.S. Navy that take of the Pacific pocket mouse is unlikely to occur at the Defense Fuel Support Point as a result of the pipelines project. Therefore, the Pacific pocket mouse will not be discussed further in this biological opinion.

Defense Fuel Support Point

According to the biological assessment, the 312-acre military facility currently consists predominantly of coastal sage scrub, ruderal, urban, and riparian habitat. Approximately 53 acres of the base consists of coastal sage scrub vegetation. The plant species include coastal sage brush, coastal prickly pear (*Opuntia littoralis*), and lemonadeberry. Several locally rare animal species have been recorded from the site, including the gray fox (*Urocyn cineoargenteus*), raptors, roadrunner (*Geococcyx californianus*)(Jeremiah George, pers. comm. to C. D. Nagano, 1996), western meadowlark (*Strunella neglecta*), and loggerhead shrike (*Lanius ludovicianus*). Both the butterfly and the gnatcatcher have been documented to inhabit the Defense Fuel Support Point. During field review of this project, habitat for the Palos Verdes blue butterfly and the coastal California gnatcatcher were located at the proposed pipelines project site. The project, as proposed, would result in permanent loss of habitat for these two species.

The Defense Logistics Agency and the U.S. Navy have undertaken a number of actions to protect and manage the Palos Verdes blue butterfly at the Defense Fuel Support Point, including an active habitat restoration program, that have significantly enhanced the survival and recovery of this species in the wild. Substantial amounts of iceplant and other exotic plants have been removed by base personnel and volunteer groups from 13.12 acres of the base. Native vegetation also has been planted in these areas. In the last 15 months, some 1,200 volunteers have contributed approximately 3,400 hours of work on habitat management at the base. Due to the steepness of some of the hill slopes, not all of the invasive vegetation can be removed by hand labor; the Defense Fuel Support Point has initiated testing of alternative control measures with the objective of minimizing or eliminating the use of pesticides in these areas. The foodplants of the butterfly, deerweed and locoweed, along with other native species have been planted at the base. The Defense Fuel Support Point has undertaken a captive propagation program for the butterfly, with the intention of using these reared individuals to increase the existing population, and perhaps eventually rearing enough animals to reintroduce to appropriate locations with willing landowners elsewhere on the Palos Verdes peninsula (Dawn Lawson, pers. comm. to C. Nagano and M. Nelson, 1995). After being advised that considerable interest from some butterfly collectors exists in this endangered animal, the Superintendent of the Defense Fuel Depot immediately advised the base security staff to include areas inhabited by the species on their hourly patrols. The Defense Fuel Support Point, under highly controlled conditions, allows access to members of the public to view the butterfly and its habitat. A military audio-visual

team produced a videotape program about the endangered animal and efforts to protect it at the base.

Effects of Action

Palos Verdes Blue Butterfly

According to the Biological Assessment and other information available to the Service, 1.98 acres of habitat that likely is inhabited by the Palos Verdes blue butterfly would be lost during the replacement of the Chevron 1-8" pipeline and during future construction, repair, emergency and other activities along the pipeline route. Based on the available information, the Service anticipates that all Palos Verdes blue butterflies inhabiting the project site would be lost as a result of the Chevron 1-8" pipeline replacement as well as during future construction, repair, emergency and other activities on the pipeline route. These actions are expected to adversely impact the only known population of the endangered Palos Verdes blue butterfly. Implementation of the plan discussed in the biological assessment would offset adverse impacts to the Palos Verdes blue butterfly and its habitat so that the project will not appreciably reduce the likelihood of its survival and recovery.

The Biological Assessment stated that 0.50 acres of occupied Palos Verdes blue butterfly habitat and 1.32 acres of unoccupied butterfly habitat would be affected by the pipelines project. A portion of the Chevron 1-8" pipeline will extend through a concentration of the only known population of the Palos Verdes blue butterfly for a distance of 1,340 by 40 feet (1.23 acres). The presence of adult butterflies observed by Mattoni (1994) served as the basis of the determination of occupied versus unoccupied habitat. The presence of eggs, larvae, and pupae were not investigated in this survey. The early stages of this butterfly are highly cryptic and may be missed even during intensive surveys by experienced entomologists; project impacts could result in harassment or harm to adults; and over time natural succession and restoration of the pipeline route could result in the use of the area by increased numbers of the animals. Therefore, the Service disagrees with the conclusion regarding unoccupied habitat in the Biological Assessment and we consider that the 1.98 acres of habitat that will be impacted by the pipelines project may function as habitat for the Palos Verdes blue butterfly. The difference between the 1.82 acres in the Biological Assessment and the 1.98 acres in this Biological Opinion is due to 0.15 acres of butterfly habitat in pipeline section 4 which was discovered at the January 7, 1996, field meeting. On April 14, 1996, Chris Nagano of my staff and members of the Los Angeles Audubon Society observed an adult female butterfly laying eggs on deerweed in this section of the pipeline route.

Coastal California Gnatcatcher

According to the biological assessment and other information available to the Service, 1.23 acres of coastal sage scrub habitat that likely is inhabited by the coastal California gnatcatcher would be lost during the implementation of the project and during future

activities along the pipeline route. Other indirect impacts include noise, dust, and large numbers of people associated with construction. These activities could interfere with gnatcatcher territorial, nesting, and foraging activities; but at present it is difficult to quantify this level of impact. Based on the available information, the Service anticipates that up to two gnatcatchers inhabiting this area would be taken as a result of the Chevron 1-8" pipeline replacement as well as during future activities on the pipeline route described in this biological opinion. Implementation of the plan discussed in the project section would offset adverse impacts to the coastal California gnatcatcher and its habitat so that the project will not appreciably reduce the likelihood of its survival and recovery.

The proposed pipelines project may incur several indirect impacts beyond the loss of 1.23 acres of coastal sage habitat. The majority of the indirect impacts will result from fragmentation and the reduction in size of coastal sage habitat at the Defense Fuel Support Point and the Palos Verdes peninsula as a whole. Although there have been substantial efforts to restore coastal sage scrub habitat at the base, none of these areas currently are being utilized by the gnatcatcher.

The population of gnatcatchers on the Palos Verdes peninsula declined from 56 pairs in 1994 to 26 pairs in 1995 and then increased to 30 pairs in 1996. The five pairs of gnatcatchers that were present at the Defense Fuel Support Point in 1994 were reduced to two unpaired females in 1995. A single female was present in 1996, however, she left the site potentially as a result of activities associated with a bird banding program and is now in residence in the vicinity of the Rancho Palos Verdes City Hall. The Service concurs with the Biological Assessment that all the coastal sage scrub at the base is suitable habitat for the gnatcatcher, and considers coastal sage scrub that has been utilized by the coastal California gnatcatcher within the recent past to be occupied habitat.

The Service believes implementation of the mitigation measures described in the biological assessment and discussed in the meetings and telephone conversations between the U.S. Navy, Defense Logistics Agency, and the Service will offset the impacts described above to the extent that the proposed project is not likely to jeopardize the continued existence of the Palos Verdes blue butterfly and the coastal California gnatcatcher. We present this conclusion for the following reasons:

1. The Defense Fuel Support Point has undertaken a number of significant actions to enhance the survival and recovery of the Palos Verdes blue butterfly in the wild, including the initiation of the restoration of 13.12 acres of coastal sage scrub habitat at the base and the initiation of a captive breeding program. The gnatcatcher also will benefit from the habitat restoration program.

2. Compensation for the take of the butterfly and the loss of 1.98 acres of its habitat will occur at a ratio of 5.05:1 acres of coastal sage scrub restored for each acre destroyed by the pipelines project. The amount of acreage that will

be restored for the Palos Verdes blue butterfly is 10.0 acres. Compensation for the take of the gnatcatcher and the loss of 1.23 acres of its habitat will occur at a ratio of 2:1 acres of coastal sage scrub restored for each acre destroyed by the pipelines project. The amount of acreage that will be restored for the coastal California gnatcatcher is 2.46 acres. The 2.46 acres will be included in the 10.0 acres of coastal sage scrub that will be restored for the Palos Verdes blue butterfly.

3. A captive propagation for the butterfly will be undertaken for five years or until the success criteria for the coastal sage scrub habitat on the restored pipeline and the mitigation areas have been met, a two-year average of adult butterflies at these locations has been at least one hundred (100) individuals per year, and the butterfly has been utilizing these areas for larval development, adult feeding, breeding, and perching for at least two years.

4. Efforts will be undertaken to locate and remove early stage individuals of the Palos Verdes blue butterfly within the construction right-of-way for the pipelines project. The animals will be maintained in the on-site laboratory until the adults emerge and then they will be released at the Defense Fuel Support Point.

5. The pipeline route and the mitigation areas will be monitored and maintained as coastal sage scrub habitat for the butterfly and the gnatcatcher at the Defense Fuel Support Point.

6. In the event that any future impacts occur on the pipeline route, the impacted areas will be restored to coastal sage scrub habitat.

7. Construction activities will take place outside of the breeding season of the gnatcatcher.

CUMULATIVE EFFECTS

Cumulative effects are those impacts of future non-Federal (State, local government, or private) activities on endangered or threatened species or critical habitats that are reasonably certain to occur during the course of the action. Future Federal actions are subject to the consultation requirements established in section 7 of the Act and therefore are not considered cumulative to the proposed project.

Local development of occupied and suitable habitat of listed species is a significant threat to survival of the species discussed herein. The direct loss of habitat due to development, and the associated fragmentation and habitat degradation that remains following development, are of critical concern in this region.

Some of the activities anticipated to affect coastal California gnatcatchers within the foreseeable future are local urban development projects with no Federal involvement. A large number of projects that lack a Federal nexus are occurring or are proposed within the vicinity of the Palos Verdes Peninsula. These projects could result in significant cumulative effects to the coastal California gnatcatcher. Population growth analysis and estimates published by the Southern California Association of Governments (SCAG) for the 2010 and 2030 time horizons shows a substantial increase in the human populations in the region.

In addition to increased urban development, type-conversion of habitat following fire, and other significant disturbances is of concern. There is an abundance of exotic grasses and forbs surrounding most native habitat in the region. These opportunistic grasses and forbs displace native habitat and can prevent the recolonization of native species. There is also the potential for loss of wildlife habitat due to native vegetation being over-run and out competed by non-native weedy vegetation.

The majority of the remaining coastal sage scrub vegetation in Los Angeles County, especially on the Palos Verdes Peninsula, has been eliminated or highly fragmented by development. Currently, only 1,103 acres of coastal sage scrub, including the Defense Fuel Support Point, remain on the Palos Verdes Peninsula. As discussed previously, habitat destruction and fragmentation are the most significant threats to the coastal California gnatcatcher. As noted by Soule *et al.* (1992), "In the coastal sage of southern California, a classic sequence of habitat destruction and fragmentation has occurred, involving a reduction in total habitat area and apportionment of the remaining area into small isolated pieces. These pieces, mostly canyons, continue to lose native vegetation as human activities fragment them internally and nibble at their edges." The Natural Communities Conservation Program (NCCP) Guidelines note that "... threats to coastal sage scrub habitat are more than losses of total habitat area alone. Threats also include losses of distinct subtypes of sage scrub and losses of the special conditions needed to maintain the broad suite of coastal sage scrub-resident species" (California Department of Fish and Game 1993). Habitat fragments have little long-term value for conservation because smaller habitat areas contain fewer species, have proportionally larger perimeters making them more vulnerable to deleterious edge effects, and are more vulnerable to adverse stochastic events. A loss of species due to area reduction is now a widely accepted prediction for both habitat islands and nature reserves (Wilson 1988). These islands and smaller reserves are faced with an increased likelihood of species extinction due to reduced population sizes.

Nearly all undeveloped land on the Palos Verdes Peninsula is within the City of Rancho Palos Verdes. With the City's recent enrollment into the NCCP, all such lands will be subject to the interim strategy outlined in the special 4(d) rule, the NCCP Coastal Sage Scrub Conservation Guidelines, and other requirements of the NCCP process. This will ensure that future land uses in this subregion will be evaluated for their impacts to the subregional planning effort, together with required mitigation to ensure protection of coastal sage scrub and the coastal California gnatcatcher. Although the Defense Fuel Support Point is not

included in the Palos Verdes NCCP, the Defense Logistics Agency is a cooperating agency in the NCCP agreement. The NCCP Conservation Guidelines recognize the feasibility of active coastal sage scrub restoration projects and estimated that a 5% enhancement potential exists for costal sage scrub habitat. The Conservation Guidelines' tolerance of up to a 5% interim habitat loss is based upon the 5% restoration/enhancement potential estimate. The depleted habitat base and coastal California gnatcatcher population levels on the Palos Verdes Peninsula suggest that species persistence here is at risk under existing conditions and would be further undermined by additional losses of coastal California gnatcatchers or habitat.

The proposed project will impact 1.23 acres of the coastal California gnatcatcher habitat and 1.98 acres of the Palos Verdes blue butterfly habitat on the Defense Fuel Support Point that is not included in the 1050 acres located within the Palos Verdes NCCP. The eight current development proposals in the Palos Verdes NCCP encompass 40 acres (3.8%) of coastal sage scrub that otherwise would qualify for interim take under the 4(d) rule. Based on the concepts and assumptions of the NCCP guidelines, this could reduce the likelihood of the survival and recovery of the coastal California gnatcatcher on the Palos Verdes peninsula. The loss of 40 acres of habitat may have serious implications for the survival and recovery of the Palos Verdes blue butterfly in the wild. However, the efforts undertaken by the Defense Logistics Agency, including the habitat restoration and the captive breeding program, have significantly increased the population size and opportunities for the recovery of this animal in the wild. In addition, it is anticipated that the Palos Verdes NCCP will lead to a viable solution for both of these species.

The Service concludes that the effects of the proposed action in conjunction with the cumulative effects resulting from future non-Federal activities are not likely to jeopardize the survival and recovery of either the coastal California gnatcatcher or the Palos Verdes blue butterfly.

INCIDENTAL TAKE

Section 9 of the Endangered Species Act prohibits any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed wildlife species without special exemption. Under the terms of Section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking within the bounds of the Act provided that such taking is in compliance with this Incidental Take statement. The measures described below are not discretionary, and must be undertaken by the action agency or made a binding condition of any authorization or permit issued to the applicant or agent, as appropriate.

Proposed project actions that may result in the death, injury, harm, or harassment of the two listed species have been previously discussed in this biological opinion. Loss of coastal sage scrub habitat would be confined to the project boundaries. Because the early life stages of the Palos Verdes blue butterfly are not sufficiently vagile to evade construction activity or

large numbers of people in their habitat, or may be injured or killed through the loss of the foodplants of the larvae, take of this species would occur. The presence and activities of construction equipment and large numbers of humans in the habitat of adult butterflies also could result in disturbance, harassment, or otherwise alter their resting, feeding, breeding, or other essential behaviors. Temporary loss of their habitat would occur as a result of the pipelines project. The take of Palos Verdes blue butterflies from future operations and maintenance on the pipelines would occur so long as the pipelines are serviceable. The Service anticipates that an unquantifiable level of take of the Palos Verdes blue butterfly would occur as a result of the proposed action. This level is unquantifiable because of the cryptic nature of the early stages of this animal and the extent of variation in the size of the population over a given period of time. Therefore, the Service estimates the level of take in terms of habitat loss (i.e., acreage). Based on the available information, the Service estimates that all Palos Verdes blue butterflies inhabiting 1.98 acres of the site proposed for replacement and other future activities on the pipeline route, depicted in figure 1 of the biological assessment would be permanently lost. This take will be in the form of harm and harassment of the Palos Verdes blue butterfly as previously described.

Take of coastal California gnatcatcher and their habitat would occur as a result of replacement and future activities on the pipeline route. The Service anticipates that 1.23 acres of coastal California gnatcatcher habitat will be permanently lost and two (2) coastal California gnatcatchers may be taken in the form of harm or harassment as a result of the proposed project described in this biological opinion.

If, during the course of the action, the amount or extent of the incidental take limit is reached, the U.S. Navy shall immediately notify the Service in writing. If the incidental take limit is exceeded, the U.S. Navy must insure that their agents immediately cease the activity resulting in the take, and reinitiate consultation with the Service immediately to avoid further potential violation of section 9 of the Act. The U.S. Navy must provide a written explanation of the causes of the potential take.

REASONABLE AND PRUDENT MEASURES

The following reasonable and prudent measures are necessary and appropriate to minimize and/or compensate incidental take of the endangered Palos Verdes blue butterfly, the threatened coastal California gnatcatcher, and habitat loss during implementation of the proposed pipelines project:

1. Loss of coastal sage habitat shall be confined to the pipelines project site.

2. The U.S. Navy or their agent shall be allowed to remove or impact the coastal sage scrub habitat on the pipeline route for pipeline replacement, routine maintenance, or emergencies in perpetuity provided the habitat is restored to original conditions after completion of the activity.

3. The adverse impacts to the Palos Verdes blue butterfly and the coastal California gnatcatcher shall be minimized by restoring suitable coastal sage scrub for these two listed taxa on the Defense Fuel Support Point.

4. The proposed captive propagation for the butterfly shall be undertaken for five years or until the success criteria for the coastal sage scrub habitat on the restored pipeline and the mitigation areas is met, a two (2) year average of adult butterflies at these locations reaches at least one hundred (100) individuals, and the species utilizes these areas for larval development, adult feeding, breeding, and perching for at least two years.

5. A worker education program shall be undertaken on the importance of protecting coastal sage habitat to minimize take of the endangered Palos Verdes blue butterfly and the threatened coastal California gnatcatcher.

TERMS AND CONDITIONS

To be exempt from the prohibitions of Section 9 of the Act, the U.S. Navy is responsible for compliance with the following terms and conditions, which implement the reasonable and prudent measures described above:

1. The following term and condition shall implement reasonable and prudent measure (1):

   a. All coastal sage scrub habitat adjacent to the project site shall be avoided during and following pipeline replacement, repair, and other activities. Fences, stakes, flags or other markers shall be used to delimit the areas that are to be avoided by construction activities.

2. The following term and condition shall implement reasonable and prudent measure (2):

   a. The U.S. Navy or their agent shall be allowed to incidentally take the butterfly and/or the gnatcatcher, and remove or impact their habitat on the pipelines route for pipeline replacement, routine maintenance, emergencies, or other activities in perpetuity provided the habitat is restored to original conditions after completion of the activity. The activities conducted on the pipeline shall not exceed the footprint of the area described in the "Description of the Proposed Action" section of this biological opinion.

   b. Future activities on the pipelines route shall only be undertaken with the approval of the Commander of the Defense Fuel Region-West. The U.S. Navy shall advise the Service of the size of the area impacted, the activities undertaken at the site, and provide an acceptable restoration plan for the

impacted area prior to start of project construction. The construction plan shall include a mitigation/restoration plan as described in 3c, 3e, 3f, 3g, 3h, and 3i of the terms and conditions of this biological opinion. The Commander of the Defense Fuel Region-West and/or the U.S. Navy shall make every reasonable attempt to advise the Service prior to initiating the activity(ies) which would impact the habitat found on the pipelines.

3. The following terms and conditions shall implement reasonable and prudent measure (3):

a. The adverse impacts to the butterfly and the gnatcatcher shall be minimized by restoring coastal sage scrub for these two listed taxa at the Defense Fuel Support Point. Deerweed and locoweed, in addition to other native plants, shall be planted in the mitigation areas.

Compensation for the take of the butterfly and the loss of 1.98 acres of its habitat will occur at a ratio of 5.05:1 acres of coastal sage scrub restored for each acre of habitat destroyed for the impacts associated with the pipelines. Accordingly, the amount of acreage that will be restored for the Palos Verdes blue butterfly is 10.0 acres.

Compensation for the take of the gnatcatcher and the loss of 1.23 acres of its habitat will occur at a ratio of 2:1 acres of coastal sage scrub habitat restored for each acre of habitat destroyed or portions thereof for the impacts associated with the pipelines. The amount of acreage that will be restored for the coastal California gnatcatcher is 2.46 acres. The 2.46 acres will be included in the 10.0 acres of coastal sage scrub that will be restored for the Palos Verdes blue butterfly.

b. An acceptable habitat restoration plan the butterfly and the gnatcatcher shall be completed for the mitigation areas. The mitigation areas shall contain seeded and native plantings, including *Artemisia californica*, *Lotus scoparius*, *Astragulus trichopodus lonchus*, and other species used as nectar sources by the butterfly. All plants utilized shall be from the Palos Verdes peninsula or other areas that are acceptable to the Service.

c. The applicant shall insure that 10.0 acres at the Defense Fuel Support Point are designated and protected as habitat for the Palos Verdes blue butterfly and the coastal California gnatcatcher. Each mitigation area shall be designed and located to prevent isolation of its butterfly subpopulation from other subpopulations on the base, and shall be approved by the Service.

d. A qualified entomologist/biologist (monitor) shall be on-site during all construction and revegetation activities associated with pipelines and the duration of the restoration of the mitigation areas to insure that no unnecessary take of the Palos Verdes blue butterfly or the coastal California gnatcatcher occurs. The monitor(s) shall possess a valid recovery permit to study the the coastal California gnatcatcher on the Palos Verdes peninsula from the Service, possess at least three (3) years of direct field experience with the butterfly at the Defense Fuel Support Point, possess at least two (2) years direct field experience with the coastal California gnatcatcher on the Palos Verdes peninsula, and possess at least one (1) years experience with the restoration of coastal sage scrub habitat on the Palos Verdes peninsula. The monitor(s) utilized shall have the authority to stop all activities until appropriate corrective measures have been completed. The monitor(s) shall also be required to report violations immediately to the Service.

e. Measures must be taken to fully control the entry of pesticides, herbicides, fertilizers, or other chemical agents into the coastal sage scrub habitat on the restored pipelines or the mitigation areas. No spraying of these agents is to be conducted within one hundred (100) feet of these areas nor any such agent with the potential to drift, flow or be washed in the areas unless their use has been approved by one of the following: Terminal Superintendent of the Defense Fuel Support Point, Commander of the Defense Fuel Region-West, monitor(s), biologists or wildlife law enforcement personnel from the U.S. Navy, Defense Logistics Agency, or the Service. * herbicide approval

f. No dumping of trash or other material shall occur on the restored pipelines route or the mitigation areas.

g. Replacement or other work on the pipelines shall not be conducted during the breeding season of the coastal California gnatcatcher (February 1 through September 1).

h. Iceplant, pampas grass (*Cortaderia selloana*), tumbleweed (*Salsola tragus*), fennel (*Foeniculum vulgare*), and castor bean (*Ricinus communis*), and other invasive non-native plant species shall be removed from the pipeline route and the mitigation areas. The use of mechanical or manual means to remove the exotic plants shall be emphasized. The use of herbicides or other chemical agents shall be minimized.

i. Biologists and wildlife law enforcement personnel from the California Department of Fish and Game and the Service shall be given complete access to the Defense Fuel Support Point to monitor the butterfly, gnatcatcher, restored pipeline route, and the mitigation areas in perpetuity.

j. The population of the Palos Verdes blue butterfly and the coastal California gnatcatcher, the general condition of the mitigation areas, and the pipeline route shall be monitored by a qualified entomologist/biologist each year beginning with the date the mitigation program is initiated. The monitoring shall be conducted for a period of five calendar years or the until the data has been reviewed and approved by the Service, U.S. Navy, and the Defense Logistics Agency. The entomologist/biologist shall possess a valid recovery permit to study the coastal California gnatcatcher on the Palos Verdes peninsula from the Service, possess at least three (3) years of direct field experience with the butterfly at the Defense Fuel Support Point, and possess at least one (1) years experience with the restoration of coastal sage scrub habitat on the Palos Verdes peninsula.

At least one visit every four days between January 20 and May 1 of each year to monitor the butterfly shall be made beginning the year the mitigation is begun. The number of field surveys shall be increased or decreased, as appropriate, if the flight season of the butterfly is earlier or later than January 20-May 1. The study shall include a population census of the adult butterflies, including the number of animals observed, their physical condition, behavior, and precise location at the site; a census of the deerweed and locoweed foodplants, including the number of plants observed, their size, and condition; a qualitative survey of the early stages of the butterfly; and a general assessment of the habitat, including any real or potential threats to the butterfly, and its food plants, such as erosion, invasive exotic plants, etc. Random-walk counts as described by Pollard (1977 and 1984) and Pollard et al. (1986) shall be used; mark-recapture or other methods that involve handling or harassment of the animals shall not be utilized. All appropriate Federal and State permits shall be obtained prior to initiating the field studies.

Three to five visits to survey the gnatcatcher between February 1 and June 30 of each year to monitor the gnatcatcher shall be made beginning the year the mitigation is begun. The dates of the field survey visits shall be made later or earlier in the year, as appropriate, as determined by the nesting season of the bird. Surveys should be conducted before 1100 hrs and after 1600 hrs PST, under weather conditions that are suitable in terms of wind and temperature. Tape recordings of gnatcatcher vocalizations should be used to elicit responses from the animals. In areas where closely adjacent territories of unbanded birds pose potential confusion over the number of gnatcatchers present, teams of 2-4 qualified biologists should survey the specific areas in question on the Defense Fuel Support Point to obtain simultaneous observations of all birds in question. The study shall include a population census of the adult gnatcatchers, including the actual number of animals observed, their physical

condition, behavior, and precise location at the site; the location, age, and sex of any banded gnatcatchers observed; the location and status of any nests observed; and a general assessment of the habitat, including any real or potential threats to the birds and its habitat, such as erosion, invasive exotic plants, etc. All appropriate Federal and State permits shall be obtained prior to initiating the field studies.

k. A written report analyzing the data from the monitoring of the endangered Palos Verdes blue butterfly and the threatened coastal California gnatcatcher at the mitigation areas and the restored pipelines route shall be conveyed to the Service and the Department of Fish and Game (Supervisor, Environmental Service, Department of Fish and Game, 350 Golden Shore, Long Beach, California 90802, and Staff Zoologist, Department of Fish and Game, 1220 S Street, Sacramento, California 95814) by December 31 of each year beginning with the date the program is initiated. The report shall include, but not be limited to, the raw data collected during the field surveys and a basic analysis of the population dynamics of the endangered Palos Verdes blue butterfly and the threatened coastal California gnatcatcher. The following shall be analyzed for the two listed species: estimated population size (using both open and closed population models, as appropriate; see Gall 1983), and spatial distribution. Maps showing the specific location where the individual adult butterflies, early stages of the butterflies, foodplants and nectar sources, and birds and their nests were observed shall be included. For the deerweed and locoweed plants the following shall be analyzed: the survival rate, condition, and size of the plants. Real and likely future threats shall be addressed along with suggested mitigations (e.g. removal of exotic vegetation, etc.). The original field notes, photographs, original correspondence, and all other pertinent material, as well as a copy of the report must be deposited and accessioned into the Natural History Museum of Los Angeles County (Curator, Entomology Section, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, California 90007) by December 31 of each year beginning with the date the mitigation program is initiated. The Carlsbad Field Office and the Natural Diversity Data Base of the California Department of Fish and Game shall be provided with the accession numbers given to this material by the Natural History Museum of Los Angeles County.

l. The U.S. Navy or their agent shall initiate or modify management activities, as appropriate, based on the annual report on the status of the Palos Verdes blue butterfly and the coastal California gnatcatcher at the pipelines route and the mitigation areas.

4. The following term and condition shall implement reasonable and prudent measure (4):

   a. The captive propagation for the butterfly shall be undertaken for five (5) years after the date the mitigation program is initiated or until the success criteria for the coastal sage scrub habitat on the pipeline route and the mitigation areas has been met, a two (2) year average of adult butterflies at these locations has been at least one hundred (100) individuals per year, and the species has been utilizing these areas for larval development, adult feeding, breeding, and perching for at least two (2) years.

   b. The U.S. Navy shall submit a captive propagation plan to the Service by December 31 of each year for the following flight season. The plan may be in verbal or written form. The plan shall include, at a minimum, the proposed number of females that will be captured, the location of the laboratory where the early stages will be raised, and the location where the resulting adults will be released. The captive propagation program should follow the methods and techniques described in Mattoni (1988) and Morton (1991a and 1991b).

   c. Captive populations should be maintained in at least two (2) locations in order to reduce the likelihood of their loss resulting from fire, disease, or other disasters.

   d. The personnel involving in the breeding program shall possess at least two (2) years of direct experience with the captive propagation of the Palos Verdes blue butterfly.

5. The following term and condition shall implement reasonable and prudent measure (5):

   a. All on-site personnel must receive instruction regarding the presence of the endangered Palos Verdes blue butterfly and the threatened coastal California gnatcatcher.

Disposition of Sick, Injured, or Dead Specimens

The Service is to be notified within one (1) working day of the finding of any dead, injured, or sick coastal California gnatcatchers during this project. Notification must include the date and time of discovery, location of the carcass, injured or sick animal and any other pertinent information. The precise location where the gnatcatcher(s) is/are found should be marked in an appropriate manner and photographed. The dead gnatcatcher(s) should be placed and sealed in an appropriate sized glass jar and refrigerated. A California Department of Fish and Game warden should be notified within one (1) hour of the discovery of injured or sick

gnatcatcher(s). Instructions should be obtained from the game warden or the bird(s) should be transported in an expeditious manner to a qualified veterinarian or approved animal rehabilitation center. Should any treated gnatcatchers survive, the Service must be contacted regarding the final disposition of the birds. The Service contact persons are Senior Resident Agent Larry Farrington of the Service's Law Enforcement Division (310/297-0062) or Chris Nagano or Marjorie Nelson (619/431-9440).

Any dead Palos Verdes blue butterflies which appear to be the result of an unusual die-off or high level of die-off that may be associated with this project must be reported to the Service within one (1) working day of discovery. Notification must include the date and time of discovery, location of the dead animal(s), and any other pertinent information. The location where the dead animal(s) is/are found should be marked in an appropriate manner and photographed. The dead Palos Verdes blue butterfly(ies) should be immediately placed and sealed in an appropriate sized glass jar and refrigerated. The Service contact persons are Senior Resident Agent Larry Farrington of the Service's Law Enforcement Division (310/297-0062) or Chris Nagano or Marjorie Nelson (619/431-9440).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as suggestions from the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The measures provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's 7(a)(1) responsibility for these species.

1. The U.S. Navy and the Defense Logistics Agency should complete a "Safe Harbors" agreement with the Service for the gnatcatcher, butterfly, other listed species, and native habitats at the Defense Fuel Support Point. The Service is interested in working with the U.S. Navy and the Defense Logistics Agency on this project.

2. The impacts to the butterfly and the gnatcatcher on the U.S. Navy property located on the southwest corner of Palos Verdes Drive North and Gaffey Street and are adjacent to the softball fields should be considered if this site is excessed as a result of closure of the Long Beach Naval Shipyard. The butterfly has been observed on this property in March 1995, and March 1996.

3. A chain-link fence should be placed around the U.S. Navy property located on the southwest corner of Palos Verdes Drive North and Gaffey Street and are

adjacent to the softball fields. This site is being degraded due to significant numbers of off-road vehicles and unauthorized dumping of mulch.

4. An ecological study of the ant fauna of the Defense Fuel Depot should be conducted that focuses on those species that may interact with the early stages of the Palos Verdes blue butterfly. The introduced Argentine ant has eliminated or displaced native ant species at many localities (Erickson 1972; Haskins and Haskins 1965, 1988; Holway 1995; Knight and Rust 1990; Ward 1987). The ecological impact on the Palos Verdes blue butterfly from this event has not been determined. The Service should be contacted if any ant taxa are found to be important to the butterfly.

5. The entire Defense Fuel Support Point, including the canyons on the south side of the base should be surveyed for the butterfly, gnatcatcher, and the Pacific pocket mouse.

6. The Defense Fuel Support Point should allow captive-propagated Palos Verdes blue butterflies from stock obtained from on-site females to be reintroduced to appropriate sites containing suitable habitat and willing landowners on the Palos Verdes peninsula. Individuals should only be taken from the Defense Fuel Support Point if adequate studies indicate the population on the base will not be adversely affected by their removal.

7. The Defense Fuel Support Point should continue its active public education program on the butterfly and its imperiled coastal sage scrub habitat.

8. The Defense Fuel Support Point should continue its active security program against poachers seeking the Palos Verdes blue butterfly. Barbed wire should be placed along the top of the chain-link fence located on the south side of the last segment of the pipelines route that contains butterfly habitat and is located directly north of the Los Angeles Police pistol range.

9. A program to remove non-native predators of the butterfly and the gnatcatcher, including house cats, dogs (*Canis familiaris*), red foxes, Norway rats, and black rats should be initiated at the Defense Fuel Support Point. All eight eggs laid by the female-female gnatcatcher pair in 1995 were taken by an unknown predator (Atwood et al. 1995). The mammalian predators also capture and/or feed on reptiles and small rodents (Churcher and Lawton 1987; George 1974; Harrison 1992; Hubbs 1951; Jurek 1994; Kovach and Dow 1981; Palazzo 1994a, 1994b) and adult butterflies (C.D. Nagano pers. obs., 1968-1995). The Defense Fuel Support Point is inhabited not only by the threatened coastal California gnatcatcher, but a wide diversity of other potential feline prey species including songbirds, reptiles, and native rodents.

House cats inhabit the residential areas located immediately to the north and south of the base and there likely are feral individuals at the Defense Fuel Support Point. House cats have been documented to compete for food with the endangered island fox (*Urocyon littoralis*) on San Nicolas Island (Kovach and Dow 1981) and similar negative interactions may occur between these felines and native gray foxes. "Cat colonies" which may become established by animal-care groups (Graham 1995, Roberto 1995) should be removed as quickly as possible. The red fox is a highly invasive exotic predator that likely was introduced to southern California in the early 20th Century (Burkett and Lewis 1992; Lewis et al. 1993; Palazzo 1994b; Sarah George, mammalogist, pers. comm. to C. D. Nagano, 1988). The red fox could be a predator on the gnatcatcher. Norway rats and black rats are omnivorous, eating a wide variety of plant and animal matter, including insects and other invertebrates (Nowak and Paradiso 1983). All exotic predator removal methods employed should not adversely affect the gray foxes or native rodents that inhabit the base.

10. A study should be completed of the relative use and biological effects of the use of deerweed as a foodplant by the Palos Verdes blue butterfly. The results of the study should be utilized to determine the number of these two species that are planted in the mitigation areas and on the pipeline route.

In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species and/or proposed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

CONCLUSION

This concludes formal consultation on the Chevron 1-8" pipeline and associated government pipelines project as described in the biological assessment. Reinitiation of formal consultation is required if the amount or extent of incidental take is exceeded, if new information reveals effects of the actions that may affect listed species or critical habitat in a manner that was not considered in this opinion, and/or if a new species is listed or critical habitat is designated that may be affected by the action. If you have any questions regarding this biological opinion, please contact Chris Nagano or Marjorie Nelson of my staff at the letterhead address or at 619/431-9440.

Sincerely,

for Gail C. Kobetich
Field Supervisor

cc: FWS:RO, Portland, OR
DFSP, San Pedro, CA (Attn. Lt. Col. C. Gross)
DFSP, San Pedro, CA (Attn: C. Wilson)
DLA, Arlington, VA (Attn: Major Z. Mehr)
UCLA, Los Angeles, CA (Attn: R.H.T. Mattoni)
FWS:LE, Torrance, CA (Attn: Senior Resident Agent L.Farrington)
FWS:LE, Torrance, CA (Attn: Special Agent G. Phocas)
CDFG, Sacramento, CA (Attn: D. Warenycia)
CDFG, San Diego, CA (Attn: B. Tippets)
LACM, Los Angeles, CA (Attn: Dr. B. Brown)

Literature Cited

American Ornithologists' Union (AOU). 1983. Checklist of North American Birds, Sixth Edition. American Ornithologists' Union, Lawrence, KS. 877 pp.

—— 1989. Thirty-seventh Supplement to the American Ornithologists' Union Checklist of North American Birds. *Auk* 106 (3): 532-538.

Arnold, R.A. 1981. Distribution, life history, and status of three California Lepidoptera proposed as endangered or threatened species. Final report. Calif. Dept. Fish and Game # S-1620- E-F-3.

—— 1987a. Decline of the endangered Palos Verdes blue butterfly in California. *Biol. Cons.* 40:203-217.

—— 1987a. Surveys for the endangered Palos Verdes blue butterfly and its larval foodplant in 1986. Final report for contract C-1455. California Department of Fish and Game, Sacramento, California.

Atwood, J. 1980. The United States distribution of the California black-tailed gnatcatcher. *Western Birds* 11: 65-78.

—— 1988. Speciation and geographic variation in black-tailed gnatcatchers. *Ornithological Monographs No. 42.* American Ornithologists' Union, Washington, D.C.

—— 1990. Status review of the California gnatcatcher (*Polioptila californica*). Manomet Bird Observatory, Manomet, Massachusetts.

—— 1991. Subspecies limits and geographic patterns of morphological variation in California gnatcatchers (*Polioptila californica*). *Bull. So. Calif. Acad. Sci.* 90: 118-133.

Atwood, J.L., M.R. Fugali, J.C. Luttrell, and N.C. Nicolai. 1994. California gnatcatchers, cactus wrens, and conservation of coastal sage scrub on the Palos Verdes peninsula: progress report no. 1 (1993). Unpublished technical report, Manomet Observatory for Conservation Sciences, Manomet, Mass.

Atwood, J.L., J. C. Luttrell, T.J. Overbey, and C.H. Reynolds. 1995a. California gnatcatchers, cactus wrens, and conservation of coastal sage scrub on the Palos Verdes peninsula: progress report no. 2 (1994). Unpublished technical report, Manomet Observatory for Conservation Sciences, Manomet, Mass.

Atwood, J.L., C.H. Reynolds, M.R. Fugagli, and S.H. Tsai. 1995b. California gnatcatchers, cactus wrens, and conservation of coastal sage on the Palos Verdes peninsula. Progress Report no. 3 (1995). Mamomet Observatory for Conservation Sciences, Mamomet, Mass.

Baker, R.R. 1970. Bird predation as a selective pressure on the immature stages of the cabbage butterflies *Pieris rapae* and *P. brassicae*. *Jour. Zool.* 162: 43-59.

Ballmer, G.R. and G.F. Pratt. 1992. Quantification of ant attendance (Myrmecophily) of lycaenid larvae. *J. Res. Lep.* 30:95-112.

Barbour, M. and J. Major 1977. Terrestrial Vegetation of California. John Wiley and Sons, New York.

Braden, G. and S. Powell 1994. Nesting biology of the coastal California gnatcatcher (*Polioptila californica californica*) in Western Riverside County. Unpublished draft report, U. S. Fish and Wildlife Service, Carlsbad, California.

Burkett, E.E. and J.C. Lewis. 1992. The spread of the red fox. *Outdoor Calif.* (March-April):1-4.

California Department of Fish and Game. 1993. Southern California coastal sage scrub Natural Community Conservation Planning process guidelines. California Department of Fish and Game, Sacramento, California.

Cappucino, N. And P. Kareiva. 1985. Coping with a capricious environment: a population study of the rare woodland butterfly, *Pieris viginiensis*. *Ecology* 66:152-161.

Carey, D. B. 1994. Patch dynamics of *Glaucopsyche lygdamus* (Lycaenidae): correlations between butterfly density and host plant diversity. *Oecologia* 99:337-342.

Churcher, P.B. and J.H. Lawton. 1987. Predation by domestic cats in an English village. J. Zool Lond. 212:439-455.

Cone, M. 1994. Butterfly feared extinct reappears. *Los Angeles Times.* March 30, 1994.

Corke, D. 1989. Of pheasants and fritillaries: is predation by pheasants (*Phasianus cochicus*) a cause of the decline of some British butterfly species? *Brit. Jour. Ent. and Nat. Hist* .2: 1-14.

Dempster, J.P. 1967. The control of *Pieris rapae* with DDT, I. The natural mortality of the young stages of *Pieris*. *J. Appl. Ecol.* 4:485-500.

Dempster, J.P. and Hall, M.L. 1980. An attempt at re-establishing the swallowtail butterfly at Wicken Fen. *Ecol. Ent.* 5:327-334.

Dempster, J.P., M.L. King, and K.H. Lakhani. 1976. The status of the swallowtail butterfly in Britain. *Ecol. Ent.* 1: 71-84.

DeSimone, S. 1995. California's coastal sage scrub. *Fremontia* 23 (4):3-8.

Downey, J.C. 1962. Myrmecophily in *Plebejus* (*Icaricia*) *icarioides* (Lepidoptera: Lycaenidae). *Ent. News* 73:57-66.

Ehrlich, P. 1983. Genetics and the extinction of butterfly populations. Pp. 152-163. **IN** C. Schonewald-Cox, S. Chambers, B. MacBryde, and L. Thomas, eds. Genetics and conservation: reference for managing wild animal and plant populations. Benjamin/Cummings, Menlo Park, California.

Erickson, J.M. 1972. The displacement of native ant species by the introduced argentine ant *Iridomyrmex humilis* Mayr. Psyche 78:257-266.

Fiedler, K., P. Seufert, N.E. Pierce, J.G. Pearson, and H. Baumgarten. 1992(1995). Exploitation of lycaenid-ant mutualisms by braconid parasitoids. *J. Res. Lep.* 31:153-168.

Friedmán, H. 1934. Birds victimized by the cowbird. *Wilson Bull.* 46:25-36.

Gall, L.F. 1984a. The effects of capturing and marking on subsequent activity in *Boloria acrocnema* (Lepidoptera: Nymphalidae), with a comparison of different numerical models that estimate population size. *Biol. Cons.* 28:139-154.

—— 1984b. The effects of capturing and marking on subsequent activity in *Boloria acrocnema* (Lepidoptera: Nymphalidae), with a comparison of different numerical models that estimate population size. *Biol. Cons.* 28:139-154.

—— 1985. Measuring the size of lepidopteran populations. *J. Res. Lep.* 24:97-116.

Garrett, K. and J. Dunn. 1981. The Birds of Southern California: Status and Distribution. Los Angeles Audubon Society. 407 pp.

George, W.G. 1974. Domestic cats as predators and factors in winter shortages of raptor prey. *Wilson Bull.* 86:384-396.

Graham, F. 1995. Unnatural predation. Audubon 97(6):84-89.

Greaves 1989, USDA Forest Service General Technical Report PSW-110. Pp. 293-298

Grinnell, J. and A. Miller 1944. The Distribution of the Birds of California. Pacific Coast Avifauna No. 27.

Hall, E.R. 1981. The mammals of North America. John Wiley and Sons. New York, New York.

Hanna, W.C. 1934. The black-tailed gnatcatcher and the dwarf cowbird. *Condor* 36:89.

Harrison, G.H. 1992. Is there a killer in your house? Nat. Wild. 30(6):10-13.

Haskins, C.P., and E.F. Haskins. 1965. *Pheidole megacephala* and *Iridomyrmex humilis* in Bermuda, equilibrium or slow replacement? *Ecology* 46:736-740.

---- 1988. Final observations on *Pheidole megacephala* and *Iridomyrmex humilis* in Bermuda. *Psyche* 95:177-184.

Holway, D.A. 1995. Distribution of the Argentine ant (*Linepithema humile*) in northern California. *Cons. Biol.* 9:1634-1637.

Hubbs, E.L. 1951. Food habitats of feral house cats in the Sacramento Valley. *Calif. Dept. Fish and Game* 37:177-189.

Jurek, R. 1994. A bibliography of feral, stray, and free-roaming domestic cats in relation to wildlife conservation. Non-game Bird and Mammal Program report 94-5, California Department of Fish and Game, Sacramento, California.

Kirkpatrick, J. and C. Hutchinson. 1977. The Community Composition of California Coastal Sage Scrub. *Vegetation* 35: 21-33.

Knight, R.L. and M.K. Rust. 1990. The urban ants of California with distribution notes of imported species. *Southwestern Ent.* 15:167-168.

Kovach, S.D. and R. Dow. 1981. Ecology of island fox and feral cats on San Nicolas Island. Pp. 439-452. **IN** R. Dow, ed. Biennial Mugu Lagoon/San Nicolas Island ecological research symposium. Pacific Missile Test Center, Point Mugu Naval Air Station, California.

Langston, R.L. 1969. A review of *Glaucopsyche*, the silvery blues in California (Lycaenidae). *Jour. Lep. Soc.* 23:149-154.

Lewis, J.C., K.L. Sallee, and RT. Golightly. 1993. Introduced red fox in California. California Department of Fish and Game Non-game Bird and Mammal Sect. Rpt. 93-10.

Mattoni, R.H.T. 1988. Captive propagation of California endangered butterflies. Calif. Dept. Fish and Game Contract C-1456, Sacramento, Calif.

—— 1992(1995). Rediscovery of the endangered Palos Verdes blue butterfly, *Glaucopsyche lygdamus palosverdesensis* Perkins and Emmel (Lycaenidae). *J. Res. Lep.* 31:180-194.

—— 1994. Current status of the Palos Verdes blue butterfly at the U.S. Navy fuel storage reserve, San Pedro, California. Agresearch Inc, Beverly Hills, Ca.

—— Undated. The 1995 adult population of the Palos Verdes blue butterfly at the Defense Fuel Supply Point, San Pedro, California. Unpublished report. Agresearch, Beverly Hills, California. 11p.

Mayfield, H. F. 1977. Brown-headed cowbird: Agent of extermination? *American Birds* 31: 107-113.

McCaskie, R.G. and E.A. Pugh. 1964. Nesting season. Southern Pacific coast region. *Audubon Field Notes* 18:534-536.

Michael Brandman Associates. 1995. California gnatcatcher and domestic cat study for the Newporter North site. Michael Brandman Assoc. Irvine, CA.

Miller, L.D. and F.M. Brown. 1981. A catalogue/checklist of the butterflies of America, north of Mexico. Lep. Soc. Mem. 2.

Morton, A.C. 1991a. Captive breeding of butterflies and moths: I. Advances in equipment and techniques. *Int. Zoo Yrbk.* 30:80-89.

—— 1991b. Captive breeding of butterflies and moths: II. Conserving genetic variation and managing biodiversity. *Int. Zoo Yrbk.* 30:89-97.

Murphy, D.D. 1989. Are we studying our endangered butterflies to death? *J. Res. Lep.* 26:236-239.

Nowak, R.M. and J. L. Paradiso. 1983. Walker's mammals of the world. Volume II. John Hopkins Univ. Press. Baltimore, Md.

O'Farrell, M.J. 1994. Pacific pocket mouse survey-Long Beach Naval Complex San Pedro Fuel Depot. O'Farrell Biological Consulting, Las Vegas, Nevada.

O'Leary, J.F. 1995. Coastal sage Scrub: threats and current status. *Fremontia* 25(4):27-31.

Palazzo, T. 1994. Keeping out cats. P. 77. **IN** C.G. Thelander, ed. Life on the edge. Biosystems Books, Santa Cruz, California.

----- 1994. Unwelcome predator. P. 183. **IN** C.G. Thelander, ed. Life on the edge. Biosystems Books, Santa Cruz, California.

Perkins, E.M. and J.F. Emmel. 1977. A new subspecies of *Glaucopsyche lygdamus* from California (Lepidoptera: Lycaenidae). *Proc. Ent. Soc. Wash.* 79(3):468-471.

Pierce, N.E. and S. Easteal. 1986. The selective advantage of attendant ants for the larvae of a lycaenid butterfly, *Glaucopsyche lygdamus. J. Animal Ecol.* 55:451-462.

Pierce, N. E. and P.S. Mead. 1981. Parasitoids as selective agents in the symbiosis between lycaenid butterfly larvae and ants. Science 211:1185-1187.

Pollard, E. 1977. A method for assessing changes in the abundance of butterflies. *Biol. Cons.* 12:115-134.

----- 1984. Fluctuations in the abundance of butterflies. *Ecol. Ent.* 9:179-188.

Pollard, E., M.L. Hall, and T.J. Bibby. 1986. No. 2 Monitoring the abundance of butterflies 1976-1985. Instit. Terr. Ecol., Monks Wood, Great Britain.

Pyle, R.L. and A. Small. 1961. Annotated field list, birds of southern California. Los Angeles Audubon Society, Los Angeles, California.

Ratcliffe, D. 1979. The end of the large blue butterfly. *New Scientist* 84(1180):457-458.

RECON. 1987. Home range, nest site, and territory parameters of the black-tailed gnatcatcher *Polioptila melanura californica* population on the Rancho Santa Fe Highlands study area, San Diego, California. RECON, San Diego, California.

Roberto, P. 1995. Whose right to life? The cat rescue movement vs. Wildlife defenders. *California Coast and Ocean* 11(2):31-40.

Singer, M.C., C. D. Thomas, and C. Parmesan. 1993. Rapid human-induced evolution of insect-host associations. *Nature* 366:681-683.

Singer, M.C. and P. Wedlake. 1981. Capture does affect probability of recapture in a butterfly species. *Ecol. Ent.* 6:215-216.

Soule, M., D. T. Bolger, A.C. Alberts, J. Wright, M. Sorice, and S. Hill. 1988. Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. *Cons. Biol.* 2:75-92.

Taylor, D. 1986. Effects of cattle grazing on passerine birds nesting in riparian habitat. *J. Range. Manag.* 39:254-258.

Thomas, J.A. 1976. The ecology and conservation of the large blue butterfly. Rep. Inst. Terr. Ecol. Monks Wood, Great Britain.

—— 1977. The ecology of the large blue butterfly. *Rep. Inst. Terr. Ecol.* 1976:25-27.

—— 1980a. The extinction of the large blue and the conservation of the black hairstreak butterflies (a contrast of failure and success). *Rep. Inst. Terr. Ecol.* 1979:19-23.

—— 1980b. Why did the large blue become extinct in Britain? *Oryx* 15:243-247

—— 1991. Rare species conservation: case studies of European butterflies. Pp. 149-197. **IN** I.F. Spellerburg, F.B. Goldsmith, and M.G. Morris, eds. The Scientific Management of Temperate Communities for Conservation. Blackwell Sci. Pub., Oxford.

Tinbergen, L. 1960. The natural control of insects in pinewoods. I. Factors influencing the intensity of predation by songbirds. *Archs Neerl. Zool.* 13:265-343.

U.S. Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Pacific Pocket Mouse Final Rule. 59 **Federal Register** 49752-49762.

Unitt, P. 1984. The birds of San Diego County. *San Diego Soc. Nat. Hist. Mem* 13.

Ward, P.S. 1987. Distribution of the Argentine ant, *Iridomyrmex humilis* Mayr, in natural habitats of the lower Sacramento River Valley and its effect on the indigenous ant fauna. *Hilgardia* 55:1-16.

Warren, M.S. 1989. Pheasants and fritillaries: Is there really any evidence that pheasant rearing may have caused butterfly declines? *Brit. Jour. Ent. and Nat. Hist.* 2:169-175.

Westman, W. 1981b. Factors influencing the distribution of species of California Coastal Sage Scrub. *Ecology* 62: 439-455.

Westman, W. 1981a. Diversity Relations and Succession in California Coastal Sage Scrub. *Ecology* 62: 170-184.

White, S.D. 1995. Disturbance and dynamics in coastal sage scrub. *Fremontia* 25(4):9-16.

Williams, D.F., H. Genoways, and J. Braun. 1993. Taxonomy. Pp. 38-196. **IN** Biology of the Heteromyidae. H. Genoways and J. Brown, eds. Amer. Soc. Mammal. Spl. Pub. No. 10.

Williams, T. 1996. The great butterfly bust. *Audubon* 98(2):30-37

Wilson, E.O. 1988. Biodiversity. National Academy Press, Washington, D.C.

Wines, M. 1984. Official bungling may have erased rare species. *Los Angeles Times*. June 11, 1984.

Wood, S. 1930. Two more victims of the cowbird. *Condor* 32:126.

United States Department of the Interior

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

In Reply Refer To:
FWS-LA-08B0606-08F0704

JUL 02 2010

Lieutenant Colonel Van Sherwood
Pest Management Consultant
Defense Logistics Agency
8725 John J. Kingman Road
Suite 2639, ATTN DES-E
Fort Belvoir, Maryland 22060-6221

Attention: Albert Owen, Naval Facilities Engineering Command, Southwest

Subject: Formal Section 7 Consultation for Routine Maintenance Operations, Defense Fuel Support Point, San Pedro, Los Angeles County, California

Dear Lieutenant Colonel Van Sherwood:

This document transmits the U.S. Fish and Wildlife Service's (Service) draft biological opinion based on our review of the Defense Logistic Agency's (DLA) proposed routine maintenance operations plan for the Defense Fuel Support Point (DFSP) San Pedro, and the effects of this proposed project on the federally endangered Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*; "PVB") and federally threatened coastal California gnatcatcher (*Polioptila californica californica*; "gnatcatcher"), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Critical habitat is not currently designated for any species within the installation. We received your request for formal consultation on May 7, 2008.

This draft biological opinion is based on information provided in your letter requesting initiation of formal consultation, site visits, meetings, telephone conversations and electronic mail exchanges with personnel from your agency and other interested parties, and other sources of information available in our files. A complete project file is maintained at the Carlsbad Fish and Wildlife Office (CFWO).

Consultation History

On April 14, 2008, your agency explained to the Service the need for section 7 consultation on operations and maintenance within DFSP San Pedro and explained the need to complete this consultation in support of an update to the installation's Integrated Natural Resources Management Plan. On April 30, 2008, we received a request for formal section 7 consultation and a description of the proposed action. We discussed details of the proposed action in a

telephone conference on June 23, 2008, and further refined the proposed action through discussions in December 2009. On June 1, 2010, we provided a draft biological opinion to your agency for review.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

DFSP San Pedro has a long and varied history of military land uses and currently serves the United States military as a fuel depot. However, large portions of the property still retain high biological values, as shown by the presence of two federally listed species, the PVB and gnatcatcher. Although the property must be managed to serve the military mission, the property has also been managed for the benefit of these two listed species. In fact, DFSP San Pedro, in part due to its careful land management and stewardship of the PVB, hosted the last known remaining wild population of PVB until recent reintroduction efforts. DFSP San Pedro also supports research and captive rearing, which will allow reintroduction of the PVB to other, historically occupied locations.

DFSP San Pedro requires some assurances, stability, and certainty regarding its current and future operations on the property with regards to habitat and population enhancement activities for these listed species. In the course of managing the facility, routine maintenance activities, such as fire prevention and fence, pipeline, fuel-storage tank, and road repair are required for operational readiness. Additionally, DFSP San Pedro participates in ongoing conservation and research benefiting the PVB and gnatcatcher, and while these activities are ultimately intended to benefit the species, they may impact individual PVB and gnatcatchers during their implementation. The intent of the proposed project is to identify and memorialize procedures that will avoid and minimize impacts to the PVB and gnatcatcher while allowing the installation to carry out its routine functions. For new construction projects, and extensive or non-routine repair initiatives that have the potential to affect federally listed species, DFSP San Pedro will initiate separate formal or informal consultation under section 7 of the Act. The proposal recognizes that DFSP San Pedro has provided important conservation benefits to the PVB and gnatcatcher to date and that the installation will continue to work towards conservation of natural resources.

According to 50 CFR § 402.02 pursuant to section 7 of the Act, the “action area” is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Subsequent analyses of the environmental baseline, effects of the action, and levels of incidental take are based upon the action area as determined by our agency. The action area for this biological opinion consists of the entire 132-hectare (ha) [327-acre (ac)] DFSP San Pedro installation.

Within the installation, 92 ha (227 ac) have little resource value for non-grassland species because they are either developed or routinely mowed for fire abatement around active fuel tanks

(Figure 1 – Operations Emphasis). An additional 9 ha (22 ac) are leased as ball fields and a firing range, and these activities effectively eliminate natural resource value as well (Figure 1 – Lease Areas). The remaining 32 ha (78 ac) provide natural resource benefits and are not subject to significant operations impacts on a regular basis (Figure 1 – PVB Management Emphasis).

The proposed project is routine maintenance and operations activities within DFSP San Pedro as described below. Areas that require routine access for military operations and maintenance include roads, water lines, wells, fuel pipelines, fuel tanks with 39-meter (m) [100-foot (ft)] buffers, valve pits with 10-m (25-ft) buffers, and fuels management zones (Figure 1). Within these areas, DFSP San Pedro will continue to conduct the following activities: road repairs, electrical system upgrades, perimeter fence-line repair and maintenance, uncovering the tops or sides of hillside tanks for repair or maintenance, pipe and valve repair and replacement, driving vehicles on established roads to conduct periodic maintenance checks (daily, weekly, monthly, etc.) and for security patrols, and other activities that support the maintenance, safety, and operation of DFSP San Pedro as defined by the facilities and public works manager, including emergency response to significant threats such as fuel or water leaks. Mowing for fire abatement will also continue throughout the Operations Emphasis area although 1.8 ha (4.4 ac) will be treated with a less intense mowing program and may provide habitat for PVB (Figure 1 – Avoidance areas). With the exception of ongoing maintenance activities, such as fuel modification and roadway maintenance, which permanently alter natural conditions, impacts from all proposed activities will be temporary.

Conservation Measures

As part of the proposed project, DFSP San Pedro will undertake the following measures to avoid, minimize, and offset potential impacts to the PVB and gnatcatcher:

1. To maintain a captive breeding program to support PVB protection and recovery, DFSP San Pedro has committed to:
    a. Continue to fund the existing onsite captive breeding program that was initiated during consultation for the Chevron pipeline project [Formal Section 7 Consultation for the Chevron 1-8” Pipeline and Associated Government Pipeline Projects, Defense Fuel Support Point, San Pedro, Los Angeles County, California (1-6-96-F-09)];
    b. Provide annual reports to the CFWO that include techniques, results and proposed changes for the captive breeding program. The reports will be submitted by October 1 of each year to allow sufficient time for the Service to provide comments for the following breeding season;
    c. Provide access to facilities and share data with public or private researchers studying captive breeding techniques;

d. Support maintenance of secondary PVB rearing facilities to protect against catastrophe;

e. Continue to provide PVB from the captive rearing program for Service-approved releases throughout the historic range of the species;

f. Continue to allow the operation of a native plant nursery on DFSP San Pedro for providing PVB host plants and other native vegetation for habitat restoration projects within and outside the facility; and

g. Continue to share PVB information with others who are trying to establish habitat and PVB populations.

2. To monitor PVB in the wild, DFSP San Pedro has committed to:

   a. Continue annual PVB surveys along transects that have been sampled since 1999 and as described in Longcore 2009;

   b. Conduct PVB surveys throughout all habitat management areas as defined in Longcore (2007) every three years or as habitat conditions are appropriate. Survey protocol will follow the 2006 basewide sampling effort and include hostplant mapping (Longcore *et al.* 2010); and

   c. Deviations from the established PVB survey protocol will require coordination with and approval from the Service.

3. The following measures will be used to minimize and avoid impacts to PVB eggs, larvae and adults within potentially occupied habitat as defined in Figure 1 (Figure 1 was generated using Geographical Information Systems software and can be scaled up as needed to distinguish mapped areas):

   a. When practical, routine maintenance and operations activities listed above will avoid the flight season (February 15 to May 31);

   b. For activities that require work within the flight season, the following measures will be implemented to minimize impacts to PVB;

      i. Hostplants will be censused within the project footprint;

      ii. All hostplants, including a 0.6-m (2-ft) buffer around their canopies will be avoided where possible; and

      iii. All work will be conducted during daylight hours to allow adult PVB to escape impacts.

4. The following measures will be used to minimize and avoid impacts to gnatcatchers within potentially occupied habitat as defined in Figure 1:

   a. The following measures are designed to eliminate impacts to active gnatcatcher nests:

i. When practical, activities will avoid the active nesting season (February 15 to August 15);

ii. For activities that will require work within the nesting season, nest surveys will be conducted within the area subject to direct habitat impacts, and a 30-m (100-ft) buffer surrounding the impact area;

1. These surveys will be conducted within the week prior to the initiation of brushing clearing, grading or other construction activities;

2. If operations and maintenance activities will last longer than 1 week, DFSP San Pedro will coordinate with the Service to determine appropriate nest survey frequency;

iii. The following measures will be employed if active nest(s) are detected within the immediate area of project impacts or within the surrounding 30-m (100-ft) buffer:

1. If practical, construction activities will be avoided within 30-m of a nest until the nest fails or juveniles successfully fledge as determined by a Service-approved biologist;

2. If construction activities are necessary within 30-m of an active nest, project-specific minimization measures will be coordinated with the Service;

b. The following measures will be implemented to minimize impacts to gnatcatchers outside of the breeding season:

i. Immediately prior to clearing vegetation, a Service-approved biologist will survey the work area for gnatcatchers;

ii. If gnatcatchers are found within the work footprint, the biologist will direct workers to begin initial vegetation clearing in an area away from gnatcatchers; and

iii. The biologist will walk ahead of clearing/grubbing equipment to passively flush birds toward areas of appropriate vegetation that are to be avoided.

5. The following measures are designed to minimize impacts to PVB and gnatcatcher habitat:

a. If access to work areas cannot be provided from existing roadways, construction equipment will access work areas by rolling over (crushing) existing vegetation;

b. If vegetation must be cleared for equipment access, vegetation will be cut at its base to avoid uprooting shrubs;

c. If substantial soil disturbance is necessary in high quality habitat as determined by a Service-approved biologist, topsoil will be salvaged and replaced following impact;

i. If additional seeding and/or planting are determined to be necessary, seeds or clippings will be collected from DFSP San Pedro to ensure appropriate plant stock is used, and the appropriate seed mix will be determined by the biologist. PVB hostplants will be included in the seed mix if surrounding areas contain suitable PVB habitat. No nonnative plant species will be included in the seed mix;

d. No more than 0.2 ha (0.5 ac) of suitable gnatcatcher or PVB habitat will be impacted in any 1-year period, and no more than 0.4 ha (1 ac) will be impacted over any 3-year period. DLA will initiate separate consultation for any activities that may impact larger areas;

e. By September 31 of each year DLA will provide the Service with an annual report that includes a table/spreadsheet that documents all habitat impacts that resulted from operations, maintenance and restoration activities implemented during the period between October 1 and September 3. The annual report will include a 3-year running cumulative table that reports and tabulates all impacts to PVB and gnatcatcher habitat from operations and maintenance activities. Habitat impacts resulting from restoration activities will be tabulated separately. The annual report will include maps and or figures that display the location of all habitat impacts from operations and maintenance and restoration activities; and

f. Where temporary habitat impacts are unavoidable, impacted areas will be restored and habitat restoration plans will be forwarded to the Service for review prior to implementation. If the Service does not respond within 30 days, DFSP San Pedro will assume that the Service has no concerns with the plans and proceed with the restoration.

6. The following measures will be implemented to minimize the risk of habitat degradation from the invasion of nonnative vegetation within designated habitat areas as defined in Figure 1:

a. Vegetation characteristics will be monitored annually within habitat areas using study areas defined in Longcore (2007). Monitoring will occur following the PVB flight season each year. The following characteristics will be estimated to provide information for annual management goals:

i. Three permanent transects will be established in each survey area to estimate percent cover of native shrubs, native forbs, nonnative grasses, nonnative forbs, and bare ground;

ii. For each study area, a Service-approved biologist will provide a narrative that describes which invasive species pose the most important threats to habitat;

b. The following species will be eradicated from the habitat areas, and any new invasion will be eliminated annually: *Arundo donax* (giant reed), *Schinus molle* (Peruvian peppertree), and *Carpobrotus edulis* (Hottentot fig or iceplant). If elimination techniques avoid PVB hostplants with a 0.6-m (2-ft) buffer around hostplant canopies and follow guidelines described in gnatcatcher minimization measures, they will not require Service approval;

c. A Service-approved biologist will maintain and continually update a list of nonnative plants that are known to quickly invade and degrade native habitat in the vicinity of DFSP San Pedro. If plant species with rapid colonization and invasion potential are observed within the habitat areas, they will be the highest priority for annual weed management. This list will initially include: *Euphorbia terracina* (spurge), *Ricinus communis* (castor bean), and *Cortaderia selloana* (pampas grass);

d. Other nonnative plants will be managed as part of habitat maintenance using the following approaches as deemed appropriate by a Service-approved biologist:

i. Routine nonnative vegetation control will be implemented using hand tools, including hand-held power tools such as weed trimmers, without the use of chemicals;

ii. To minimize impacts to PVB adults, use of powered weed trimmers or other potentially disturbance inducing methods will be avoided during the PVB flight season (February 15 to May 31) within areas determined to be occupied by monitoring and areas mapped in Figure 1 as potentially occupied by PVB;

iii. In problematic areas, herbicides will be applied by certified pesticide applicators as needed using the following guidelines:

1. A mixture of 2 percent glyphosate and 98 percent water with no surfactant will be used. Alternate herbicides or formulations may be used with Service approval;

2. A marking dye (*e.g.* Blazon® Blue or Tracer™) will be added to the spray solution to help ensure that the herbicide is applied only to target plants;

3. The herbicide solution will be sprayed through a wand that reaches down to the base of target plants where a small amount of the herbicide solution will be sprayed;

4. Herbicide treatments will be limited to periods of low wind to reduce spray drift (unintended dispersal of herbicide through

currents of air). Herbicide will not be used if conditions become windy (maximum gusts of 11 kilometers per hour (km/h) [7 miles per hour (mph)];

5. No herbicide will be applied within 0.6 m (2 ft) of any coast locoweed (*Astragalus trichopodus* var. *lonchus*) or deerweed (*Lotus scoparius*) canopy;

iv. Using data from vegetation sampling, each study area will be assessed to determine whether or not it meets the following criteria in regards to the severity of nonnative plant dominance.

1. If the relative ratio of nonnative plant cover to native plant cover for any study area exceeds 1:1, the biologist will initiate vegetation management for that study area during the same calendar year; and

2. If nonnative vegetation remains above this threshold 2 years later, the biologist will contact the Service and DFSP San Pedro to coordinate remedial actions, which may include supplemental seeding to enhance success.

7. The following measures will be implemented to restore PVB habitat in vegetation communities that have matured to a point that they no longer include open patches with PVB hostplants and support few or no PVB:

a. For restoration activities, there will be an appropriate plan with existing conditions, methods, monitoring, maintenance (3-5 years), success criteria, reporting, and remedial actions. These plans will be forwarded to the Service for approval;

b. Restoration priority will be given to the edges and outside of existing gnatcatcher habitat as shown on Figure 1;

c. Priority will be given to areas that have relatively low PVB abundance according to recent survey data;

d. The basic strategy will be to mimic natural disturbance events that historically maintained PVB habitat, but specific techniques will be determined on a project-specific basis; and

e. No more than 0.4 ha (1 ac) will be disturbed for the purpose of habitat restoration in any 1-year period, and this acreage will not be included in the limit described in Conservation Measure 5d.

8. Consistent with our biological opinion issued in 2005 regarding mowing within DFSP San Pedro (FWS-LA-1-6-06-RF-4022), the following measures will be implemented to minimize and avoid impacts to PVB and its habitat within the designated mowing areas as shown in Figure 1:

a. No mowing will be conducted between February 15th and May 31st , when PVB eggs, larvae or adults are likely to be present; and

b. No heavy equipment will be used for vegetation clearing in the 1.8 ha (4.4 ac) of Avoidance areas shown in Figure 1, and no clearing or mowing will occur between February 15th and May 31st. Where appropriate, bright colored flagging and tape will be used to demark the Avoidance areas.

STATUS OF THE SPECIES

Palos Verdes Blue Butterfly

Listing Status and Critical Habitat

The Service listed the PVB as endangered and designated critical habitat on July 2, 1980 (Service 1980). The PVB was listed because all known populations were small, limited in range, and threatened by urban development and/or weed control practices. The PVB was thought to be extinct in 1983 when the only known population was lost due to development (Arnold 1987); however, the species was rediscovered in 1994 on DFSP San Pedro (Mattoni 1992). A recovery plan for the PVB was published in 1984 (Service 1984), and a 5-year review was published in 2008 (Service 2008).

Species Description

The PVB was recognized as one of 11 subspecies of the silvery blue butterfly (*Glaucopsyche lygdamus*; Lepidoptera: Lycaenidae) in 1977 (Perkins and Emmel 1977; Mattoni 1992). The PVB is a small butterfly with a wingspan of about 25-30 millimeters (1-1.2 inches) (Arnold 1987). The dorsal wing surfaces of the males are silvery-blue with narrow black borders and brownish-grey in the females with blue iridescence. Ventral wing surfaces of both sexes are chalky grey with several round, white-ringed, black spots.

This subspecies is differentiated from other silvery blues by size, wing color, spot pattern, geographic range, flight characteristics, and flight period (Service 1984; Arnold 1987; Mattoni 1992). Coast locoweed (*Astragalus trichopodus* var. *lonchus*) was once thought to be the exclusive larval hostplant for the PVB; however, PVB larvae on DFSP are also known to feed on deerweed (*Lotus scoparius*), which is a known hostplant for the southern blue (*Glaucopsyche lygdamus australis*). Therefore, hostplant use is not a reliable character for distinguishing these subspecies.

Habitat Affinities

The PVB was historically and is currently restricted to the Palos Verdes peninsula, Los Angeles County, California. It is found in open coastal sage scrub (CSS) vegetation that includes coast locoweed or deerweed. PVB require suitable larval hostplants for oviposition and larval

development. Both coast locoweed and deerweed are naturally distributed within disturbed patches in CSS communities on the Palos Verdes peninsula. Both plant species invade cleared areas following disturbance, and coast locoweed can sometimes persist in more mature scrub. PVB likely require some minimum number of larval hostplants and nectar resources to successfully exploit a habitat patch over extended periods (Mattoni and Longcore 2002). Mattoni and Longcore (2002) suggest that slope and azimuth may also affect habitat quality; however, this hypothesis has not been adequately tested.

Life History

The PVB is a univoltine (single brood) species with a flight period that extends from approximately late January to early May (Arnold 1987; Lipman *et al*. 1999). Eggs are generally laid individually on flowerheads of the larval hostplants, where larvae eclose (hatch) and feed. In coast locoweed, PVB larvae eventually enter into and feed on seedpods (Arnold 1987). Later instar larvae are known to be tended by ants. These larvae secrete a sweet fluid or "honeydew," which is taken by ants. Based on studies with an unspecified subspecies of *G. lygdamus*, silvery blue fitness is likely increased through reduced predation, parasitism and drop-off (larvae that drop off hostplants) associated with ant-tending (Pierce and Eastseal 1986).

Mature larvae probably crawl into leaf litter surrounding hostplants, where they are thought to pupate (Lipman *et al.* 1999). Pupae associated with coast locoweed have been seen in seedpods (Arnold 1987); however, deerweed seedpods are too small to contain pupae, and pupae that feed on deerweed are most likely to remain at the base of their hostplant (Arnold 2004). Pupae are known to remain in diapause for one or more years under laboratory conditions. It is thought that PVB pupae are capable of prolonged diapause under natural conditions as well, and annual variation in population estimates supports this contention. Multiple year diapause is a common strategy among butterflies and is considered an adaptive response to annual or seasonal variation in resource availability (Scott 1986).

The adult flight period is tied to hostplant flowering and generally occurs between late January and early May (Arnold 1987; Lipman *et al.* 1999). PVB adults are thought to be relatively poor dispersers (Mattoni 1992). Initial studies suggest that males are more likely to disperse among habitat patches than females (Lipman *et al*. 1999). Oviposition (egg-laying) occurs throughout the flight season, and eggs are laid on the flowerheads or leaves of coast locoweed or deerweed.

Abundance and Population Dynamics

Researchers conducted surveys for the PVB on DFSP San Pedro, from 1994 to 2009 and on the adjacent former Palos Verdes Navy housing area from 1999 to 2009 (Longcore *et al.* 2010). Based on population estimation methods described in Mattoni *et al.* (2001), combined population sizes for DFSP San Pedro and Palos Verdes Navy housing area from 1994 to 2008 were estimated at 69, 105, 247, 109, 199, 209, 132, 139, 215, 30, 282, 204, 219, 211, 45, and 214. These results suggest that Palos Verdes blue butterfly populations fluctuate dramatically under natural conditions.

Relative estimates of annual abundance varied substantially among habitat patches in an 8-year study at DFSP San Pedro (Mattoni *et al.* 2002a). This spatial and temporal variation suggests that no single patch provides consistently high-quality habitat for the Palos Verdes blue butterfly over the long-term. Patches with few or no PVB in a given year may support high abundances in other years. Long term population viability may rely on dispersal among habitat patches or subpopulations. This dynamic is termed a metapopulation, wherein the overall population is maintained through the extinction-recolonization dynamics among a number of habitat patches or subpopulations (Gilpin and Hanski 1991).

In 2000, pupae from a captive rearing program were released into two unoccupied areas within DFSP in an effort to reintroduce the PVB into areas with suitable host plants (Mattoni *et al.* 2002b). The reintroduction effort was considered successful because several adults emerged with typical flight and mating behavior in each area in 2001. PVB have been observed within these areas during surveys in subsequent years (Longcore et al. 2010).

Status and Distribution

Historically, the PVB occurred throughout the Palos Verdes peninsula. When the PVB was first recognized as a distinct subspecies in the 1970's, its range and distribution were already reduced by grazing, agriculture, and residential and urban development (Service 1984; Arnold 1987; Mattoni 1992). The type locality of the subspecies on the Alta Vista Terrace was developed for residential use in 1978, causing the extirpation of that population (Service 1984). By the early 1980's, PVB were found at only 10 locations (Arnold 1987). Between 1983 and 1994, there were no documented observations of PVB, and the subspecies was presumed to be extinct (Arnold 1987). In 1994, PVB was rediscovered on DFSP San Pedro (Mattoni 1992). Following its rediscovery, a captive rearing program was established from individuals gathered at DFSP San Pedro (Longcore *et al.* 2002). The captive rearing program continues to be implemented and has expanded to a secondary facility at Moorpark College. PVB from these facilities have been used for reintroduction efforts throughout the Palos Verdes Peninsula as described below.

In 1996, the Navy completed a formal section 7 consultation with the Service for a Chevron pipeline replacement project at DFSP San Pedro (1-6-96-F-09). This project resulted in a temporary disturbance of 0.80 ha (1.98 ac) of habitat occupied by the butterfly. To offset this

habitat loss the Navy restored the area over the pipeline and revegetated a 4-ha (10-ac) area at DFSP San Pedro.

Unauthorized motorized vehicle use from trespass has occurred for many years at the northeast portion of fuel depot, adjacent to the Palos Verdes Navy housing area in and/or near areas of CSS and known occurrences of the butterfly. The Navy has installed a fence to minimize future potential off-road vehicle impacts to the butterfly and habitat in this area.

The Department of Housing and Urban Development completed a formal section 7 consultation with the Service for disposal and reuse of the Palos Verdes and San Pedro Navy housing areas adjacent to DFSP (FWS-LA-1017.6). Approximately .04 ha (0.09 ac) of known occupied PVB habitat and an additional 18.8 ha (46.6 ac) of potential PVB habitat were cleared as a result of this project. As a part of this project, the Navy established a 4.2-ha (10.4-ac) PVB reserve within the San Pedro Navy housing area that includes most of the occupied PVB habitat in the housing areas. In addition, the Navy funded an extensive pupal salvage effort within areas scheduled to be cleared (Longcore *et al.* 2003). Only two PVB pupae were found in the salvage effort, which suggests that little occupied habitat was lost due to project construction.

PVB from the captive rearing program were introduced to the 11.5-ha (28.5-ac) Linden H. Chandler Preserve (Chandler Preserve) in the City of Rolling Hills Estates in 2009 and the 51-ha (125-ac) Deane Dana Friendship Community Regional County Park (Friendship Park) in 2010. PVB were previously released in the Chandler Preserve following habitat restoration efforts in 2000, but this effort was not successful.

In association with the recent introduction at the Chandler Preserve, the Palos Verdes Peninsula Land Conservancy restored PVB habitat over several years and has committed to maintain the restoration area for the benefit of PVB (Low-Effect Habitat Conservation Plan for Restoration and Management of Linden H. Chandler Preserve in the City of Rolling Hills Estates, Los Angeles County, California 2008). The Los Angeles County Department of Parks and Recreation has also recently performed several years of restoration of PVB habitat within Friendship park and has committed to maintaining the restoration area until 2013 (Deane Dana Friendship Community Regional County Park Safe Harbor Agreement for the Palos Verdes Blue Butterfly, 2010). The success of these reintroduction efforts will be evaluated through surveys over the next several years.

Two male and one female PVB were discovered at the Malaga Dune in 2001 (Rudi Mattoni and Jeremiah George, personal communication, 2001). Previous surveys at this location did not detect any PVB. Therefore, PVB abundance is assumed to be very low at this site, and the site may or may not be currently occupied (Rudi Mattoni, personal communication, 2001). The Malaga Dune is within the City of Palos Verdes Estates.

In summary, there is one fairly robust population of the PVB at DFSP and within preserved habitat at the former Palos Verdes Naval housing area. A captive rearing program provides

some assurance against impacts from catastrophic events to wild populations and serves as a source for PVB reintroductions. The Malaga Dune likely supports few or no PVB, and although PVB have been reintroduced to the Chandler Preserve and Friendship Park, several years of survey data will need to be collected to evaluate the effectiveness of those efforts.

Threats

Given the extremely limited range of the PVB, the primary threats to this species are catastrophic events and stochastic factors that could lead to extirpation given small population size (Shaffer 1981). One extreme disturbance event or a series of years with negative population growth could eliminate the only population with known potential for long-term viability at DFSP San Pedro.

Many areas that are currently considered open space on the Palos Verdes peninsula may be subject to development in the future. Given the historically widespread distribution of PVB on the peninsula, development of these open space areas would likely result in loss of areas with potential for recolonization by PVB. However, most of the remaining restorable habitat for PVB is within the City of Rancho Palos Verdes, and this City is actively developing a Natural Communities Conservation and Habitat Conservation Plan that would include habitat protection and restoration within most of the remaining open space.

Overall, conservation of PVB depends on the efficacy of habitat restoration techniques to establish suitable habitat for the PVB. Because both coast locoweed and deerweed are early successional species, over time restoration areas may naturally transition into later successional CSS of lesser or no suitability for PVB. If natural succession is allowed to proceed, suitable PVB habitat may be lost. Ultimately, active habitat management may be needed to maintain the availability of hostplants to support PVB.

Conservation Needs

Additional populations of PVB need to be established to reduce the potential for extinction through demographic stochasticity or a single catastrophic event. Reintroduction efforts within DFSP San Pedro have shown that the existing captive rearing program has the potential to produce viable populations in suitable habitat.

Restoration and enhancement efforts are currently hindered by a lack of information; thus, researching the biological needs of the PVB is a high priority. Specific aspects of PVB biology that should be addressed include its dispersal capacity, its vulnerability to predation, pupation site requirements, and habitat requirements beyond hostplant presence.

Coastal California Gnatcatcher

Listing Status and Critical Habitat

The gnatcatcher was listed as threatened by the Service on March 30, 1993 (Service 1993). Critical habitat was designated for the gnatcatcher on October 24, 2000 (Service 2000) and revised on December 19, 2007 (Service 2007).

Species Description

The gnatcatcher is a small, long-tailed member of the thrush family (Muscicapidae) that is endemic to cismontane southern California and northwestern Baja California, Mexico (Atwood 1980, 1988, 1990, 1991; American Ornithologists' Union (AOU) 1983, 1989). Its body plumage is dark blue-gray above and grayish-white below, while the tail is mostly black above and below. The male has a distinctive black cap that is absent during the winter, and both sexes have a distinctive white eye-ring. Vocalizations of this species include a call consisting of a rising and falling series of three kitten-like mew notes. The gnatcatcher is distinguished from the black-tailed gnatcatcher (*Polioptila melanura*) by its darker body plumage, less extensive white on tail feathers (rectrices 5 and 6), and longer tail.

Habitat Affinities

The gnatcatcher typically occurs in or near coastal sage scrub, which is composed of relatively low-growing, dry-season deciduous and succulent plants. Characteristic plants of these communities include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), lemonade berry (*Rhus integrifolia*), *Salvia* spp., *Encelia* spp., and *Opuntia* spp. (Atwood 1990, Beyers and Wirtz 1997, Braden *et al.* 1997, Weaver 1998).

Gnatcatchers are found in moderately dense stands of coastal sage scrub (Atwood 1980, 1988). Beyers and Wirtz (1997) found that nesting territories typically have greater than 50 percent shrub cover and an average shrub height that exceeds 1 m (2.3 ft). The relative density of shrub cover influences gnatcatcher territory size, with territory size increasing as shrub cover decreases, likely due to limited resource availability. Gnatcatchers will use sparsely vegetated coastal sage scrub as long as perennial shrubs are available, although there appears to be a minimum cover threshold below which habitat becomes unsuitable (Beyers and Wirtz 1997).

Life History

The gnatcatcher is primarily insectivorous. Based on fecal sample analysis, its diet consists of small arthropods, especially leaf- and planthoppers (Homoptera) and spiders (Araneae) (Burger *et al.* 1999). Both adults and young consume more sessile than active prey items (Burger *et al.* 1999).

Gnatcatchers are non-migratory and exhibit strong site tenacity (Atwood 1990). Gnatcatcher pairs strongly defend territories during the breeding season against other gnatcatchers and predators, and some will defend territories throughout the year (Preston *et al.* 1998). Breeding season territories range in size from less than 1 ha (2.5 ac) to 10 ha (25 ac) (Atwood *et al.* 1998a, Preston *et al.* 1998), with mean territory size generally greater for inland populations than coastal populations (Preston *et al.* 1998). During the non-breeding season, gnatcatchers have been observed to wander into adjacent territories and unoccupied habitat, increasing their home range size to approximately 78 percent larger than their breeding territory (Preston *et al.* 1998).

Most gnatcatchers first breed at 1 year of age (Atwood and Bontrager 2001). The gnatcatcher breeding season extends from late-February through early-August with the peak of nesting attempts occurring from mid-March through mid-May (Grishaver *et al.* 1998, Atwood and Bontrager 2001). Nests are constructed over a 4-10 day period and are most often placed in perennial species of coastal sage scrub about 1.2 ha (3 ft) above the ground (Atwood 1990). Gnatcatchers typically lay clutches of 3 to 5 eggs (Atwood 1990, Galvin 1998, Grishaver *et al.* 1998), and clutch sizes may be influenced by the amount of precipitation immediately preceding nest initiation (Patten and Rotenberry 1999). The egg incubation period is 14 days, and the nestling period is 10 to 15 days (Grishaver *et al.* 1998). Both sexes participate in all phases of the nesting cycle, and gnatcatcher pairs may produce more than one brood in one nesting season (Atwood 1990, Grishaver *et al.* 1998).

Juveniles stay within their natal territories up to 5 weeks after fledging from the nest (Grishaver *et al.* 1998), with juveniles subsequently dispersing to find their own foraging and nesting territories. Juveniles have been observed to disperse up to 10.0 km (6.2 mi) from their natal territory (Atwood and Bontrager 2001), but they generally have been documented to disperse less than 3.0 km (1.9 mi) on average (Bailey and Mock 1998, Galvin 1998, Atwood and Bontrager 2001). Dispersing gnatcatchers are apparently able to traverse highly human-modified landscapes for at least short distances (Bailey and Mock 1998). Juveniles begin to establish territories as early as late spring and territories are established by the end of October (Preston *et al.* 1998).

Distribution

The gnatcatcher is found on the coastal slopes of southern California, from southern Ventura southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties into Baja California, Mexico to approximately 30 degrees North latitude near El Rosario (Atwood 1980, 1990; Service 2000). Within its range, the distribution of coastal California gnatcatcher is further defined by relatively narrow elevation limits (Atwood and Bolsinger 1992). Atwood and Bolsinger (1992) found that of 324 sites occupied by the gnatcatcher between 1960 and 1990, 84 percent were located below 250 m (820 ft) elevation. In general, inland populations of the gnatcatcher can be found below 500 m (1,640 ft) elevation and coastal populations tend to be found below 250 m (820 ft) elevation. Atwood and Bontrager (2001) estimated approximately 94 percent of the gnatcatchers in the United States are found in Orange,

western Riverside, and San Diego counties. Relatively isolated populations also remain in portions of its former range in Los Angeles, San Bernardino, and southern Ventura counties.

Population Dynamics

The abundance of gnatcatchers at a given locale can fluctuate extensively on an annual basis (Atwood *et al.* 1998b, Erickson and Miner 1998, Preston *et al.* 1998). These fluctuations can be relatively extreme, resulting in population sizes that double or halve in a single year (Atwood and Bontrager 2001). Cold, wet winters appear to reduce over-wintering survivorship, and wet springs increase gnatcatcher reproductive success through increased plant productivity and corresponding increases in food availability (Erickson and Miner 1998, Patten and Rotenberry 1999). Drought conditions may reduce gnatcatcher productivity, as suggested by reduced levels of nest success and reduced number of broods during drought conditions (Grishaver *et al*. 1998).

Population Estimates

In 1993, the Service estimated that approximately 2,562 pairs of gnatcatchers remained in the United States. Of these, 30 pairs (1.2 percent) occurred in Los Angeles County, 757 pairs (29.5 percent) occurred in Orange County, 261 pairs (10.2 percent) occurred in Riverside County, and 1,514 pairs (59.1 percent) occurred in San Diego County. In October 1996, the Service estimated the total number of gnatcatchers in the United States at 2,899 pairs (Service 1996). Both of these estimates were based on summing observations that were made over the span of several years without a consistent, probability-based sampling design that can be used to generate an associated margin of error for the population estimates and that takes into account annual population fluctuations (Winchell and Doherty 2008). In the most recent assessment of the range-wide gnatcatcher population, the Service determined that there was insufficient quantitative data to determine whether the overall gnatcatcher population had increased or decreased from 1996 to 1999 (Service 1999).

In 2002, the Service implemented a probability-based sampling scheme to estimate the gnatcatcher population within 81,036 ac (32,794 ha) of coastal scrub and scrub-chaparral ecotone plant communities on accessible public and quasi-public lands of Orange and San Diego counties (Winchell and Doherty 2008). Within this area during the spring of 2002, the average number of gnatcatchers estimated over four sample periods was 1,324 (95 percent confidence interval = 976-1,673) (Winchell and Doherty 2008).

Threats

Gnatcatchers were considered locally common in the mid-1940s, but they had declined substantially in the United States by the 1960s (Atwood 1980). Because of habitat loss and fragmentation resulting from urban and agricultural development, the species was listed as threatened on March 30, 1993 (Service 1993). The direct loss of habitat reduces the amount of breeding, sheltering and foraging area available, thereby reducing reproductive capacity and

ultimately the population size. Development within and near gnatcatcher habitat has increased recreational use of habitats, fire frequency, waste dumping, air pollution, exotic plant and animal species, predators, cowbird parasitism, domestic pets, and night lighting, all of which can have adverse impacts on the quality of habitat for the gnatcatcher. In addition, changes in global climate conditions have the potential to alter the quality and distribution of habitats suitable for the gnatcatcher.

Conservation

Since the listing of the gnatcatcher, the Service has worked with proponents of development projects to offset the loss of occupied or potential gnatcatcher habitat. This has been achieved through conservation, enhancement, and/or restoration of coastal sage scrub as agreed to during interagency consultation, the gnatcatcher 4(d) Rule, or the habitat conservation planning (HCP) process. Development and implementation of several regional HCPs provides long-term protection of gnatcatchers in western Riverside, Orange, and San Diego counties through the conservation and management of relatively large contiguous blocks of habitat.

Conservation Needs

Large blocks of habitat on public and private lands have been secured and are being managed for the benefit of the gnatcatcher as discussed above. Long term management will likely be required in most conserved areas to address the numerous threats posed by the urban edge and ensure the persistence of the species. Some long-term management actions that will address identified threats include predator control, cowbird trapping, routine invasive vegetation removal, limited public access in areas of high quality habitat, and control of irrigation water and other urban run-off adjacent to preserved habitat. Monitoring of the species distribution over time will assist in determining the effectiveness of management actions at reducing threats and will allow for management to be adapted in the event that threats have not been adequately reduced. Adaptive management plans are being developed or have been developed for regional habitat conservation plans in Orange, Riverside, and San Diego counties.

ENVIRONMENTAL BASELINE

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

Because the mission of DFSP San Pedro is to store and deliver fuel for military operations, maintenance and operation of fuel supply infrastructure are the primary activities conducted throughout the facility. These activities are described in the project description for this biological opinion. Previous biological opinions within the action area were focused on

operations and maintenance projects such as pipeline construction [Chevron 1-8" Pipeline and Associated Government Pipelines (FWS-LA-1-6-96-F-09)], fire abatement [2004 and 2005 Fire Suppression, Defense Fuel Support Point, San Pedro (FWS-LA-4022.1)], and building maintenance [Renovation of Building 108, Defense Fuel Support Point, San Pedro (FWS-LA-4504.1)].

Palos Verdes Blue Butterfly

We estimate that 14.4 ha (35.5 ac) of potentially occupied PVB habitat are present within DFSP San Pedro. Since 1994, PVB surveys have been conducted annually along fixed transects within DFSP San Pedro, and several transects have been added and followed through the years (Longcore et al. 2010). These transects run through most of the area designated as "PVB Management Emphasis" in Figure 1, and PVB have been observed at least once in all but one transect. The estimated population size from these surveys varies between approximately 30 and 300 individuals. The variability in population estimates is most likely explained by annual climate patterns, specifically drought conditions (Longcore 2009).

For some transects, PVB are observed intermittently, and in other transects PVB have not been observed for several years (Longcore *et al*. 2010). Intermittent occupancy can be explained by a combination of low detectability, which masks occupancy in transects occupied at low density, and local, temporary extirpation, which is consistent with metapopulation dynamics. In contrast, transects where PVB have not been observed for several years likely no longer support suitable habitat for the subspecies because the habitat has matured into dense scrub communities lacking suitable hostplants for PVB.

Overall, the PVB population size within DFSP San Pedro has been stable or increasing since it was discovered in 1994. This result suggests that habitat management has been effective to this point. However, the apparent loss of PVB from some transects suggests that habitat conditions are degrading in these areas and some level of habitat management is likely needed to sustain PVB into the future.

Coastal California Gnatcatcher

We estimate that 18.5 ha (45.8 ac) of potentially occupied gnatcatcher habitat are present within DFSP San Pedro. Gnatcatchers have been known to occupy DFSP San Pedro since surveys began in 1993 (Tierra Data Systems 1998; Courtois 2003). A maximum of five breeding pairs have been observed, but in some years no evidence of breeding was observed (Tierra Data Systems 1998). The most recent surveys were conducted in 2003, when four distinct pairs were observed with evidence of successful breeding by at least two pairs (Courtois 2003).

Gnatcatcher habitat broadly overlaps suitable PVB habitat within DFSP San Pedro. Whereas PVB require relatively open patches of coastal sage scrub, gnatcatchers prefer relatively dense scrub for nesting.

EFFECTS OF THE ACTION

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

Implementation of the proposed project will temporarily clear no more than 0.2-ha (0.5-ac) of PVB and gnatcatcher habitat in any year and no more than 0.4-ha (1-ac) of PVB and gnatcatcher habitat in any 3-year period. Based on the anticipated maintenance and operations needs for DFSP San Pedro and the avoidance and minimization measures that will be incorporated into project planning, we anticipate that these acreage thresholds will rarely be met. In addition, these impacts will principally be focused along linear easements associated with roads, fuel pipelines, and water lines depicted in Figure 1, such that most occupied habitat will not be directly impacted by maintenance and operations projects. For habitat restoration activities, up to 0.4-ha (1-ac) of PVB and gnatcatcher habitat may be temporarily disturbed within a 1-year period in addition to the acreage disturbed for operations and maintenance. We anticipate that these habitat restoration activities will have a net benefit to these species. Overall, we anticipate that the combination of project-related habitat restoration and ongoing habitat maintenance and restoration activities throughout DFSP San Pedro will maintain or increase habitat availability for the PVB and gnatcatcher within the installation over time.

Palos Verdes Blue Butterfly

For projects that will impact PVB habitat, which is almost exclusively within the PVB Management Emphasis area, we anticipate no direct mortality of adults and little to no loss of other developmental stages. During operations and maintenance activities within this area (collectively “project activities”), avoidance of a 0.6-m (2-ft) buffer around PVB hostplants will likely eliminate all impacts to eggs, larvae and pupae. Project activities that cannot avoid this buffer have the potential to crush eggs, larvae and pupae. These life stages could also be displaced (i.e., inadvertedly moved) during project activities and not survive such disturbance due to desiccation or distance from host plant. Because eggs, larvae and pupae are extremely difficult to detect in the field, it is not possible to accurately predict or detect the number of individuals impacted by specific projects; nonetheless, since we expect few projects to fall into this category, we expect the number of eggs, larvae, and pupae crushed to be low.

Previous mowing has likely eliminated hostplant availability for PVB oviposition within the designated mowing areas shown in Figure 1. Therefore, we anticipate that no pupae will be lost during mowing, and by restricting the timing of mowing, impacts to dispersing adult butterflies from this activity will be avoided. There will be no direct impacts of the mowing program to

PVB eggs, larvae or adults within the 1.8 ha (4.4 ac) of Avoidance areas.

Some PVB pupae may be crushed or displaced during vegetation removal within the Avoidance areas, but the restrictions on heavy equipment will limit impacts to pupae. Colonization of Avoidance areas by larval hostplants is expected by restricting mowing, and the location of the Avoidance areas within the landscape of DFSP San Pedro will increase the likelihood of PVB dispersal among occupied areas throughout the installation. Clearing of nonnative vegetation within Avoidance areas will increase the likelihood of successful PVB dispersal into these areas. Thus, overall, vegetation management within the Avoidance areas will benefit PVB.

Vehicles will be driven along established roads within PVB habitat for routine security and maintenance checks. Because these roads will be used during the PVB flight season, there is some potential for PVB adults to be struck by vehicles. However, DFSP San Pedro has an establish speed limit of 24 km/h (15 mph) throughout the installation, and we anticipate that this speed limit will allow adult PVB to avoid vehicles.

Within the PVB Management Emphasis area, some PVB pupae may be crushed or displaced through habitat restoration and management activities such as vegetation removal and planting. Based on survey information from DFSP San Pedro, and habitat conditions within the areas that will be restored, we anticipate that no PVB eggs, larvae or adults will be present within the restoration areas from June 1 to February 15. Therefore, restricting the timing of when restoration activities will be implemented should prevent impacts to eggs, larvae and adults.

Similarly, no eggs, larvae or adults are anticipated to be present during the timing of herbicide application. While no studies have been conducted to specifically evaluate toxicity of glyphosate to PVB pupae, the available data suggest that herbicides containing glyphosate, such as Roundup Pro®, have very low toxicity to insects in general, and toxic effects have only been shown at much higher dosage levels than currently proposed (Giesy *et al.* 2000; Trumbo 2005). In addition, the pupal stage is less vulnerable to toxic effects than other developmental stages because the pupal case and low metabolic rate of pupae reduces the transport of potentially harmful chemicals from the environment to internal organs. Therefore, we anticipate that no PVB eggs, larvae, pupae or adults will be impacted by herbicide toxicity. However, some pupae may be trampled during herbicide application. Overall, habitat restoration and management activities, including herbicide application, are expected to have a net benefit to PVB through the creation and maintenance of suitable PVB habitat at DFSP San Pedro.

Effect on Recovery

The proposed actions will contribute to several recovery goals identified in the PVB recovery plan (Service 1984). Protection and management of PVB habitat and specific management of larval resources were all identified as recovery priorities, and the proposed activities will contribute to these goals. By continuing to support the captive breeding program and committing to work with local agencies and non-profit groups to release PVB throughout the

Palos Verdes Peninsula, the installation will contribute to expansion of the range of the PVB. Release of PVB into their historic range was identified as an important recovery goal within the recovery plan and was recently emphasized in the PVB 5-Year Review (Service 2008). Successful reintroduction of PVB into its historic range will substantially increase the likelihood of long-term survival and recovery of the subspecies.

Coastal California Gnatcatcher

DFSP San Pedro supports about 18.5 ha (45.8 ac) of gnatcatcher habitat, and no more than 0.2 ha (0.5 ac) of suitable gnatcatcher habitat will be cleared in any 1-year period, and no more than 0.4 ha (1 ac) will be cleared over any 3-year period. Actions will be taken to restore temporary habitat impacts so that no long term loss of habitat for gnatcatchers at DFSP San Pedro is expected. Breeding season territories range in size from less than 1 ha (2.5 ac) to 10 ha (25 ac) (Atwood *et al.* 1998a, Preston *et al.* 1998). Thus, in any given year, sufficient habitat should be available to support the feeding, breeding and sheltering needs of the resident population of gnatcatchers (up to five pairs) despite the temporary impacts expected

Additionally, we anticipate no direct mortality of gnatcatcher eggs, juveniles or adults in association with operations and maintenance activities. Some activities may temporarily disturb gnatcatchers; however, we do not anticipate significant impacts to nesting behavior or reproductive success since 1) most activities will occur outside of the gnatcatcher breeding season and 2) when breeding season restrictions are not practicable, pre-project nest surveys will be performed to determine and maintain a 30-m (100-ft) buffer between impacts and active nests. Finally, any activity that must be implemented during the breeding season and that will occur within 30 m (100 ft) of an active gnatcatcher nest will be coordinated with the Service. Through this coordination, we anticipate that minimization measures will be identified and implemented to prevent adverse impacts to gnatcatcher breeding success.

Cumulative Effects

Cumulative effects are those effects of future non-Federal (State, local government, or private) activities on endangered or threatened species or critical habitats that are reasonably certain to occur during the course of the action. Future federal actions are subject to the consultation requirements established in section 7 of the Act and therefore are not considered cumulative to the proposed project.

Because DFSP San Pedro is a Federal installation, future actions on DFSP San Pedro that have potential to affect PVB and the gnatcatcher are subject to section 7 consultation requirements and are therefore not considered cumulative to the proposed project. Thus, we have not identified any cumulative effects in the action area that are reasonably certain to occur during implementation of the subject maintenance and operations plan.

CONCLUSION

After reviewing the current status of the PVB and gnatcatcher, the environmental baseline for the action area, the direct and indirect effects of the proposed project, and the cumulative effects, it is our biological opinion that the proposed operations and maintenance activities are not likely to jeopardize the continued existence of the PVB or gnatcatcher. We reached this conclusion because 1) the acreage of PVB and gnatcatcher habitat impacts will be small when compared to the overall acreage of occupied habitat present within DFSP San Pedro, 2) habitat maintenance and restoration will maintain or improve habitat conditions for both species over time, 3) based on the habitat quality within the project area, we anticipate that only a small number of PVB individuals will be killed or injured and no gnatcatcher individuals will be killed or injured during project implementation; and 4) short-term impacts will be offset by long-term management of habitat at DFSP for these two species.

INCIDENTAL TAKE STATEMENT

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

The measures described below are nondiscretionary and must be undertaken by the DLA in order for the exemption in section 7(o)(2) to apply. The DLA has a continuing duty to regulate the activity that is covered by this incidental take statement. If the DLA (1) fails to adhere to the terms and conditions of the incidental take statement or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

We anticipate that the number of PVB individuals that will be killed or injured will be low due to the minimization measures committed to by the DLA. However, quantifying the precise number of individual PVB that may be incidentally taken is not possible because detection of mortality or injury is highly unlikely for eggs, larvae and pupae given their size and difficulty in identification. Thus, we have described the incidental take anticipated and quantified it using

PVB habitat (e.g. scrub vegetation with hostplants present) as an ecological surrogate to establish incidental take thresholds, which should not be exceeded.

Within the 32 ha (78 ac) PVB Management Emphasis area during vegetation clearing for routine maintenance and operations activities, we anticipate crushing or displacement of PVB eggs, larvae and/or pupae to result in death or injury to these PVB life stages; and during habitat restoration and management activities, we anticipate trampling of pupae to result in death or injury to this PVB life stage. Take thresholds for the PVB Management Emphasis area are as follows:

- Temporary disturbance of up to 0.2 ha (0.5 ac) of PVB habitat per year during routine operations and maintenance;

- Temporary disturbance of up to 0.4 ha (1 ac) of PVB habitat over any 3-year period during routine operations and maintenance; and

- Temporary disturbance of up to 0.4 ha (1 ac) of PVB habitat per year during habitat restoration activities.

Within the 1.8 ha (4.4 ac) mowing Avoidance area during habitat management activities to remove nonnative vegetation, we anticipate crushing or displacement of pupae to result in death or injury to this PVB life stage. The take threshold for the mowing Avoidance area will be exceeded if mowing or mechanized equipment is used in this 1.8 ha (4.4 ac) area.

No incidental take of coastal California gnatcatchers (any life stage) or PVB adults is anticipated, and none is authorized.

EFFECT OF THE TAKE

In the accompanying biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the Palos Verdes blue butterfly or coastal California gnatcatcher.

REASONABLE AND PRUDENT MEASURES

DLA has committed to implement significant conservation measures as an integral part of their routine maintenance activities at DFSP San Pedro, including providing the Service with an annual report that will allow us to monitor the incidental take described above. Thus, we have not identified any additional reasonable and prudent measures to further minimize take of PVB within the action area.

TERMS AND CONDITIONS

No terms and conditions are necessary because no Reasonable and Prudent Measures have been identified.

Disposition of Dead Specimens

This office is to be notified within 3 working days if any PVB or gnatcatchers are found dead or injured as a direct or indirect result of implementation of this project. Notification must include the date, time, and location of any individuals and any other pertinent information. Dead animals should be collected in an appropriate manner only by a biologist approved by the Service. The office contact person is the Division Chief for Los Angeles County, who may be contacted at the letterhead address or at (760) 431-9440.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, help implement recovery plans, or to develop information. We have no conservation recommendations at this time.

REINITIATION NOTICE

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

If you have any questions or comments about this letter or the consultation process in general, please contact Eric Porter of this office at (760) 431-9440, extension 285.

Sincerely,

Karen A. Goebel

for Jim A. Bartel
Field Supervisor

LITERATURE CITED

American Ornithologists' Union (AOU). 1983. Check-list of North American birds, Sixth edition. Allen Press. Lawrence, Kansas. 877pp.

American Ornithologists' Union (AOU). 1989. Thirty-seventh supplement to the American Ornithologists' Union checklist of North American birds. *Auk* 106 (3):532-538.

Arnold, R. A. 1987. Decline of the endangered Palos Verdes blue butterfly in California. *Biological Conservation* 40: 203-217.

Arnold, Richard. 2004. Consulting Biologist, Entomological Consulting Services, Ltd., Pleasant Hill, California. Telephone communication to Eric Porter, Biologist, Carlsbad Fish and Wildlife Office in Carlsbad, California (April 28, 2004).

Atwood, J. 1980. The United States distribution of the California black-tailed gnatcatcher. *Western Birds* 11:65-78.

Atwood, J. 1988. Speciation and geographic variation in Black-tailed Gnatcatchers. *Ornithology Monograph*. 42.

Atwood, J. 1990. Status review of the California gnatcatcher (*Polioptila californica*). Manomet Bird Observatory, Manomet, Massachusetts.

Atwood, J. 1991. Subspecies limits and geographic patterns of morphological variation in California gnatcatchers (*Polioptila californica*). *Bulletin of the Southern California Academy of Sciences* 90:118-133.

Atwood, J. and J. S. Bolsinger. 1992. Elevational distribution of California gnatcatchers in the United States. *Journal of Field Ornithology* 63(2):159-168.

Atwood, J. L. and D. R. Bontrager. 2001. California gnatcatcher (*Polioptila californica*). *In* The Birds of North America, No. 574 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Atwood, J., S. Tsai, C. Reynolds, J. Luttrell, and M. Fugagli. 1998a. Factors affecting estimates of California gnatcatcher territory size. *Western Birds* 29: 269-279.

Atwood, J., S. Tsai, C. Reynolds, and M. Fugagli. 1998b. Distribution and population size of California gnatcatchers on the Palos Verde Peninsula, 1993-1997. *Western Birds* 29: 340-350.

Bailey, E. and P. Mock. 1998. Dispersal capability of the California gnatcatcher: A landscape analysis of distribution data. *Western Birds* 29: 351-360.

Beyers, J. and W. Wirtz. 1997. Vegetative characteristics of coastal sage scrub sites used by California gnatcatchers: implications for management in a fire-prone ecosystem. Proceedings: Fire Effects on Rare and Endangered Species and Habitats Conference, Nov. 13-16, 1995. Coeur d' Alene, Idaho.

Braden, G., R. McKernan, and S. Powell. 1997. Association of within-territory vegetation characteristics and fitness components of California gnatcatchers. *The Auk* 114: 601-609.

Burger, J. C., M. A. Patten, J. T. Rotenberry, and R. A. Redak. 1999. Foraging ecology of the California gnatcatcher deduced from fecal samples. *Oecologia (Berlin)* 120: 304-310.

Courtois, B. O. 2003. California gnatcatcher presence/absence summary: Defense Fuel Support Point, San Pedro. Submitted to Carlsbad Fish and Wildlife Office September 23, 2003.

Erickson, R., and K. Miner. 1998. Six years of synchronous California gnatcatcher population fluctuations at two locations in coastal Orange County, California. *Western Birds* 29: 333-339.

Galvin, J. 1998. Breeding and dispersal biology of the California gnatcatcher in central Orange County. *Western Birds* 29: 323-332.

Giesy, J. P, S. Dobson, K. R. Solomon. 2000. Ecotoxicological risk assessment for Roundup® herbicide. *Reviews of Environmental Contamination and Toxicology* 167: 35-120

Gilpin, M. and I. Hanksi, eds. 1991. Metapopulation dynamics: Empirical and theoretical investigations. Academic Press, London.

Grishaver, M., P. Mock, and K. Preston. 1998. Breeding behavior of the California gnatcatcher in southwestern San Diego County, California. *Western Birds* 29: 299-322.

Lipman, A., T. R. Longcore, R. Mattoni, and Y. Zhang. 1999. Habitat evaluation and reintroduction planning for the endangered Palos Verdes blue butterfly. Final Technical Report to the California Department of Fish and Game. 44 pp.

Longcore, T., R. Mattoni, A. Lipman, Z. Krenova, and C. Rich. 2002. Final Report for Palos Verdes Blue Butterfly Year 2002 Captive Rearing on Defense Fuel Support Point, San Pedro, California. Los Angeles: The Urban Wildlands Group (Defense Logistics Agency Agreement # N68711-02-LT-00010). 17 pp.

Longcore, T., R. Mattoni, and A. Mattoni. 2003. Final Report for Palos Verdes Blue Butterfly Pupal Salvage on Palos Verdes and San Pedro Housing, San Pedro, California. The

Urban Wildlands Group (Department of the Navy Letter Agreement # N68711-02-LTC3001).

Longcore, T., K. H. Osborne, and A. Dalkey. 2010. Draft Report for 2009 Palos Verdes Blue Butterfly Adult Surveys on Defense Fuel Support Point, San Pedro, California. Los Angeles: The Urban Wildlands Group (Defense Logistics Agency Agreement # N62473-08-LT-R0011).

Mattoni, R. 1992. Rediscovery of the endangered Palos Verdes blue butterfly, *Glaucopsyche lygdamus palosverdesensis* Perkins and Emmel (Lycaenidae). *Journal of Research on the Lepidoptera* 31: 180-194.

Mattoni, R. and T. Longcore. 2002. Census results for Palos Verdes blue butterfly and associated species, 1994–2001. *In*: Mattoni, R. (ed.), Status and trends: habitat restoration and the endangered PalosVerdes blue butterfly at the Defense Fuel Support Point, San Pedro, California, 1994–2001. Los Angeles: The Urban Wildlands Group. 81 pp.

Mattoni, R., T. Longcore, and A. Lipman. 2002a. Description of habitat characteristics of the Palos Verdes blue butterfly. *In*: Mattoni, R. (ed.), Status and trends: habitat restoration and the endangered PalosVerdes blue butterfly at the Defense Fuel Support Point, San Pedro, California, 1994–2001. Los Angeles: The Urban Wildlands Group. 81 pp.

Mattoni, R., M. Vergeer, J. George, and Y. Marlin. 2002b. Release of captive reared Palos Verdes blue butterfly: manipulative field experiments. *In*: Mattoni, R. (ed.), Status and trends: habitat restoration and the endangered PalosVerdes blue butterfly at the Defense Fuel Support Point, San Pedro, California, 1994–2001. Los Angeles: The Urban Wildlands Group. 81 pp.

Mattoni, R. T., Longcore, T., Zonneveld, C., and Novotny, V. 2001. Analysis of transect counts to monitor population size in endangered insects: the case of the El Segundo blue butterfly, *Euphilotes bernardino allyni*. *Journal of Insect Conservation* 5: 197-206.

Patten, M. and J. Rotenberry. 1999. The proximate effects of rainfall on clutch size of the California gnatcatcher. *The Condor* 101: 876-880.

Perkins, E. M. and J. F. Emmel. 1977. A new subspecies of *Glaucopsyche lygdamus* from California (Lepidoptera: Lycaenidae). *Proclamations of the Entomological Society of Washington* 79: 468-471.

Pierce, N. and S. Eastseal. 1986. The selective advantage of attendant ants for the larvae of a lycaenid butterfly, *Glaucopsyche lygdamus*. *Journal of Animal Ecology* 55: 451-462.

Pratt, G. 2004. (Draft of) Final Report for Palos Verdes Blue Survey 2004 on Defense Fuel Support Point, San Pedro, California. University of California at Riverside (Defense Logistics Agency Agreement # N68711-04-LT-A0003). 30 pp.

Preston, K., P. Mock, M. Grishaver, E. Bailey, and D. King. 1998. California gnatcatcher territorial behavior. *Western Birds* 29: 242-257.

Scott, J. A. 1986. The butterflies of North America: A Natural History and Field Guide. Stanford University Press, Palo Alto, CA. 583 pp.

Shaffer, M. L. 1981. Minimum population sizes for species conservation. *BioScience* 31: 131-134.

Tierra Data Systems. 1998. Biological assessment: Terminal operations and maintenance, and restoration of natural habitats at the Defense Fuel Support Point, San Pedro. Prepared for Naval Facilities Engineering Command, Southwest Division (Contract No. N68711-95-D-7605).

Trumbo, Joel. 2005. Pesticide Use Coordinator, California Department of Fish and Game, Sacramentao, California. Telephone communication to Eric Porter, Biologist, Carlsbad Fish and Wildlife Office in Carlsbad, California (November 8, 2005).

U.S. Fish and Wildlife Service. 1980. Listing the Palos Verdes Blue Butterfly as an Endangered Species with Critical Habitat; Final Rule. Federal Register 45:44939-44942.

U.S. Fish and Wildlife Service. 1984. The Palos Verdes Blue Butterfly Recovery Plan, dated January 19, 1984, prepared by the United States Fish and Wildlife Service under contract with Dr. Richard Arnold, Department of Entomology, University of California 94720.

U.S. Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; Determination of threatened status for the Coastal California Gnatcatcher; Final Rule. Federal Register 58:16742-16757.

U.S. Fish and Wildlife Service. 1996. Reinitiation of the biological opinion on implementation of the special rule for the Coastal California Gnatcatcher. On file, U.S. Fish and Wildlife Service Carlsbad Fish and Wildlife Office, Carlsbad, California.

U.S. Fish and Wildlife Service. 1999. Reinitiation of intra-service consultation on implementation of the special rule for the coastal California gnatcatcher. On file at U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, Carlsbad, California.

U.S. Fish and Wildlife Service. 2000. Endangered and threatened wildlife and plants; Final determination of critical habitat for the coastal California gnatcatcher; Final Rule.

Federal Register 65:63680-63743.

U.S. Fish and Wildlife Service. 2007. Endangered and threatened wildlife and plants; Revised designation of critical habitat for the coastal California gnatcatcher (*Polioptila californica californica*); Final Rule. Federal Register 72:72010-72213.

U.S. Fish and Wildlife Service 2008. Palos Verdes Blue Butterfly (*Glaucopsyche lygdamus palosverdesensis*) Five-Year Review: Summary and Evaluation. United States Fish and Wildlife Service, Carlsbad, California. March 2008.

Weaver, K. L. 1998. Coastal sage scrub variations of San Diego County and their influence on the distribution of the California gnatcatcher. *Western Birds* 29: 392-405.

Winchell, C. S. and P. F. Doherty Jr. 2008. Using California gnatcatcher to test underlying models in habitat conservation plans. *Journal of Wildlife Management* 72: 1322-1327.

Appendix D: Baseline Surveys and Species Lists

Habitat and Population Baseline Inventory

Bird (Aigner and Koehler), small mammal (Hertel and Maldonado), and herpetological (Hertel and Maldonado) surveys were conducted in 1997 on DFSP San Pedro. The surveys were then compared to previous baseline information of the wildlife inhabiting DFSP San Pedro. In addition to baseline surveys, specific surveys were conducted to assess the extent and condition of CAGN and PVB on DFSP San Pedro (see below).

Invertebrates

There are no baseline surveys of invertebrates at DFSP San Pedro. Large insects, commonly encountered during transect walks because they share deerweed as a host plant with PVB, include the green hairstreak, common hairstreak, marina blue, and funereal skipper. The Diego beefly flies synchronously with the PVB and is a parasite upon the young of ground-dwelling bees. The European earwig has been a problem predator of PVB pupae (Mattoni and George 2001). See Table D-1 for a species list of invertebrates that includes the Palos Verdes blue butterfly habitat area and DSFP San Pedro.

Amphibians and Reptiles

No sensitive or endangered species were observed or captured on the study site during the 1997 herpetological survey, conducted by Hertel and Maldonado. Western fence lizards and side-blotched lizards were commonly found. Southern alligator lizards were not observed, but this common species is less outward in behavior than the other two lizard species. Three California kingsnakes and one gopher snake, both considered common, were observed. See Table D-2 for a compiled species list of vertebrates observed at the Palos Verdes blue butterfly habitat area and DFSP San Pedro.

Birds

In 1987, RECON noted 60 species of birds on DFSP San Pedro. A survey done by Chambers Group, Inc. in 1994 showed findings of 28 species of birds in the winter, and 23 species in June. Aigner and Koehler (1997) recorded 62 bird species during their surveys of upper and lower riparian routes, in which 14 were confirmed breeders and 18 were presumed breeders. There were three additional species observed during the surveys, believed to be winter visitors or migrants. See Table D-2 for a compiled species list of vertebrates observed at the Palos Verdes blue butterfly habitat area and DFSP San Pedro.

Residents

The numerically dominant avian species at DFSP San Pedro are those typical of the urban interface: house finch, European starling, and mourning dove. The open space at DFSP San Pedro provides valuable resident and migratory habitat for rare species of the scrub and riparian communities. During the 1997 surveys (Aigner and Koehler), most spring migrating birds concentrated in riparian scrub. The highest bird densities were associated with an area that supports a large population of willows, where exotic trees and shrubs were absent, and bordered in some locations by relatively undisturbed coastal sage scrub (Aigner and Koehler 1997).

Current conditions at DFSP San Pedro support few birds of prey. Most numerous and abundant are the American kestrel, followed by the great horned owl and the red-tailed hawk. Kestrels, red-tailed hawks, and great horned owls were also reported during the 1993 avian surveys. Many kestrel fledglings were seen during the June 1997 small mammal surveys. The kestrel is extremely adaptable and is found in a wide variety of habitats including farmlands, open country, cities, and woodland edges. Great horned owls nest in trees in riparian areas. Other birds of prey appear as migrants or casual visitors at DFSP San Pedro, including Cooper's hawk, sharp-shinned hawk, and American peregrine falcon.

The smaller raptors are most likely feeding on the abundance of exotic small mammals, the native harvest mouse, Botta's pocket gopher and possibly the few reptile species on DFSP San Pedro. The occurrence of larger mammals, such as the desert cottontail, Virginia opossum, and feral cats offer the larger raptors numerous feeding opportunities. Accipters feed mainly on small birds, but will occasionally take small mammals.

During the 1994 summer avian surveys at DFSP San Pedro, tracks of the greater roadrunner were observed in the grasslands located in the northwestern corner. Roadrunners have also been seen on DFSP San Pedro in 1997 (J. Morton, pers. com. 1998).

Neotropical Migrants

Nesting by neotropical migratory birds has not been well-documented on the DFSP San Pedro. These birds are protected under the MBTA and EO 1318. However, several habitat conservation plans have recently been released for southern California under the aegis of PIF, a national bird conservation program of which the Navy is an active collaborator with other federal, state, and private partners. A fundamental concept of all plans is managing for healthy and diverse bird communities by providing diverse habitat conditions representing the spectrum structural conditions characteristic to those plant communities over the long term. The plans most applicable to the DFSP San Pedro are the draft conservation plans for birds in coastal scrub and chaparral, grassland, and riparian habitats (all published in 2000 and available on the web at www.prbo.org/CPIF/Consplan.html).

Mammals

Mammals are well represented on DFSP San Pedro by smaller species such as the opossum, desert cottontail, pocket gopher, house mouse, black rat, and striped skunk. California ground squirrels were not observed during the small mammal survey; however, workers observed them in residence under the headquarters building in 1997 and more recently in the newly planted Gaffey Street beautification corridor. Larger animals, such as the raccoon, coyote, and feral dogs and cats, are included in the survey count. Navy personnel at DFSP San Pedro observed a non-native red fox in 1997, and a gray fox has also been reported. See Table D-2 for a compiled species list of vertebrates observed at the Palos Verdes blue butterfly habitat area and DFSP San Pedro.

California Gnatcatcher

Basewide CAGN surveys were conducted in 1993, 1997, 2003 and 2011.

The population of CAGN decreased: five breeding pairs in 1993 and 1994, two unpaired females in 1995, and one female in 1996. The isolated birds observed at DFSP San Pedro likely belong to a single, peninsula-wide population, based on observations of banded birds (Atwood 1993). In 1997 surveys, the species was observed but no pair was detected and nesting was not confirmed (Aigner and Koehler 1997).

In 2003 observations were made that likely represent a certain number of multiple sightings of the same individuals over an extended period (Courtois 2003). There were at least four pairs present, and three to six sightings of fledglings, or adults feeding fledglings, indicating at least some level of breeding success.

In the most recent 2011 basewide surveys, the DFSP San Pedro population appeared to consist of the following: at least two pair (one pair observed with one to three fledglings, and the other exhibiting nesting behavior) and two to three single males (ICF 2011).

In 2012, CAGN surveys were conducted across ten reserves covering 1,225 acres of PVPLC-managed land (PVPLC 2013). These surveys found decreased number of pairs occupying PVPLC lands. Compared to 2006 (64) and 2009 (40), surveys in 2012 found only an estimated 33 territories occupied by CAGN.

Surveys at DFSP San Pedro help to further expand knowledge of CAGN at DFSP San Pedro, and add to peninsula-wide data sets. For additional information refer to Section 2.3.1.

Palos Verdes Blue Butterfly

The PVB is an endemic of the Palos Verdes Peninsula. Historically, it is believed to have been restricted to cool, seaward slopes distributed across most of the Peninsula (Mattoni 1996b; USFWS 1984). The species was feared to have gone extinct when no butterflies were seen on the peninsula in over a decade between 1983 and 1994. In 1994, the DFSP San Pedro population was discovered, and from 1994 to 1999 represented the only known PVB population in existence. During surveys in 1999, PVB were also confirmed for the first time in habitat on the former Palos Verdes Naval Housing Area on the north end of the DFSP San Pedro.

PVB and its associated host plants, deerweed and coast locoweed, have been surveyed on a yearly basis since the discovery of PVB at DFSP San Pedro in 1994. Surveys are conducted on established transects. In 2009 and 2010, PVB from the captive rearing program were released into restored habitat on DFSP San Pedro, the Linden H. Chandler Preserve in the city of Rolling Hills Estates and Deane Dana Friendship Community Regional County Park (USFWS 2010). The success of these re-introduction efforts are being evaluated through surveys.

For additional information refer to Section 2.3.1.

Table D-1. Compiled species list of invertebrates observed at the Palos Verdes blue butterfly habitat area and Defense Fuel Support Point San Pedro. Entries marked with a V indicates visual observations only. No specimens were captured for positive identification. Entries marked with an A indicates audio observations only. No specimens were captured for positive identification.

Order	Family	Species Name	Common Name
Phlyum Arthropoda			
Class Arachnida			
Acarina	unknown	unknown	red mite
Araneida	Araneidae	unknown	orb weaver (small)
Araneida	Oxyopidae	*Peucetia* sp.	green lynx spider
Araneida	unknown	unknown	unidentified spiders (2-3 types)
Class Malacostraca			
Isopoda	Oniscidae	*Oniscidae* sp.	sowbug
Class Insecta (Hexapoda)			
Coleoptera	Anthribidae	unknown	fungus weevil
Coleoptera	Carabidae	unknown	predaceous ground beetle
Coleoptera	Coccinellidae	unknown	lady beetle A (red w/ black patch)

Order	Family	Species Name	Common Name
Coleoptera	Coccinellidae	unknown	lady beetle B (deep red, very round)
Coleoptera	Coccinellidae	*Hippodamia convergens*	convergent lady beetle
Coleoptera	Coccinellidae	*Coccinella septempunctata*	seven spot lady beetle
Coleoptera	Curculionidae	unknown	snout beetle
Coleoptera	Dermestidae	*Athrenus* sp.	carpet beetle
Coleoptera	Lathridiidae	unknown	minute brown scavenger beetle
Coleoptera	Melyridae	unknown	soft-winged flower beetle
Coleoptera	Mordellidae	unknown	tumbling flower beetle
Coleoptera	Tenebrionidae	*Eleodes* sp.	darkling beetle
Coleoptera	Tenebrionidae	unknown	darkling ground beetle
Coleoptera	Throscidae	unknown	throscid beetle
Collembola	Entomobryidae	unknown	elongate-bodied springtails
Dermaptera	Forficulidae	*Forficula auricularia*	European earwig
Diptera	Agromyzidae	unknown	leaf miner fly
Diptera	Anthomyzidae	unknown	anthomyzid fly
Diptera	Cecidomyidae	unknown	gall gnat
Diptera	Lonchaeidae	unknown	lonchaeid fly
Diptera	Muscidae	unknown	house fly
Diptera	Muscidae	unknown	muscid fly
Diptera	Phoridae	unknown	hump-backed fly
Diptera	Pipunculidae	unknown	big-headed fly
Diptera	Sciaridae	unknown	dark-winged fungus gnat
Diptera	Sphecidae	*Bembix americana*	Diego beefly
Diptera	Syrphidae	unknown	common hover fly
Diptera	Tipulidae	*Tipula* sp.	crane fly
Diptera	unknown	unknown	unidentified flies (2 types)
Hemiptera	Miridae	unknown	leaf bug
Homoptera	Aphididae	unknown	aphid
Homoptera	Cicadellidae	unknown	leaf hoppers (2-3 varieties)
Homoptera	Membracidae	unknown	tree hopper
Homoptera	Psyllidae	unknown	psyllids (2 types)
Hymenoptera	Agaonidae	unknown	fig wasp
Hymenoptera	Apidae	*Apis mellifera*	honey bee
Hymenoptera	Apidae	*Bombus* sp.	bumble bee
Hymenoptera	Braconidae	unknown	braconid wasp
Hymenoptera	Chalcididae	unknown	chalcidid wasp
Hymenoptera	Cynipidae	unknown	gall wasp
Hymenoptera	Eulophidae	unknown	eulophid wasp
Hymenoptera	Formicidae	*Linepithema humile*	Argentine ant
Hymenoptera	unknown	unknown	metallic green-blue wasp[V]
Hymenoptera	Mymaridae	unknown	fairyfly
Hymenoptera	Pteromalidae	unknown	pteromalid wasp
Hymenoptera	Sphecidae	*Sphex ichneumoneus*	golden digger wasp
Hymenoptera	Trichogrammatidae	unknown	trichogrammatid wasp
Lepidoptera	Hesperiidae	unknown	skipper[V]
Lepidoptera	Lycaenidae	*Strymon melinus*	common hairstreak
Lepidoptera	Lycaenidae	*Callophrys rubi*	green hairstreak
Lepidoptera	Lycaenidae	*Glaucopsyche lygdamus palosverdesensis*	Palos Verdes blue
Lepidoptera	Lycaenidae	*Leptotes marina*	marine blue butterfly

Order	Family	Species Name	Common Name
Lepidoptera	Lycaenidae	*Hemiargus ceraunus*	ceraunus blue
Lepidoptera	Microlepidoptera	unknown	unidentified microleps
Lepidoptera	Noctuidae	unknown	noctuid moth[V]
Lepidoptera	Nymphalidae	*Nymphalis antiopa*	mourning cloak butterfly
Lepidoptera	Nymphalidae	*Vannessa cardui*	painted lady butterfly
Lepidoptera	Pieridae	*Pieris rapae*	cabbage white butterfly
Lepidoptera	Pterophoridae	unknown	plume moth
Lepidoptera	unknown	unknown	moth (large, tan)
Lepidoptera	unknown	unknown	moth (large, mottled tan)v
Neuroptera	Myrmeleontidae	*Brachynemurus* sp.	ant lion
Odonata	Aeshnidae	*Aeshna multicolor*	blue-eyed darner (fem)
Odonata	Libellulidae	unknown	red skimmer[V]
Odonata	unknown	*Suborder Anisoptera*	dragonfly species
Orthoptera	Acrididae	*Schistocerca nitens*	gray bird grasshopper
Orthoptera	Acrididae	*Melanoplus* sp.	melanoplus grasshopperv
Orthoptera	Blattidae	*Blatta orientalis*	Oriental cockroach
Orthoptera	Gryllidae	*Gryllus* sp.	cricket[A]
Orthoptera	Oecanthinae	*Oecanthus fulfoni*	snowy tree cricket
Orthoptera	Tettigoniidae	*Conocephalus fasciatus*	slender meadow katydid
Orthoptera	unknown	unknown	juvenile grasshopper
Psocoptera	Psocidae	unknown	common bark louse
Psocoptera	Pseudocaecilidae	unknown	pseudocaeciliid bark louse
Thysanoptera	Thripidae	unknown	thrips
Thysanura	Machilidae	unknown	jumping bristletail
Phylum Mollusca			
Class Gastropoda			
Stylommatophora	Bradybaenidae	*Monadenia* sp.?	land snail (native?)
Pulmonata	Limacidae?	*Agriolimax* sp.?	common slug

Table D-2. Compiled species list of vertebrates observed at the Palos Verdes blue butterfly habitat area and Defense Fuel Support Point San Pedro.

Order	Family	Species name	Common Name
Phylum Chordata			
Class Reptilia			
Squamata	Anguidae	*Elgaria multicarinata*	southern alligator lizard
Squamata	Colubridae	*Masticophis flagellum piceus*	red racer (red coachwhip)
Squamata	Phrynosomatidae	*Sceloporus occidentalis*	western fence lizard
Squamata	*Colubridae*	*Pituophis catenifer*	gopher snake
Squamata	Colubridae	*Lampropeltis getula californiae*	California kingsnake
Squamata	Phrynosomatidae	*Uta stansburiana*	common side-blotched lizard
Squamata	Phrynosomatidae	*Sceloporus occidentalis longipes*	Great Basin (western) fence lizard
Class Aves			
Anseriformes	Anatidae	*Anas platyrhynchos*	mallard
Apodiformes	Apodidae	*Chaetura vauxi*	Vaux's swift
Apodiformes	Apodidae	*Aeronautes saxatalis*	white-throated swift
Apodiformes	Trochilidae	*Selasphorus sasin*	Allen's hummingbird
Apodiformes	Trochilidae	*Calypte anna*	Anna's hummingbird
Charadriiformes	Charadriidae	*Charadrius vociferus*	killdeer
Charadriiformes	Laridae	*Larus occidentalis*	western gull
Charadriiformes	Scolopacidae	*Numenius phaeopus*	whimbrel

Order	Family	Species name	Common Name
Columbiformes	Columbidae	*Columba livia*	rock pigeon
Columbiformes	Columbidae	*Streptopelia chinensis*	spotted dove
Columbiformes	Columbidae	*Zenaida macroura*	mourning dove
Falconiformes	Accipitridae	*Accipiter cooperii*	Cooper's hawk
Falconiformes	Accipitridae	*Accipter striatus*	sharp-shinned hawk
Falconiformes	Accipitridae	*Buteo jamaicensis*	red-tailed hawk
Falconiformes	Falconidae	*Falco peregrinus*	peregrine falcon
Falconiformes	Falconidae	*Falco sparverius*	American kestrel
Passeriformes	Aegithalidae	*Psaltriparus minimus*	bushtit
Passeriformes	Alaudidae	*Eremophila alpestris*	horned lark
Passeriformes	Cardinalidae	*Passerina amoena*	lazuli bunting
Passeriformes	Cardinalidae	*Pheucticus ludovicianus*	rose-breasted grosbeak
Passeriformes	Corvidae	*Aphelocoma californica*	western scrub-jay
Passeriformes	Corvidae	*Corvus brachyrhynchos*	American crow
Passeriformes	Corvidae	*Corvus corax*	common raven
Passeriformes	Emberizidae	*Melospiza lincolnii*	Lincoln’s sparrow
Passeriformes	Emberizidae	*Zonotrichia leucophrys*	white-crowned sparrow
Passeriformes	Fringillidae	*Carduelis tristis*	American goldfinch
Passeriformes	Fringillidae	*Pipilo crissalis*	California towhee
Passeriformes	Fringillidae	*Carpodacus mexicanus*	house finch
Passeriformes	Fringillidae	*Melospiza melodia*	song sparrow
Passeriformes	Fringillidae	*Spinus lawrencei*	Lawrence’s goldfinch
Passeriformes	Fringillidae	*Spinus psaltria*	lesser goldfinch
Passeriformes	Hirundinidae	*Hirundo rustica*	barn swallow
Passeriformes	Hirundinidae	*Petrochelidon pyrrhonota*	cliff swallow
Passeriformes	Hirundinidae	*Stelgidopteryx serripennis*	northern rough-winged swallow
Passeriformes	Hirundinidae	*Tachycineta bicolor*	tree swallow
Passeriformes	Icteridae	*Agelaius phoeniceus*	red-winged blackbird
Passeriformes	Icteridae	*Euphagus cyanocephalus*	Brewer's blackbird
Passeriformes	Icteridae	*Icterus bullockii*	Bullock's oriole
Passeriformes	Icteridae	*Icterus cucullatus*	hooded oriole
Passeriformes	Icteridae	*Molothrus ater*	brown-headed cowbird
Passeriformes	Icteridae	*Sturnella neglecta*	western meadowlark
Passeriformes	Laniidae	*Lanius ludovicianus*	loggerhead shrike
Passeriformes	Mimidae	*Mimus polyglottos*	northern mockingbird
Passeriformes	Motacillidae	*Anthus rubescens*	American pipit
Passeriformes	Parulidae	*Dendroica coronata*	yellow-rumped warbler
Passeriformes	Parulidae	*Dendroica occidentalis*	hermit warbler
Passeriformes	Parulidae	*Dendroica petechia*	yellow warbler
Passeriformes	Parulidae	*Geothlypis trichas*	common yellowthroat
Passeriformes	Parulidae	*Vermivora celata*	orange-crowned warbler
Passeriformes	Parulidae	*Wilsonia pusilla*	Wilson's warbler
Passeriformes	Passeridae	*Passer domesticus*	house sparrow
Passeriformes	Polioptilidae	*Polioptila californica californica*	California gnatcatcher
Passeriformes	Ptilogonatidae	*Phainopepla nitens*	Phainopepla
Passeriformes	Regulidae	*Regulus calendula*	ruby-crowned kinglet
Passeriformes	Sturnidae	*Sturnus vulgaris*	European starling
Passeriformes	Sylviidae	*Polioptila caerulea*	blue-gray gnatcatcher
Passeriformes	Turdidae	*Catharus guttatus*	hermit thrush
Passeriformes	Turdidae	*Catharus ustulatus*	Swainson’s thrush

Order	Family	Species name	Common Name
Passeriformes	Tyrannidae	*Empidonax difficilis*	Pacific-slope flycatcher
Passeriformes	Tyrannidae	*Empidonax traillii*	willow flycatcher
Passeriformes	Tyrannidae	*Myiarchus cinerascens*	ash-throated flycatcher
Passeriformes	Tyrannidae	*Sayornis nigricans*	black phoebe
Passeriformes	Tyrannidae	*Sayornis saya*	Say's phoebe
Passeriformes	Tyrannidae	*Tyrannus verticalis*	Western kingbird
Passeriformes	Tyrannidae	*Tyrannus vociferans*	Cassin's kingbird
Passeriformes	Troglodytidae	*Troglodytes aedon*	house wren
Passeriformes	Vireonidae	*Vireo gilvus*	warbling vireo
Passeriformes	Vireonidae	*Vireo solitarius*	solitary vireo
Pelecaniformes	Pelecanidae	*Pelecanus occidentalis californicus*	brown pelican
Psittaciformes	Psittacidae	*Amazona farinosa*	mealy parrot
Piciformes	Picidae	*Colaptes auratus*	northern flicker
Piciformes	Picidae	*Picoides pubescens*	downy woodpecker
Strigiformes	Strigidae	*Bubo virginianus*	great horned owl
Class Mammalia			
Artiodactyla	Cervidae	*Odocoileus hemionus*	mule deer
Carnivora	Canidae	*Canis latrans*	coyote
Carnivora	Canidae	*Canis familiaris*	domestic dog
Carnivora	Canidae	*Urocyon cinereoargenteus*	gray fox
Carnivora	Canidae	*Vulpes vulpes*	red fox
Carnivora	Felidae	*Felis catus*	domestic cat
Carnivora	Mephitidae	*Mephitis mephitis*	striped skunk
Carnivora	Mephitidae	*Spilogale putorius*	spotted skunk
Carnivora	Mustelidae	*Mustela frenata*	long-tailed weasel
Carnivora	Procyonidae	*Procyon lotor*	northern raccoon
Didelphimorphia	Didelphidae	*Didelphis virginiana*	Virginia opossum
Eulipotyphla	Soricidae	*Notiosorex crawfordi*	desert shrew
Insectivora	Talpidae	*Scapanus latimanus*	broad-footed mole
Lagomorpha	Leporidae	*Lepus californicus*	black-tailed jackrabbit
Lagomorpha	Leporidae	*Sylvilagus audubonii*	Audubon's or desert cottontail
Lagomorpha	Leporidae	*Sylvilagus bachmani*	brush rabbit
Rodentia	Cricetidae	*Reithrodontomys megalotis*	western harvest mouse
Rodentia	Heteromyidae	*Chaetodipus californicus*	California pocket mouse
Rodentia	Heteromyidae	*Perognathus longimembris*	little pocket mouse
Rodentia	Muridae	*Microtus californicus*	California vole
Rodentia	Muridae	*Mus musculus*	house mouse
Rodentia	Muridae	*Neotoma lepida*	desert woodrat
Rodentia	Muridae	*Peromyscus californicus*	California mouse
Rodentia	Muridae	*Peromyscus maniculatus*	deermouse
Rodentia	Muridae	*Rattus norvegicus*	brown rat
Rodentia	Muridae	*Rattus rattus*	house rat
Rodentia	Sciuridae	*Spermophilus beecheyi*	California ground squirrel
Rodentia	Geomyidae	*Thomomys bottae*	Botta's pocket gopher
Soricomorpha	Soricidae	*Sorex ornatus*	ornate shrew

This Page Intentionally Blank

Appendix E: Plant Species Lists

Plant species were not surveyed as part of this INRMP. Plant species lists exist from other efforts and below are three tables of species. Table E-1 presents California native plants observed at DFSP San Pedro by Angelika Brinkmann-Busi, which she assembled as a CNPS volunteer in the early 1990s. Table E-2, also assembled by Ms. Brinkmann-Busi, presents non-native plants present at DFSP San Pedro, many of which are commonly present in disturbed southern California coastal habitats. Table E-3 presents plants recorded elsewhere on the Palos Verdes Penninsula, but not recorded at DFSP San Pedro (Lipman et al. 1999).

Table E-1. California native plants observed at Defense Fuel Support Point San Pedro.

Family	Species Name	Common Name
Angiosperms: Eudicots		
Anacardiaceae	*Malosma laurina*	laurel sumac
Anacardiaceae	*Rhus integrifolia*	lemonade berry
Anacardiaceae	*Toxicodendron diversilobum*	poison oak
Apiaceae	*Apiastrum angustifolium*	wild celery
Apiaceae	*Daucus pusillus*	rattlesnake weed
Asclepiadaceae	*Asclepias fascicularis*	narrow-leaf milkweed
Asteraceae	*Acourtia microcephala*	perezia
Asteraceae	*Ambrosia acanthicarpa*	annual bur sage
Asteraceae	*Ambrosia psilostachya*	western ragweed
Asteraceae	*Artemisia californica*	coastal sagebrush
Asteraceae	*Baccharis salicina*	Emoryi's baccharis
Asteraceae	*Baccharis pilularis* var. *consanguineae*	coyote brush
Asteraceae	*Baccharis salicifolia*	mulefat
Asteraceae	*Corethrogyne filaginifolia*	California aster
Asteraceae	*Deinandra fasciculata*	tarweed
Asteraceae	*Encelia californica*	Calilfornia brittlebush/bush sunflower/California encelia
Asteraceae	*Ericameria palmeri* ssp. *pachylepis*	palmer goldenbush
Asteraceae	*Erigeron canadensis*	horseweed
Asteraceae	*Eriophyllum confertiflorum*	golden yarrow
Asteraceae	*Hazardia squarrosus*	sawtooth goldenbush
Asteraceae	*Helianthus annuus*	common sunflower
Asteraceae	*Heterotheca grandiflora*	telegraph weed
Asteraceae	*Heterotheca sessiliflora* ssp. *fastigiata*	golden aster
Asteraceae	*Lasthenia chrysostoma*	goldfields
Asteraceae	*Logfia filaginoides*	California filago
Asteraceae	*Malacothrix saxatilis*	malacothrix
Asteraceae	*Pseudognaphalium biolettii*	everlasting/two-tone everlasting
Asteraceae	*Pseudognaphalium californicum*	California everlasting
Asteraceae	*Pseudognaphalium canescens* ssp. *microcephalum*	small-head cudweed
Asteraceae	*Stephanomeria virgata*	wand chicory

Family	Species Name	Common Name
Asteraceae	*Xanthium strumarium*	cockle bur
Boraginaceae	*Amsinckia intermedia*	common fiddleneck
Boraginaceae	*Cryptantha clevelandii.*	Cleveland popcorn flower
Boraginaceae	*Eucrypta chrysanthemifolia*	common eucrypta
Boraginaceae	*Heliotropium curassavicum* ssp. *oculatum*	wild heliotrope
Boraginaceae	*Phacelia cicutaria*	caterpillar phacelia
Cactaceae	*Cylindropuntia californica* var. *californica*	snake cholla
Cactaceae	*Cylindropuntia prolifera*	coast cholla
Cactaceae	*Opuntia littoralis*	coastal prickly pear
Cactaceae	*Opuntia oricola*	prickly pear
Caprifoliaceae	*Sambucus nigra* ssp. *caerulea*	Mexican/blue elderberry
Chenopdiaceae	*Atriplex lentiformis*	big saltbush
Convolvulaceae	*Calystegia peirsonii*	Peirson's morning glory
Convolvulaceae	*Dichondra occidentalis*	western dichondra
Crassulaceae	*Crassula connata*	pigmy plant
Crassulaceae	*Dudleya lanceolata*	lance-leaf dudleya/live forever
Crossosomataceae	*Crossosoma californica*	Catalina crabapple
Cucurbitaceae	*Cucurbita foetidissima*	calabazilla/stink gourd
Cucurbitaceae	*Marah macrocarpa*	wild cucumber/man root
Euphorbiaceae	*Chamaesyce polycarpa*	prostrate spurge
Euphorbiaceae	*Chamaesyce albomarginata*	rattlesnake weed
Euphorbiaceae	*Croton californicus* var. *californicus*	California croton
Euphorbiaceae	*Croton setigerus*	dove weed/turkey mullein
Fabaceae	*Acmispon heermannii*	Heermann's deer weed
Fabaceae	*Acmispon americanus* var. *americanus*	Spanish clover
Fabaceae	*Acmispon glaber*	deer weed
Fabaceae	*Acmispon strigosus*	bishop's deer weed
Fabaceae	*Astragalus trichopodus* var. *lonchus*	locoweed
Fabaceae	*Lupinus succulentus*	arroyo lupine
Fabaceae	*Lupinus truncatus*	collar lupine
Fagaceae	*Quercus agrifolia*	coast live oak
Juglandaceae	*Juglans californica*	southern California black walnut
Lamiaceae	*Salvia mellifera*	black sage
Lamiaceae	*Trichostema lanceolatum*	vinegar plant
Malvaceae	*Malvella leprosa*	alkali mallow
Montiaceae	*Calandrinia ciliata*	red maids
Montiaceae	*Claytonia perfoliata*	Miner's lettuce
Nyctaginaceae	*Mirabilis laevis* var. *crassifolia*	wishbone bush
Onagraceae	*Camissoniopsis micrantha*	miniature suncup
Orobanchaceae	*Castilleja exerta*	owls clover
Papaveraceae	*Eschscholzia californica*	California poppy
Phrymaceae	*Mimulus aurantiacus*	bush monkey flower
Plantaginaceae	*Collinsia heterophylla*	Chinese houses
Plantaginaceae	*Keckiella cordifolia*	climbing penstemon
Plantaginaceae	*Plantago erecta*	Indian plantain
Polygonaceae	*Eriogonum elongatum*	long-stemmed buckwheat
Polygonaceae	*Eriogonum fasciculatum*	California buckwheat
Polygonaceae	*Eriogonum gracile*	slender buckwheat
Polygonaceae	*Persicaria hydropiperoides*	water peper
Polygonaceae	*Pterostegia drymarioides*	thread stem

Family	Species Name	Common Name
Polygonaceae	*Rumex hymenosepalus*	wild rhubarb
Polygonaceae	*Rumex salicifolius*	willow dock
Rosaceae	*Heteromeles arbutifolia*	toyon
Rosaceae	*Horkeliella congdonis*	horkeliella
Rosaceae	*Horkelia cuneata* var. *sericea*	star potentilla
Rubiaceae	*Galium angustifolium*	narrow-leaved/ shrubby bedstraw
Rubiaceae	*Galium aparine*	goose grass
Salicaceae	*Salix goodingii*	black willow
Salicaceae	*Salix laevigata*	red willow
Salicaceae	*Salix lasiolepis*	arroyo willow
Solanaceae	*Datura wrightii*	jimsonweed
Solanaceae	*Solanum douglasii*	Douglas' nightshade
Urticaceae	*Urtica dioica* ssp.*holosericea*	stinging nettle
Angiosperms: Monocots		
Arecaceae	*Washingtonia filifera*	California fan palm (native elsewhere in California)
Poaceae	*Distichlis spicata*	salt grass
Poaceae	*Leymus condensatus*	giant rye
Poaceae	*Melica imperfecta*	California melic grass
Poaceae	*Nassella cernua*	nodding needlegrass
Poaceae	*Nassella lepida*	needlegrass
Poaceae	*Nassella pulchra*	purple needlegrass
Themidaceae	*Bloomeria crocea*	common goldenstar
Themidaceae	*Dichelostemma capitatum*	blue dicks
Ferns		
Pteridaceae	*Pellaea andromedifolia*	coffee fern
Pteridaceae	*Pityrogramma triangularis*	goldback fern

Table E-2. Non-native plants observed at Defense Fuel Support Point San Pedro.

Family	Species Name	Common Name
Angiosperms: Eudicots		
Aizoaceae	*Carpobrotus chilensis*	sea fig
Aizoaceae	*Carpobrotus edulis*	hottentot fig
Aizoaceae	*Mesembryanthemum nodiflorum*	slender-leaved iceplant
Anacardiaceae	*Schinus molle*	Mexican/Peruvian pepper tree
Anacardiaceae	*Schinus terebinthifolius*	Brazilian pepper tree
Apiaceae	*Daucus carota*	Queen Ann's lace
Apiaceae	*Foeniculum vulgare*	sweet fennel
Araliaceae	*Hedera helix*	English ivy
Asteraceae	*Centaurea melitensis*	tocalote
Asteraceae	*Cirsium vulgare*	bull thistle
Asteraceae	*Gazania longiscapa*	African daisy
Asteraceae	*Glebionus coronarium*	garland
Asteraceae	*Helminthotheca echioides*	ox tongue
Asteraceae	*Lactuca serriola*	prickly lettuce
Asteraceae	*Pseudognaphalium luteoalbum*	everlasting
Asteraceae	*Silybum marianum*	milk thistle
Asteraceae	*Sonchus oleraceus*	common sow thistle
Brassicaceae	*Brassica nigra*	black mustard
Brassicaceae	*Hirschfeldia incana*	shortpod mustard

Family	Species Name	Common Name
Brassicaceae	*Lobularia maritima*	sweet alyssum
Brassicaceae	*Raphanus sativus*	wild radish
Caryophyllaceae	*Stellaria media*	common chickweed
Chenopdiaceae	*Atriplex semibaccata*	Australian saltbush
Chenopdiaceae	*Chenopodium album*	pigweed
Chenopdiaceae	*Salsola tragus*	Russian thistle
Convolvulaceae	*Convolvulus arvensis*	bindweed
Euphorbiaceae	*Euphorbia lathyris*	caper spurge
Euphorbiaceae	*Ricinus communis*	castor bean
Fabaceae	*Acacia cyclops*	acacia
Fabaceae	*Acacia retinodes*	everblooming acacia
Fabaceae	*Medicago polymorpha*	California burclover
Fabaceae	*Melilotus albus*	white sweetclover
Fabaceae	*Melilotus officinalis*	yellow sweetclover
Fabaceae	*Prosopis glandulosa*	honey locust
Fabaceae	*Trifolium hirtum*	rose clover
Fabaceae	*Vicia benghalensis*	purple vetch
Fabaceae	*Vicia villosa*	hairy vetch
Geraniaceae	*Erodium botrys*	storksbill
Geraniaceae	*Erodium cicutarium*	red-stemmed filaree
Lamiaceae	*Marrubium vulgare*	horehound
Malvaceae	*Malva parviflora*	cheeseweed
Malvaceae	*Malva sylvestris*	high mallow
Myrsinaceae	*Anagallis arvensis*	scarlet pimpernel
Nyctaginaceae	*Mirabilis jalapa*	four-o'clock
Onagraceae	*Oenothera laciniata*	evening primrose
Oxalidaceae	*Oxalis pes-caprae*	Bermuda buttercup
Plumbaginaceae	*Limonium perezii*	sea lavendar
Polygonaceae	*Rumex crispus*	curly dock
Solanaceae	*Nicotiana glauca*	tree tobacco
Solanaceae	*Solanum elaeagnifolium*	white horse-nettle
Angiosperms: Monocots		
Agavaceae	*Agave americana*	century plant
Poaceae	*Arundo donax*	giant reed
Poaceae	*Avena barbata*	slender wild oak
Poaceae	*Avena fatua*	wild oak
Poaceae	*Bromus diandrus*	ripgut
Poaceae	*Bromus hordeaceus*	soft chess
Poaceae	*Bromus madritensis* ssp. *rubens*	red brome
Poaceae	*Bromus tectorum*	cheat grass
Poaceae	*Cortaderia selloana*	pampasgrass
Poaceae	*Digitaria ischaemum.*	smooth crabgrass
Poaceae	*Festuca myuros* var. *hirsuta*	foxtail fescue
Poaceae	*Hordeum marinum* ssp. *leporinum*	Mediterranean barley
Poaceae	*Lolium multiflorum*	Italian ryegrass
Poaceae	*Phalaris minor*	canary grass
Poaceae	*Poa annua*	annual bluegrass
Poaceae	*Polypogon monspeliensis*	rabbitfoot grass
Poaceae	*Schismus barbatus*	Mediterranean schismus

Table E-3. Additional California native plants observed beyond Defense Fuel Support Point San Pedro at Palos Verdes Peninsula.

Family	Species Name	Common Name
Ferns		
Dryopteridaceae	*Dryopteris arguta*	wood fern
Polypodiaceae	*Polypodium californicum*	California polypody
Pteridaceae	*Adiantum jordanii*	California maidenhair fern
Angiosperms: Eudicots		
Asteraceae	*Artemisia douglasiana*	mugwort
Asteraceae	*Artemisia dracunculus*	wild tarragon
Asteraceae	*Grindelia robusta*	gum plant
Asteraceae	*Pentachaeta lyonii*	Lyon's pentacheata
Asteraceae	*Rafinesquia californica*	California chicory
Boraginaceae	*Nemophila menziesii*	baby-blue-eyes
Boraginaceae	*Phacelia viscida*	sticky phacelia
Boraginaceae	*Pholistoma racemosum*	white fiesta flower
Caprifoliaceae	*Lonicera subspicata*	honeysuckle
Caprifoliaceae	*Symphoricarpus mollis*	snowberry
Cleomaceae	*Peritoma arborea*	bladder pod
Convolvulaceae	*Cuscuta californica*	dodder
Fabaceae	*Lathyrus vestitus* var. *vestitus*	canyon pea
Fabaceae	*Lupinus bicolor*	miniature lupine
Fabaceae	*Trifolium willdenovii*	tomcat clover
Grossulariaceae	*Ribes californicum*	California gooseberry
Lamiaceae	*Salvia columbariae*	chia
Lamiaceae	*Stachys ajogoides* ssp. *rigida*	hedge nettle
Onagraceae	*Camissoniopsis bistorta*	southern sun cup
Onagraceae	*Camissoniopsis micrantha*	smallflower evening primrose
Onagraceae	*Clarkia purpurea*	purple clarkia
Onagraceae	*Clarkia unguiculata*	elegant clarkia
Onagraceae	*Epilobium canum*	California fuchsia
Onagraceae	*Epilobium ciliatum*	willow herb
Orobanchaceae	*Castilleja affinis*	paint brush
Orobanchaceae	*Orobanche* sp.	broomrape
Papaveraceae	*Platystemon californicum*	cream cups
Plantaginaceae	*Antirrhinum kellogii*	Kellog's snapdragon
Plantaginaceae	*Antirrhinum nuttullianum*	purple snapdragon
Plantaginaceae	*Nuttallanthus texanus*	toadflax
Polemoniaceae	*Gilia angelensis*	angels gilia
Polemoniaceae	*Gilia capitata*	globe gilia
Polemoniaceae	*Linanthus dianthiflorus*	linanthus
Ranunculaceae	*Clematis ligusticifolia*	Virgin's bower
Ranunculaceae	*Delphinium parryi*	blue larkspur
Ranunculaceae	*Ranunculus californicus*	California buttercup
Rosaceae	*Rubus ursinus*	California blackberry
Verbenaceae	*Verbena lasiostachys*	common vervain
Violaceae	*Viola pedunculata*	johnny-jump-up
Angiosperms: Monocots		
Liliacaeae	*Calochortus catalinae*	mariposa lily
Liliacaeae	*Fritillaria biflora*	chocolate-lily
Themidaceae	*Brodiaea coronaria*	brodiaea

This Page Intentionally Blank

Appendix F: Landscape Plant List

The following plant lists are intended to give guidance to landscape planning for DFSP San Pedro. Specifications for each plant species are listed, as well as preferences for sun exposure and irrigation needs. These lists are developed specifically for the San Pedro Urban/Wildland interface, in habitat known to have historically supported a population of the PVB. Each species listed is known to be in cultivation and should be available from local and state-wide sources.

Recommendations made here are plants native to California, with the exception of Table F-10, which lists non-native shade trees appropriate for developed locations. Unless otherwise noted by irrigation needs, species presented are native to locations with a Mediterranean climate and an average rainfall of approximately 15 inches (38 cm) per year. Many of the recommended species are those that occur within 30 miles (48 km) of San Pedro. There is increasing availability of plant material in nurseries propagated from local genetic stock. For new plantings at DFSP San Pedro, this would be the top choice when available. There are at least two reasons for this as a practice consistent with the goal of sustainable landscapes. Both reasons emerge from the principle that plants, like all organisms, often form local populations with a distinct gene pool. From the perspective of sustainable horticulture, obtaining plants from within the local genetic population will assure forms of the species that are most adapted to the locale. From the perspective of conservation, the introduction of conspecific plants (same species) from outside the local gene pool may unwittingly introduce genetic material not contained within the local gene pool. The effects of this dynamic are subtle and long term, but could contribute to a homogenization of local gene pools and the loss of genetic diversity.

One note to observe when using these lists is the ambiguous separation of perennials and shrubs. Used here is a broad understanding of a perennial plant that would include all herbaceous perennials (containing no above ground woody parts) and plants referred to as suffrutescent. These are plants that are found mostly within Mediterranean climates that may develop a scaffold of branches above ground that are woody at the base but always herbaceous within the current season's growth. These are sometimes referred to as subshrubs, but are considered perennial in the broad sense in this treatment.

Another is the distinction between trees and shrubs. Used here is a naturalistic approach that considers the life history of the species in question. Many of the larger shrubs can eventually become tree-like, especially with pruning. However, even in nature, these large growing shrubs have multiple trunks from the base of the plant with crowns typically much more dense than trees. With regard to this list, shrubs rarely exceed 20 feet (6 m) in height. Most tree species listed are considerably taller when mature.

Table F-1. California native annuals.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Antirrhinum kelloggii	common snapdragon	PV	3-32”	4-8”	L			X
Antirrhinum nuttallianum	purple snapdragon	PV	3-72”	4-8”	L			X
Calandrinia ciliata	red maids	PV	4-18”	4-18”	R-M-L			X
Camissoniopsis bistorta	California suncup	PV	20-32”	20-32”	L			X
Camissoniopsis micranthum	miniature suncups	PV	18-24”	18-24”	L			X
Castilleja densiflora	coastal paintbrush	SCo	4-12”	4”	M-L			X
Castilleja exerta	purple owl's clover	PV	6-12”	4”	M-L			X
Cistanthe maritima	sea kisses	SCo	4-18”	4-18”	R-M-L			X
Clarkia amoena	godetia	CA	12-24”	6-12”	M-L		X	X
Clarkia bottae	punch-bowl godetia	SCo	12-24”	12-18”	M-L		X	X
Clarkia concinna	red ribbons	CA	4-12”	12”	M-L		X	X
Clarkia purpurea	farewell to spring	PV	12-24”	6-12”	M-L		X	X
Clarkia rubicunda	red godetia	CA	24-36”	24-36”	M-L		X	X
Clarkia unguiculata	elegant clarkia	PV	12-24”	12”	M-L		X	X
Collinsia concolor	southern Chinese houses	SCo	6-18”	6-18”	M-L		X	X
Collinsia heterophylla	Chinese houses	PV	10-20”	8-12”	M-L	X	X	
Eschscholzia californica	California poppy	PV	12-24”	12-24”	M-L			X
E. caespitosa	tufted gold- poppy	SCo	4-12”	8-18”	L			X
Gilia capitata	blue gilia	PV	4-12”	3-6”	M-L			X
Gilia tricolor	bird's-eye gilia	CA	4-12”	3-6”	M-L			X
Lasthenia chrysostema	goldfields	PV	2-4”	3-8”	M-L			X
Layia platyglossa	tidy tips	SCo	12-24”	12-18”	M-L			X
Linanthus dianthiflorus	farinose ground pink	PV	4-8”	4-6”	L			X
Lupinus bicolor	miniature lupine	PV	3-6”	3-6”	M-L			X
Lupinus microcarpus var. densiflorus	valley lupine	SW	12-24”	12-24”	M-L			X
Lupinus nanus	valley sky lupine	SCo	4-12”	4-12”	M-L			X
Lupinus succulentus	arroyo lupine	PV	12-24”	12-24”	M-L			X
Mentzelia gracilenta	slender stick-leaf	SW	36-48”	12-24”	L			X
Mentzelia lindleyi	blazing stars	CA	12-24”	12-24”	L			X
Nemophila maculata	spotted nemophila	CA	8-12”	8-12”	R-M		X	
Nemophila menziesii	baby blue eyes	PV	3-6”	8-12”	R-M		X	X
Phacelia campanularia	desert bluebell	SW	4-24”	4-24”	L			X
Phacelia parryi	Parry's phacelia	SCo	4-36”	4-36”	L		X	X
Phacelia viscida	sticky bluebells	PV	12-24”	12-24”	M-L			X
Platystemon californicus	cream cups	PV	4-12”	4-12”	M-L			X
Salvia columbariae	chia	PV	3-24”	2-9”	L			X
Triphysaria eriantha	butter and eggs	SW	2-6”	2-3”	M-L			X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-2. California native perennials.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Abronia maritima	red sand verbena	SCo	3-6”	18-24”	M-L			X
Abronia umbellata	pink sand verbena	SCo	3-6”	18-24	M-L			X
Anemopsis californica	yerba mansa	SCo	8-24”	12"+	R-M-L		X	X
Aquilegia formosa	western columbine	SW	24-36”	2-18”	R-M		X	X
Artemisia douglasiana	mugwort	PV	20-80”	80"+	M-L		X	X
Artemisia dracunculus	tarragon	PV	20-60”	20-60”	M-L			X
Asclepias californica	round-hood milkweed	SCo	18-24”	12-18”	L			X
Asclepias fascicularis	narrow-leaf milkweed	PV	18-24”	36"+	L			X
Astragalus trichopodus var. lonchus	ocean locoweed	PV	8-36”	8-36”	L			X
Camissoniopsis cheiranthifolia ssp. suffruticosa	beach evening primrose	SCo	4-24”	12-24”	L			X
Dudleya abramsii	Abrams's dudleya	SCo	4-8”	4-8”	L		X	X
Dudleya cymosa	canyon liveforever	SCo	4-12”	4-12”	L		X	X
Dudleya edulis	ladies' fingers	SCo	6-12”	6-12”	L		X	X
Dudleya lanceolata	lance-leaf dudleya	PV	6-12”	6-12”	L		X	X
Dudleya pulverulenta	chaulk dudleya	SCo	12-24”	12-24”	L		X	X
Epilobium canum	California fuchsia	PV	6-30”	12-48”	M-L			X
Erigeron glaucus	seaside aster	CA	8-12”	4-36”	M-L			X
Eriogonum grande var. rubescens	red buckwheat	ChI	2-3”	36"+	L		X	X
Eriophyllum confertiflorum	yellow yarrow	PV	18-24”	18-24”	M-L			X
Erysimum capitatum	western wallflower	SCo	12-24”	12-18”	L			X
Euthamia occidentalis	western golden rod	SCo	24-60”	24"+	R-M			X
Helianthus californicus	California sunflower	SCo	48-84”	48"+	R-M-			X
Heterotheca sessiliflora	bristly goldenaster	PV	8-24”	8-24”	M-L			X
Heuchera maxima	island alum root	ChI	24-36”	12-18”	M-L		X	X
Heuchera rubescens	San Diego alum root	SW	4-8”	8-12”	M-L		X	
Iris douglasiana	coast Iris	CA	8-18”	24-72”	M-L		X	X
Iris macrosiphon	woods iris	CA	6-12”	8-18”	L		X	X
Iris ‘Pacific Coast Hybrids’	PCH iris	Cv	12-24”	12-36”	M-L		X	X
Iva hayesiana	San Diego marsh-elder	SCo	36”	36”	M		X	X
Lepechinia calycina	pitcher sage	CA	36-48”	36-48”	L	X	X	
Leptosyne maritima	San Diego sea-dahlia	SCo	12-30”	12-30”	M-L			X
Lupinus formosus	summer lupine	SCo	8-30”	8-30”	L		X	X
Lupinus latifolius	broadleaf lupine	SCo	24-48”	24-48”	L			X
Mimulus aurantiacus var. pubescens	sticky monkey flower	PV	24-48”	24-48”	L		X	X
Mimulus aurantiacus var. puniceus	coast monkey flower	SCo	24-36”	24-36”	M-L		X	X
Mimulus clevelandii	Cleveland monkey flower	SW	24-36”	24-36”	L		X	X

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Monardella macrantha	scarlet monardella	SW	12-24”	18-36”	L			X
Oenothera elata ssp. hookeri	Hooker's evening primrose	SCo	18-48”	12-18”	R-M		X	X
Penstemon centranthifolius	scarlet bugler	SW	24-36”	18-24”	L			X
Penstemon clevelandii	southern penstemon	SW	24-30”	18-24”	L			X
Penstemon heterophyllus	foothill penstemon	SW	8-12”	12-18”	L			X
Penstemon rostriflorus	cherry penstemon	SW	18-30”	18-24”	M-L			X
Penstemon spectabilis	showy penstemon	SW	36-48”	18-24”	L			X
Pluchea odorata	salt marsh fleabane	SCo	36-48”	18-30”	M-L		X	X
Romneya coulteri	Matilija poppy	SCo	60-84”	60"+	L			X
Salvia spathacea	hummingbird sage	SCo	24-48”	24"+	M-L		X	X
Sidalcea malvaeflora	checkerbloom	SCo	6-24”	18-36”	M-L		X	X
Silene laciniata	southern pink	SCo	4-6”	6-12”	M-L		X	
Sisyrinchium bellum	blue eyed grass	SCo	6-18”	4-8”	L			X
Solidago velutina ssp. californica	California golden rod	SCo	12-36”	12”	L			X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-3. California native ferns.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Adiantum capillus-veneris	western five-fingered fern	SW	18-24”	12"+	M-L	X	X	
Adiantum jordanii	California maidenhair	PV	6-18”	12"+	M-L	X	X	
Dryopteris arguta	coastal wood fern	PV	12-24”	12"+	M-L	X	X	
Pellaea andromedaefolia	coffee fern	SCo	6-28”	12"+	L	X	X	
Pellaea mucronata	bird's-foot fern	SCo	6-12”	12"+	L	X	X	X
Pentagramma triangularis	gold-back fern	SCo	2-6”	6-12”	L	X	X	
Polypodium californicum	California polypody fern	SCo	4-12”	12"+	M-L	X	X	
Polypodium scouleri	leather-leaf polypoy fern	SCo	6-28”	12"+	M-L	X	X	
Polystichum munitum	western sword fern	CA	24-60”	36"+	M-L	X	X	
Woodwardia fimbriata	giant chain fern	SCo	36-72”	24"+	R-M	X	X	

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-4. California native bulbs.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Allium crispum	crinkled onion	CA	6-12”	3”	L			X
Allium praecox	early onion	SCo	8-18”	3”	M-L		X	X
Allium uniflorum	pink meadow onion	CA	6-24”	6"+	M-L			X
Bloomeria crocea	common golden star	PV	6-28”	3”	L			X
Brodiaea californica	northern brodiaea	CA	12-24”	3-6”	L		X	X
Brodiaea coronaria	crown brodiaea	PV	8-12”	6”	L		X	X
Brodiaea elegans	harvest brodiaea	SW	8-12”	6"+	L			X
Calochortus albus	globe lily	SW	8-36”	3”	L		X	X
Calochortus amabilis	golden fairy lantern	CA	8-18”	3”	M-L		X	X
Calochortus catalinae	Catalina maripose lily	PV	18-24”	3”	L			X
Calochortus concolor	golden-bowl mariposa lily	SW	12-24”	3”	L		X	X
Calochortus splendens	splendid mariposa lily	SCo	8-24"	3”	L			X
Calochortus superbus	superb mariposa lily	SCo	16-24”	3”	L			X
Chlorogalum pomeridianum	wavy-leafed soap plant	SCo	24-60”	12-18”	L		X	X
Dichelostemma capitatum	blue dicks	PV	12”	3-6”	L			X
Dichelostemma ida-maia	firecracker flower	CA	18-30”	3-6”	L		X	X
Dichelostemma multiflorum	wild hyacinth	CA	18-30”	6"+	L		X	X
Fritillaria biflora	chocolate lily	PV	6-12”	3-9”	L		X	X
Fritillaria affinus	mission bells	CA	18-36”	3”	M-L		X	X
Lilium humboldtii ssp. ocellatum	Humboldt Lily	SCo	60-84”	12"+	L		X	X
Lilium pardalinum	leopard lily	SCo	36-72”	12"+	R		X	X
Toxicoscordion fremontii	Fremont's camas	SCo	12-36”	12”	L			X
Triteleia hyacintha	white brodiaea	CA	12-24”	6"+	M-L		X	X
Triteleia ixioides	golden brodiaea	CA	8-24”	6"+	L		X	X
Triteleia laxa	Ithuriel's spear	SW	8-18”	6"+	L		X	X
Triteleia peduncularis	long-rayed brodiaea	CA	18-30”	6"+	M-L		X	X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Notes on bulbs: Many native bulbs may be eaten by gophers. It is suggested that gopher baskets be used when planting to protect the bulbs from predation. Those with an "L" under irrigation should not receive any irrigation from June until fall rains. Summer moisture can cause the bulbs to rot. Purchase only nursery-produced bulbs, never ones that are wild-collected.

Table F-5. California native perennial grasses and grass-like plants.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
edges nd us es								
Carex amplifolia	bigleaf sedge	CA	18-36”	24"+	R-M-L	X	X	X
Carex barbarae	Santa Barbara sedge	SCo	12-48”	24"+	M		X	X
Carex densa	dense sedge	SCo	12-24”	12"+	R-M		X	X
Carex globosa	round-fruit sedge	SCo	6-12”	12"+	M-L		X	X
Carex gracilior	slender sedge	CA	12-24”	12-24”	R-M		X	X
Carex multicaulis	rush sedge	SW	12-24”	12-24”	M-L	X	X	
Carex nudata	torrent sedge	CA	24-36”	24-36”	R-M		X	X
Carex praegracilis	sand-dune sedge	SCo	6-12”	8"+	M			X
Carex spisa	two-tooth sedge	SCo	36-48”	24"+	R-M		X	X
Carex subfusca	brown sedge	SW	4-8”	12"+	M-L		X	X
Carex tumulicola	slender sedge	CA	18-24”	18-24”	M-L	X	X	X
Juncus bolanderi	Bolander's rush	CA	12-36”	12"+	R			X
Juncus covillei	Coville's rush	CA	6-12”	12"+	R			X
Juncus effuses var. austrocalifornicus	Pacific rush	SCo	24-60”	12-24”	M		X	X
Juncus lescurii	dune rush	CA	12-36”	12"+	R-M			X
Juncus patens	California gray rush	SCo	18-36”	12-24”	M-L		X	X
Juncus phaeocephalus	brown-headed rush	SCo	6-24”	12"+	R-M			X
Juncus xiphioides	flat-leaf rush	SCo	18-36”	12"+	R-M			X
rue r sses								
Danthonia californica	California oatgrass	SW	2-6”	12"+	M-L		X	X
Elymus condensatus 'Canyon Prince'	San Miguel Island giant wildrye	ChI	24-36”	36-48”	L		X	X
Elymus glaucus	blue wildrye	SCo	12-18”	18-24”	L		X	X
Elymus triticoides	creeping wildrye	SCo	24-48’	24"+	L		X	X
Festuca californica	California fescue	CA	36-48”	12-18”	M-L		X	X
Festuca rubra	red fescue	SW	6-12”	12"+	M-L	X	X	X
Koeleria macrantha	junegrass	SW	12-18”	8-12”	L		X	X
Melica imperfect	melic	SCo	18-36”	12”	M-L		X	X
Muhlenbergia rigens	deergrass	SCo	36-48”	36-48	M-L		X	X
Stipa lepida	foothill needlegrass	SCo	12-18”	8-12”	"		X	X
Stipa pulchra	purple needlegrass	SCo	12-24”	8-12”	L		X	X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-6. California native ground cover plants.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Abronia maritima	red sand verbena	SCo	3-6”	18-24”	M-L			X
Abronia umbellata	pink sand verbena	SCo	3-6”	18-24”	M-L			X
Arctostaphylos edmunsii	Edmunds manzanita	CA	4-18”	8-72”	M-L		X	X
Arctostaphylos hookeri ‘Monterey Carpet’	Monterey carpet manzanita	CA	8-18”	48-72”	M-L			X
Arctostaphylos x ‘Emerald Carpet’	emerald carpet manzanita	Cv	4-8”	36-60”	M-L		X	X
Arctostaphylos x ‘Indian Hill’	Indian Hill manzanita	Cv	12-24”	48-60”	M-L			X
Arctostaphylos x ‘John Dourley’	Dourley's manzanita	Cv	18-36”	48-72”	M-L			X
Artemisia californica ‘Canyon Gray’	canyon gray coastal sagebrush	CA	6-12”	36-60”	M-L			X
Artemisia pycnosephala	beach sandwort	CA	12-18”	18-24”	L			X
Asarum caudatum	western ginger	CA	6-12”	24"+	M	X	X	
Baccharis pilularis ‘Pigeon Point’	Pigeon Point coyote brush	CA	18-36”	72-144”	M-L			X
Berberis aquifolium ‘Compacta’	compact Oregon grape	CA	24-36”	24"+	M		X	X
Berberis aquifolium var. *repens*	creeping Oregon grape	CA	24-36”	24"+	M-L		X	X
Ceanothus thrysiflorus var. *griseus* ‘Horizontalis’	Carmel creeper	CA	24-36”	60"+	M-L			X
Ceanothus x ‘Joyce Coulter’	Joyce Coulter wild lilac	Cv	24-36”	60"+	M-L			X
Epilobium canum	Calfornia fuchsia	SCo	6-30”	12-48”	M-L			X
Erigeron glaucus	seaside aster	CA	8-12”	24-36”	M-L			X
Eriophyllum lanatum ssp. *arachnoideum*	dwarf woolly sunflower	CA	12-24”	12-24”	M-L			X
Grindelia stricta var. *playphylla*	spreading gum plant	CA	24-36”	48-72”	M-L			X
Iris douglasiana	coast iris	CA	8-18”	24-72”	M-L		X	X
Iris 'Pacific Coast Hybrids'	Pacific Coast Hybrids iris	Cv	12-24”	12-36”	M-L		X	X
Salvia leucophylla ‘Point Sal Spreader’	Point Sal purple sage	SCo	24-36”	72"+	L			X
Salvia mellifera ‘Terra Seca’	Terra Seca sage	SCo	12-24”	36-60”	L			X
Salvia x ‘Mrs. Beard’	Mrs. Beard's sage	Cv	6-12”	24-48”	L			X
Salvia x ‘Bee's Bliss’	bee's bliss sage	Cv	6-12”	36-60”	L			X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-7. California native climbers.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Aristolochia californica	California Dutchman's pipe	CA	12'+	12'+	M-L	X	X	X
Calystegia macrostegia	California morning glory	SCo	6-30'	30'+	M-L			X
Clematis ligusticifolia	chaparral virgin bower	PV	18'	18'+	L		X	X
Lonicera hispidula	California honeysuckle	SCo	6-18'	6-18'	M-L	X	X	X
Lonicera subspicata var. *subspicata*	southern honeysuckle	PV	3-8'	3-8'	L		X	X
Vitis girdiana	desert wild grape	SCo	30'	30'+	M-L		X	X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-8. California native shrubs.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Arctostaphylos bakeri 'Louis Edmunds'	Louis Edmunds manzanita	CA	4-6'	4-6'	M-L			X
Arctostaphylos densiflora 'Howard McMinn'	McMinn manzanita	CA	4-6'	5-8'	M-L			X
A. d. 'Sentinal'	sentinal manzanita	CA	6-8'	4-8'	M-L			X
Arctostaphylos edmunsii	Little Sur manzanita	CA	1-2'	8-12'	M-L			X
Arctostaphylos glandulosa	Eastwood manzanita	SCo	3-6'	6-10'	L			X
Arctostaphylos hookeri	Monterey manzanita	CA	3-6'	4-8'	M-L			X
Arctostaphylos manzanita	Parry manzanita	CA	6-20'	6-15'	L			X
Arctostaphylos pajaroensis	Pajaro manzanita	CA	6-8'	6-10'	L			X
Arctostaphylos purissima	La Purissima manzanita	CA	3-6'	6-10'	L			X
Arctostaphylos rudis	shagbark manzanita	CA	3-6'	4-8'	L			X
Arctostaphylos obispoensis	serpentine manzanita	CA	6-15'	6-10'	L			X
Arctostaphylos x 'Austin Griffiths'	Griffiths' manzanita	Cv	8-12'	6-8'	M-L			X
Arctostaphylos x 'Indian Hill'	Indian Hill manzanita	Cv	1-2'	4-5'	M-L			X
Arctostaphylos x 'John Dourley'	Dourley's manzanita	Cv	1.5-3'	4-6'	L			X
Arctostaphylos x 'Sunset'	sunset manzanita	Cv	6-8'	8-10'	M-L			X
Arctostaphylos x 'White Lanterns'	white lanterns manzanita	Cv	4-6'	6-8'	M-L			
Arctostaphylos x 'Winterglow'	winterglow manzanita	Cv	2-3'	4-6'	M-L			X
Artemisia californica	California sagebrush	PV	2-6'	4-8'	L			X
Berberis aquifolium	Oregon grape	CA	4-8'	4'+	M		X	X
Berberis x 'Golden Abundance'	golden abundance Oregon grape	Cv	4-6'	4'+	M		X	X
Berberis pinnata	California holly grape	SW	4-8'	4'+	L		X	X
Carpenteria californica	California bush anemone	CA	6-10'	6-10'	M		X	X
Ceanothus maritimus	Hoover ceanothus	CA	3-6'	4-8'	L			X

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Ceanothus oliganthus var. *sorediatus*	Hoover Jim brush	SW	5-15'	10-15'	L			X
Ceanothus purpureus	hollyleaf ceanothus	CA	3-6'	4-10'	L			X
Ceanothus rigidus 'Snowball'	smowball ceanothus	CA	2-4'	6-10'	L			X
Ceanothus thrysiflorus	blue blossom	M	6-20'	10-20'	L		X	X
C. t. 'Skylark'	skylark blue blossom	CA	4-6'	9-12'	L		X	X
C. t. 'Snow Flurry'	snow flurry wild lilac	CA	9-12'	9-12'	L		X	X
Ceanothus thrysiflorus var. *griseus* 'Louis Edmunds'	Louis Edmonds Carmel ceanothus	CA	6'	20'	L			X
Ceanothus thrysiflorus var. *griseus* 'Santa Ana'	Santa Ana Carmel ceanothus	CA	5-8'	6-10'	'L			X
Ceanothus tomentosus	Ramona lilac	SCo	6-8'	6-8'	L			X
Ceanothus 'Concha'	concha wild lilac	Cv	4-6'	6-9'	L			X
Ceanothus 'Dark Star'	dark star wild lilac	Cv	4-6'	6-10'	L			X
Ceanothus 'Frosty Blue'	frosty blue wild lilac	Cv	8-12'	8-12'	L			X
Ceanothus 'Joyce Coulter'	Joyce Coulter wild lilac	Cv	3-6'	10-15'	L			X
Ceanothus 'Julia Phelps'	Julia Phelps wild lilac	Cv	4-8'	8-12'	L			X
Ceanothus 'Ray Hartman'	Ray Hartman wild lilac	Cv	12-20'	12-20'	L			X
Ceanothus 'Sierra Blue'	sierra blue wild lilac	Cv	12-20'	12-20'	L			X
Ceanothus 'Wheeler Canyon'	Wheeler Canyon wild lilac	Cv	4-8'	6-12'	L			X
Cercocarpus betuloides var. *betuloides*	birch-leaf mountain mahogany	SCo	3-10'	3-6'	L			X
Cercocarpus betuloides var. *blancheae*	island mountain mahogany	ChI	18-20'	6-10'	L			X
Comarostaaphylis diversifolia ssp. *diversifolia*	summer holly	SCo	12-20'	15-20'	L			X
Cornus sericea	creek dogwood	SCo	6-15'	6'+	R-M		X	X
Dendromecon harfordii	island bush poppy	ChI	8-15'	8-15'	L			X
Dendromecon rigida	bush poppy	SCo	8-10'	4-8'	L			X
Encelia californica	coast sunflower	PV	2-5'	2-5'	L			X
Eriogonum arborescens	Santa Cruz Island buckwheat	ChI	2-8'	2-8'	L			X
Eriogonum cinereum	ashyleaf buckwheat	SCo	2-6'	2-6'	L			X
Eriogonum fasiculatum	California buckwheat	PV	4-6'	6-10'	L			X
Eriogonum giganteum	St. Catherine's lace	ChI	6-10'	8-12'	L			X
Eriogonum latifolium	coast buckwheat	CA	1-2'	4-6'	L			X
Frangula californica	California coffeeberry	SCo	6-12	6-12'	L			X
F. c. 'Eve Case'	Eve Case coffeeberry	CA	3-6'	3-6'	M-L		X	X
F. c. 'Mound San Bruno'	Mound San Bruno coffeeberry	CA	3-6'	3-6'	M-L		X	X
Frangula californica ssp. *tomentella*	hoary coffeeberry	SCo	12-18	12-18'	L			X
Fremontodendron californicum	California flannel bush	SCo	8-20'	12-20'	L			X
Fremontodendron x 'California Glory'	California glory flannel bush	Cv	12-18'	8-12'	L			X
Fremontodendron x 'San Gabriel'	San Gabriel flannel bush	Cv	12-18'	12-20'	L			X

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Gambelia speciosa	showy island snapdragon	ChI	2-3'	3-6'	M-L	X	X	X
Garrya fremontii	Fremont silk tassel	SW	5-10'	5-10'	L			X
Garrya veatchii	canyon silktassel	SCo	4-6'	4-6'	L			X
Heteromeles arbutifolia	toyon	PV	6-20'	6-20'	'M-L		X	X
Keckiella antirrhinoides	yellow bush penstemon	SCo	3-6'	3-6'	L			X
Keckiella cordifolia	heartleaf keckiella	PV	4-6'+	6-8'+	M-L		X	X
Lupinus albifrons	silver bush lupine	SCo	4-8'	4-8'	L			X
Lupinus arboreus	tree lupine	SCo	3-7'	3-7'	L			X
Malacothamnus fasiculatus	chaparral mallow	SCo	6-10'	6'+	L			X
Malacothamnus palmeri	Santa Lucia bush mallow	CA	6-8'	6-8	'L			X
Malva assurgentiflora	malva rose	ChI	5-10'	5-10'	L		X	X
Peritoma arborea	bladderpod	PV	3-6'	2-4'	L			X
Philadelphus lewisii	wild mock-orange	CA	6-10	6-10'	M-L		X	X
Rhamnus crocea	redberry	SCo	3-6'	3-6'	L		X	X
Rhamnus ilicifolia	holly-leaf redberry	SCo	8-15'	8-15'	L		X	X
Rhus integrifolia	lemonade berry	PV	3-24'	2-9'	L			X
Rhus ovata	sugar berry	SCo	12-18	12-18'	L			X
Ribes aureum var. *gracillimum*	golden currant	SCo	3-6'	3-4'	M-L		X	X
Ribes indecorum	white-flowered currant	SCo	4-6-'	3-4'	L		X	X
Ribes malvaceum	chaparral currant	SCo	4-8'	3-6'	L		X	X
Ribes sanguineum var. *glutinosum*	pink-flowered currant	CA	4-8'	3-6'	M-L		X	X
Ribes speciosum	fuchsia-flowered gooseberry	SCo	4-6	6-8'	L		X	X
Ribes viburnifolium	Catalina currant	ChI	2-3'	3-6'	M-L	X	X	
Salvia apiana	white sage	PV	4-6'	4-6'	L			X
Salvia clevelandii	Cleveland sage	SCo	2-4'	4-8'	L			X
Salvia leucophylla	purple sage	SCo	4-6'	6-10'	L			X
Salvia l. 'Amethyst Bluff'	amethyst bluff sage	SCo	2-4'	4-8'	L			X
Salvia mellifera	black sage	PV	3-6'	4-8'	L			X
Salvia x 'Allen Chickering'	Allen Chickering sage	Cv	4-6'	6-8'	L			X
Salvia x 'Aromas'	Aromas sage	Cv	4-6'	6-8'	L			X
Salvia x 'Pozo Blue'	Pozo blue sage	Cv	4-6'	6-8'	L			X
Salvia x 'Whirley Blue'	whirly blue sage	Cv	4-6'	6-8'	L			X
Styrax redivivus	snowdrop bush	SW	5-12'	5-12'	M-L		X	X
Symphorocarpus albus var. *laevigatus*	snowberry	SW	2-6'	'6'+	M-L	X	X	
Trichostema lanatum	woolly blue curls	SCo	2-3'	2-3'	L			X
Venegasia carpesioides	canyon sunflower	SCo	2-5'	2-5'	M-L	X	X	
Xylococcus bicolor	mission manzanita	SCo	6-10'	6-10'	L			X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-9. California native trees.

Botanical Name	Common Name	Native Status	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Aesculus californica	California buckeye	CA	20-40'	20-40'	L			X
Alnus rhombifolia	white alder	SCo	30-60'	30-45'	R-L		X	X
Chilopsis linearis	desert willow	SW	20-40'	20-40'	L			X
Juglans californica	southern California black walnut	PV	20-30'	20-30'	L			X
Lyonothamnus floribundus ssp. *asplenifolius*	Santa Cruz Island ironwood	ChI	30-60'	20-30'	L		X	X
Platanus racemosa	California sycamore	SCo	50-100'	30-50'	R-M			X
Prunus ilicifolia ssp. *ilicifolia*	holly-leaf cherry	SCo	30-45'	15-25'	L			X
Prunus ilicifolia ssp. *lyonii*	Catalina cherry	ChI	30-45'	15-25'	M-L			X
Quercus agrifolia	coast live oak	PV	60-90'	60-120	L			X
Quercus chrysolepis	canyon live oak	SCo	40-70'	50-70''	M-L		X	X
Quercus engelmannii	mesa blue oak	SCo	20-40'	30-50'	L			X
Quericus tomentella	island oak	ChI	40-60'	20-40'	M-L			X
Umbellularia californica	California bay	SCo	20-60'	20-60'	M-L		X	X

Key to native status: = plants recorded as native to the Palos Verdes Peninsula; o = species native to the south coast region of California; = plants native to the Channel Islands; = species native to the interior of southern California; A = plants native to central or northern California; = Plant cultivars derived from hybrids of native species.

Cultivar selections of wild plants are listed as PV, SCo, ChI, SW, or CA, depending on where the selections were originally made.

Key to irrigation: = regular watering to keep soil moist; M = moderate to occasional watering applied deeply and allowed to dry between irrigations; = infrequent to no irrigation needed except during winter drought.

Spread: x"+ indicates spread after 1-3 years, but the species is known to form larger clumps over time.

Table F-10. List of exotic tree species. A number of non-native shade trees are available that would be appropriate where irrigation is available. Below is a sample.

Botanical Name	Common Name	Form	Height	Spread	Irrigation	Shade	Part Shade	Full Sun
Arbutus x 'Marina'	marina madrone	Evergreen	30-40'	20-30'	M			X
Cinnamonum camphora	champhor tree	Evergreen	40-50'	50-60	M			X
Erythrina x *sykesii*	hybrid coral tree	Deciduous	25-35'	30-45	M			X
Ficus microcarpa	Indian laurel fig	Evergreen	45-60'	60-80	M			X
Ficus rubiginosa	rustyleaf fig	Evergreen	35-50'	40-60	M			X
Fraxinus oxycarpa 'Raywood'	Raywood ash	Deciduous	30-40'	25-30	M			X
Hymenosporum flavum	sweetshade	Evergreen	12-40'	9-20	M			X
Magnolia grandiflora	southern magnolia	Evergreen	40-80'	30-50	M			X
Pittosporum undulatum	Victorian box	Evergreen	30-40'	30-40	M			X
Quercus virginiana	southern live oak	Evergreen	40-80'	60-100	M			X
Tipuana tipu	tipuana	Deciduous	25-40'	30-60	M			X

Key to irrigation: R= regular watering to keep soil moist; M= moderate to occasional watering applied deeply and allowed to dry between irrigations; L= infrequent to no irrigation needed except during winter drought.

This Page Intentionally Blank

Appendix G: Reporting on Migratory Bird Management

Migratory Bird Treaty Act

Each INRMP must address the conservation of birds and their habitat to promote and support migratory birds in compliance with the MBTA, EO 13186, and any subsequent rules, and agreements. This is accomplished largely by leveraging DoD conservation efforts with appropriate State/Regional Bird Conservation Plans (Figure G-1). Additional information is available on the DoD-PIF Website: www.dodpif.org.

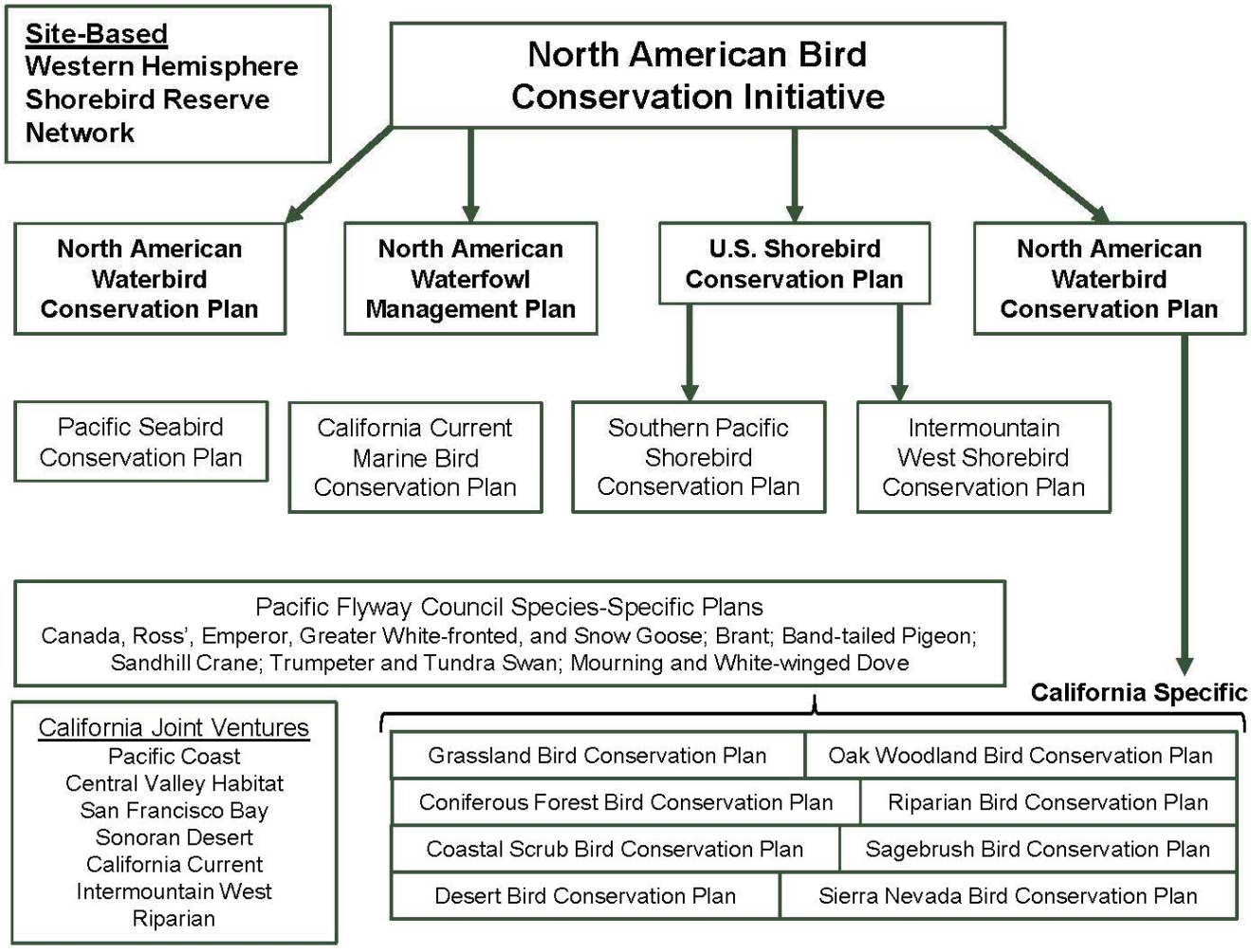


Figure G-1. Regional bird conservation plans in which the United States or California are a partner. Some of these pertain to Defense Fuel Support Point San Pedro, such as the Coastal Scrub Bird Conservation Plan.

The MBTA of 1918 (16 USC 703-711) is legislation that covers species protected under four international treaties. These treaties are agreements between the United States, Canada, Mexico, Japan, and Russia and protect most species of birds. The MBTA prohibits the taking or pursuing of migratory birds, their eggs, feathers, or nests. Game birds are listed and protected except where specific seasons, bag limits, and other factors govern their hunting. Exceptions are also made for some nuisance pests, which have standing federal depredation orders (e.g. yellow-headed, red-winged, tri-colored, rusty and Brewer's black- birds, cowbirds, all grackles, crows, magpies, rock doves, European starlings, and house sparrows).

Migratory Bird Rule. In an effort to provide guidance for conflicts arising between military readiness activities and the MBTA, the USFWS issued the final rule on Migratory Bird Permits: Take of Migratory Birds by the Armed Forces (50 Code of Federal Regulations Part 21 in the 28 February 2007 Federal Register, pages 8931-8950). The Migratory Bird Rule authorizes the military to “take" migratory birds during military readiness exercises under the MBTA without a permit, but if the military determines that the activity will significantly affect a population of migratory birds, they must work with the USFWS to implement conservation measures to minimize and/or mitigate the effects.

Many natural resources management activities benefit migratory birds including habitat management, erosion control, conservation law, trespass enforcement and invasive weed management.

Migratory Bird Management at DFSP San Pedro

No specific military readiness activities affecting migratory birds at DFSP have been identified as falling under the Migratory Bird Rule.

Previous surveys on either DFSP San Pedro or its immediate vicinity identified eight species that currently have a special status from either the state of California or the federal government, including three that are confirmed breeders. The bird inventory used for this INRMP is derived from Aigner and Koehler (1997), which was the last baseline survey conducted at DFSP. Among species that breed at DFSP San Pedro, management strategies for the federally threatened CAGN are discussed in Section 4.1.1.2. Other breeding species include the loggerhead shrike and Allen’s hummingbird. Both of these species are listed as BCC by the USFWS and the CDFW. Three other special status species not known to breed at DFSP San Pedro were noted on the property, including the peregrine falcon, which is endangered by the CDFW. The state endangered willow flycatcher has been observed in the riparian areas during migration, and the USFWS Bird of Conservation Concern, Lawrence’s goldfinch, was noted once flying over DFSP San Pedro.

Most local birds typically nest between January and August in buildings, trees, shrubs, and on the ground. If nesting birds or eggs are encountered within a construction area, work must be phased to avoid disturbing the birds.

Many benefits for migratory birds derive from the measures designed to protect the PVB and the CAGN, and described in the BO on Routine Operations and Maintenance (USFWS 2010). These include:

- Annual habitat disturbance limits that function as habitat take limitations for the PVB and CAGN in a habitat Management Emphasis Area, but that also benefit migratory birds. Consultation must be reinitiated if these PVB and CAGN habitat disturbance thresholds are exceeded during routine operations and maintenance at DFSP San Pedro.
- Defined areas for management emphasis of the CAGN.

- Identification of buffer "Avoidance Areas" where mowing protocols are adjusted to be less intensive so that these areas might provide at least temporary habitat for the PVB. This also benefits migratory bird nesting by restricting disturbance during the breeding season.
- Measures to control weediness of habitat areas and avoid habitat degradation by invasive species.
- Consistent with the USFWS BO issued in 2005 regarding mowing within DFSP San Pedro (FWS-LA-1-6-06-RF-4022), measures will be implemented to minimize and avoid impacts to the PVB and its habitat within the designated mowing areas, as shown on Map 4-1. No mowing will be conducted between February 15th and May 31st, when PVB eggs, larvae, or adults are likely to be present; and no heavy equipment will be used for vegetation clearing in the 4.4 acres (1.8 ha) of Avoidance Areas shown in Map 4-1, and no clearing or mowing will occur between February 15th and May 31st. Where appropriate, bright colored flagging and tape will be used to mark the avoidance areas.

See below for the DFSP San Pedro strategy details for management of bird species found on the property.

Objective: Conserve viable habitat for avian species that use DFSP San Pedro for stopover resting, feeding, and nesting.

I. Conduct periodic surveys of avian populations at DFSP San Pedro to monitor population size and habitat use.

II. Preserve and maintain habitat for migratory birds.

A. Prevent noxious weeds from taking over native habitats.

B. Remove exotics that may detrimentally affect native migratory birds.

C. Protect wetlands and areas of dense vegetative cover.

III. Cooperate with large-scale efforts to research, monitor and manage migratory bird populations.

A. Participate in the DoD-PIF program.

This Page Intentionally Blank

Appendix H: Critical Habitat Designation Concerns—Benefits for Endangered Species

The ESA was revised via the National Defense Authorization Act of 2004 (Public Law 108-136) to recognize INRMP conservation measures and species benefit that could obviate the need for critical habitat designation on Navy lands. Section 4(a)(3) of the revised ESA states that: "The Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the DoD, or designated for its use, that are subject to an integrated natural resources management plan prepared under Section 101 of the Sikes Act (16 USC 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

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 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: 1) biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals); 2) quantifiable, scientifically valid parameters that will demonstrate achievement of objectives and standards for these parameters by which progress will be measured are identified; 3) provisions for monitoring and,

where appropriate, adaptive management; 4) 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 5) a duration sufficient to implement the plan and achieve the benefits of its goals and objectives.

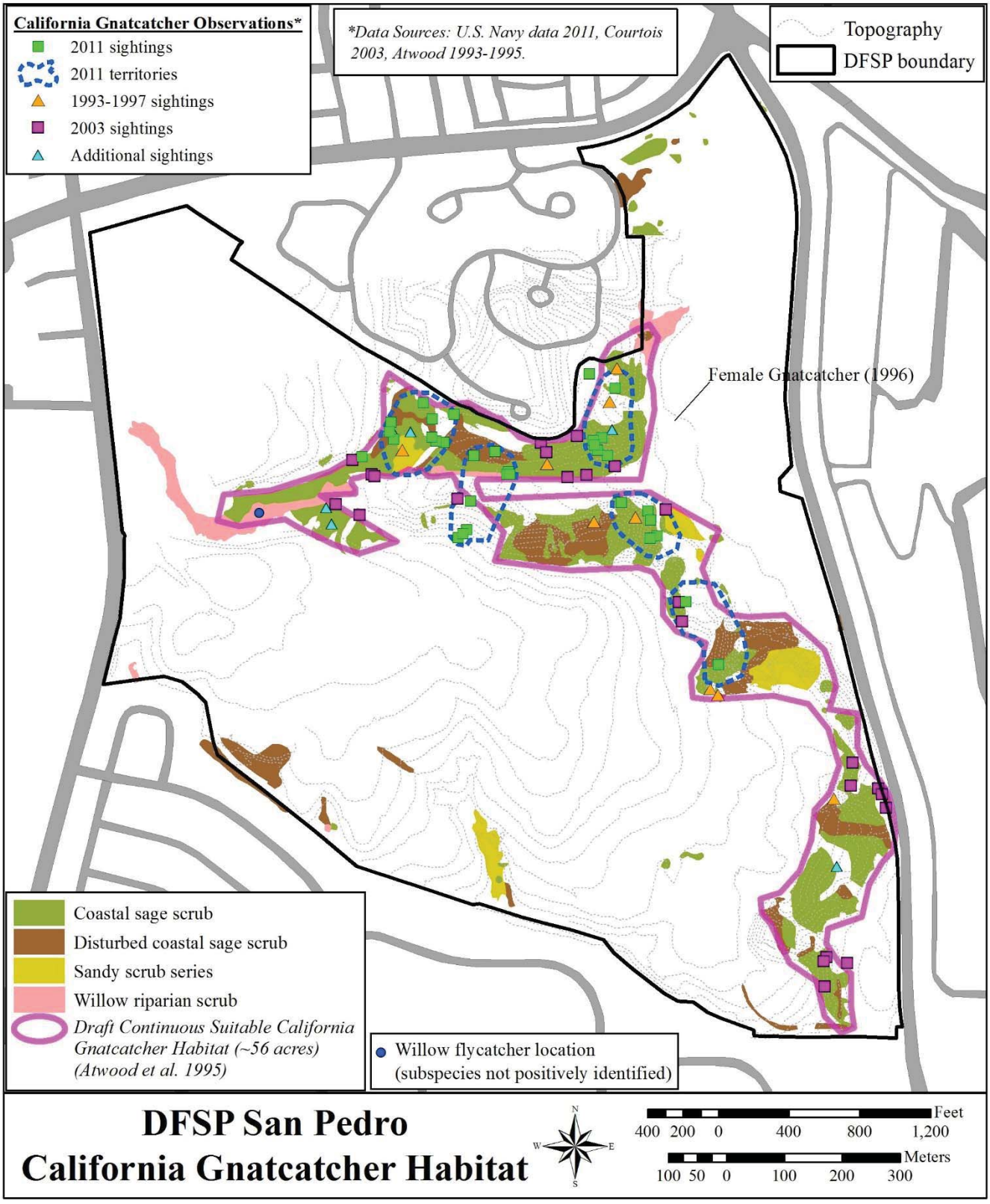
Map 2-7 of this INRMP shows designated Critical Habitat for the PVB and CAGN in the vicinity of DFSP San Pedro. Map H-1 shows CAGN habitat mapped on the installation.

When the species was federally listed as endangered and Critical Habitat was designated (45 FR 44935-44939, 02 July 1980), the PVB population at DFSP was unknown. The Critical Habitat designated in 1980 mirrored the areas containing the four known populations in existence at the time (Refer to Map 2-7). This may have reflected the absence of a population, or was simply due to a lack of systematic surveys or documented sightings. DFSP had been the only known locality of the PVB until 2000, when a colony was apparently successfully reintroduced at nearby Chandler Preserve, and 2001, when a small colony was discovered at Malaga Dunes. Most of this Critical Habitat was within the vicinity of DFSP San Pedro, but in the absence of a known population DFSP San Pedro was not included in that designation.

Listed as federally threatened on 30 March 1993, the CAGN nests in the coastal sage scrub plant community on DFSP San Pedro. DFSP San Pedro property is designated Critical Habitat for the CAGN (65 Federal Register 63679-63743, 24 October 2000), which means that the USFWS will consider effects on habitat of the CAGN, as well as on the bird itself, when reviewing environmental documents within its purview.

This INRMP, along with the 2010 BO, provides a conservation benefit to the PVB and CAGN by ensuring against catastrophic loss of population centers or habitat for coming decades. Quantifiable parameters for demonstrating achievement of these objectives include the limitations to levels of habitat disturbance that can occur in a single year, based on management areas shown on Map 4-1. In addition, the INRMP obviates the need to designate Critical Habitat at DFSP by the following:

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 results from measures described in the 2010 BO, including definition of Management Emphasis Area for listed species, areas to manage emphasizing the PVB, the CAGN, habitat restoration, and operations. By defining these zones, larger habitat areas are conserved to maintaining or increasing populations with less fragmentation of habitat. The area defined contains sufficient acreage and buffer to insure against catastrophic events. The 2010 BO also defines habitat restoration and weeding techniques and protocols that reduce the threat to habitat posed by invasive weeds. Finally, a captive rearing program for the PVB ensures adequate buffering against population collapse.
2. The plan provides certainty that the management plan will be implemented. The INRMP has an implementation strategy as identified in Chapter 5, and summarized by the Implementable Table in Appendix I. DFSP San Pedro, charged with plan implementation, along with its partners are capable of accomplishing the objectives of the INRMP and have adequate funding for the management plan. They have the authority to implement the plan and have obtained all necessary authorizations or approvals. An implementation schedule, including completion dates, for the conservation effort is provided in Appendix I.



Map H-1. California gnatcatcher habitat at Defense Fuel Support Point San Pedro (Atwood et al. 1995).

3. The plan provides certainty that the conservation effort will be effective. The 2010 BO provides for monitoring of the conservation effort using methods of Longcore (2010) that have been validated and implemented for the past several years. The 2010 BO requires annual reporting on these metrics. This monitoring is to take place into the indefinite future, since the BO has no expiration date. Further, the 2010 BO contains reinitiation procedures. Consultation must be reinitiated if these PVB and CAGN habitat disturbance thresholds are exceeded:
   a. Temporary disturbance of up to 0.5 acres (0.2 ha) of PVB or CAGN habitat per year during routine operations and maintenance;
   b. Temporary disturbance of up to 1 acre (0.4 ha) of PVB habitat or CAGN habitat over any three-year period during routine operations and maintenance; and
   c. Disturbance from habitat restoration is tabulated separately. Temporary disturbance of up to 1 acre (0.4 ha) of PVB or CAGN habitat per year during habitat restoration activities.

Appendix I: Implementation Summary Table

The project prescriptions were developed cooperatively with both internal and external stakeholders, including the USFWS, CDFW, PVPLC, Urban Wildlands Group, and others. Compliance with current BOs and OPNAVINSTs was the first source of projects. A summary of the project(s) rationale is included in Chapter 3 and Chapter 4.

Refer to Appendix C for a copy of the BO that forms the basis of many of the prescriptions in this INRMP (BO on Routine Operations and Maintenance [USFWS 2010]).

Table I-1. Implementation summary table with project prescriptions developed for this Integrated Natural Resources Management Plan.

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Measure of Success or Desired Future Condition
						Frequency	Year	
Endangered/Threatened Species Management								
47615SNR03	4.1.1.1	DLA/Navy	Maintain captive population of PVB. Required by the 2010 BO. May need to move existing facility, establish second site. Begin site approval process, if necessary.	4	ESA	On-going	2014-2025	Listed Species & Critical Habitat INRMP Project Implementation
47615SNR02	4.1.1.1	DLA/Navy	Operate a native plant nursery that will propagate native plants from local sources, including PVB host plant.	4	ESA	On-going	2014-2025	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
47615SNR03	4.1.1.1	DLA/Navy	Conduct PVB annual surveys along established transects and conduct basewide surveys every three years.	4	ESA	Annual	2014-2025	Ecosystem Integrity Listed Species & Critical Habitat Partnerships Effectiveness INRMP Project Implementation
4761SNR03	4.1.1.1	DLA/Navy	Conduct surveys of PVB habitat.	4	ESA	Annual	2014-2025	
47615SNR01	4.1.1.2	DLA/Navy	Conduct CAGN protocol surveys.	4	ESA	Every three years.	2014-2025	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
	4.1.1.1 4.1.1.3	DLA/Navy	Restore impacted habitat. Required by 2010 BO on a project-specific basis.	NA	ESA	On-going	2014-2025	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
Habitat Restoration for Sensitive Species Support								
TBD	4.1.1.3	DLA	Develop restoration plan taking into account historic species composition.	4	ESA, EO 13186		2014	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
Pest Management								
47615SNR02	4.1.1.1 4.3.4 4.6	DLA/Navy	Weed eradication and invasive species removal of known weeds (coordinate with other local efforts).	4	ESA, NWCA, EO 13112	Every five years.	2014-2025	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
	4.3.4 4.6	DLA/Navy	Control feral cats (using active and passive means), as needed.	NA	ESA, EO 13186		2014-2025	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
	4.3.4 4.6	DLA/Navy	Investigate methods of rodent elimination and control (including ground squirrels). Avoid use of poisons outside of buildings, where feasible.	NA	EO 13186, EO 12856		2014-2025	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
	4.3.4 4.6	DLA/Navy	Complete predator hazard assessment, as needed.				2013	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Measure of Success or Desired Future Condition
						Frequency	Year	
Fish and Wildlife Management								
47615SNR06	4.3.1 4.3.2 4.3.3 4.5	Navy	Conduct baseline inventory surveys for herpetological, avian, mammalian (including bats), and invertebrate species.	4	Sikes Act, DoDI 4715.3		2016	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
47615SNR02	4.4	Navy	Complete vegetation mapping to comply with currently accepted standards.	4			2016	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
Long-Term Monitoring of Natural Resources								
TBD	4.4	Navy	Conduct periodic surveys targeting each special status plant species with the potential to occur.	4	Sikes Act		2016	Ecosystem Integrity Listed Species & Critical Habitat INRMP Project Implementation
NA	4.4	Navy	Develop and implement a management program for any special status plant species that are found.	NA	Sikes Act		2016	Ecosystem Integrity Listed Species & Critical Habitat Partnerships Effectiveness INRMP Project Implementation
Soil Erosion Prevention and Management								
47615SNR00	4.7.1	DLA	Update Main Terminal and Marine Terminal Stormwater Pollution Prevention Plans.	4	CWA, SCA, Sikes Act	Annually	2014-2015	Ecosystem Integrity Listed Species & Critical Habitat Partnerships Effectiveness INRMP Project Implementation
47615SNR07		DLA	Ensure all personnel receive appropriate training to ensure compliance with all natural resources requirements.	4	ESA	On-going. Permanent maintenance personnel should be briefed annually.	2014-2015	Ecosystem Integrity Listed Species & Critical Habitat Partnerships Effectiveness INRMP Project Implementation
Construction and Maintenance								
47615SNR07		DLA/Navy	Ensure all personnel receive appropriate training to ensure compliance with all natural resources requirements.	4	ESA	Ongoing. Permanent maintenance personnel should be briefed annually.	2014-2025	Partnerships Effectiveness INRMP Project Implementation INRMP Impact on the Installation Mission
Outdoor Recreation								
	4.9	DLA/Navy	Evaluate feasibility of additional public access for recreation.	4	Sikes Act		2014	Fish & Wildlife Management & Public Use

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Measure of Success or Desired Future Condition
						Frequency	Year	
Land Use and Environmental Planning								
	5.1	DLA/Navy	Conduct Environmental Quality Assessment annually.	0	All applicable	Ongoing.	2014-2025	Ecosystem Integrity INRMP Project Implementation
	5.1	DLA/Navy	Conduct Environmental Compliance Evaluation every three years.	0	All applicable		2014	INRMP Project Implementation
Information Management								
	4.8 5.4.1	DLA/Navy	Ensure GIS data layers archived at NAVFAC, and copies maintained at DFSP San Pedro.	0	Multiple	Ongoing.		Listed Species & Critical Habitat Partnerships Effectiveness

Legal Driver Definitions:

CWA = Clean Water Act; DoD = U.S. Department of Defense; DoDD = U.S. Department of Defense Directive; DoDI = U.S. Department of Defense Instruction; EO = Executive Order; ESA = Endangered Species Act; MCAA = ; NWCA = ; SCA = Soil Conservation Act

Notes:

1: Class I Compliance Projects being funded through the POM process should be addressed first, as they are must-funds. Class II, III, & IV Projects, and Projects funded with forestry, agricultural outlease, fish and wildlife, legacy, or other fund sources, which are stewardship-type projects, should be addressed next.

2: Refer to the Navy Environmental Requirements Cookbook, Chapter 12, Natural Resources Requirements.

3: Most projects listed here will not require further NEPA documentation as they are covered under the Environmental Assessment/Environmental Impact Statement prepared for the INRMP. Other projects not specifically addressed in the INRMP, or modified projects, will usually be closely enough related to the INRMP that they can be Categorically Excluded. However, in certain circumstances NEPA documentation may be required.

4: DLA is funding natural resources until FY 2016 and Navy will begin funding in FY 2016 throughout remaining years.

Appendix J: Natural Resources Metrics

This Page Intentionally Blank

FY11 Defense Environmental Programs Annual Report to Congress (DEPARC) – Natural Resources Data Summary

Introduction

In accordance with DoDI 4715.03, *Natural Resources Conservation Program,* and the Sikes Act Improvement Act, the Deputy Under Secretary of Defense (Installations and Environment) requires environmental management information to support Congressional reporting and ensure DoD is on track to meet its environmental management goals. Consequently, the Navy Natural Resources (NR) Metrics were developed to support the annual Natural Resources Program reviews between the Navy and its Sikes Act partners, the USFWS and State Fish and Wildlife agencies. These NR Metrics can be used to gather and report essential information required by Congress, Executive Orders, existing U.S. laws, and the Department of Defense. There are seven Focus Areas that comprise the NR 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 for Public Use
4. Partnership Effectiveness
5. Team Adequacy
6. INRMP Project Implementation
7. INRMP Impact on the Installation Mission

Each of the seven Focus Areas contains questions that can be evaluated. Questions are weighted, with responses to questions having different values, ranging from 0.0 to 1.0. Each Focus Area is scored, using a rating scheme of Green (1.0-0.67), Yellow (0.66-0.34), and Red (0.33-0.0), resulting in a comprehensive scorecard for the entire NR Metrics for each Navy installation (Figure 1).

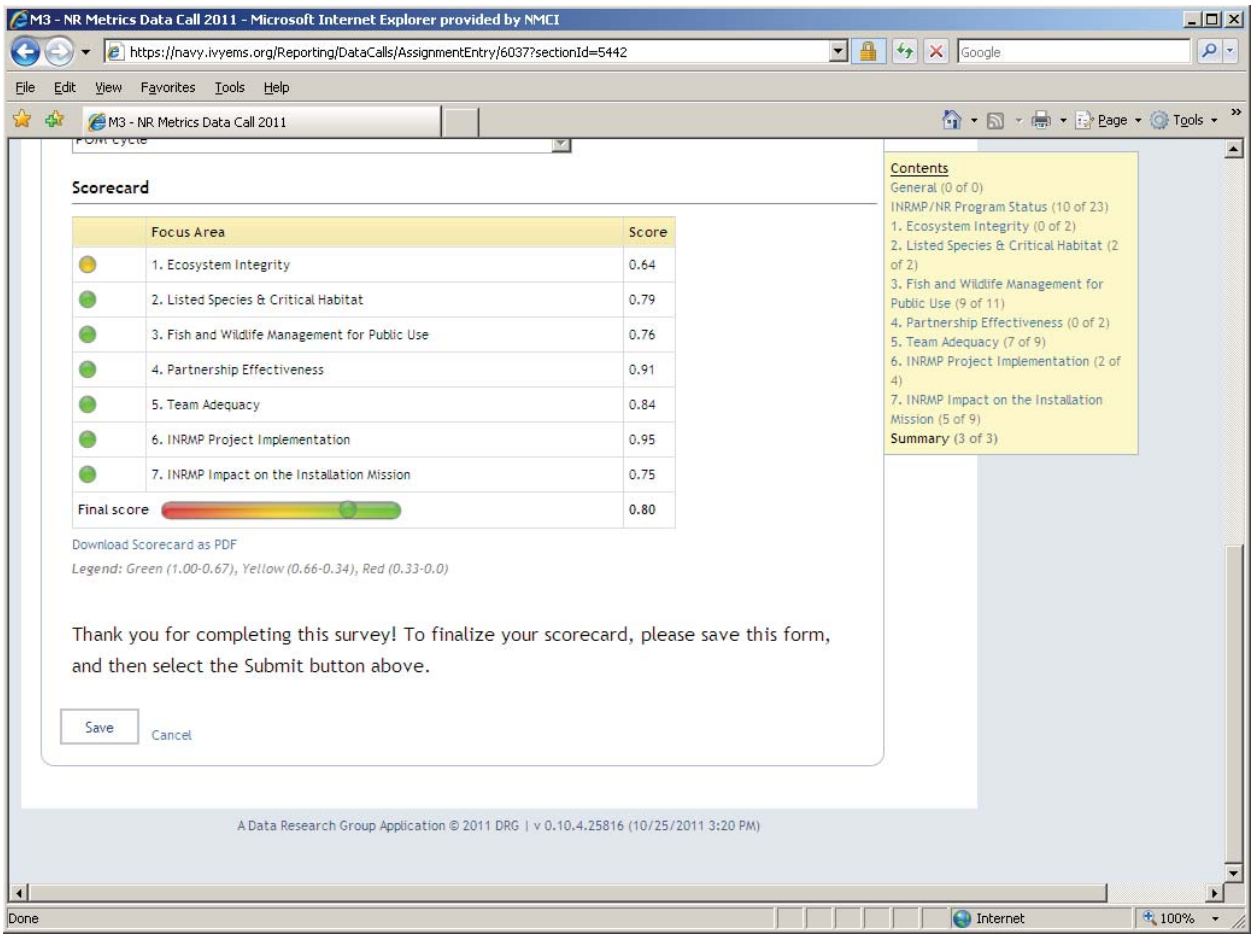


Figure 1. Example of NR Metrics Scorecard.

The questions asked in each Focus Area of the NR Metrics are intended to measure how well the Navy managed natural resources at each installation during any given year as well as the status of project implementation. In FY11, the Navy revised the questions to reflect the updated DoDI 4715.03 and draft OPNAVINST 5090, currently under revision. In addition, the field was asked to respond for all Navy-owned sites, which includes installations and special areas, in the Navy's real property database, iNFADS. Of the approximately 829 sites within iNFADS, 314 sites were found to have significant natural resources. These sites were then rolled up based on main installations, e.g. all special areas associated with an installation and covered under the same INRMP. Unique special areas having their own INRMP were counted separately. This list of sites was then correlated to the CNIC Base Command list.

Summary of NR Metrics by Focus Area

Per FY11 NR Metrics, many of the installations appear to have healthy NR programs (as indicated by the numerous green scores for the various Focus Areas), which reflects their ability to successfully implement projects identified in their existing INRMPS. Further, responses to questions in the Ecosystem Integrity and Listed Species & Critical Habitat Focus Areas indicate that existing INRMPs are sufficient in accomplishing ecosystem based management and protection of listed species. The questions *scored* in the NR Metrics that were used to evaluate

the health of the NR program and effectiveness of the INRMP at each installation are listed below by Focus Area.

Focus Area 1: Ecosystem Integrity –

According to the DoDI 4715.3, the goal of ecosystem management is to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Over the long term, that approach shall maintain and improve the sustainability and biological diversity of terrestrial and aquatic (including marine) ecosystems while supporting sustainable economies, human use, and the environment required for realistic military training operations. This Focus Area is intended to define the ecosystems that occur on the installation and assess the integrity of these ecosystems. The term, integrity, refers to the quality of state of being complete, unbroken condition, wholeness, entirety, unimpaired, without significant damage, good condition, or general soundness. Terrestrial ecosystems, as defined by Nature Serve's "Ecological Systems of the United States: A Working Classification of US Terrestrial Systems" and marine ecosystems, as defined by NOAA's "Coastal and Marine Ecological Classification Standard" (including only the Benthic Biotic Component, Surface Geology Component, and Water Column Component of the classification scheme) were selected from a list and assigned to each installation. Locally-defined ecosystems were added, if necessary. Once the ecosystems were assigned to the installation, the following questions [4 out of 5 new in FY11] were asked for each of the ecosystems identified as being present on the installation.

1. To what extent is the ecological system on the installation fragmented due to land conversion? (0-5)

   Answers:
   0 = Ecosystem fragmentation is the result of five (5) of the phenomena (0)
   1 = Ecosystem fragmentation is the result of four (4) of the phenomena (0.20)
   2 = Ecosystem fragmentation is the result of three (3) of the phenomena (0.40)
   3 = Ecosystem fragmentation is the result of two (2) of the phenomena (0.60)
   4 = Ecosystem fragmentation is the result of one (1) of the phenomena (0.80)
   5 = No fragmentation (1.00)

2. Is the ecosystem effectively managed to sustain viable populations of species? (0-3)

   Answers:
   0 = Not effectively managed (0)
   1 = Minimally effective management (0.33)
   2 = Moderately effective management (0.67)
   3 = Effectively managed (1.00)

3. To what degree is the ecological system vulnerable to stressors? (0-5)

   Answers:
   0 = Completely Vulnerable (0)
   1 = Severely Vulnerable to Stress (0.20)
   2 = Highly Vulnerable to Stress (0.40)

3 = Moderately Vulnerable to Stress (0.60)
4 = Slightly Vulnerable to Stress (0.80)
5 = Not Vulnerable to Stress (1.00)

4. To what degree has the installation's INRMP/Natural Resources Program provided an overall benefit to ecological integrity? (0-3)

   Answers:
   0 = No Benefit (0)
   1 = Minor Benefit (0.33)
   2 = Moderate Benefit (0.67)
   3 = Significant Benefit (1.00)

Each of these questions in the Ecosystem Integrity Focus Area is equally weighted by a value of 1. This means that no one question contributes more to the overall score of the Focus Area than any other question. However, question #4 is the most relevant in terms of assessing the importance of the INRMP on Ecosystem Integrity. The score of each question, as well as the overall score of the Focus Area, can't exceed 1.00. This means that the score calculated for each question is the product of the numerical value associated with the answer provided and the weight (=1). For example, if the answer provided for question #4 is "No Benefit", then the score for that question is [0 x 1 = 0]. But, if the answer provided for question #4 is "Significant Benefit", then the score for that question is [1.00 x 1 = 1.00]. Therefore, if the INRMP has a significant benefit to ecological integrity, then the response of "Significant Benefit" to this question increases the potential for a higher overall score for this Focus Area, which may contribute to the Focus Area being coded as green.

Note: The numerical value associated with each answer is the result of the total potential score for the question (1.00) divided by the number of possible answers, except for zero. If NA is chosen, the question drops out of the calculation. For example, for question #4, there are three possible answers (other than "No Benefit", which is zero) so [1.00/3 = 0.33]. The answers are ranked according to importance, e.g. an INRMP with a "Significant Benefit" has more importance on the overall benefit to ecological integrity than an INRMP with a "minor benefit". Therefore, an answer of "Significant Benefit" to question #4 is weighted by 3, resulting in a score of 1.00 for the question.

Focus Area 2: Listed Species & Critical Habitat -

This Focus Area is intended to identify the federally listed species that occur on a Navy installation and/or special area, as well as determine if conservation efforts are effective and if the INRMP provides the conservation benefits necessary to preclude designation of critical habitat for particular species. Federally listed species were selected from the USFWS list of federally threatened and endangered species and assigned to each installation. Once the listed species were assigned to the installation, the following questions [1 out of 6 new in FY11] were asked for each of the federally listed species identified as being present on the installation.

1. To what extent do INRMP projects & programs provide a benefit to this species? (0-4, NA)

   Answers:
   0 = No benefit (0)
   1 = Minor benefits (0.25)
   2 = Moderate benefit (0.50)
   3 = Major benefit (0.75)
   4 = Significant benefit (1.00)
   NA

2. To what degree have projects been funded in support of this species? (0-4, NA)

   Answers:
   0 = No funding (0)
   1 = 1% to 25% funded (0.25)
   2 = 26% to 50% funded (0.50)
   3 = 51% to 75% funded (0.75)
   4 = 76% to100% funded (1.00)
   NA

3. To what extent are quantifiable goals, parameters, and monitoring requirements in place to assess conservation effectiveness? (0-4, NA)

   Answers:
   0= None (0)
   1= Minimal (0.25)
   2= Moderate (0.50)
   3= Good (0.75)
   4= Excellent (1.00)
   NA

4. Do existing surveys provide adequate data on habitat conditions? (Y/N)

   Answers:
   N (0)
   Y (1.00)

5. Do existing surveys provide adequate data on population presence and numbers? (Y/N)

   Answers:
   N (0)
   Y (1.00)

The questions in the Listed Species & Critical Habitat Focus Area are not equally weighted. Questions #1 and #3 are weighted the most at 1.1; question #2 is weighted 1.0; and questions #4 and #5 are weighted the least at 0.9. In particular, question #1 speaks directly to the effect of the INRMP on listed species. Therefore, if the answer provided for question #1 is "Significant Benefit", then the score for that question is [1.00 x 1.1 = 1.1]. Therefore, if the INRMP has a

significant conservation benefit to a listed species, then the response to this question increases the potential for a higher overall score for this Focus Area, which may contribute to the Focus Area being coded as green.

Focus Area 3: Fish and Wildlife Management for Public Use –

The purpose of this Focus Area is to evaluate the availability of public recreational opportunities, such as fishing and hunting, given the existing security requirements for the installation. While recreational opportunities may be available at an installation, they may be restricted for security reasons. The following questions [6 out of 9 new in FY11] were asked.

1. Are recreational opportunities available on the installation? (Y/N)

   Answers:
   N (0)
   Y (1.00)
   NA (landscape doesn't support recreational opportunities)

2. If recreational opportunities are available, are they limited/restricted for security reasons? (Y/N/NA)

   Answers:
   Y (0)
   N (1.00)
   NA (recreational opportunities are not available)

3. If recreational opportunities are available, are they offered to the public?

   Answers:
   N (0)
   Y (1.00)
   NA (recreational opportunities are not available)

4. If recreational opportunities are available, are they offered to DoD personnel?

   Answers:
   N (0)
   Y (1.00)
   NA (recreational opportunities are not available)

5. If recreational opportunities are available, are they accessible by disabled veterans/Americans?

   Answers:
   N (0)
   Y (1.00)

NA (recreational opportunities are not available)

6. Are Sikes Act fees collected for outdoor recreational opportunities? (Y/N/NA)

   Answers:
   N (0)
   Y (1.00)
   NA (recreational opportunities do not include hunting and fishing)

7. Is there an active natural resources law enforcement program on the installation? (Y/N/NA)

   Answers:
   N (0)
   Y (1.00)
   NA (recreational opportunities do not include hunting and fishing)

8. Are sustainable harvest goals addressed in the INRMP and effective for the management of the species' population? (0-4, NA)

   Answers:
   0 = Not effective (0)
   1 = Minimal effectiveness (0.25)
   2 = Moderate effectiveness (0.50)
   3= Effective (0.75)
   4 = Highly effective (1.00)
   NA (recreational opportunities do not include hunting and fishing)

9. Is public outreach/educational awareness provided? (0-4, NA)

   Answers:
   0 = No public outreach provided (0)
   1 = Low outreach (0.25)
   2 = Moderate outreach (0.50)
   3 = Good outreach (0.75)
   4 = Excellent outreach (1.00)
   NA

The questions in the Fish and Wildlife Management for Public Use Focus Area are not equally weighted. Question #1 is weighted the most at 1.2; questions #2-5, #8, and #9 are weighted 1.0; and questions #6 and #7 are weighted the least at 0.9. Overall the questions in this Focus Area are relatively evenly weighted due to the fact that there are many contributing factors to whether or not recreational opportunities are available at an installation. Specifically, security restrictions often limit access to recreational opportunities. However, question #1 speaks to whether recreational opportunities are available on the installation. Therefore, if the answer provided for question #1 is "Yes", then the score for that question is [1.00 x 1.2 = 1.2]. Therefore, if the installation offers recreational opportunities, as prescribed by the Sikes Act, then the response to this question increases the potential for a higher overall score for this Focus Area, which may

contribute to the Focus Area being coded as green. Similarly, question #2 asks if available recreational opportunities are limited or restricted for security reasons. Therefore, if the answer provide for question #2 is "Yes", then the score for that question is [0 x 1 = 0]. This will reduce the overall score for this Focus Area, which may contribute to the Focus Area being coded yellow or red.

Focus Area 4: Partnership Effectiveness –

The purpose of this Focus Area is to determine to what degree partnerships are cooperative and result in effective implementation of the INRMP. Partnerships and/or initiatives actively participated in by installation NR staff were identified. Once they were identified, the following questions [4 out 10 new in FY11] were asked for each of the partnerships and/or initiatives identified as relevant to the installation.

1. Does your Natural Resources program support the regional conservation efforts of the USFWS? (Y/N)

   Answers:
   N (0)
   Y (1.00)

2. Does your Natural Resources program support State conservation goals identified in State Wildlife Action Plans (SWAPs)? (Y/N)

   Answers:
   N (0)
   Y (1.00)

3. Does your Natural Resources program support regional NOAA/NMFS conservation objectives/efforts? (Y/N/NA)

   Answers:
   N (0)
   Y (1.00)
   NA

4. Does your Natural Resources program support other Conservation Initiatives? (Y/N)

   Answers:
   N (0)
   Y (1.00)

5. Is there adequate collaboration/cooperation between partners? (0-4)

   Answers:
   0 = None (0)
   1 = Minimal cooperation (0.25)
   2 = Satisfactory cooperation (0.50)
   3 = Effective cooperation (0.75)
   4 = Highly effective cooperative (1.00)

6. Are NR program executions meeting USFWS & State expectations? (0-4)

   Answers:
   0 = Dissatisfied (0)
   1 = Minimally satisfied (0.25)
   2 = Somewhat satisfied (0.50)
   3 = Completely satisfied (0.75)
   4 = More than satisfied (1.00)

7. Did the USFWS participate in the INRMP/Natural Resources Program annual review? (Y/N)

   Answers:
   N (0)
   Y (1.00)

8. Did the State participate in the INRMP/Natural Resources Program annual review? (Y/N)

   Answers:
   N (0)
   Y (1.00)

9. Did the NOAA/NMFS participate in the INRMP/Natural Resources Program annual review, if applicable? (Y/N/NA)

   Answers:
   N (0)
   Y (1.00)
   NA

10. To what extent has the INRMP/Natural Resources Program successfully supported other mission areas? (e.g. encroachment, BASH, range support, port operations, air operations, facilities management, etc.) (0-4)

    Answers:
    0 = Not supported (0)
    1 = Minimally supported (0.25)
    2 = Satisfactorily supported (0.50)

3 = Well supported (0.75)
4 = Very well supported (1.00)

The questions in the Partnership Effectiveness Focus Area are not equally weighted. Questions #5 and #7-9 are weighted the most at 1.1; questions #1-3 and #6 are weighted 1.0; and questions #4 and #10 are weighted the least at 0.8. In particular, questions #7-9 speak directly to stakeholder participation in the annual Sikes Act review of the INRMP and NR Program at each of the installations. Specifically, question #7 asks if the USFWS participated in the INRMP/Natural Resources Program annual review. Therefore, if the answer provided for question #7 is "Yes", then the score for that question is [1.00 x 1.1 = 1.1]. Likewise, if the answers to question #8 (regarding State Fish and Wildlife agency participation in the review) is "Yes" and question #9 (regarding NOAA/NMFS participation in the review, when applicable) is "Yes", then the score for each of these questions is [1.00 x 1.1 = 1.1]. Therefore, if our Sikes Act partners are actively engaged in the annual review of our INRMPs, then the response to these questions increases the potential for a higher overall score for this Focus Area, which may contribute to the Focus Area being coded as green.

Focus Area 5: Team Adequacy –

The purpose of this Focus Area is to assess the effectiveness and adequacy of the Navy natural resources team in accomplishing the goals and objectives of the INRMP and Natural Resources Program at each installation. Team refers to the Navy staff only. The following questions [1out of 7 new in FY11] were asked.

1. Is there a Navy professional Natural Resources Manager assigned by the Installation Commanding Officer? (Y/N)

   Answers:
   N (0)
   Y (1.00)

2. Is there an on-site Navy professional Natural Resources Manager? (Y/N)

   Answers:
   N (0)
   Y (1.00)

3. Is HQ and Regional support adequate, e.g. reach back support for execution, policy support, etc.)? (0-4)

   Answers:
   0 = No support (0)
   1 = Minimal support (0.25)
   2 = Satisfactory support (0.50)
   3 = Well supported (0.75)
   4 = Very well supported (1.00)

4. Is there adequate Natural Resources staff to properly implement the INRMP goals and objectives? (Y/N)

   Answers:
   N (0)
   Y (1.00)

5. The team is enhanced by the use of contractors. (0-4)

   Answers:
   0 = Disagree (0)
   1 = Somewhat agree (0.25)
   2 = Neutral (0.50)
   3 = Agree (0.75)
   4 = Strongly Agree (1.00)

6. The team is enhanced by the use of volunteers. (0-4, NA)

   Answers:
   0 = Disagree (0)
   1 = Somewhat agree (0.25)
   2 = Neutral (0.50)
   3 = Agree (0.75)
   4 = Strongly Agree (1.00)
   NA

7. The Natural Resources team is adequately trained to accomplish its duties to ensure compliance. (0-4)

   Answers:
   0 = Disagree (0)
   1 = Somewhat agree (0.25)
   2 = Neutral (0.50)
   3 = Agree (0.75)
   4 = Strongly Agree (1.00)

The questions in the Team Adequacy Focus Area are not equally weighted by a value of 1. Questions #4 and #7 are weighted the most at 1.1; questions #1-3 are weighted 1.0; and questions # and #6 are weighted the least at 0.9. In particular, questions #4 and #7 speak directly to having sufficient NR staff and adequately trained NR staff to properly implement the INRMP goals and objectives at each of the installations. Therefore, if the answers to question #4 (regarding sufficient NR staff) is "Yes" and question #7 (regarding adequately trained NR staff) is "Yes", then the score for each of these questions is [1.00 x 1.1 = 1.1]. Therefore, the likelihood of getting a higher overall score for this Focus Area increases if there is sufficient NR staff that is adequately trained at the installation, which may contribute to the Focus Area being coded as green.

Focus Area 6: INRMP Project Implementation –

The purpose of this Focus Area is to assess how the goals and objectives of the INRMP have been met through the projects implemented during the previous fiscal year. Projects were selected from a list of EPRWeb projects and evaluated based on the type of funding received, the status of the project, and whether projects realized their intended goals. In addition, benefits to ecosystem integrity or a listed species, previously identified as a part of the installation, were noted for each project, if applicable. The following questions [9 out of 10 new in FY11] were asked for each project identified as being implemented during FY11 at each installation.

1. Is project accomplishment on schedule? (Y/N)

   Answers:
   N (0)
   Y (1.00)

2. What is the Project Status? (0,1)

   Answers:
   0= On-Hold; Funds Not Yet Received (0)
   1= In EPRWeb; In POM; Emergent; Funding Received; SOW Prepared; Awarded/Executed; Now In-Progress; Completed (1.00)

3. Which Natural Resources Program Area was most benefitted from the project? (0,1)

   Answers:
   0=None (0)
   1= Flora; Fauna; Habitat; At Sea; INRMP; Listed Species; Wetlands; Invasives; Soil; Forestry; Outdoor Recreation; Training; Other NR Requirements (Misc) (1.00)

4. The project design met the goals and objectives of the INRMP. (0-4)

   Answers:
   0 = Disagree (0)
   1 = Neither agree nor disagree (0.25)
   2 = Somewhat Agree (0.50)
   3 = Fully Agree (0.75)
   4 = Strongly Agree (1.00)

The questions in the INRMP Project Implementation Focus Area are equally weighted by a value of 1. In general, these questions are intended to evaluate the status of INRMP project implementation. Because there are some many factors outside the control of the NR program manager, it is difficult to score this Focus Area. It wouldn't be fair to penalize the NR program manager because many times the implementation status is due to a lack of funding or delays in execution. As long as the NR program manager has done their part in getting projects POMed and designed to meet the goals and objectives of the INRMP, then this should be reflected in the

score for this Focus Area. For example, if the answer to question #2 (regarding status of the project) is "In EPRWeb; In POM; Emergent; Funding Received; SOW Prepared; Awarded/Executed; Now In-Progress; or Completed" and question #4 (regarding project design) is "Strongly Agree", then the score for each of these questions is [1.00 x 1 = 1.00]. Therefore, the likelihood of getting a higher overall score for this Focus Area increases, which may contribute to the Focus Area being coded as green.

Focus Area 7: INRMP Impact on Installation Mission –

This Focus Area is designed to measure the level to which existing natural resource compliance requirements and associated actions support the installation's ability to sustain the current operational mission. Per the Sikes Act, the goals and objectives of an INRMP should achieve no net loss of the mission at an installation. The following questions [0 are new in FY11] were asked.

1. Has Coordination between natural resources staff and other installation departments and military staff been successful/effective? (0-4)

   Answers:
   0 = No coordination (0)
   1 = Minimal coordination (0.25)
   2 = Satisfactory coordination (0.50)
   3 = Effective coordination (0.75)
   4 = Highly effective coordination (1.00)

2. To what extent has the INRMP successfully supported other mission areas? (e.g. encroachment, BASH, range support, port operations, air operations, facilities management, etc.) (0-4)

   Answers:
   0 = Not supported (0)
   1 = Minimally supported (0.25)
   2 = Satisfactorily supported (0.50)
   3 = Well supported (0.75)
   4 = Very well supported (1.00)

3. To what extent has there been a net loss of training lands or mission-related operational/training activities? (0-4)

   Answers:
   0 = Mission is fully impeded; training activities cannot be conducted (0)
   1 = Mission/Training activities are somewhat impeded with workarounds (0.25)
   2 = Neutral (0.50)
   3 = No loss occurred (0.75)
   4 = Mission has seen benefits (1.00)

4. Does the Natural Resource program effectively consider current mission requirements? (0-4)

   Answers:
   0: Strongly disagree
   1: Disagree
   2: Neutral
   3: Agree
   4: Strongly Agree

The questions in the INRMP Impact on Installation Mission Focus Area are equally weighted by a value of 1. In general, these questions are intended to evaluate the effectiveness of the installation's NR program on mitigating and/or avoiding natural resource impacts on the installation's military mission. For example, if the answer to question #3 is "Mission has seen benefits, then the score for this question is [0.75 x 1 = 0.75]. Therefore, the INRMP satisfies a fundamental requirement of the Sikes Act, no net loss of the mission, contributing to a higher overall score for this Focus Area, which may contribute to the Focus Area being coded as green.

Summary of INRMP and Sikes Act Questions

In addition to the NR Metrics questions, some additional questions were asked to assess the status of INRMPs at installations. In general, if an installation is reported as having significant natural resources, then it was counted as an installation requiring an INRMP. Per the DoDI 4715.03, significant natural resources are defined as resources identified as having special importance to an installation and/or its ecosystem. Natural resources may be significant on a local, regional, national, or international scale. All threatened, endangered and at-risk species are significant natural resources that normally require an INRMP. Installations that actively manage fish and wildlife, forestry, vegetation and erosion control, agricultural outleasing or grazing, or wetlands protection should be evaluated for significance, but normally will require an INRMP. An evaluation for significance should also consider the degree of active management, special natural features, aesthetics, outdoor recreational opportunities, and the ecological context of the installation. There are 73 Navy installations requiring INRMPs, all of which currently have an INRMP.

However, not all Navy installations with an INRMP have a compliant INRMP. A compliant INRMP is defined as "a complete plan that meets the purposes of the Sikes Act (§101(a)(3)(A-C)), contains the required plan elements (§101(b)(1)(A-J)), and has been reviewed for operation and effect within the past 5 years (§101(2)(b)(2))." Therefore, a compliant INRMP must be Sikes Act compliant and less than 5 years old. If the INRMP is greater than 5 years old, then it must have undergone a review for operation and effect within the past 5 years. A review for operation and effect is defined as "a comprehensive review by the Parties, at least once every 5 years, to evaluate the extent to which the goals and objectives of the INRMP continue to meet the purpose of the Sikes Act, which is to carry out a program that provides for the conservation and rehabilitation of natural resources on military installations. The outcome of this review will assist in determining if the INRMP requires a revision (§101(f)(1)(A)). (CNO-N45) The annual review can qualify for the 5-year review for operation and effect, which is legally required by the Sikes Act, if mutually agreed upon by both partners (i.e. USFWS and State)." According to this

definition, there are 41 compliant INRMPs and 32 noncompliant INRMPs. But, if you qualify the annual review of the Natural Resource Program/INRMP with the USFWS and State Fish and Wildlife agencies as a sufficient review for operation and effect, then the total number of noncompliant INRMPs decreases to only 4. Therefore, the remaining 28 INRMPs could be considered partially compliant because they meet the condition of a noncompliant INRMP, but the USFWS participated in the annual NR Metrics review during the last reporting period (FY11).

INRMP implementation refers to projects that meet the goals and objectives of the INRMP. In FY11, total funds expensed toward implementing all 73 INRMPs equal $29,475,223. These funds include O&MN, MIS, Ag-Outlease, Forestry Reserve Account, Legacy, and Special Projects funds. Of this, $4,502,462 was spent on federally listed species, which accounts for approximately 15% of the total INRMP implementation costs. There are 75 critical habitat designations across all Navy installations, with 37 of these granted critical habitat designation exclusion under the ESA (Sec. 4. (a)), per NDA 2004. Further, 31 of those critical habitat designation exclusions were granted due to an INRMP.

Further Consideration

Given the results of the FY11 NR Metrics, it appears that there may be a discrepancy between the health of the NR programs across the Navy and the POM-14 budget request. It is important to consider that the NR Metrics were designed to be subjective. So, it is difficult to try and interpret the answers provided to the NR Metrics in a way that will help justify something objective, like the budget. The two are not directly correlated. The POM-14 budget request is forward looking, e.g. what is needed to execute projects associated with INRMPs in the out-years. On the other hand, the NR Metrics reflect the past execution and implementation of INRMPs.

However, the increased request for funds may reflect the fact that many of the INRMPs need to be revised. According to this year's DEPARC data, there are 28 partially compliant INRMPs and 4 noncompliant INRMPs. Many of these may require a revision. There are likely many new projects associated with these noncompliant and partially compliant INRMPs that need to be implemented; hence, the increased request for funds.

Therefore, INRMP project tables should really be compared to projects in POM-14. This will highlight if there are still projects in INRMPs that need to be implemented, hence the INRMPs are not being successfully implemented and the goals and objectives of the INRMP may not be met. In the future, consideration should be given to framing questions in the INRMP Project Implementation Focus Area in a manner that asks about INRMP Implementation tables, instead of EPR Execution Reports. If the objective is to evaluate how well the current INRMP is being implemented and meeting the goals of the NR Program, then this is what should be driving requests for funds. The annual funds expensed will continue to be pulled from the EPR Execution Report.

Appendix K: Applicable Reports

This Page Intentionally Blank

THE URBAN WILDLANDS GROUP, INC.
P.O. BOX 24020, LOS ANGELES, CALIFORNIA 90024-0020, TEL (310) 247-9719

FINAL REPORT
FOR
2012 PALOS VERDES BLUE BUTTERFLY ADULT SURVEYS
ON
DEFENSE FUEL SUPPORT POINT
SAN PEDRO, CALIFORNIA

COOPERATIVE AGREEMENT NUMBER:
N62473-11-2-2304

Contracting Officer:
Linda Protocollo
Naval Facilities Engineering Command (NAVFAC), Southwest
1220 Pacific Highway
San Diego, CA 92132-5190
Tel: (619) 532-1159, Fax: (619) 532-1155
Email: Linda.protocollo@navy.mil

Agreement Representative:
Albert Owen, Ph.D.
Natural Resources Specialist
Naval Facilities Engineering Command (NAVFAC), Southwest
937 North Harbor Drive
San Diego, CA 92132-5190
Tel: (619) 532-3775, Fax: (619) 532-4160
Email: albert.owen@navy.mil

FINAL REPORT
FOR
2012 PALOS VERDES BLUE BUTTERFLY ADULT SURVEYS
ON
DEFENSE FUEL SUPPORT POINT
SAN PEDRO, CALIFORNIA

Prepared By:
Travis Longcore, Ph.D.
The Urban Wildlands Group
P.O. Box 24020
Los Angeles, CA 90024-0020

Ken H. Osborne, M.S.
Osborne Biological Consulting
6675 Avenue Juan Diaz
Riverside, CA 92509-6242

December 30, 2012

Recommended Citation:
Longcore, T., and K. H. Osborne. 2012. Final Report for 2012 Palos Verdes Blue Butterfly Adult Surveys on Defense Fuel Support Point, San Pedro, California. Los Angeles: The Urban Wildlands Group (Defense Logistics Agency Agreement # N62473-12-2-2101).

Table of Contents

Executive Summary

Surveys for adult Palos Verdes blue butterfly at the Defense Fuel Support Point (DFSP), San Pedro, were completed along a standardized transect that has been surveyed since 1994. Estimates of total population size and other population attributes were calculated using established formulas and software. The distribution of butterflies was analyzed and a population viability model estimated extinction risk based on population characteristics derived from all annual surveys. The status for Palos Verdes blue butterfly at DFSP in 2012 is as follows:

- The estimate of the wild adult population along the transect is 96 at DFSP and 48 in the former Navy Housing area, which is in the second quartile of yearly population estimates.
- The probability of extinction calculated is 70%, which represents an improvement over 2011, but still indicates a population at great risk.
- The densest concentrations of the butterfly (excluding release sites) were around the nursery and at the former Navy Housing.
- The distribution of the species on the property has decreased in extent since the mid-1990s when surveys were initiated, commensurate with the maturation of coastal sage scrub vegetation.

Based on these results, the following management actions are strongly recommended:

- Continue the program of targeted disturbance to clear vegetation and allow development of early successional habitat near existing Palos Verdes blue butterfly habitat.
- Continue to establish new populations of the species, either at DFSP or elsewhere, to decrease risk of extinction.
- Continue to maintain a captive population to allow for reintroduction if an extended drought limits butterfly distribution at DFSP.

1 Introduction

The federally endangered Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*) was discovered at the Defense Fuel Support Point ([DFSP] Figure 1) in 1994 after ten years of presumed extinction (Mattoni 1994). Since that time, surveyors have monitored the adult population of butterflies along a fixed transect each year (Longcore 2007a, b, 2008; Longcore & Mattoni 2003, 2005; Longcore & Osborne 2010; Longcore et al. 2010; Mattoni & Longcore 2002; Osborne 2002). Each year the results increase information about a range of attributes for the species and allow for refined estimates of population viability and population trends. This report describes the transect, results of the transect surveys, and updates analysis of population parameters and viability.

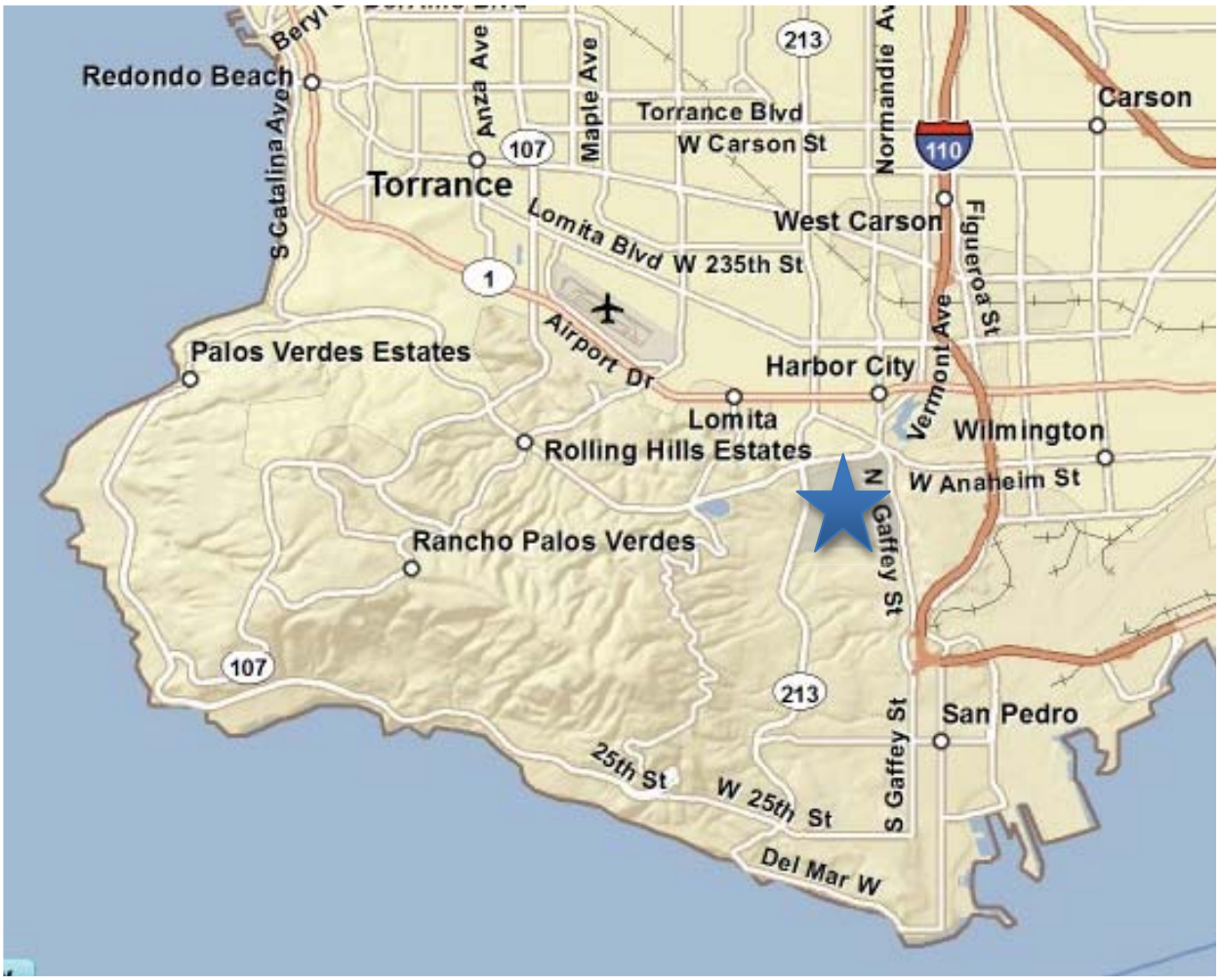


Figure 1. Location of Defense Fuel Support Point, San Pedro and former Navy Housing area in southwestern Los Angeles.

In 1994, Mattoni established a transect that included the larger stands of larval foodplant (*Acmispon glaber* [=*Lotus scoparius*] and *Astragalus trichopodus lonchus*) at DFSP at that time (Mattoni 1994). This standard transect was subsequently extended several times in following years to include areas where butterflies were later found (Mattoni and Longcore 2002). The 19 years of annual counts provide data to assess trends in the butterfly's patterns of distribution and abundance on the transect. Below we present results of surveys from 1994 to 2012 and include an estimate of the adult population using a standardized algorithm developed for this purpose (see Mattoni & Longcore 2002). Furthermore, we analyze the trends in occupancy within the habitats that the different segments of the transect traverse. Finally, we update a population viability analysis for the species at DFSP using parameter estimates derived from the transect count.

2 Methods

2.1 Transect Counts

Surveyor Rick Rogers counted butterflies on Pollard transect walks (Figure 2) throughout the flight period of the butterfly (Pollard 1977; Pollard & Yates 1983). For purposes of population estimation, regular walks along a standard transect have been shown to be superior to the other survey methods that also do not involve handling butterfly individuals (Royer et al. 1998). Mark-recapture methods of population estimation are not completed on this endangered species because of the damage done to small butterflies by marking and handling (Morton 1982; Singer & Wedlake 1981). Walks were initiated on February 14, well before the first sighting of Palos Verdes blue butterflies in the spring.

The transect is ~3.2 km long (Figure 2), which is divided into segments based on habitat characteristics. The transect remains the same as instituted in 1994, with segments 5-3 and 9 added in 1996, segment 10 added in 1997, segment 11 added in 1999, and segment 5-4 added in 2005. When established, the transect included all areas where Palos Verdes blue butterfly had been observed and along corridors between habitat patches. We learned from a base-wide survey in 2006 that additional areas were occupied by the butterfly but not included on the transect (Longcore 2007a). All butterfly surveys, years 2005 to present, have been conducted under the USFWS 10(a)(1)(A) recovery permit of Ken H. Osborne, number TE837760.

The surveys include DFSP and the adjacent former Navy Housing area. Funding for the surveys of the former Navy Housing area was provided from a separate federal source but incorporate within the same contract.

Figure 2. Location of Palos Verdes blue butterfly transect at DFSP (segments 1–10) and former Navy Housing (segment 11), as found on the Torrance, California 7.5' USGS quadrangle. Former Navy Housing area is further delineated by dark blue outline (Map credit: B. MacDonald).

2.2 Population Estimates

We estimate total adult population size (N_t) with the formula

$$N_t = \sum_{i=1}^{n} \frac{x_i d_i}{LSR}$$

where N_t is total population size, n is number days of observations, x_i is the number of individuals on the ith day of observation, d_i is the number of days from the ith survey to the ith + 1 survey, L is the average adult lifespan of each individual (9.3 days), R is the average sex ratio observed (70% males), and S is the assumed search efficiency (40%) (Mattoni et al. 2001). This technique is a modification of the estimate of brood size proposed by Watt et al. (1977).

We also used the software program INCA (INsect Count Analyzer; downloaded at http://www.urbanwildlands.org/INCA/) to analyze the count data for 1994 through 2011 (Longcore et al. 2003; Zonneveld 1991). For some years solutions failed to converge with the count data alone, so we provided prior information about the flight period by constraining the distribution of the death rate based on results from previous years (see INCA documentation for details). This model fits a curve to the transect numbers by estimating four parameters: day of peak emergence, spread of emergence, longevity, and total population size (Longcore et al. 2003; Zonneveld 1991). The statistical model underlying this method is not particularly robust to calculation of population size and longevity when the peak number of butterflies observed in a day on the surveys is less than 25, but other parameters can be estimated robustly (Gross et al. 2007). The population and longevity results from this method should be interpreted with caution, given that the peak number of Palos Verdes blue butterflies at DFSP is usually less than 25.

Observed butterfly abundance varies widely with environmental conditions, most notably weather (Pollard 1988). Large increases and decreases in population are therefore expected and make the detection of trends difficult. The geographic area occupied by a species makes a somewhat greater predictor of population stability and, indeed, occupancy forms the basis of mathematical models of persistence of butterflies in metapopulations (Hanski 1999). Establishing occupancy is confounded by butterfly abundance. During a year when butterflies are not common, no butterflies may be seen at a site because of rarity, not because the butterfly has become extinct. With constant effort, detection of occupancy increases with population size (Zonneveld et al. 2003).

2.3 Occupancy Analysis

We tested for trends in occupancy of Palos Verdes blue butterfly by constructing a multiple logistic regression, in which the independent continuous variables were year and estimated population size and the dependent categorical variable was presence or absence of butterflies along each transect segment. While the dependent variable may exhibit some degree of spatial autocorrelation, the well-documented asynchronous fluctuation of abundance among transect segments suggests that these responses are statistically independent (Mattoni & Longcore 2002). To identify the geographic distribution of trends in occupancy, we then completed logistic regressions for each transect segment with year as the independent variable and butterfly presence as the dependent variable.

2.4 Population Viability Analysis

We implemented a population viability analysis for Palos Verdes blue butterfly at DFSP (Morris et al. 1999). This method uses the total population size each year to calculate the average growth rate (λ) and its variance (σ^2), and assumes that surveys of the species have recorded the normal variability in population growth rates that can be exhibited by the population. The method then uses a statistical model known as diffusion approximation (Dennis et al. 1991) to estimate the probability of extinction under user-designated conditions (i.e., initial population size and extinction threshold). We used the total population size for each year as estimated from transect surveys for 1994–2012. We set the extinction threshold at 1 because individuals of this species may undergo multiple year diapauses; whereby even if population size in any given year is extremely low, pupae remain in the ground that have not eclosed and can "rescue" the population during the next year. This was illustrated by the dramatic rebound in population in 2004, following an all-time low of 30 adult butterflies in 2003 (see Table 2). If the pupae could not undergo multi-year diapause the extinction threshold would be higher because the number of butterflies flying each year would be all of the individuals extant, not a proportion of the total.

2.5 Climatic Models

We obtained climatic data from the nearest station (Long Beach) and ran a multiple regression analysis to relate the estimated population size to precipitation and temperature. We evaluated a series of candidate models, using total larval year rainfall (September through May of previous season), larval year spring rainfall (March through May of previous season), larval year winter

rainfall (September through March of previous season), mean maximum temperature during previous flight season (March and April), and estimated population during previous flight season. Models were evaluated with Akaike's Information Criterion (AIC). These variables were chosen for model construction because of the observed relationship between rainfall and availability of larval foodplant. Rainfall during winter and spring were tested separately because rain during the flight season (spring) could adversely affect adults. Mean maximum temperature during the flight period was used to identify the possible influence of heat stress on adults.

Figure 3. Polygons used to conduct presence surveys for Palos Verdes blue butterfly at former Defense Fuel Support Point (1–5, 9–46) and former Navy Housing area (6-8).

2.6 DFSP and Former Navy Housing Survey

To better detect Palos Verdes blue butterflies colonizing new habitats at DFSP and the former Navy Housing area, we conducted surveys for presence in all available habitats. This effort involved two parts: a base-wide survey for the larval hostplants for the species and a set of surveys for adults. For both surveys we divided the property into 46 polygons that follow discernable landmarks on the ground (Figure 3). Maps of each polygon with 1-m aerial photographs were then used in the field during surveys for foodplant and butterflies. Surveys were conducted by Ken Osborne in addition to the regular transects conducted by Rick Rogers (see appendix for data sheets).

After the flight season Osborne surveyed each polygon for presence of deerweed and locoweed. Surveying after the flight season when the annual grasses have died makes it easier to locate and map deerweed, which remains green into the summer. Polygons were drawn on the survey maps to show the extent of areas with foodplant and record the percent foodplant cover within those polygons and the total percent cover within the polygon. Field maps were then digitized and compared with results from 2006 and 2009 using a Geographic Information System (ArcMap 10.0).

All polygons were surveyed for butterflies. Sixteen polygons are covered by the regular transect and therefore were already being surveyed by Rick Rogers. The other polygons were surveyed by Osborne. Surveys were conducted of each polygon during the peak of the flight season (i.e., on five days from March 14 to April 17, 2012). Surveyors recorded the location of all adult butterflies. Polygons were surveyed in random order to avoid systematic biases of surveying early or late in the day.

3 Results

3.1 Population Estimates

Transect surveys were conducted on 22 days from February 14 to April 30 (Figure 3, Table 1). All of the butterflies were observed in the northern half of the fuel depot an in the former Navy Housing area (Figure 4). Butterflies were first observed on March 2 and last on April 17, with two peaks in observed abundance (Table 1).

Figure 4. Location of all Palos Verdes blue butterflies observed on surveys of DFSP and Naval Housing Area, San Pedro, in spring 2012.

Table 1. Survey conditions and observations for Palos Verdes blue butterfly at Defense Fuel Support Point and adjacent former Navy Housing area. Additional butterflies that were released from the captive rearing program in 2011 are identified separately and were identified in the survey data by the geographically distinct locations they were released and the timing of those releases. Offspring from individuals released in prior years are included in the regular counts.

Date	Male PVB (released)	Female PVB (released)	Temp ºF (start/finish)	Wind Speed mph (start/finish)	Percent Cloudy (start/finish)
February 14	0	0	63/62	1–2/3–8	5/10
February 17	0	0	67/70	1–2/2–3	0/0
February 21	0	0	70/72	0–2/1–2	0/0
February 23	0	0	73/74	2–3/2–4	0/0
February 29	0	0	59/64	2–3/2–5	5/5
March 2	4	0	70//72	2–3/2–4	0/0
March 5	12	5	68/73	1–2/3–4	50/20
March 8	8	5	75/77	1–2/1–3	0/0
March 13	9	4	63/70	1–3/1–3	100/10
March 15	3	1	62/67	1–2/1–2	100/0
March 20	10	1	73/74	2–3/2–3	10/0
March 24	9	3	65/67	2–4/2–4	20/0
March 27	9	3	63/67	1–2/3–5	60/20
March 29	9(1)	3(1)	65/70	1/5	50/50
April 2	2(2)	3	67/72	1–4/2–4	10/0
April 4	3(2)	1(1)	68/70	1–2/1–4	0/0
April 9	2	3	70/73	1–2/2–4	0/0
April 12	1	0	60/65	1–3/2–4	50/25
April 17	1	2	78/77	1–2/1–4	0/0
April 19	0	0	71/75	1–3/1–3	0/0
April 23	0	0	62/65	1/1	100/100
April 30	0	0	65/70	1–2/1–2	100/100

The population estimate of 145 adults (96 at DFSP, 48 at former Navy Housing) for 2012 was in the second quartile of years surveyed (Table 2). Flight period (i.e., the number of days between the first and last observation) continues to be modestly predicted by estimated population size (r^2=0.28, $F_{1,16}$=6.385, *P*=0.02). The length of the season can be estimated as 32.7 days plus 9.7 days for each 100 butterflies in the population, simply because of the added probability of observing an early or late individual with increased population size (Figure 5). The maximum daily count was highly correlated (Pearson's correlation; r = 0.77) with the estimated population size. The Zonneveld method was unable to fit a curve to the 2012 data, so no estimates from this method are reported. The model generally fails when the number of individuals observed is low (e.g., 2003) or follows an unusual pattern (2012). For 2012, the double peak in numbers (17 on March 5, then 12 on March 12) does not match the model assumption of a single peak of emergence.

Table 2. Abundance and phenology of Palos Verdes blue butterfly at DFSP and Palos Verdes Naval Housing area, 1994–2012.

Year	*First Observed*	*Last Observed*	*Flight Period (days)*	*Daily Maximum*	*Estimated Population*
1994	March 12	April 8	30	14	69
1995	February 28	March 26	27	29	105
1996	March 1	May 5	67	30	247
1997	February 23	April 7	50	12	109
1998	February 28	April 8	50	23	199
1999	February 24	May 4	77	14	209
2000	March 13	April 26	45	25	132
2001	March 12	April 27	46	13	139
2002	February 21	April 19	47	23	243
2003	February 21	March 28	35	3	30
2004*	March 6	April 14	39	43	282
2005	February 28	April 5	36	31	204
2006	February 23	April 30	73	13	219
2007	February 26	April 12	46	27	211
2008	March 4	April 7	34	7	45
2009	February 27	May 1	67	28	214
2010	March 10	April 10	32	7	47
2011	March 16	May 2	47	6	53
2012	March 2	April 17	47	17	148

*Transect followed from map by two observers working together (G. Pratt/C. Pierce). All other transects by R. Mattoni (2003), K. Osborne (2002, 2011 Naval Housing only), or R. Rogers (1994–2001, 2005–2012).

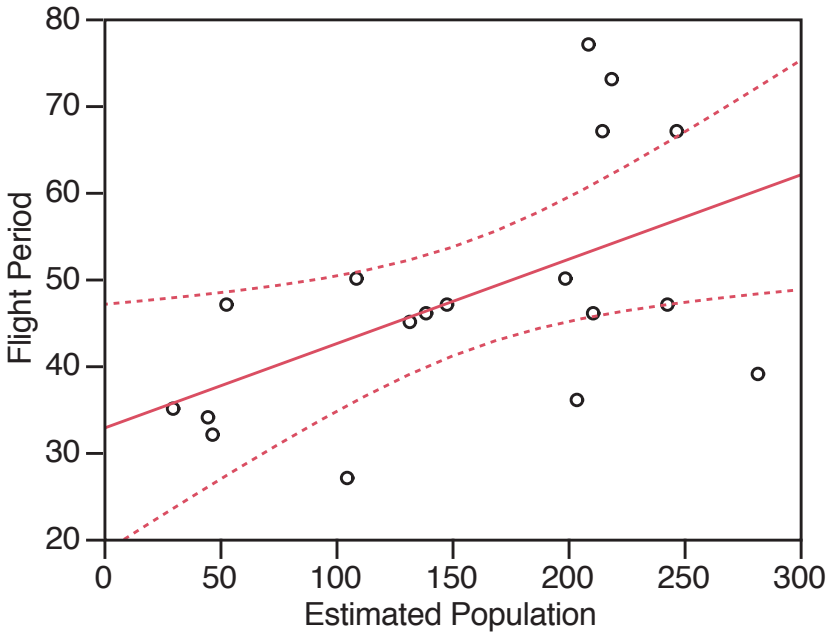


Figure 5. Influence of population size on observed flight periods for Palos Verdes blue butterfly, 1994–2012, defined as number of days between first and last observation. Linear regression and 95% confidence intervals for the regression are shown. Relative to the population size, the 2012 season was average when compared to all other survey years.

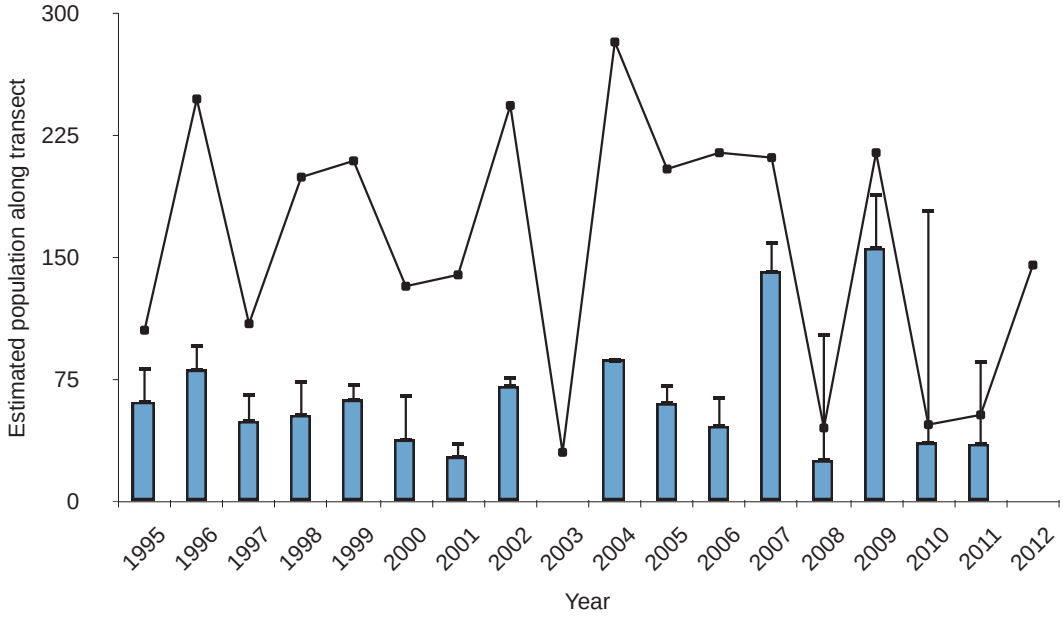


Figure 6. Solid line: population of Palos Verdes blue butterfly at DFSP and now-former Navy Housing area, 1994–2012, estimated by Mattoni et al. (2003) method. Bars: estimated population of Palos Verdes blue butterfly at DFSP, 1994–2011, calculated by Zonneveld (1991) method from transect counts. This index is not adjusted for sex ratio or search efficiency. Error bars + 1 S.D. The Zonneveld method failed to produce an estimate for 2003 or 2012.

During 19 years of monitoring, the estimated population of Palos Verdes blue butterfly has fluctuated from year to year (Figure 6). The overall trend is negative, but not significantly so (Figure 7). As discussed below (Section 3.5), annual fluctuations in population are most likely explained by a combination of weather (rainfall during the larval year) and by changes in foodplant abundance and distribution (Section 3.2). Because weather variables can result in a boom-and-bust cycle for butterfly numbers, the statistical power to detect a secular trend in abundance will be low. So although the negative trend should be treated with caution, it may indeed represent a long-term trend that is masked by weather-related variation.

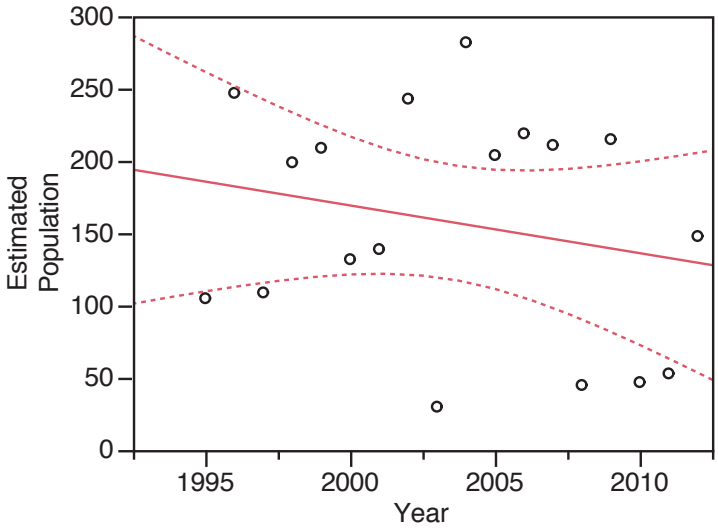


Figure 7. Trend in estimated abundance of Palos Verdes blue butterfly at Defense Fuel Support Point and former Navy Housing area, 1995–2012. The trend is negative with low explanatory power (r^2=0.05, $F_{1,16}$=0.84, p=0.37).

3.2 Foodplant Surveys

The foodplant distribution maps were updated for 2012 (Figure 8). Previous surveys found that the density of deerweed declined precipitously during 2006–2009, while the current surveys show an increase in some areas and continued declines in others (Figure 9). For the current period we detected patches of decline in deerweed cover in only 14 of the 46 polygons. Only 10 polygons did not contain at least some area where deerweed increased, even in those polygons that are entirely operational emphasis and are not managed for butterflies. One notable increase in deerweed was mapped in polygon 15, where grading and subsequent growth of deerweed resulted in a dense new hostplant patch and the natural reappearance of the butterflies. This site has been further augmented by butterfly releases.

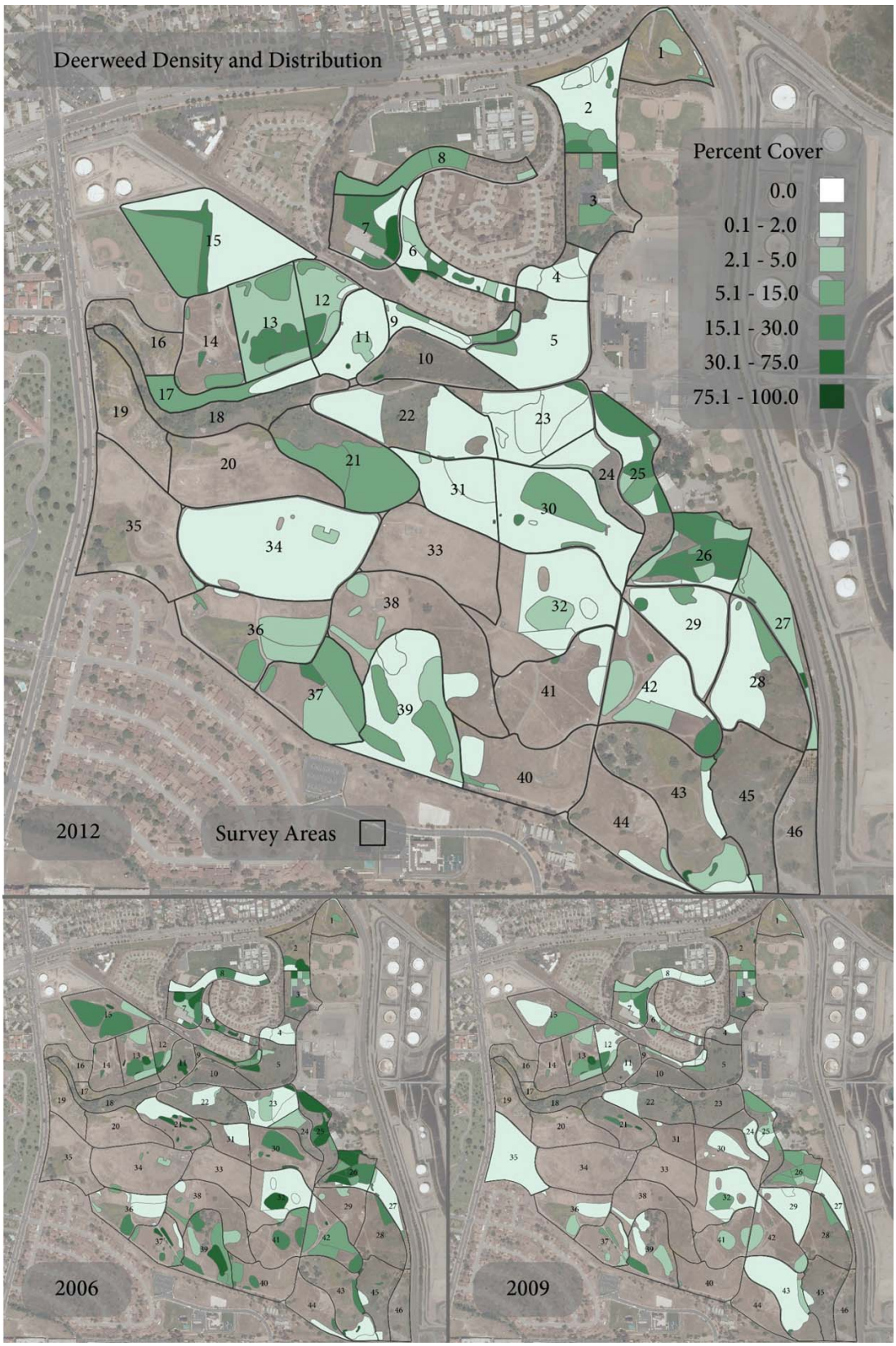


Figure 8. Distribution and density of deerweed (*Lotus scoparius*) at DFSP in 2012 (top panel), compared to 2006 and 2009 (bottom panels).

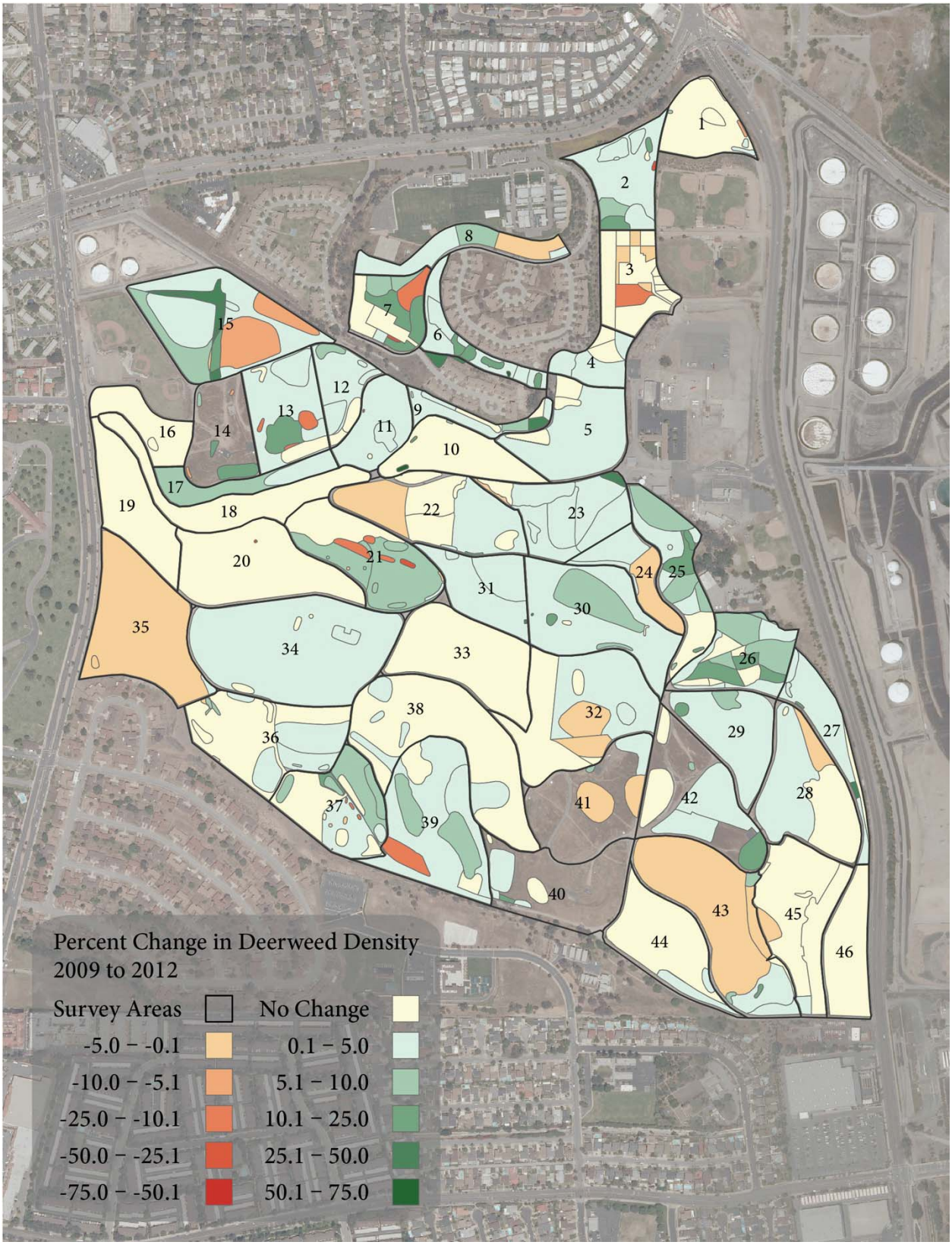


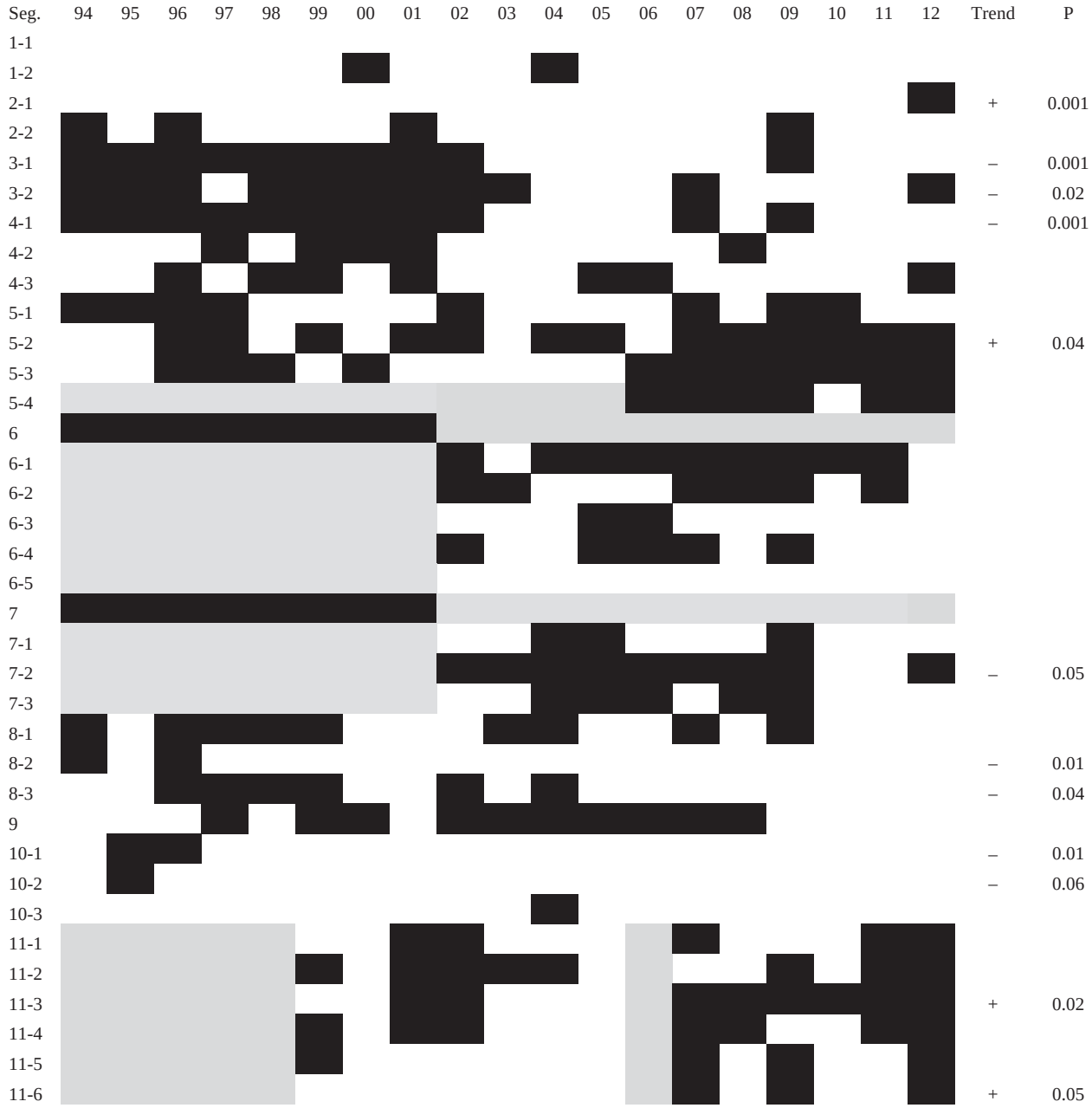
Figure 9. Change in cover of deerweed (*Lotus scoparius*) from 2009 to 2012.

3.3 Patterns of Occupancy

The multiple logistic regression of Palos Verdes blue butterfly presence by year and by estimated population shows no significant change in the number of transect segments occupied over time, but a significant decrease in the number of transect segments occupied when total population estimates are low (χ^2=12.61; P <0.001). This result shows that butterflies are concentrated in fewer locations along the transect when numbers are low. Although the explanatory power of these regressions is low (r^2 values for the logistic regression are small; 0.02–0.04), they are consistent with the habitat dynamics at DFSP. Larger population sizes result in observation of butterflies on more transects simply because of increased ease in detecting them and expanded habitat use during such years. Significant negative trends in occupancy at segments, as documented further in a segment-by-segment analysis, is most likely the result of foodplants being replaced by later succession species (e.g., *Artemisia californica*, *Eriogonum fasciculatum*, and *Encelia californica*) over time as shown in the changes in foodplant documented in the basewide surveys. Such a decline was predicted a decade ago (Osborne 2002).

Logistic regressions for each transect segment separately show that of the 12 significant (p<0.10) trends, 8 were negative (Table 3). Those sites showing negative trend over time are sites that were occupied when the butterfly was rediscovered in 1994, or were revegetated shortly thereafter (e.g., 2-2, 3-1, 4-1, 5-1). Four segments now show positive trends.

Table 3. Status of Palos Verdes blue butterfly by transect segment (see Figure 2), 1994–2011: present (black), not detected (white), not surveyed (grey). Trends by logistic regression reported with chi-squared probability (P), with only trends significant at (P < 0.1) reported. Segments 6 and 7 were split into subsegments in 2002.



3.4 Population Viability Analysis

The population viability analysis produced a probability of extinction of 70% with the average time to extinction for the scenarios calculated with the updated 2012 data is 120 years (Table 4).

The decreased probability of extinction is encouraging and likely a result of the larger estimated population size, while the decreased time to extinction for the extinction scenarios reflects the high variability in growth rates (a series of bad years with low growth rate more easily leading to extinction). This analysis is sensitive to the number of butterflies observed during the season, so "good" years result in estimates of lower extinction risk, perhaps more so than is biologically warranted. Similar analyses have been completed for Fender's blue butterfly (*Icaricia icarioides fenderi*) with eight years of population data (Schultz & Hammond 2003) and for Oregon silverspot (*Speyeria zerene hippolyta*) with 14 years of population data (Crone et al. 2007). The population growth rate and its variance for Palos Verdes blue are within the range of values found for individual populations of Fender's blue butterfly. Schultz and Hammond (2003) demonstrated that extinction risk decreased more with additional populations than with increasing populations at existing sites. Consequently, off-site release of Palos Verdes blue butterflies from the captive population should, if found to be successful, reduce overall extinction risk substantially. To date, butterflies have been released from the captive propagation program at three off-site localities that are permitted to receive the butterfly and managed for natural resource values. None of the landowners hosting the release efforts has yet to report establishment of an additional stable Palos Verdes blue butterfly population.

Table 4. Results of population viability analysis after each season 2003–2012.

Year	*Probability of Extinction*	*Years to Extinction (for extinction scenarios)*
2003	100%	37
2004	24%	40
2005	36%	53
2006	33%	56
2007	35%	62
2008	100%	125
2009	43%	71
2010	100%	165
2011	100%	151
2012	70%	120

3.5 Climate Influence on Observed Population

The models that best described estimated population size all included precipitation measures (Table 5). Flight season temperature and previous year's population were not included in any of

the best models. The best model was the natural log of total larval year rainfall (Table 5; Estimated Population = 17.6 + 60.6 * ln(Larval Year Rainfall)), which explains 30% of the variation in estimated population size (see Figure 10). Larval year rainfall alone was positively associated with butterfly population size, but the relationship is much stronger when rainfall is log-transformed. This can be interpreted as meaning that a moderately wet year is good, but there is no marginal benefit of an extremely wet year.

Table 5. Regression models predicting estimated population size.

Variables	R^2	P	AIC
Ln (Larval Year Rainfall)	0.30	0.02	208.46
Ln (Larval Winter Rainfall)	0.17	0.06	210.86
Ln (Larval Spring Rainfall)	0.05	0.38	214.09

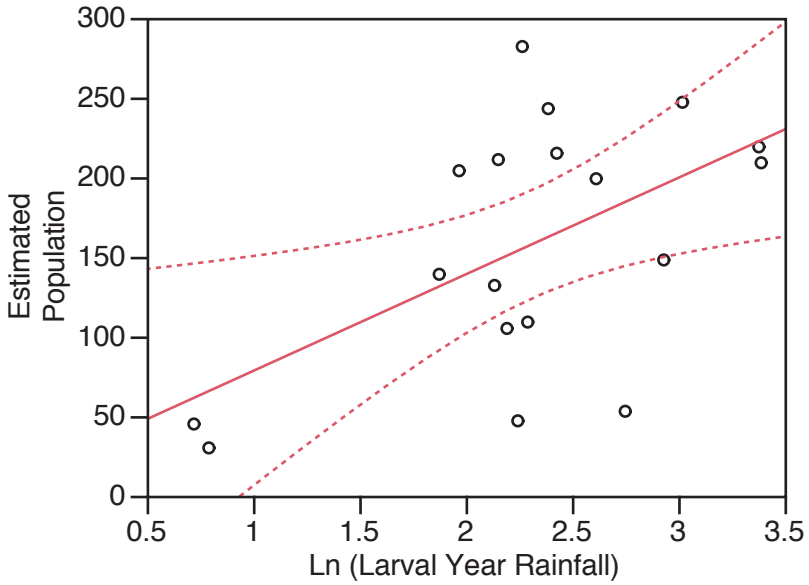


Figure 10. Estimated population of Palos Verdes blue butterfly at DFSP by log-transformed rainfall during larval year. Linear regression with 95% confidence limits for regression shown (r^2=0.30, $F_{1,16}$=6.96, P<0.02).

4 Discussion

Our methodology of estimated total population size remains preferable to other methods. Pickens (2007) recently suggested the use of maximum daily count as an index for butterfly abundance. For Karner blue butterfly (*Lycaeides melissa samuelis*) he showed that maximum daily count correlated highly with a variant of the Watt et al. method that we employ (Pearson's correlation; r = 0.70 and 0.89 for two different sites; both numbers log-transformed) compared with r

= 0.87 for our data. Based on these results, we will continue to report both the estimated total population and the maximum daily count as indicators of population trends.

The adult Palos Verdes blue butterfly population in 2012 was below the long-term mean (in the second quartile), and the trend of contraction of range within the installation has continued, with very few butterflies seen in the southern half of the installation. Our previous understanding that larval year rainfall explains a large portion of annual variation in observed numbers (Longcore et al. 2010) remains intact, but is weakened in its explanatory power. For the third year in a row, the population number was below that estimated by the rainfall. This may be explained by patch dynamics, where previous declines in deerweed resulted in elimination of butterflies from some areas in on the base, and now the modestly increased foodplant resources are not all colonized. So despite above average rainfall, and some recovery in foodplant cover, butterfly numbers are not as high as they might be for these conditions.

The population viability analysis continues to show a high risk of extinction of Palos Verdes blue butterfly at DFSP. It is easy to construct a scenario where a couple of dry years combined with waning foodplant resources puts the species into an extinction spiral. It has been interesting to see the changing distribution of the butterfly on the property over the years, and it serves as a sharp reminder that what is habitat at one time can easily become non-habitat. The experimental scrape in polygon 39 has significant quantities of young deerweed plants and will soon be a site appropriate for release of captive individuals. Given the early-season rains in fall of 2012, release might be appropriate as soon as 2013 or 2014. This or other similar approaches need to be repeated in places where management of the butterfly is prioritized so that the distribution of habitat at DFSP can be expanded. Such management will be essential to the long-term persistence of the species on the property and elsewhere.

The status of sites were the butterfly has been released are as follows. One site apparently supported the butterfly for several years, but foodplant cover declined during succession and the site is apparently no longer occupied (per incidental observations of J. Johnson and A. Dalkey). The releases at Friendship Park do not seem to have resulted in a stable population and status of follow-up management to promote foodplant growth is unknown. Releases at the Linden S. Chandler Preserve are ongoing, as is management for habitat quality, so successful establishment of a self-sustaining population cannot yet be evaluated, but maintaining foodplant in abundance remains a challenge. The overall outlook for Palos Verdes blue at DFSP and

throughout its range will remain negative until management that successfully maintains early succession conditions dominated by foodplant becomes effective and routine.

5 Literature Cited

Crone, E. E., D. Pickering, and C. B. Schultz. 2007. Can captive rearing promote recovery of endangered butterflies? An assessment in the face of uncertainty. Biological Conservation **139**:103–112.

Dennis, B., P. L. Munholland, and J. M. Scott. 1991. Estimation of growth and extinction parameters for endangered species. Ecological Monographs **61**:115–144.

Gross, K., E. J. Kalendra, B. R. Hudgens, and N. M. Haddad. 2007. Robustness and uncertainty in estimates of butterfly abundance from transect counts. Population Ecology **49**:191–200.

Hanski, I. 1999. Metapopulation dynamics. Oxford University Press, Oxford.

Longcore, T. 2007a. Final report for 2006 Palos Verdes Blue Butterfly adult surveys on Defense Fuel Support Point, San Pedro, California (Defense Logistics Agency Agreement # N68711-06-LT-R0011). Pages 1–13. The Urban Wildlands Group Los Angeles.

Longcore, T. 2007b. Final report for 2007 Palos Verdes blue butterfly adult surveys on Defense Fuel Support Point, San Pedro, California. (Defense Logistics Agency (Agreement #N68711-07-LT-R0011). Pages 1–12. The Urban Wildlands Group, Los Angeles.

Longcore, T. 2008. Final report for 2008 Palos Verdes blue butterfly adult surveys on Defense Fuel Support Point, San Pedro, California. (Defense Logistics Agency Agreement #62473-08-LT-R0011). Pages 1–16. The Urban Wildlands Group, Los Angeles.

Longcore, T., and R. Mattoni. 2003. Final report for Palos Verdes blue butterfly year 2003 adult surveys on Defense Fuel Support Point, San Pedro, California. The Urban Wildlands Group (Defense Logistics Agency Agreement # N68711-03-LT-C3003), Los Angeles.

Longcore, T., and R. Mattoni. 2005. Final report for 2005 Palos Verdes blue butterfly adult surveys on Defense Fuel Support Point, San Pedro, California. Pages 1–11. The Urban Wildlands Group (Defense Logistics Agency Agreement # N68711-05-LT-A0012), Los Angeles.

Longcore, T., R. Mattoni, C. Zonneveld, and J. Bruggeman. 2003. INsect Count Analyzer: a tool to assess responses of butterflies to habitat restoration. Ecological Restoration **21**:60–61.

Longcore, T., and K. H. Osborne. 2010. Final report for 2010 Palos Verdes blue butterfly adult surveys on Defense Fuel Support Point, San Pedro, California. (NAVFAC SW Agreement # N62473-08-LT-R0011). Pages 1–16. The Urban Wildlands Group, Los Angeles.

Longcore, T., K. H. Osborne, and A. Dalkey. 2010. Final report for 2009 Palos Verdes blue butterfly adult surveys on Defense Fuel Support Point, San Pedro, California. Pages 1–24. The Urban Wildlands Group, Los Angeles.

Mattoni, R., and T. Longcore. 2002. Census results for Palos Verdes blue butterfly and associated species, 1994–2001. Pages 2-10 in R. Mattoni, editor. Status and trends: habitat restoration and the endangered Palos Verdes blue butterfly at the Defense Fuel Support Point, San Pedro, California, 1994–2001. The Urban Wildlands Group, Los Angeles.

Mattoni, R., T. Longcore, C. Zonneveld, and V. Novotny. 2001. Analysis of transect counts to monitor population size in endangered insects: the case of the El Segundo blue butterfly, *Euphilotes bernardino allyni*. Journal of Insect Conservation **5**:197–206.

Mattoni, R. H. T. 1994. Rediscovery of the endangered Palos Verdes blue butterfly, *Glaucopsyche lygdamus palosverdesensis* Perkins and Emmel (Lycaenidae). Journal of Research on the Lepidoptera **31**:180–194.

Morris, W., D. Doak, M. Groom, P. Kareiva, J. Fierberg, L. Gerber, P. Murphy, and D. Thomson. 1999. A practical handbook for population viability analysis. The Nature Conservancy, Arlington, Virginia.

Morton, A. C. 1982. The effects of marking and capture on recapture frequencies of butterflies. Oecologia **53**:105–110.

Osborne, K. H. 2002. Population monitoring for the Palos Verdes blue on the Defense Fuel Support Point, San Pedro, California: year 2002 survey results. Osborne Biological Consulting, Riverside, California.

Pickens, B. A. 2007. Understanding the population dynamics of a rare, polyvoltine butterfly. Journal of Zoology **273**:229–236.

Pollard, E. 1977. A method for assessing change in the abundance of butterflies. Biological Conservation **12**:115–132.

Pollard, E. 1988. Temperature, rainfall and butterfly numbers. Journal of Applied Ecology **25**:819–828.

Pollard, E., and T. J. Yates 1983. Monitoring butterflies for ecology and conservation. Chapman & Hall, London.

Royer, R. A., J. E. Austin, and W. E. Newton. 1998. Checklist and "Pollard walk" butterfly survey methods on public lands. American Midland Naturalist **140**:358–371.

Schultz, C. B., and P. W. Hammond. 2003. Using population viability analysis to develop recovery criteria for endangered insects: case study of the Fender's blue butterfly. Conservation Biology **17**:1372–1385.

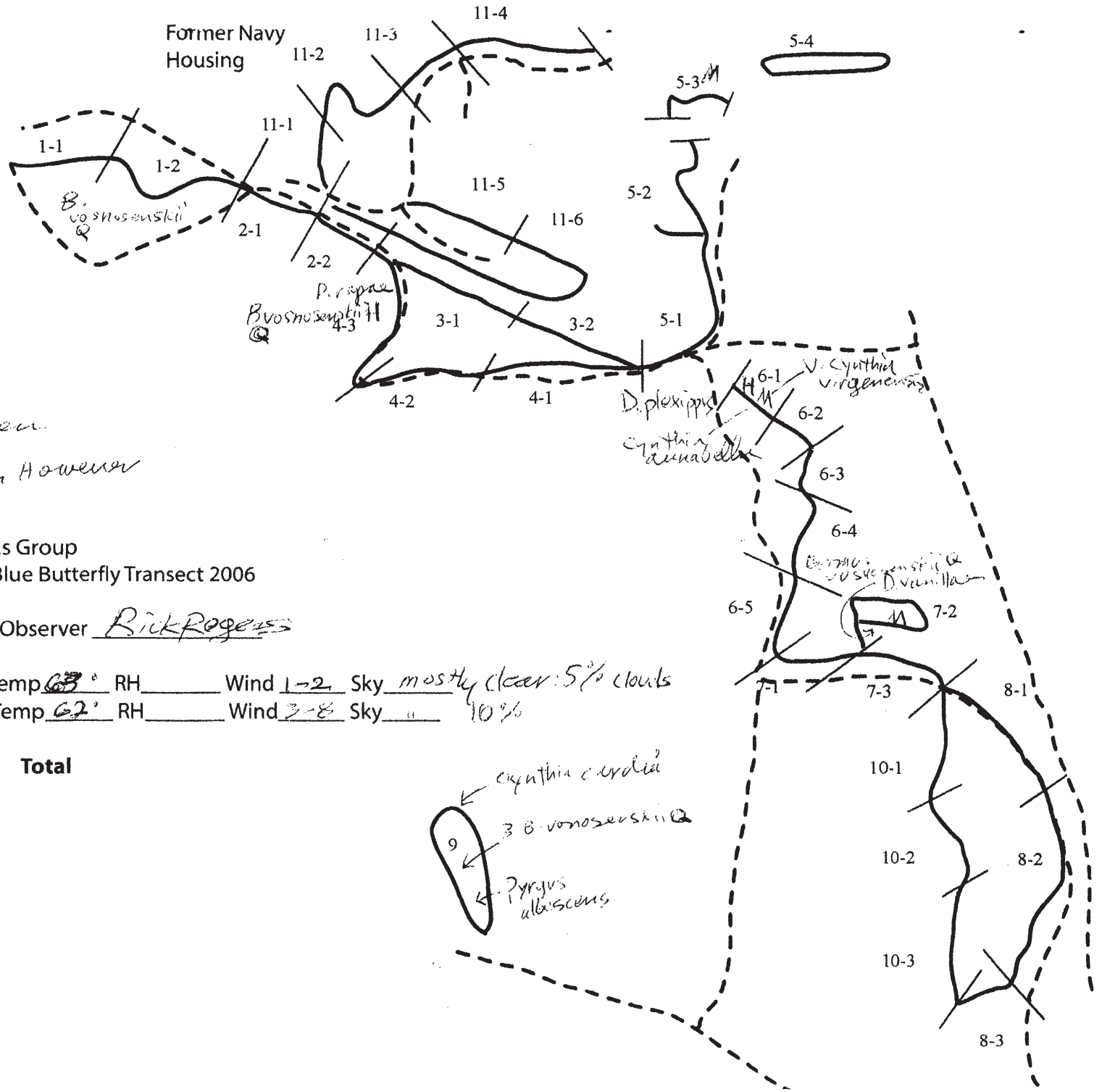
Singer, M. C., and P. Wedlake. 1981. Capture does affect probability of recapture in a butterfly species. Ecological Entomology **6**:215–216.

Watt, W. B., F. S. Chew, L. R. G. Snyder, A. G. Watt, and D. E. Rothschild. 1977. Population structures of Pierid butterflies I. Numbers and movements of some montane *Colias* species. Oecologia **27**:1–22.

Zonneveld, C. 1991. Estimating death rates from transect counts. Ecological Entomology **16**:115–121.

Zonneveld, C., T. Longcore, and C. Mulder. 2003. Optimal schemes to detect presence of insect species. Conservation Biology **17**:476–487.

6 Appendix: Data Sheets



No PVB's seen

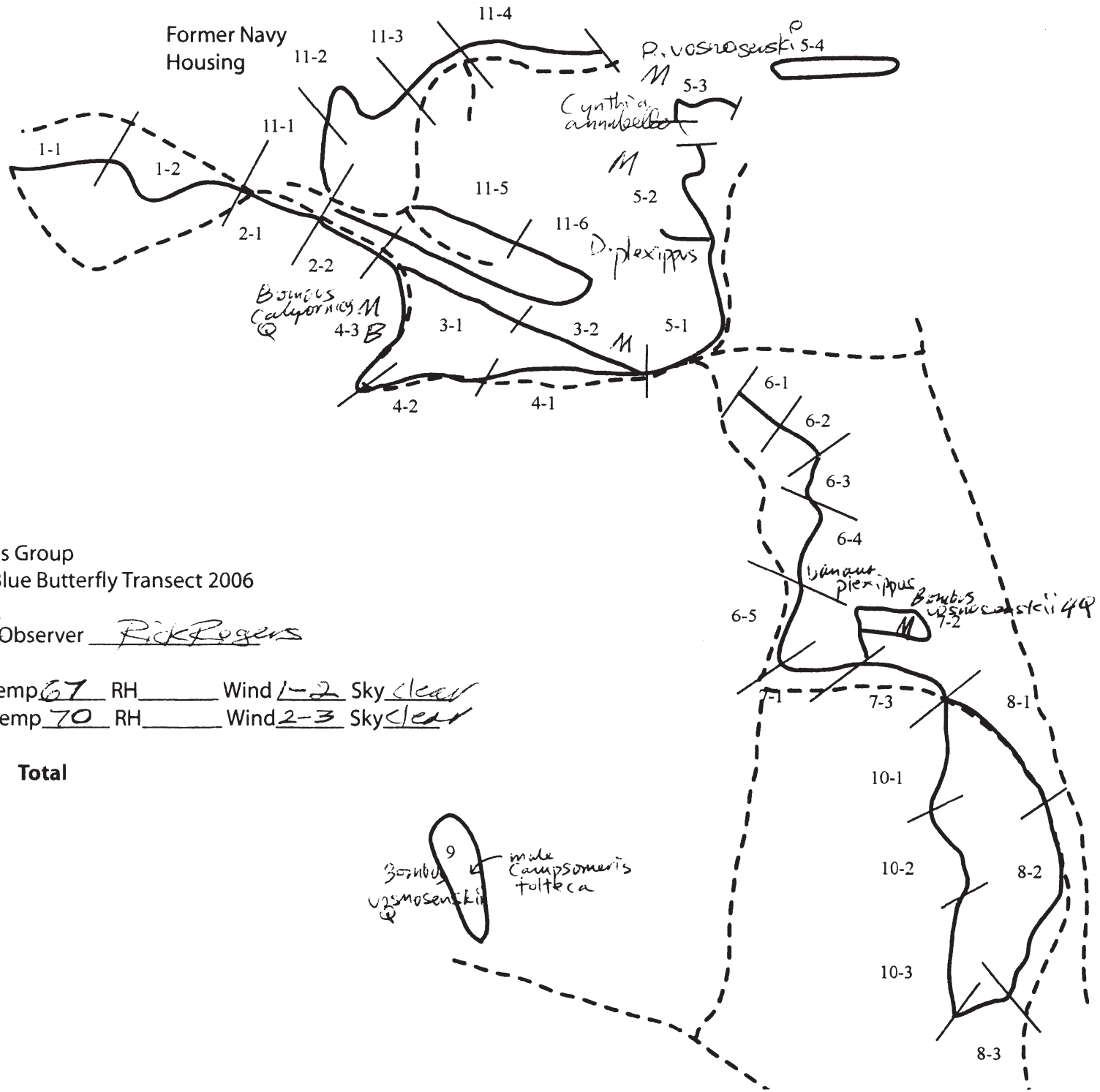
8 Lep.s seen However (4 diff Species)

The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date Feb. 14, 2012 Observer Rick Rogers

Time start 11:25 Temp 63° RH_____ Wind 1-2 Sky mostly clear: 5% clouds
Time finish 1:25 Temp 62° RH_____ Wind 3-8 Sky " 10%

Legend		Total
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	



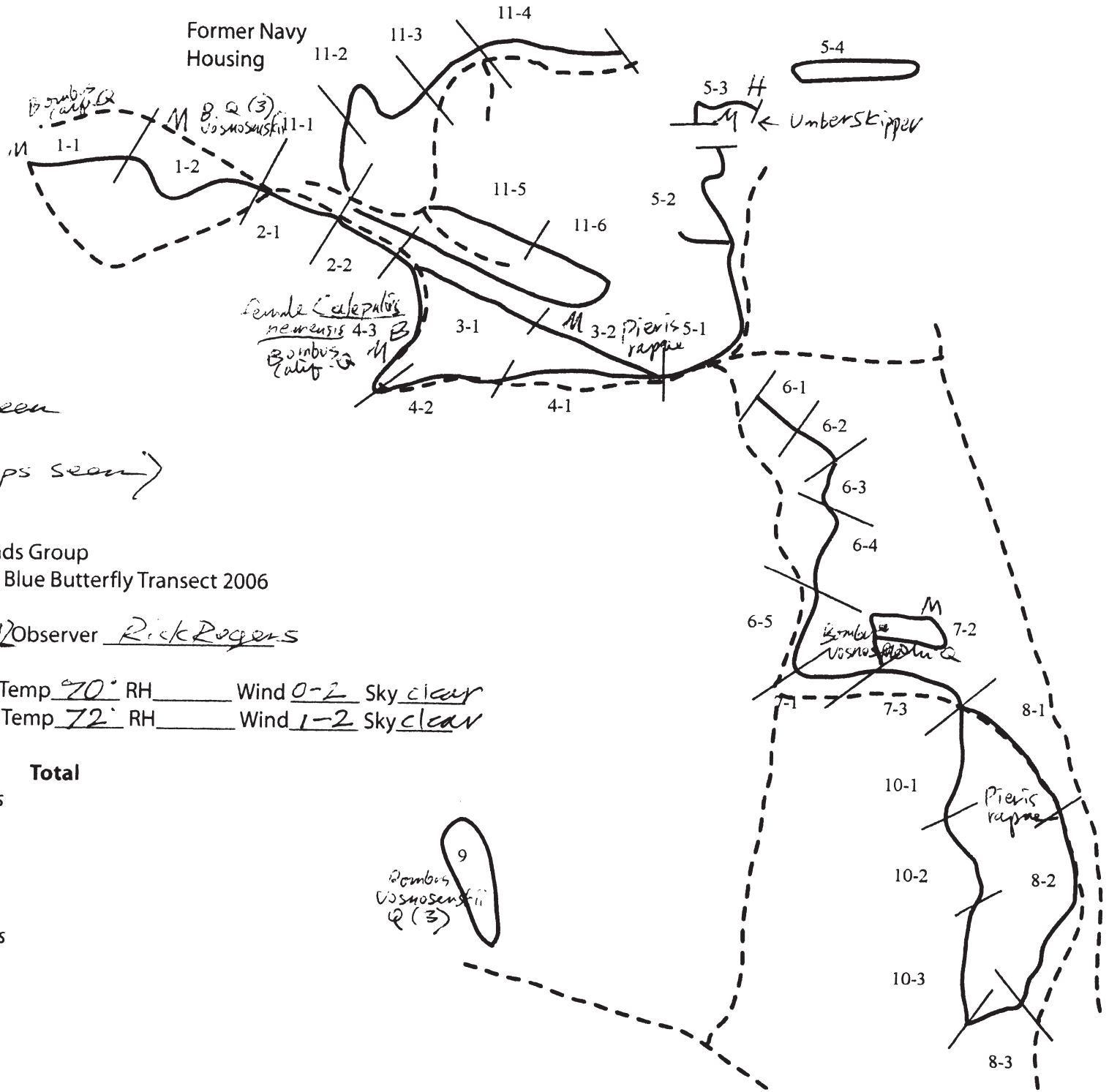
The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date Feb 17 2012 Observer Rick Rogers

Time start 11:20 Temp 67 RH _____ Wind 1-2 Sky clear
Time finish 1:20 Temp 70 RH _____ Wind 2-3 Sky clear

Legend **Total**

♀♂	*G. lygdamus*
F	*E. funeralis*
M	*L. marina*
G	*C. perplexa*
H	*S. melinus*
B	*B. diegoensis*

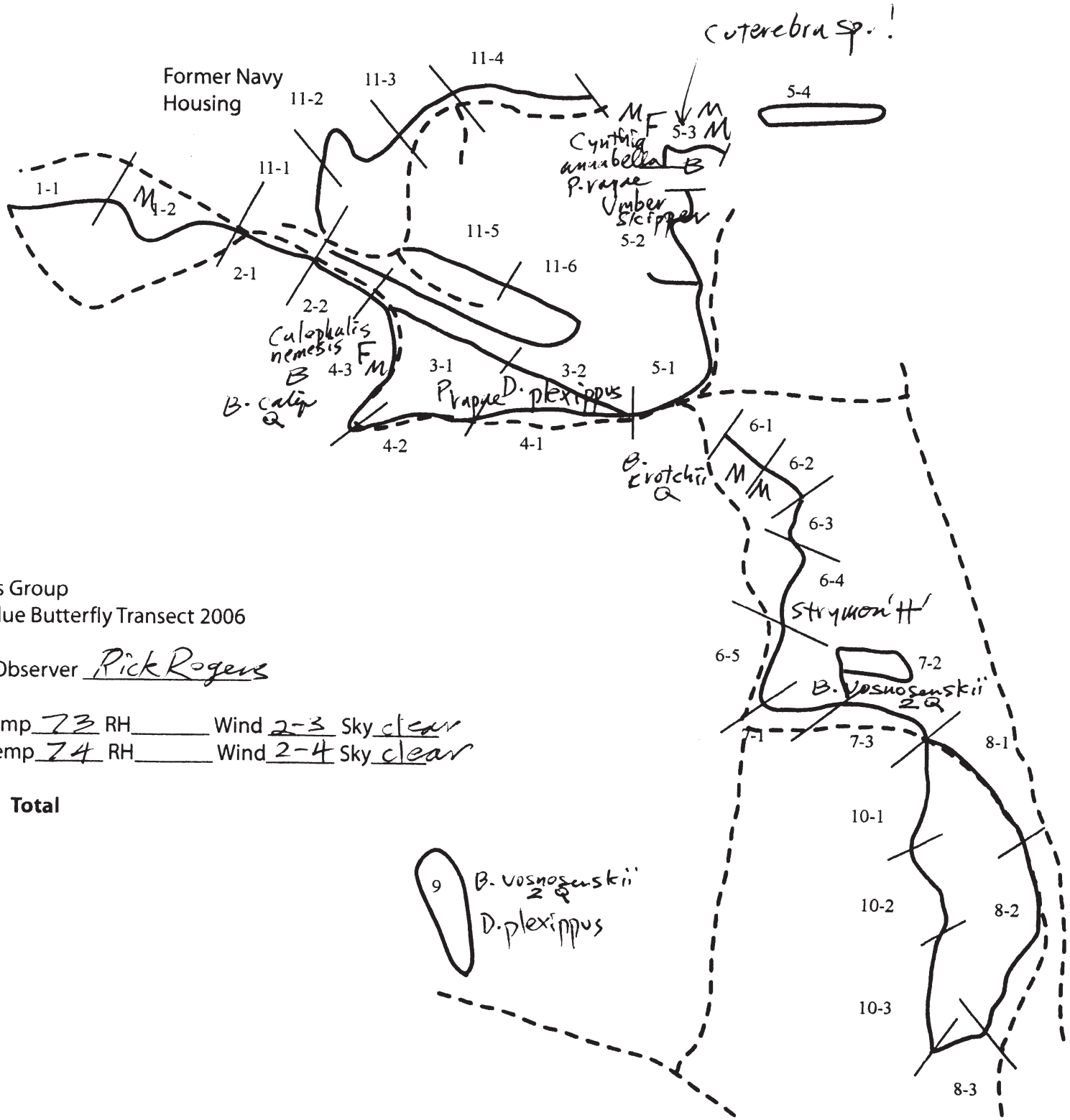


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date Feb 21 2017 Observer Rick Rogers

Time start 11:05 Temp 70° RH _____ Wind 0-2 Sky clear
Time finish 1:05 Temp 72° RH _____ Wind 1-2 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

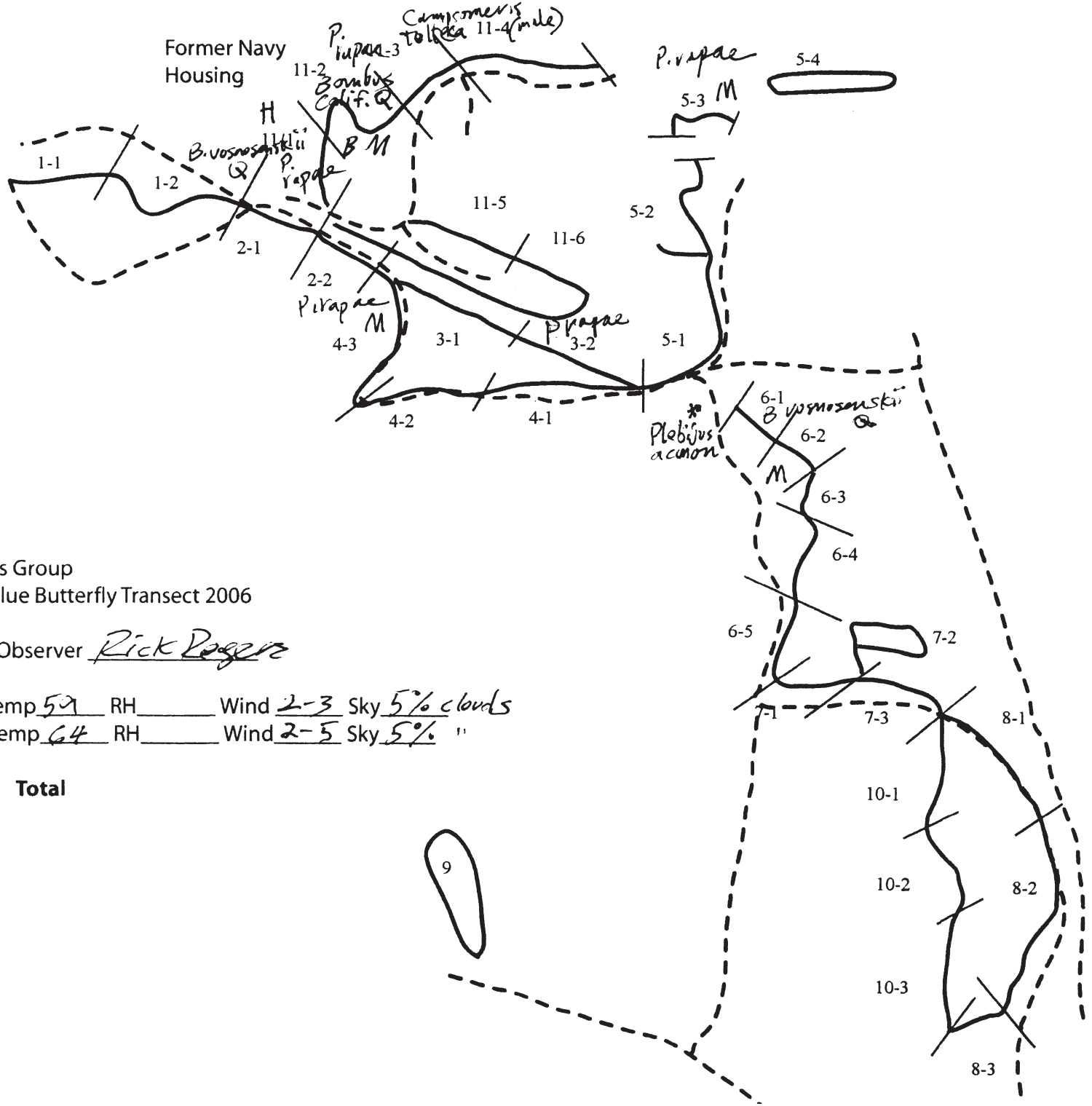


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date Feb. 23, 2012 Observer Rick Rogers

Time start 11:30 Temp 73 RH _____ Wind 2-3 Sky clear
Time finish 1:30 Temp 74 RH _____ Wind 2-4 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	



The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date 29, Feb. 12 Observer Rick Rogers

Time start 12:00 Temp 59 RH _____ Wind 2-3 Sky 5% clouds
Time finish 2:00 Temp 64 RH _____ Wind 2-5 Sky 5% "

Legend **Total**

♀♂	*G. lygdamus*
F	*E. funeralis*
M	*L. marina*
G	*C. perplexa*
H	*S. melinus*
B	*B. diegoensis*

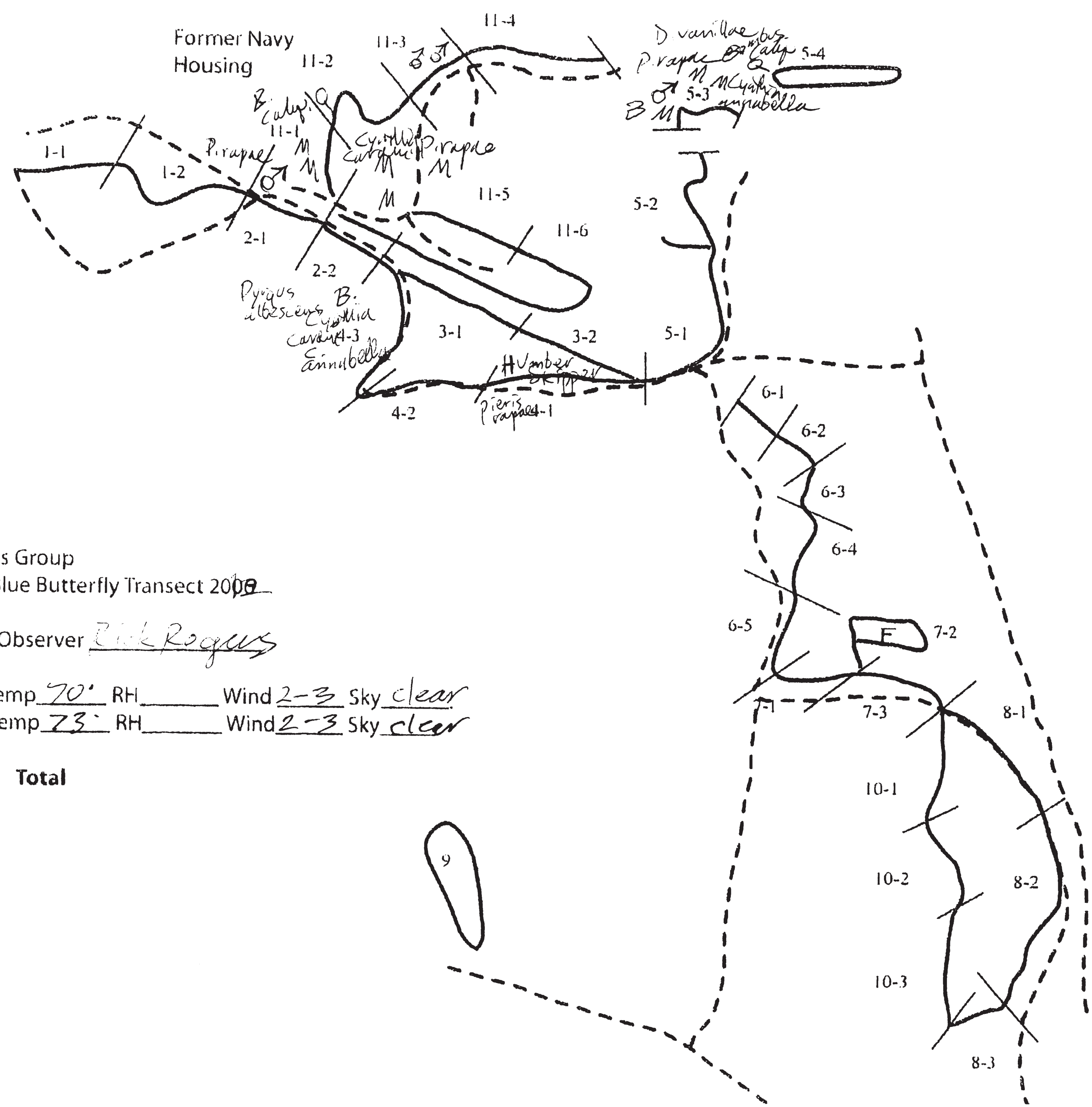
The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2010

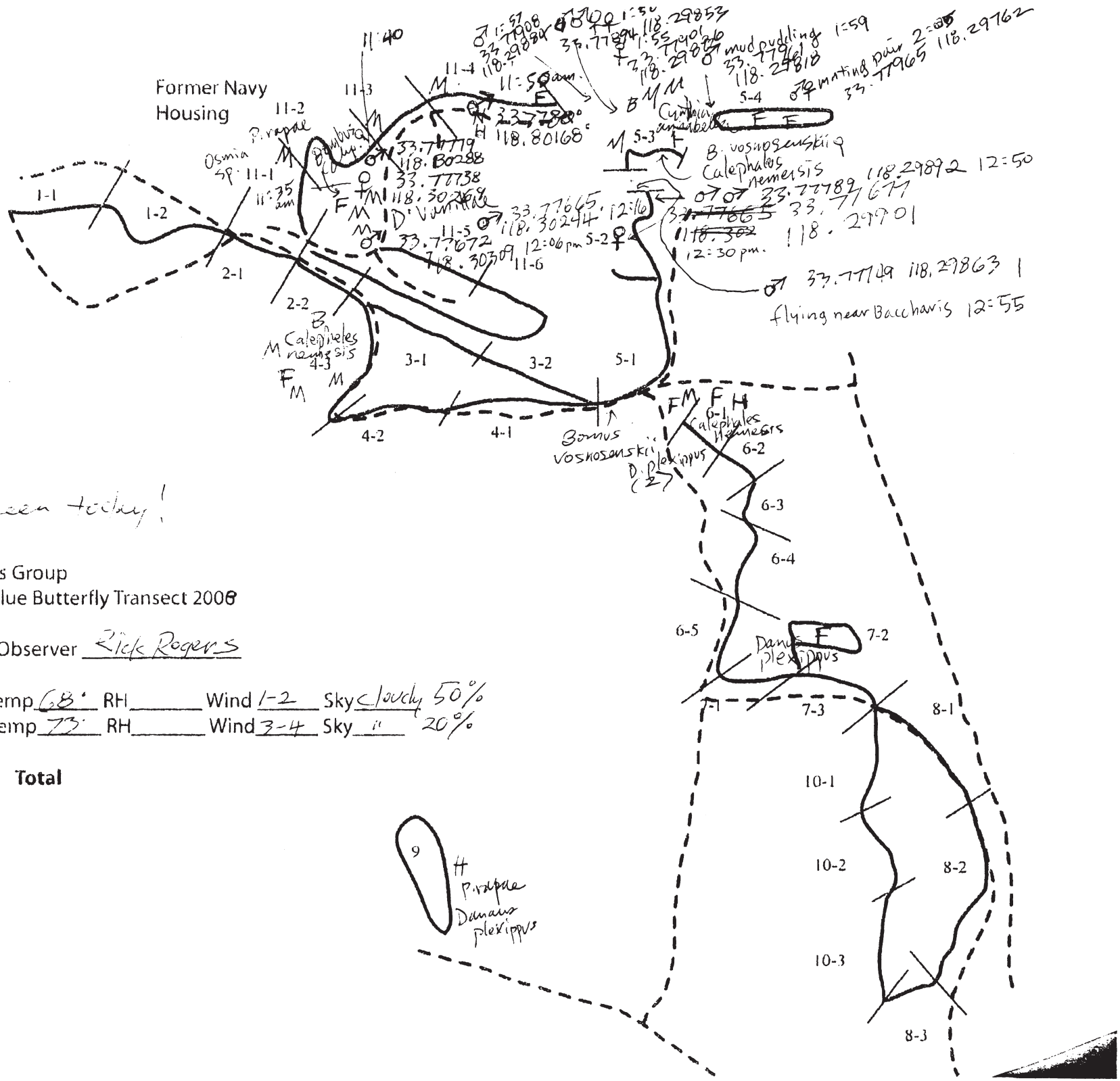
Date Nov 2, 2012 Observer Rick Rogers

Time start 11:35 Temp 70° RH_______ Wind 2-3 Sky clear
Time finish 1:35 Temp 73° RH_______ Wind 2-3 Sky clear

Legend **Total**

♀♂ *G. lygdamus*
F *E. funeralis*
M *L. marina*
G *C. perplexa*
H *S. melinus*
B *B. diegoensis*





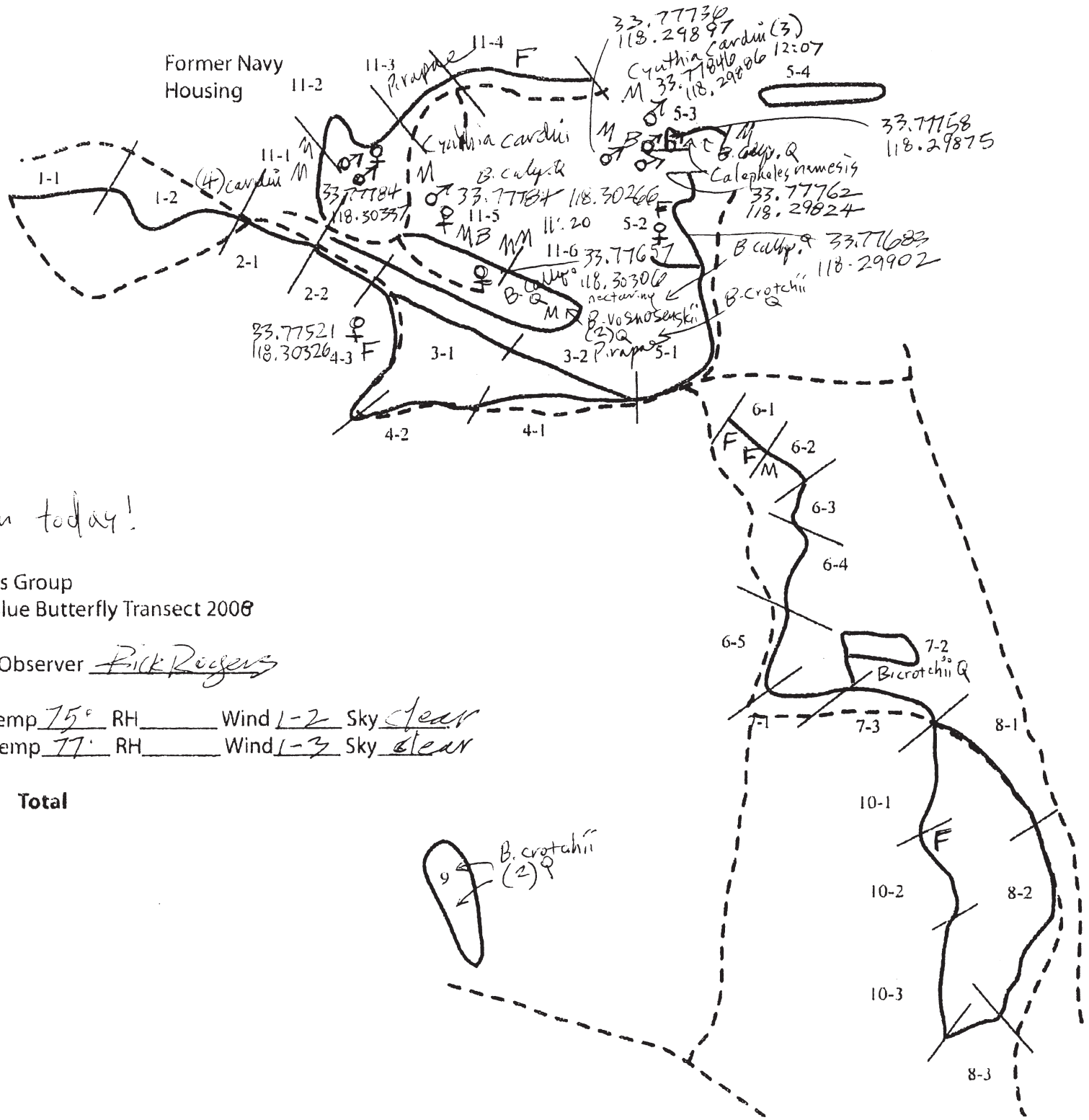
17 PVB's seen today!

The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2008

Date May 5, 2012 Observer Rick Rogers

Time start 11:30 Temp 68° RH _____ Wind 1-2 Sky cloudy 50%
Time finish 1:40 Temp 73° RH _____ Wind 3-4 Sky " 20%

Legend		Total
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	



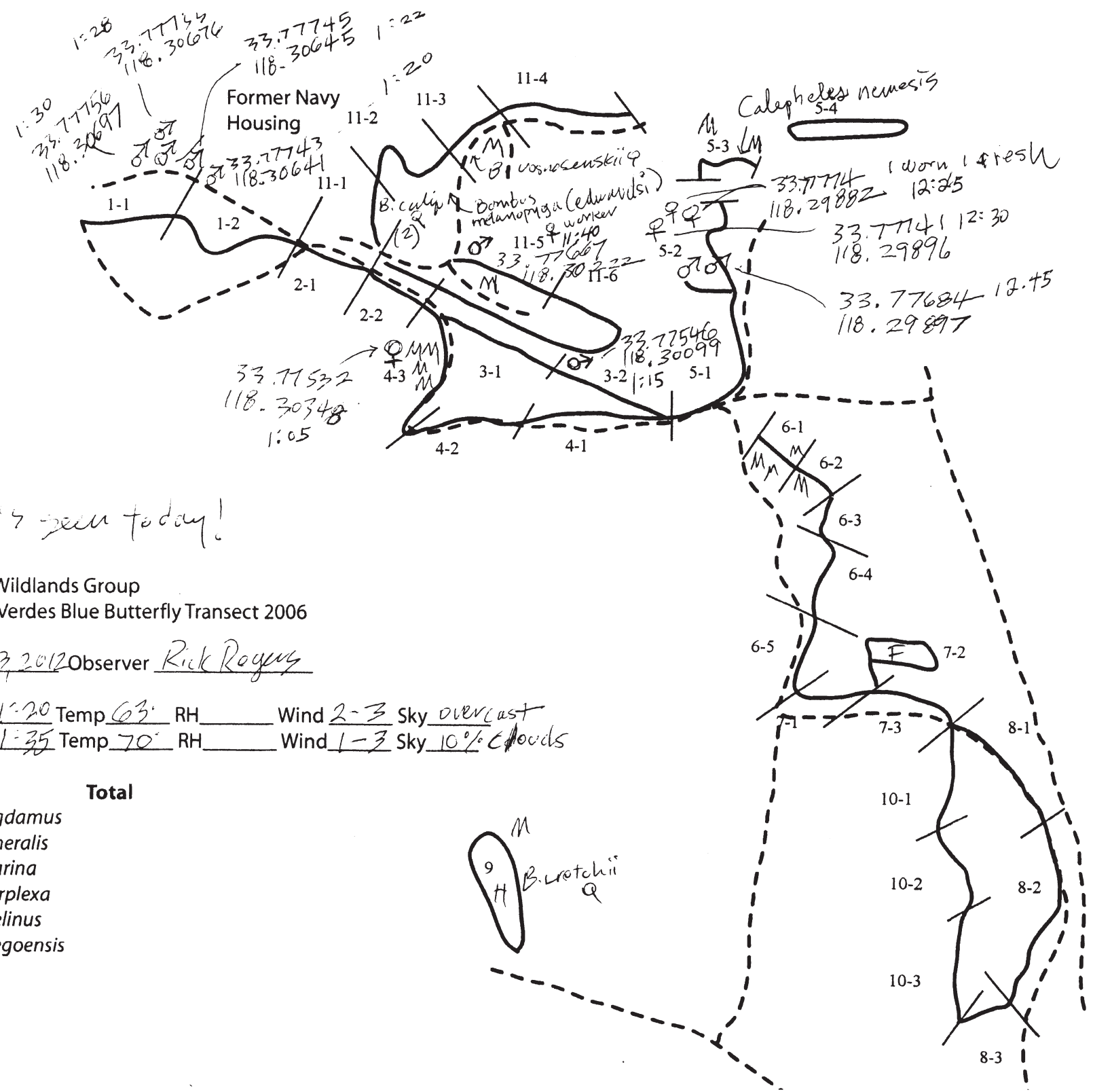
13 PVB's seen today!

The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2008

Date June 8, 2012 Observer Rick Rogers

Time start 4:15 Temp 75° RH _____ Wind 1-2 Sky clear
Time finish 1:30 Temp 77° RH _____ Wind 1-3 Sky clear

Legend		Total
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	



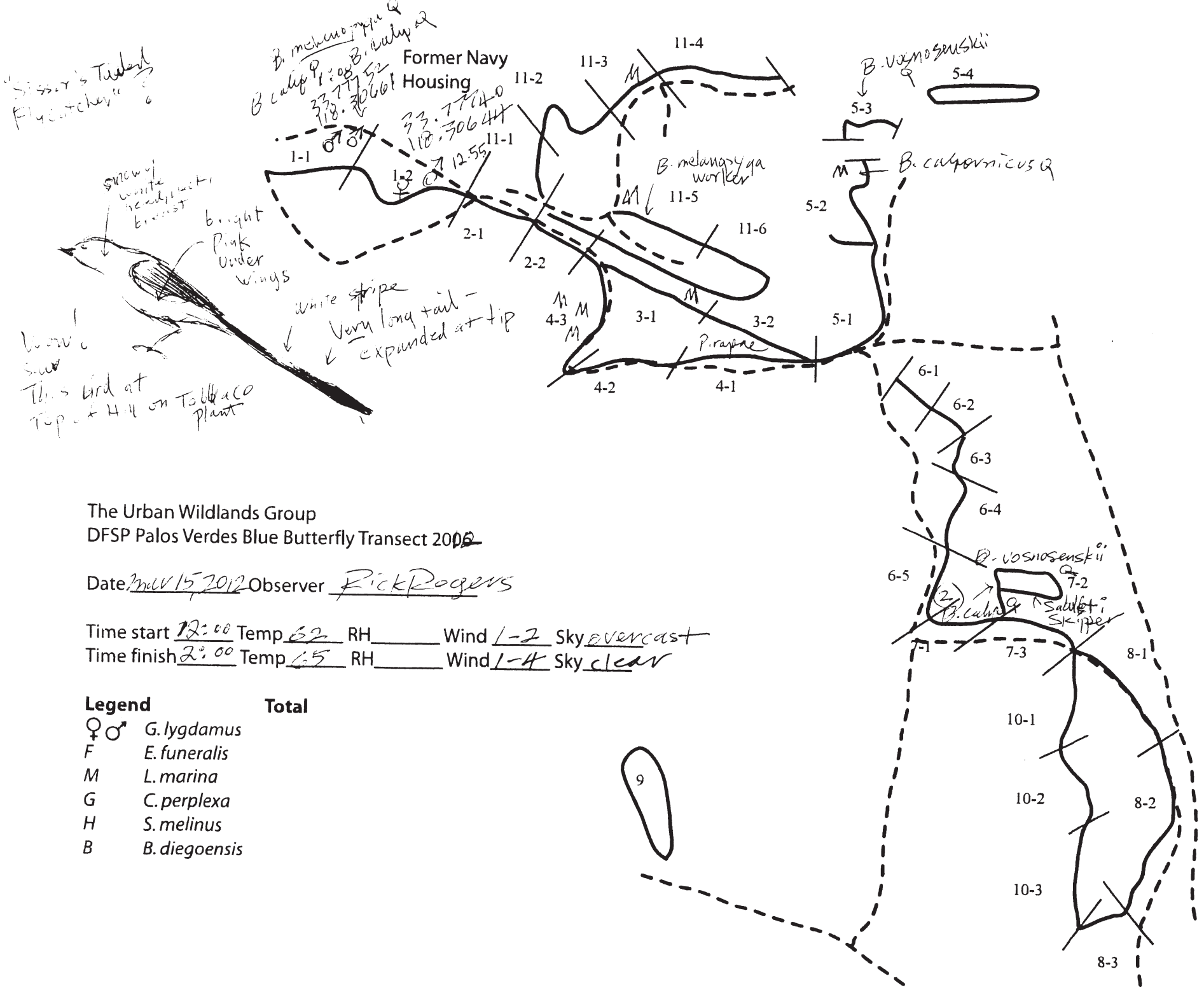
13 PVB's seen today!

The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date May 13, 2012 Observer Rick Rogers

Time start 11:20 Temp 63° RH_____ Wind 2-3 Sky overcast
Time finish 1:35 Temp 70° RH_____ Wind 1-3 Sky 10% Clouds

Legend		Total
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

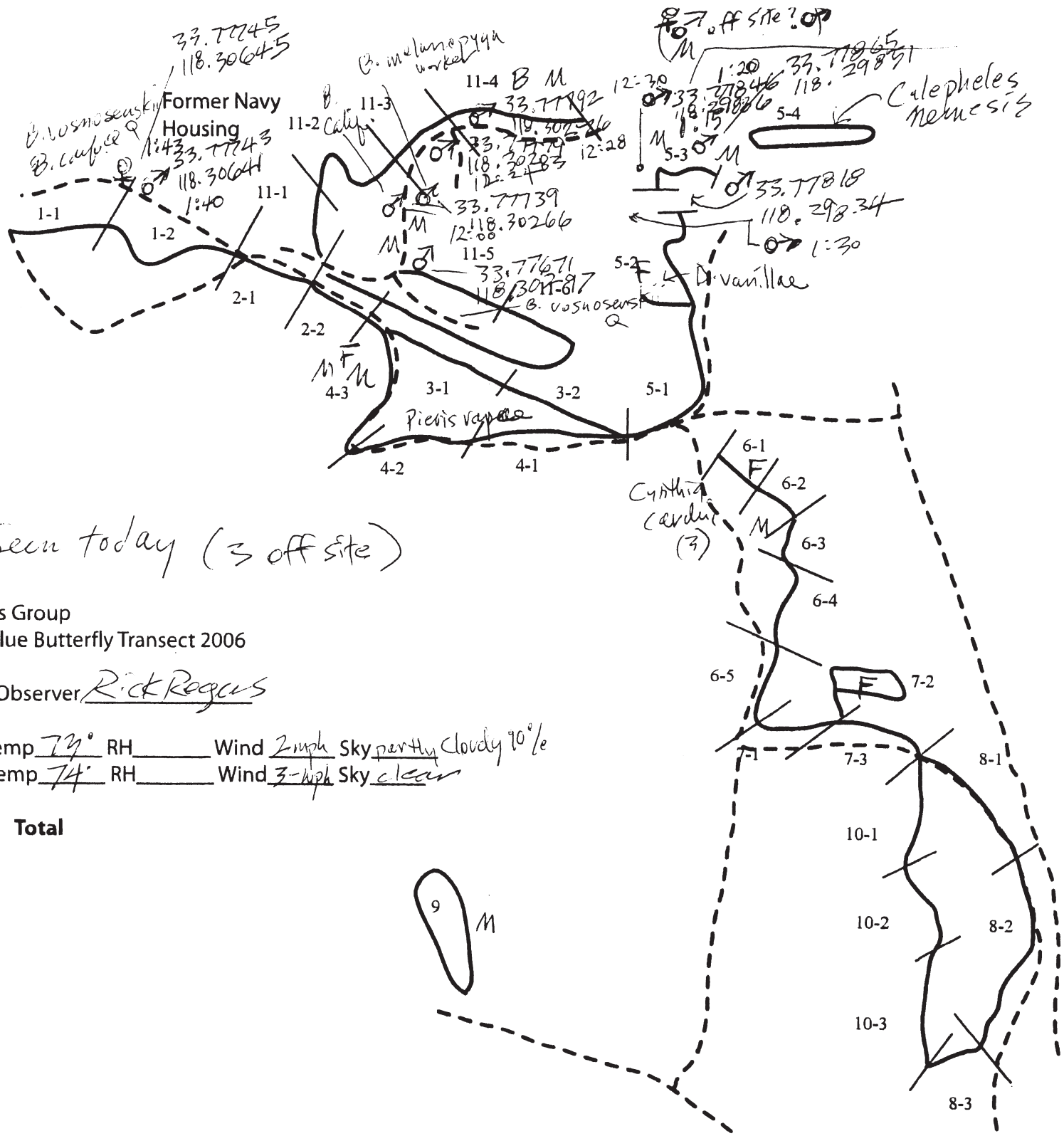


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2012

Date March 15 2012 Observer Rick Rogers

Time start 12:00 Temp 62 RH _____ Wind 1-2 Sky overcast
Time finish 2:00 Temp 65 RH _____ Wind 1-4 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	



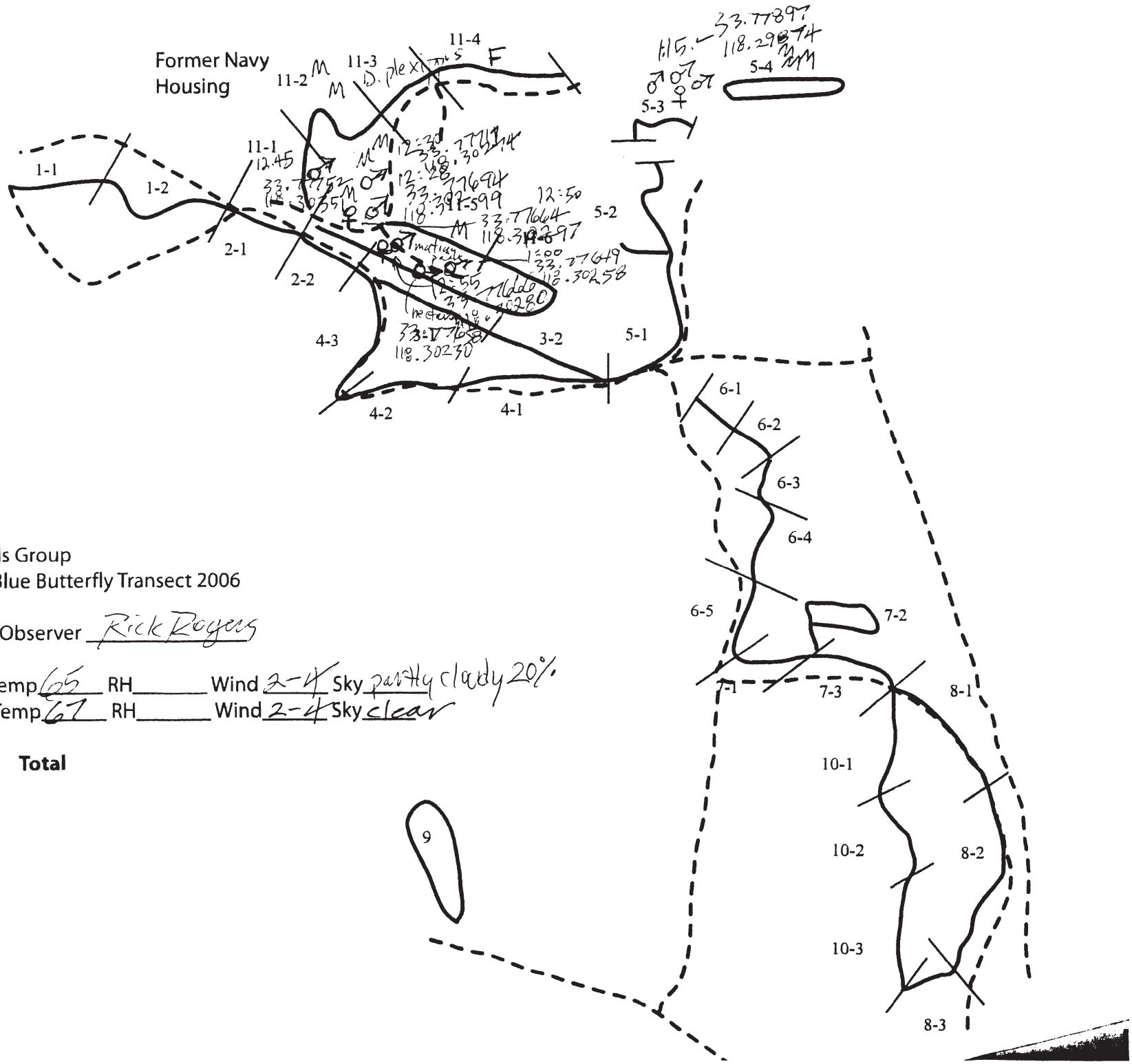
11 PVB's Seen today (3 off site)

The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date ~~Mar~~ 20, 2012 Observer Rick Reagan

Time start 12:00 Temp 73° RH _____ Wind 2mph Sky partly cloudy 10%
Time finish 2:00 Temp 74° RH _____ Wind ~~3-mph~~ Sky clear

Legend		Total
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

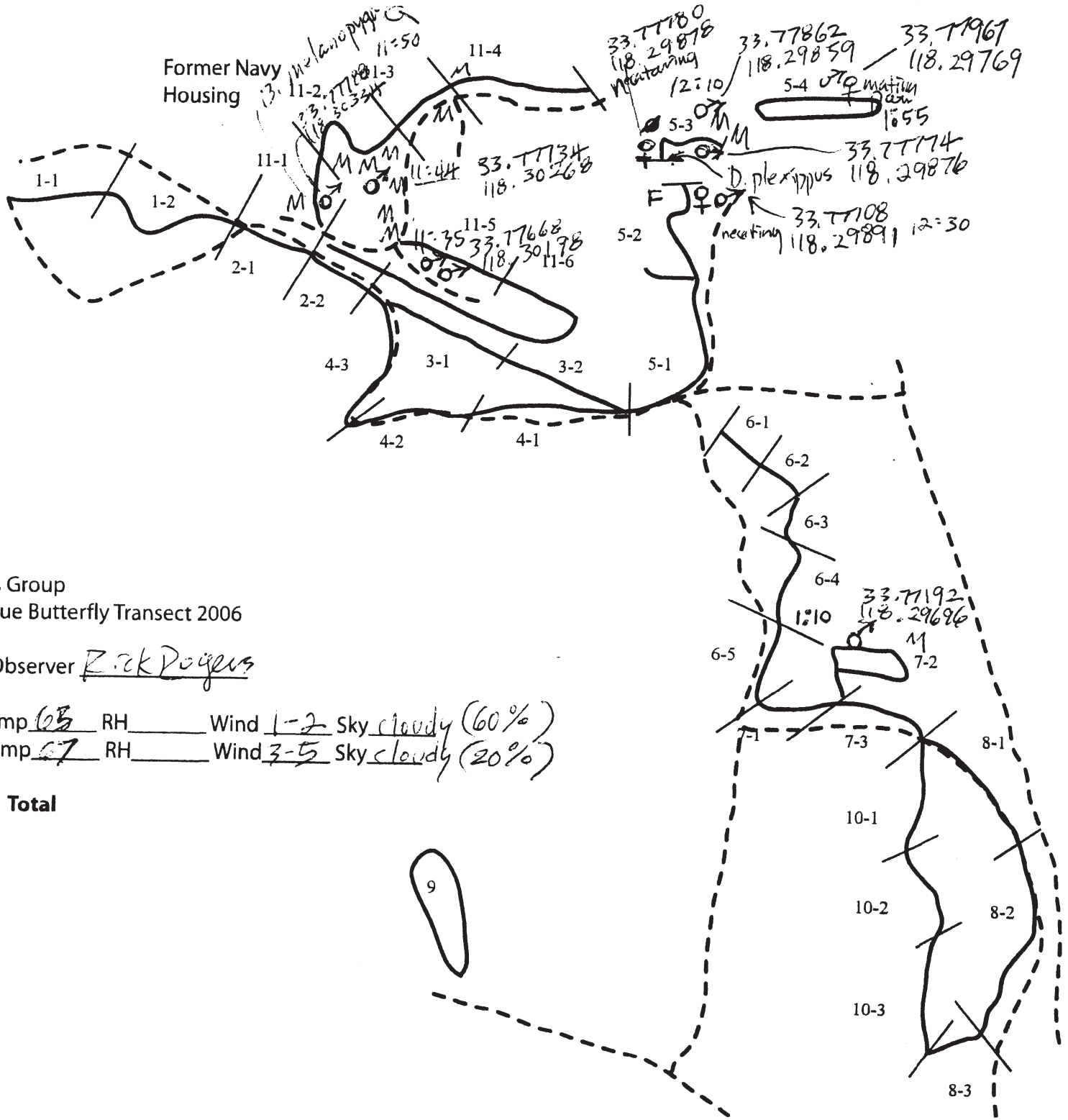


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date 3/24/2012 Observer Rick Rogers

Time start 12:20 Temp 65 RH _____ Wind 2-4 Sky partly cloudy 20%
Time finish 1:28 Temp 67 RH _____ Wind 2-4 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

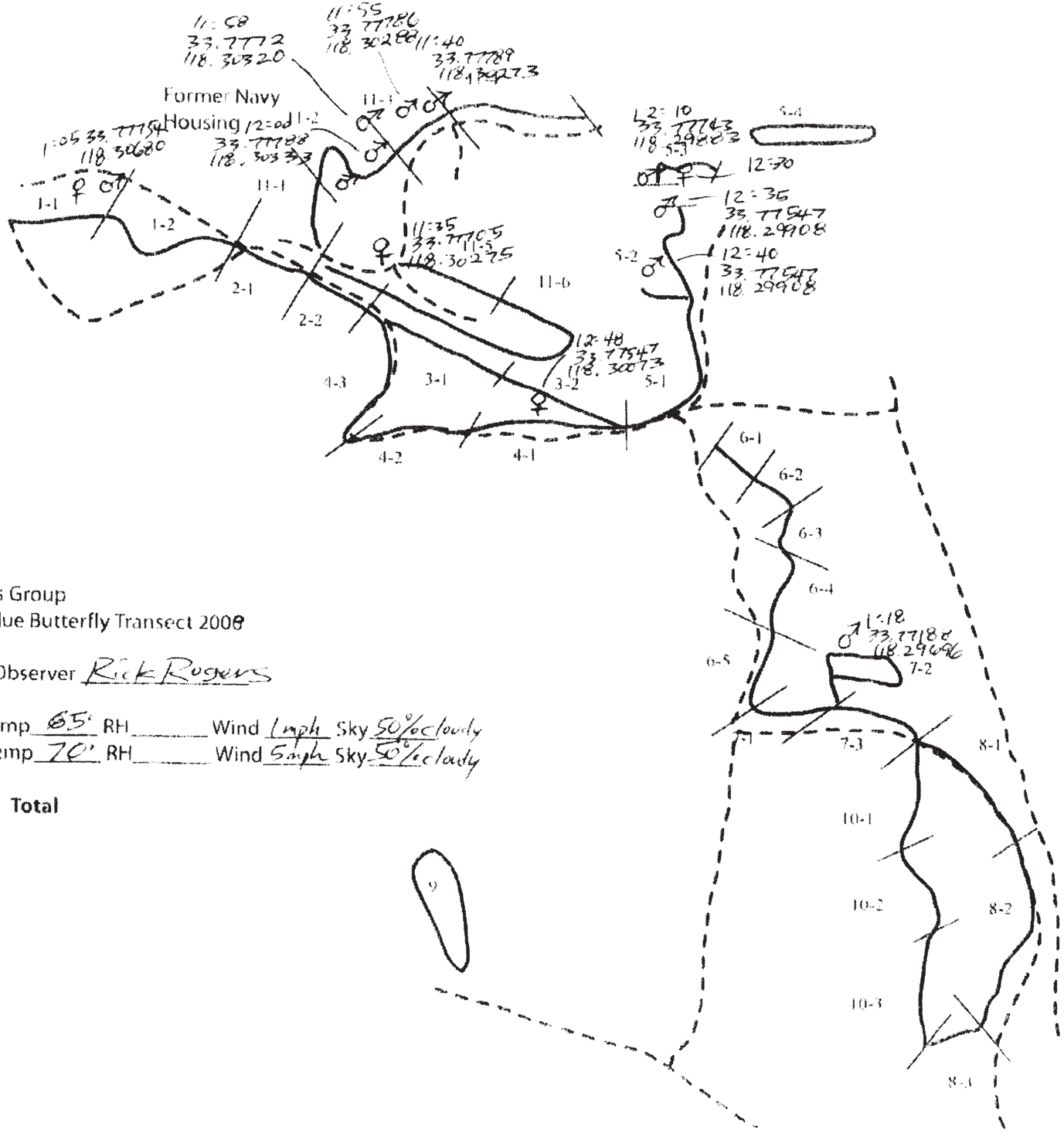


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date 27 MAY 2012 Observer Rick Rogers

Time start 11:35 Temp 65 RH _____ Wind 1-2 Sky cloudy (60%)
Time finish 1:55 Temp 67 RH _____ Wind 3-5 Sky cloudy (20%)

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

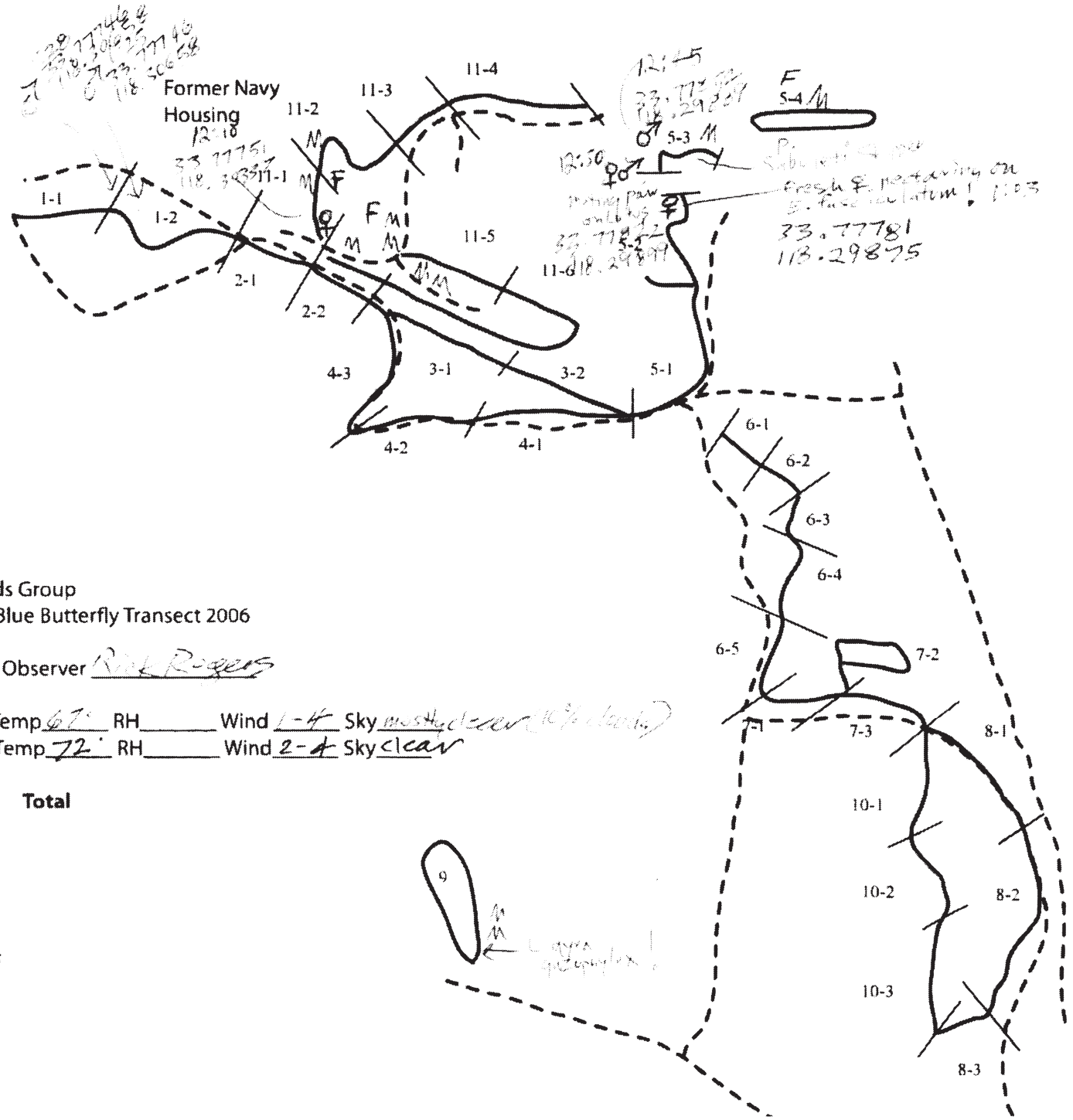


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2008

Date Mar 29, 2012 Observer Rick Rogers

Time start 11:34 Temp 65° RH _____ Wind 1mph Sky 50% cloudy
Time finish 1:34 Temp 70° RH _____ Wind 5mph Sky 50% cloudy

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

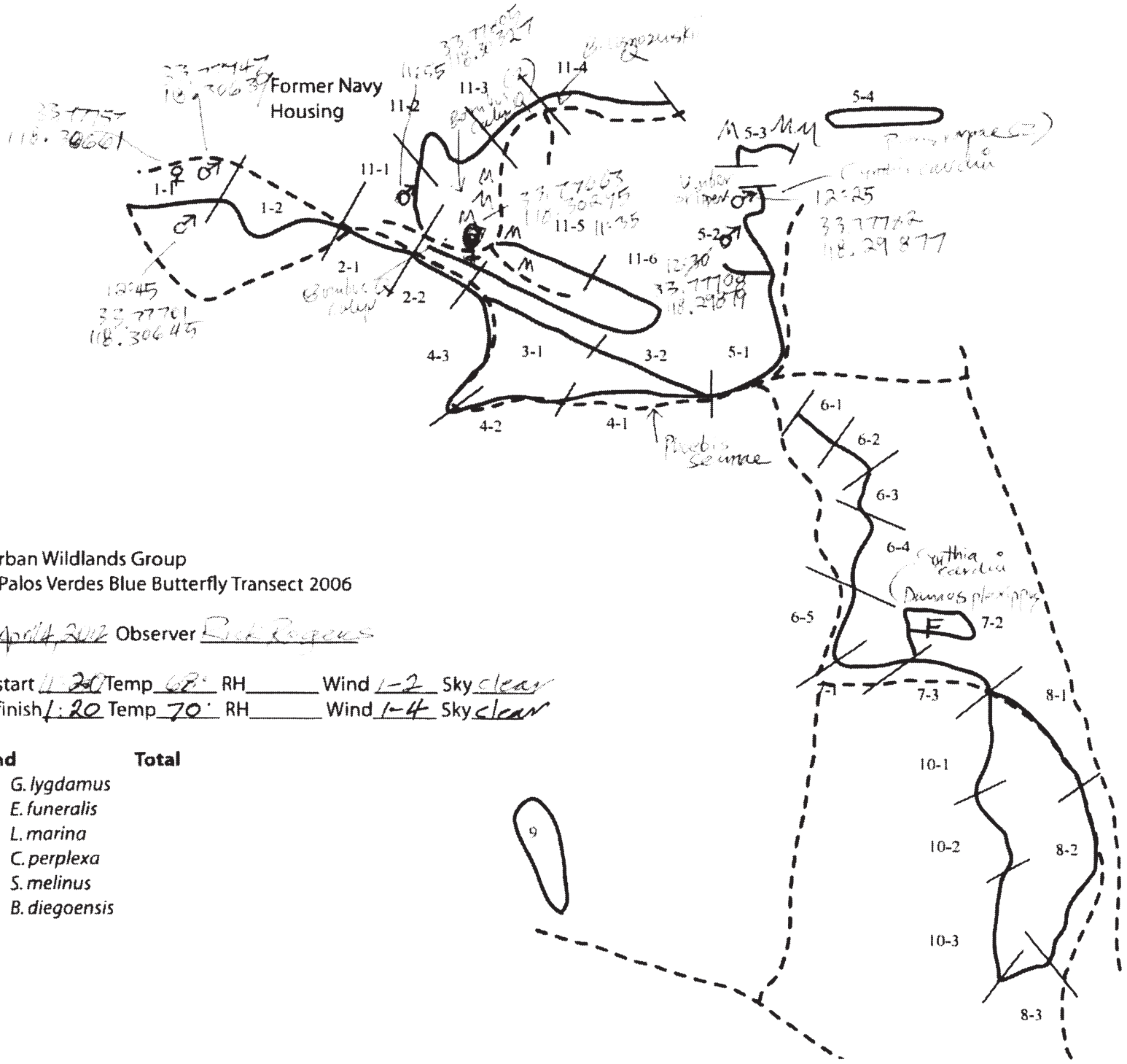


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date April 2, 2012 Observer Rick Rogers

Time start 11:55 Temp 67° RH _____ Wind 1-4 Sky mostly clear (10% cloudy)
Time finish 1:55 Temp 72° RH _____ Wind 2-4 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

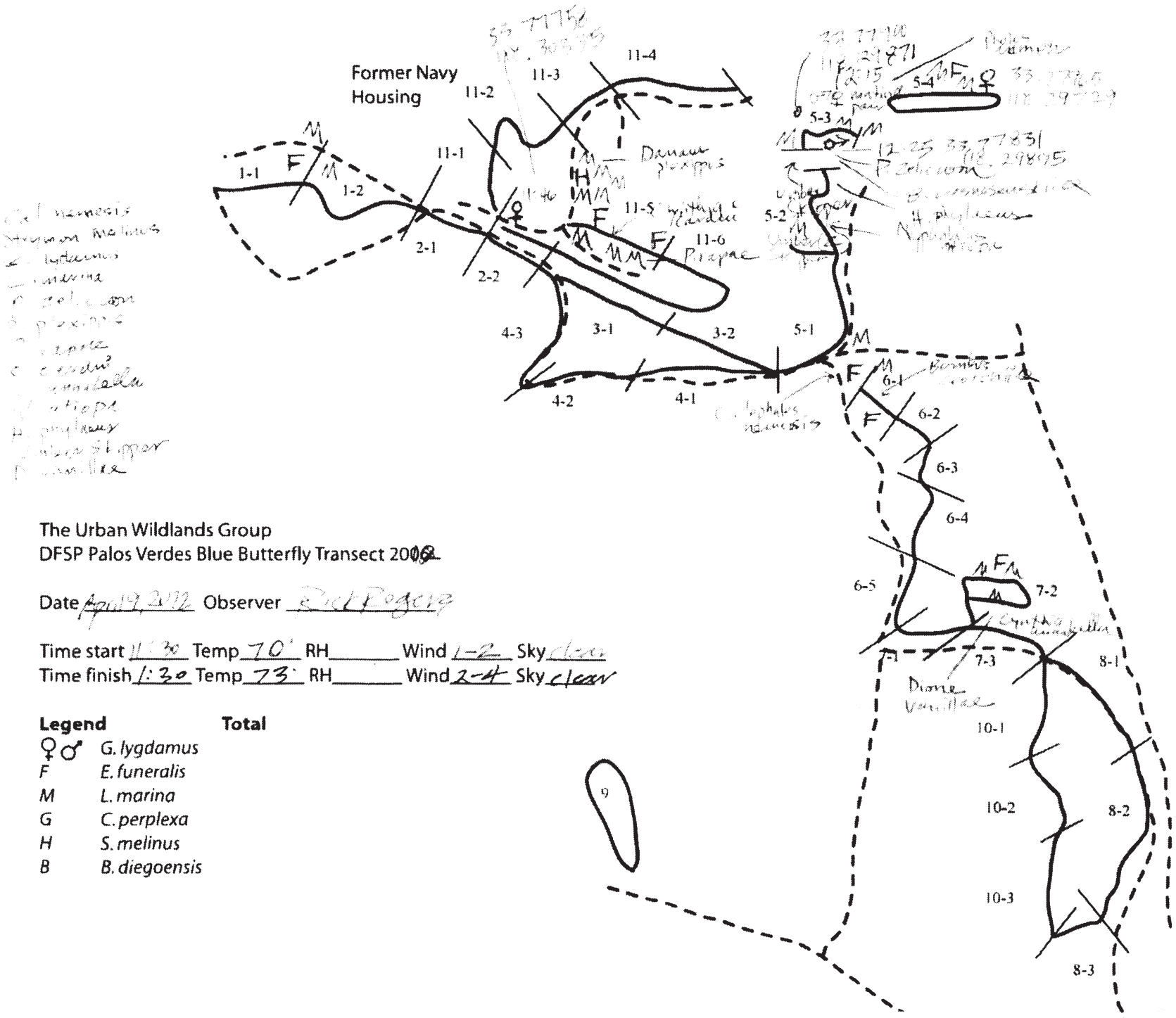


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date April 4, 2006 Observer [illegible]

Time start 11:30 Temp 62° RH_____ Wind 1-2 Sky clear
Time finish 1:20 Temp 70° RH_____ Wind 1-4 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

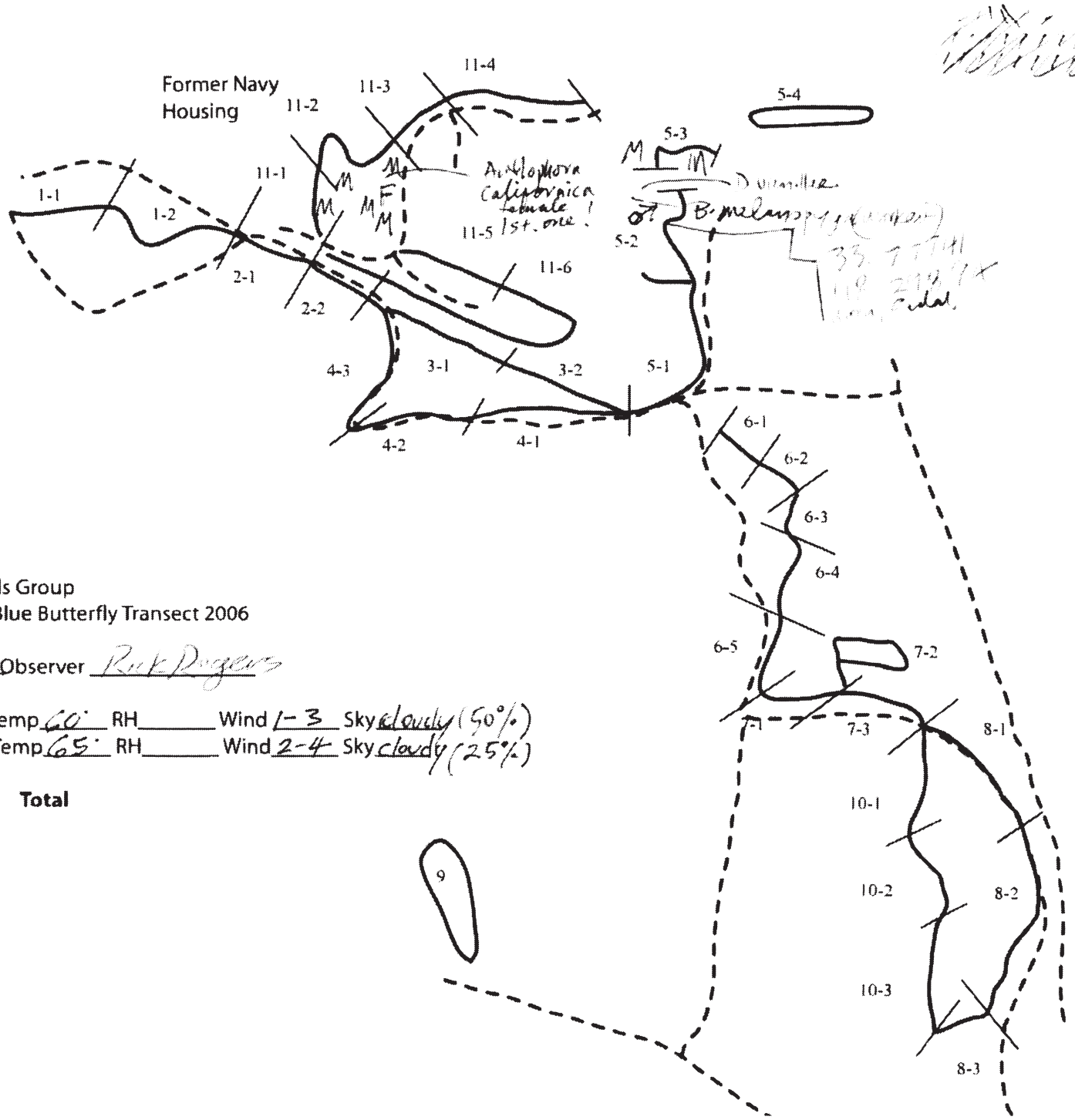


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2008

Date April 19, 2012 Observer Rick Rogers

Time start 11:30 Temp 70° RH _____ Wind 1-2 Sky clear
Time finish 1:30 Temp 73° RH _____ Wind 2-4 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

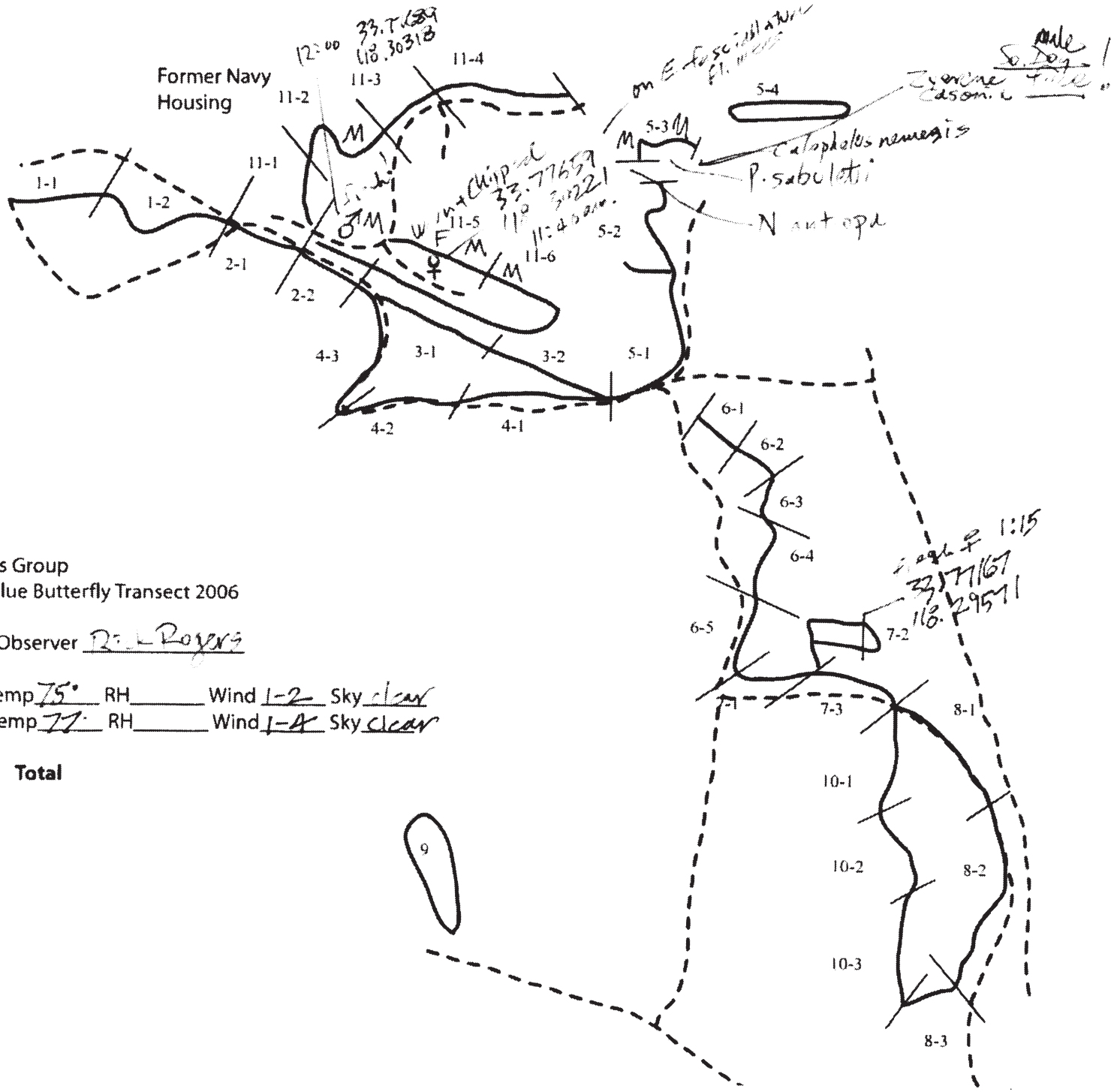


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date April 12 2012 Observer Rick Rogers

Time start 12:00 Temp 60° RH _____ Wind 1-3 Sky cloudy (50%)
Time finish 2:00 Temp 65° RH _____ Wind 2-4 Sky cloudy (25%)

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

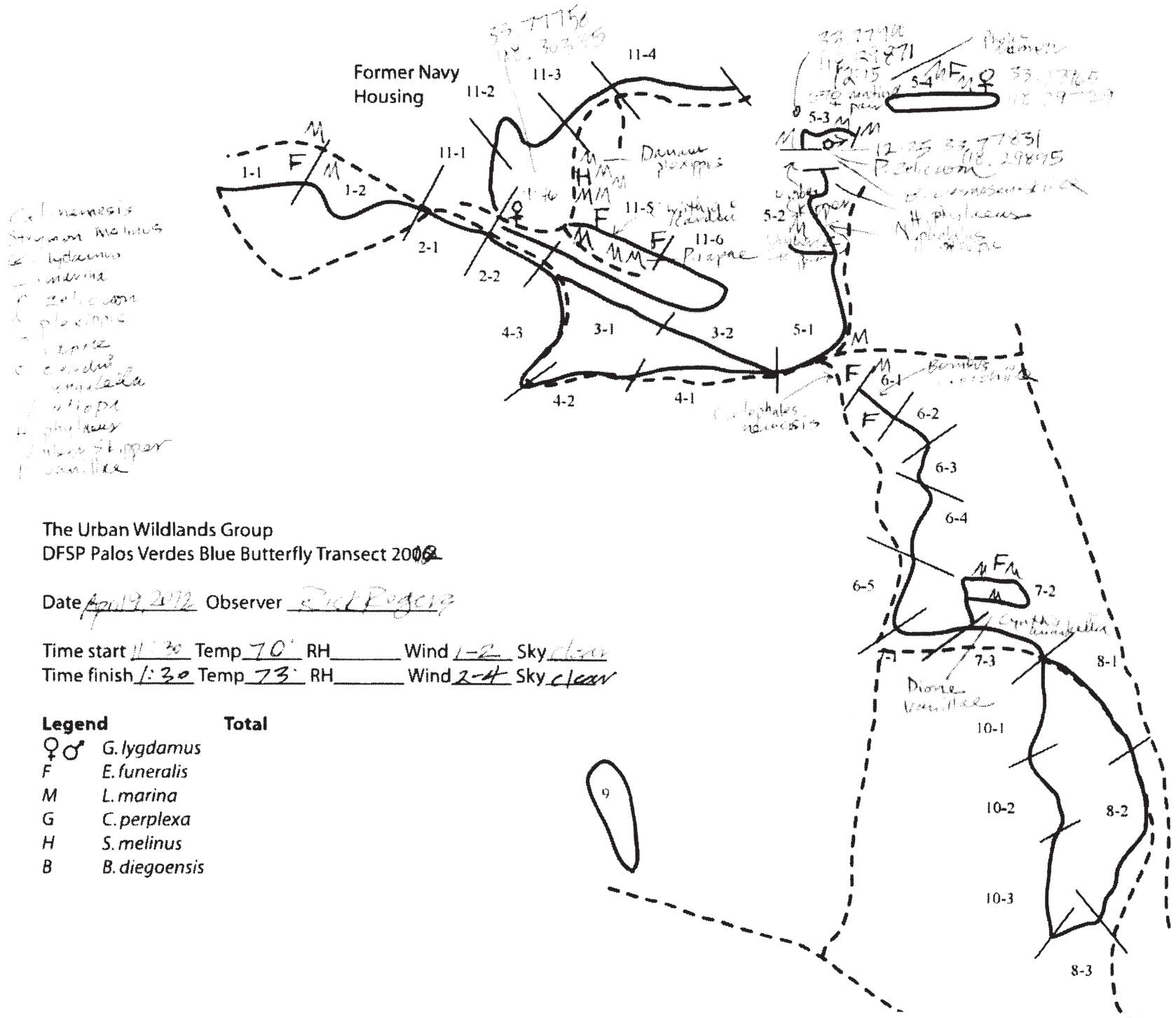


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date Apr 17, 2012 Observer R. Rogers

Time start 11:25 Temp 75° RH _____ Wind 1-2 Sky clear
Time finish 1:25 Temp 77° RH _____ Wind 1-4 Sky clear

Legend		Total
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	



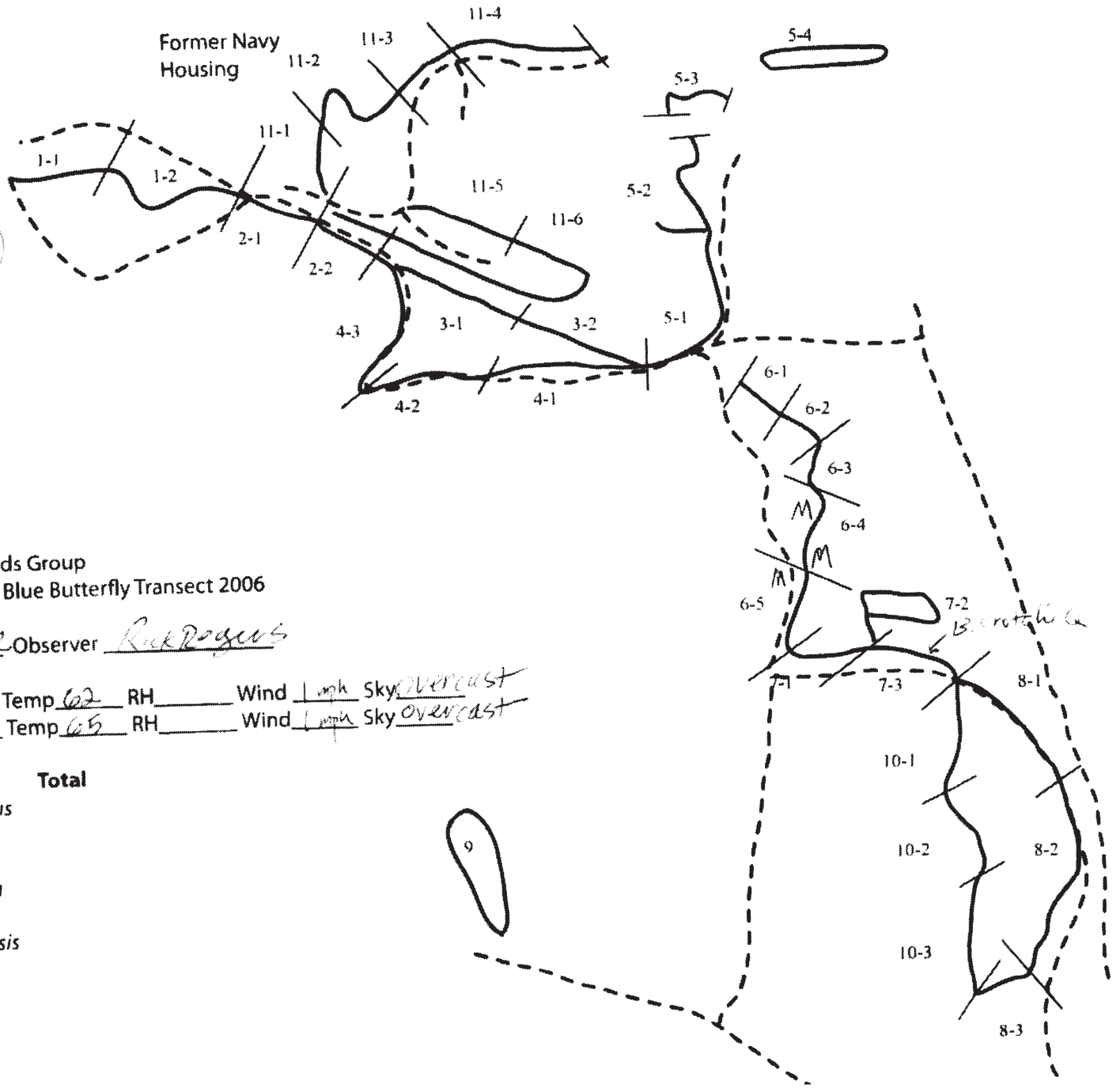
The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2008

Date April 9, 2012 Observer Rick Degen

Time start 11:30 Temp 70° RH _____ Wind 1-2 Sky clear
Time finish 1:30 Temp 73° RH _____ Wind 2-4 Sky clear

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

Malecio
Asuncion
510 772-7639

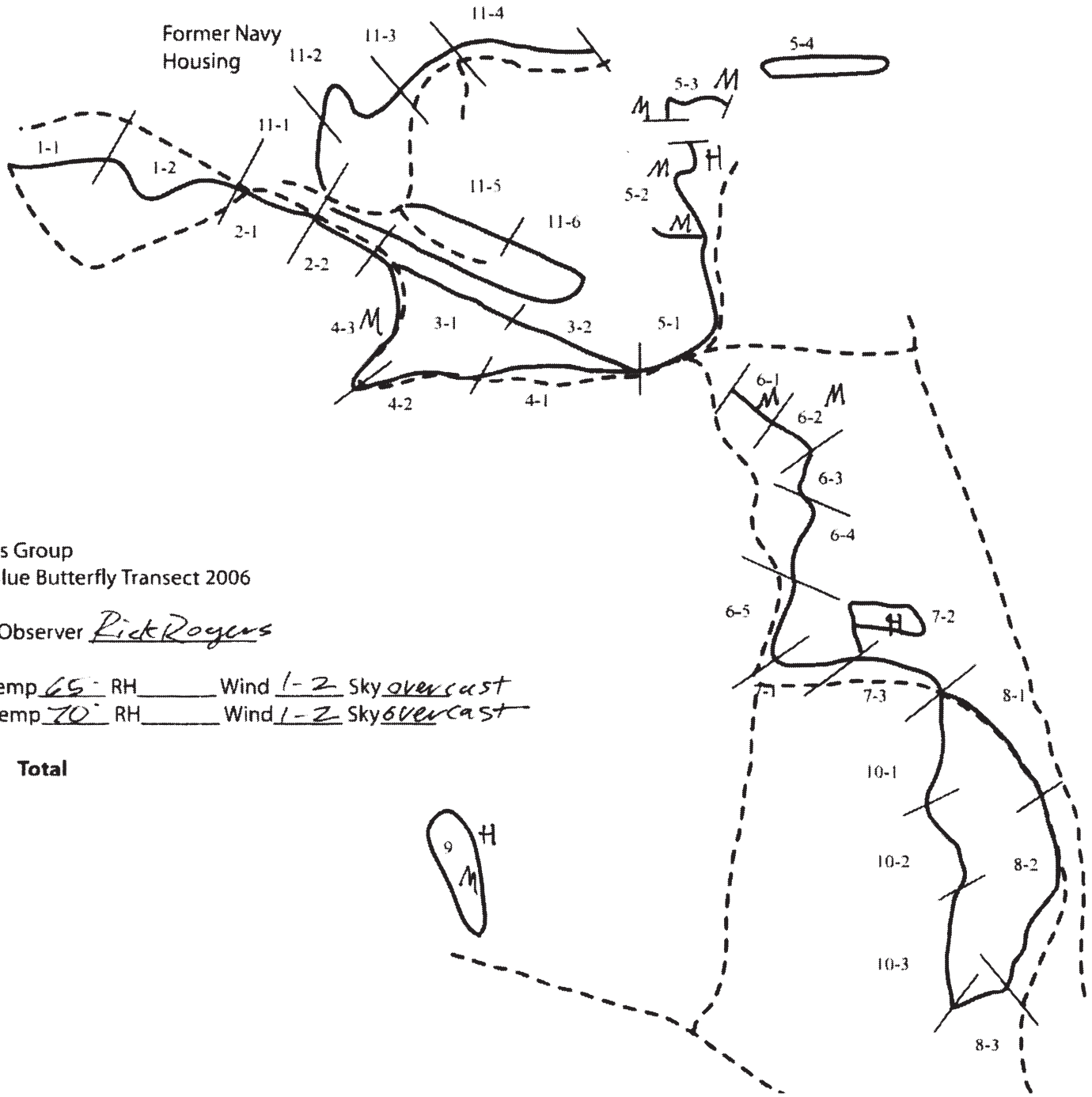


The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date April 23, 2006 Observer Rick Rogers

Time start 11:45 Temp 62 RH _____ Wind 1 mph Sky overcast
Time finish 1:45 Temp 65 RH _____ Wind 1 mph Sky overcast

Legend		Total
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	



The Urban Wildlands Group
DFSP Palos Verdes Blue Butterfly Transect 2006

Date April 30 2012 Observer Rick Rogers

Time start 11:35 Temp 65° RH _____ Wind 1-2 Sky overcast
Time finish 1:35 Temp 70° RH _____ Wind 1-2 Sky overcast

Legend		**Total**
♀♂	*G. lygdamus*	
F	*E. funeralis*	
M	*L. marina*	
G	*C. perplexa*	
H	*S. melinus*	
B	*B. diegoensis*	

Ken H. Osborne (permit #TE837760-7)
6675 Avenue Juan Diaz,
Riverside, CA 92509
(951) 360-6461
Euproserpinus@msn.com

March 15, 2012

Attn: Ms. Susie Tharratt,
USFWS Carlsbad Field Office
6010 Hidden Valley Road, Suite 101
Carlsbad, CA 92011
Facsimile (760) 431-9624

To Whom It May Concern:

I write to inform you of my observations of multiple adult Palos Verdes Blue Butterflies (*Gloucopsyche lygdamus palosverdesensis*), made during the course our scheduled biannual base wide survey of the Navy Fuel Support Depot in San Pedro, on the Palos Verdes Peninsula. Observations were made yesterday, March 14, between 1245 and 1400 hours (Daylight savings time). Conditions were sunny and moderately warm (66° - 68° *F*) and generally calm (winds 1-2 mph), with winds increasing substantially after 1400 hours.

From approximately 1245 hours, I encountered a males and female PVB; male cruising the habitat, female nectaring at mustard and *Lotus*, and ovipositing on *Lotus*. This initial observation at 33° 46.738' N latitude, -118° 17.910' W longitude.

In the period from approximately 1250 to 1255 hours, I observed additional male PVB (all cruising the habitat) as follows: One male; 33° 46.728' N latitude, -118° 17.916' W longitude; One male; 33° 46.737' N latitude, -118° 17.927' W longitude; Three males; 33° 46.744' N latitude, -118° 17.931' W longitude; One male; 33° 46.771' N latitude, -118° 17.998' W longitude. All of these male observations probably involved approximately four or five individuals.

O walking out of this portion of survey area, along the cut slope north of the baseball fields, I casually observed four male PVB cruising the habitat – did not stop to take GPS coordinates as this is a portion of transect survey being undertaken on a semiweekly basis by Rick Rogers.

At approximately 1315 hours, one male PVB at 33° 46.708' N latitude, -118° 17.928' W longitude. (I also observed a California Coastal Gnatcatcher [CCGN] in this area).

At approximately 1318 hours, one female PVB at 33° 46.705' N latitude, -118° 17.915' W longitude.

At approximately 1330 hours, one female PVB at 33° 46.629' N latitude, -118° 17.899' W longitude.

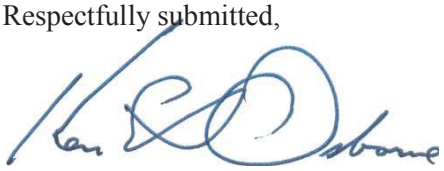
At approximately 1336 hours, one male and one female PVB at 33° 46.624' N latitude, -118° 17.937' W longitude.

At approximately 1346 hours, one male PVB at 33° 46.430’ N latitude, -118° 17.910’ W longitude, flies to 33° 46.433’ N latitude, -118° 17.900’ W longitude (thus crossing into an additional survey polygon). (I also observed CCGN up the slope in this area).

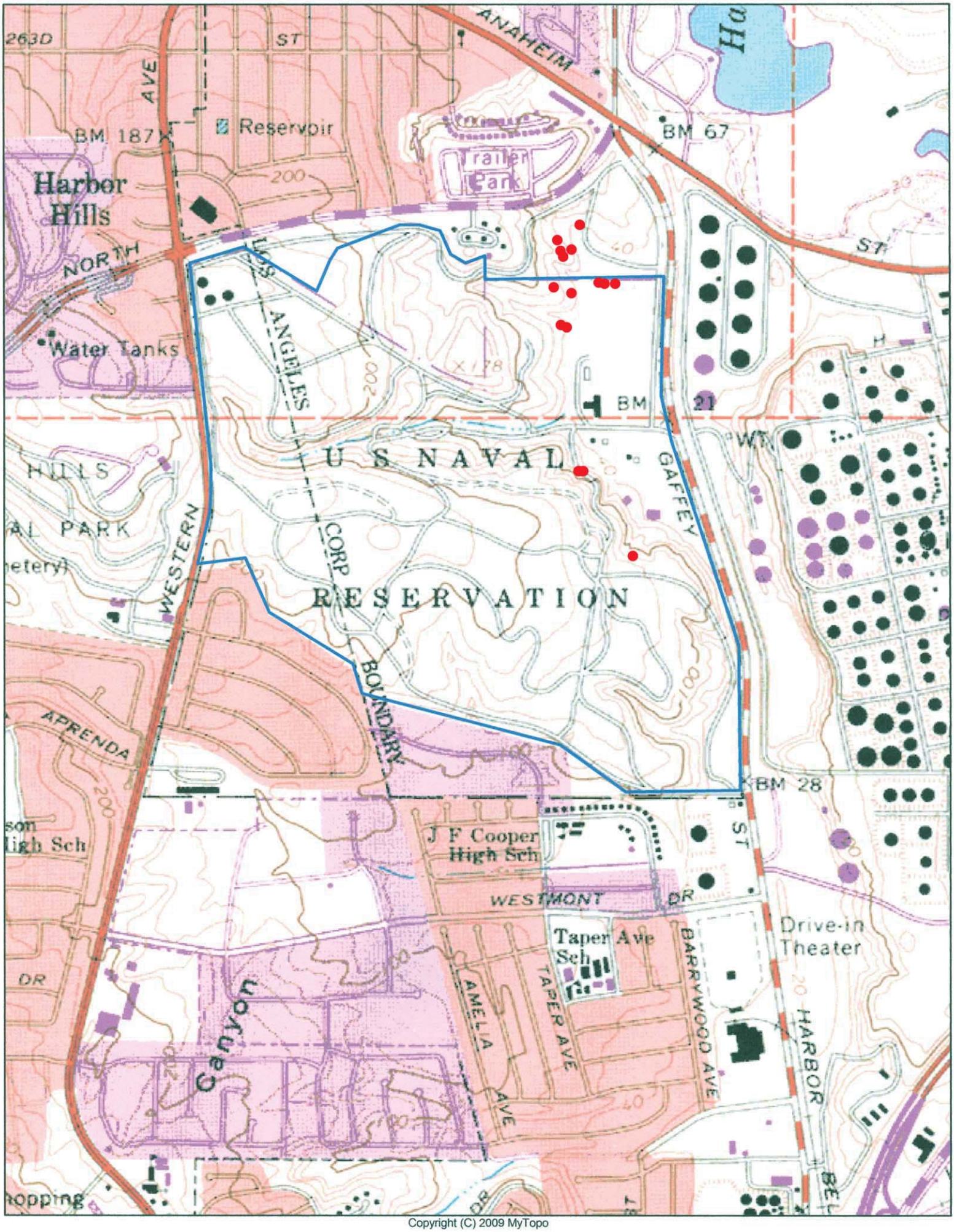
At approximately 1354 hours, one male PVB at 33° 46.310’ N latitude, -118° 17.805’ W longitude. (I also observed CCGN in this area).

These PVB observations are approximately mapped (red dots) on the attached Torrance, CA, USGS topographic map.

Respectfully submitted,



Ken H. Osborne



Ken H. Osborne (permit #TE837760-7)
6675 Avenue Juan Diaz,
Riverside, CA 92509
(951) 360-6461
Euproserpinus@msn.com

March 22, 2012

Attn: Ms. Susie Tharratt,
USFWS Carlsbad Field Office
6010 Hidden Valley Road, Suite 101
Carlsbad, CA 92011

To Whom It May Concern:

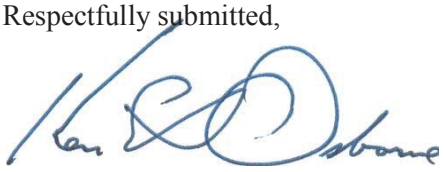
I write to inform you of my observations of multiple adult Palos Verdes Blue Butterflies (*Gloucopsyche lygdamus palosverdesensis*), made during the course our scheduled biannual base wide survey of the Navy Fuel Support Depot (DFSP) in San Pedro, on the Palos Verdes Peninsula. Observations were made yesterday, March 21, between 1415 and 1438 hours (Daylight savings time). Conditions were sunny and warm (70° - 71° *F*) and generally calm with increased winds in the afternoon (winds 5-10 mph).

At approximately 1415 hours, using binoculars from the side of a road and viewing from a distance of approximately 50 meters, I observed two male PVB cruising the habitat. This observation (the butterflies) at 33° 46' 39.2" N latitude, -118° 19' 24.4" W longitude (coordinates obtained from Google Earth). This viewing, where we know the butterflies to be present, was made as a methods check against the survey effort I am making over wide portions of the DSFP - where I am obtaining negative results on this day.

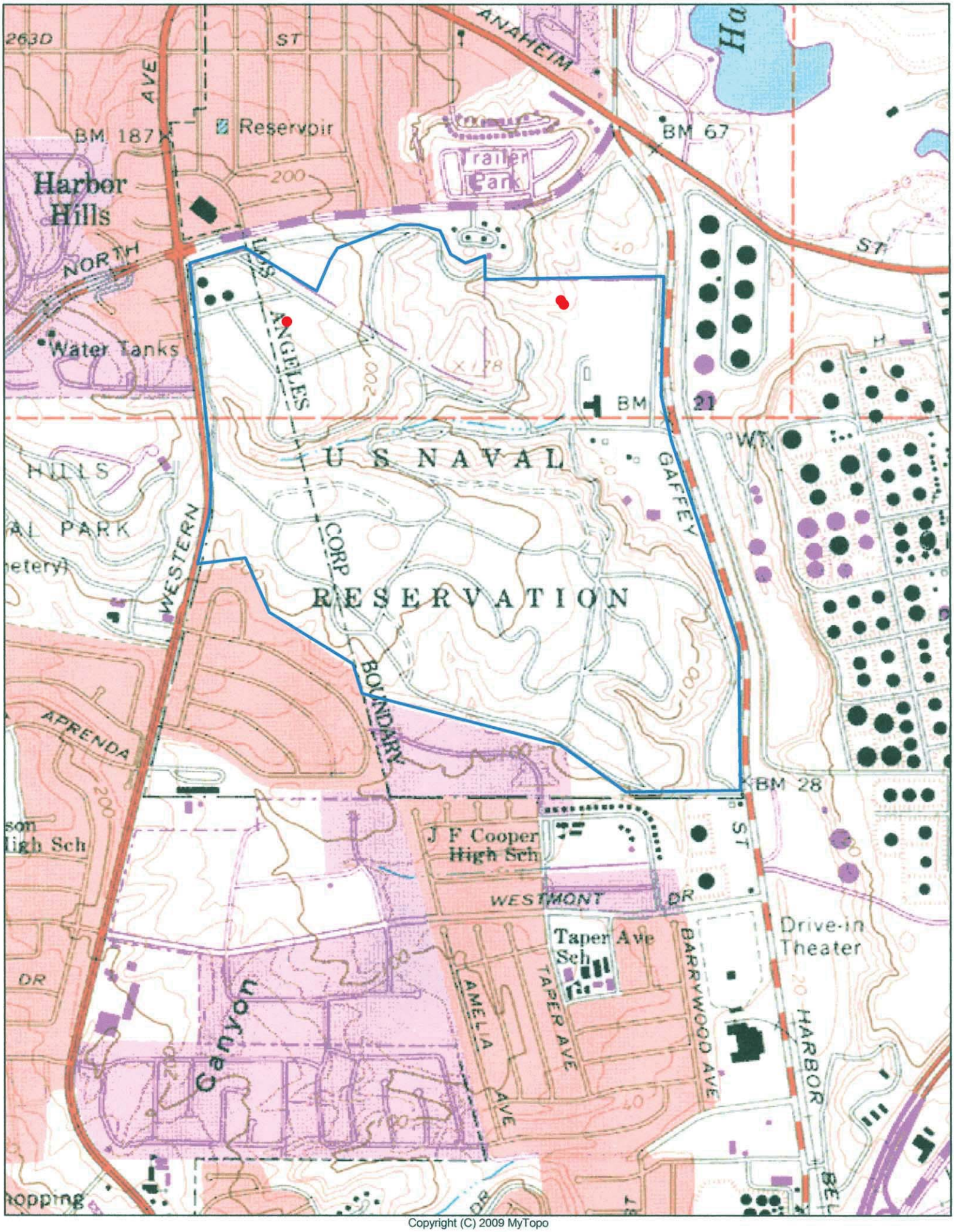
At 1438 hours, I observed male PVB (all cruising the habitat) as follows: One male; 33° 46.728' N latitude, -118° 17.912' W longitude; Two males; 33° 46.671' N latitude, -118° 17.915' W longitude (these my GPS coordinates).

These PVB observations are approximately mapped (red dots) on the attached Torrance, CA, USGS topographic map.

Respectfully submitted,



Ken H. Osborne



Ken H. Osborne (permit #TE837760-7)
6675 Avenue Juan Diaz,
Riverside, CA 92509
(951) 360-6461
Euproserpinus@msn.com

March 28, 2012

Attn: Ms. Susie Tharratt,
USFWS Carlsbad Field Office
6010 Hidden Valley Road, Suite 101
Carlsbad, CA 92011

To Whom It May Concern:

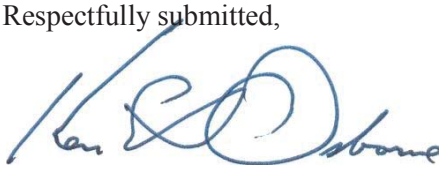
I write to inform you of my observations of multiple adult Palos Verdes Blue Butterflies (*Gloucopsyche lygdamus palosverdesensis*), made during the course our scheduled biannual base wide survey of the Navy Fuel Support Depot (DFSP) in San Pedro, on the Palos Verdes Peninsula. Observations were made yesterday, March 27, between 1110 and 1328 hours (Daylight savings time). Conditions were sunny and warm (66° *F*) and generally calm.

At approximately 1110 hours, using binoculars from the side of a road and viewing from a distance of approximately 100 meters, I observed a male PVB cruising the habitat. This observation (the butterfly) at approximately 33° 46' 39.2" N latitude, -118° 19' 24.4" W longitude (coordinates obtained from Google Earth). This viewing, where we know the butterflies to be present, was made as a methods check against the survey effort I am making over wide portions of the DSFP.

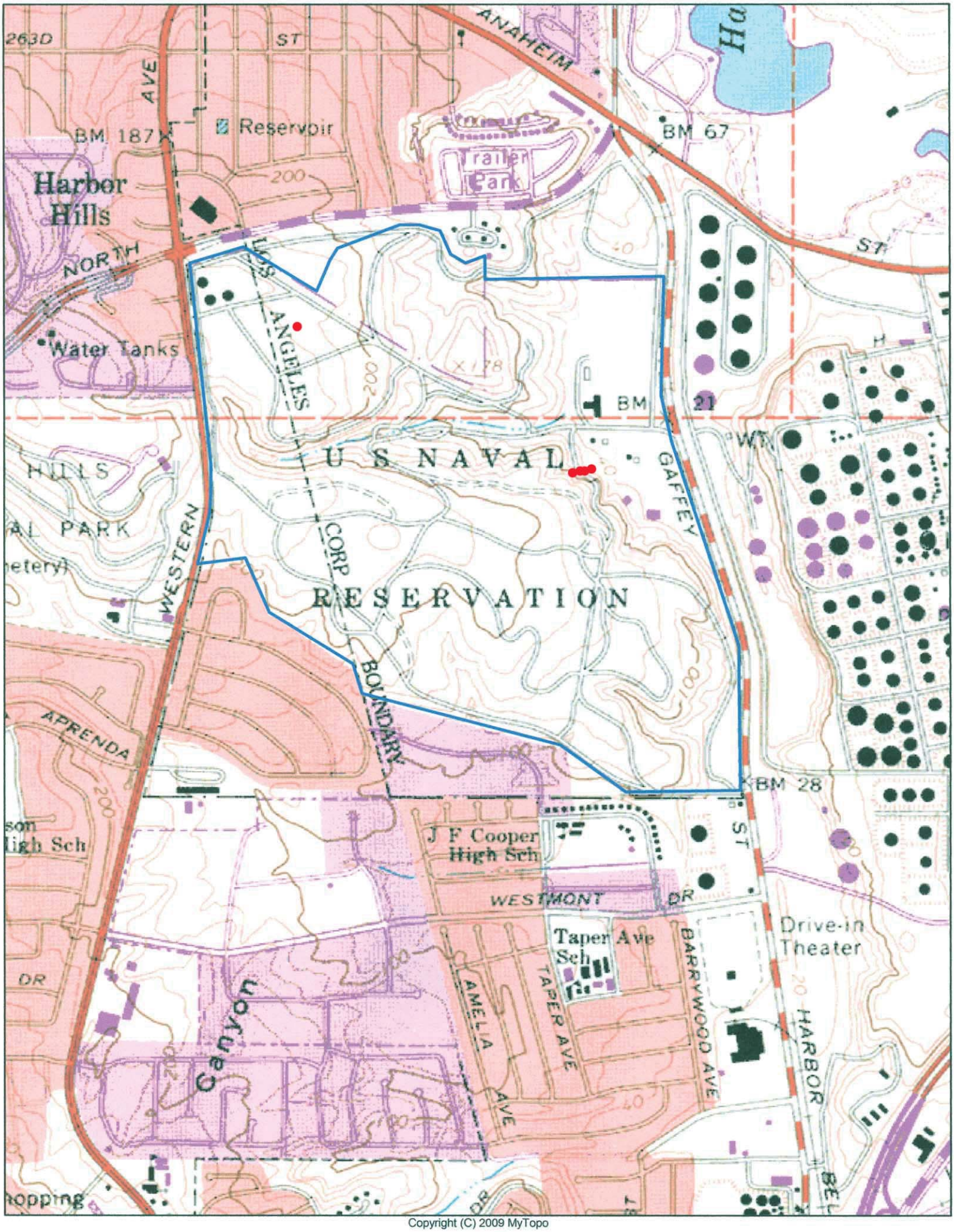
At 1328 hours, I observed a male PVB (cruising the habitat) beginning at 33° 46.443' N latitude, -118° 17.923' W longitude, and flying to the south to 33° 46.448' N latitude, -118° 17.889' W longitude, thus traveling from one survey polygon to another.

These PVB observations are approximately mapped (red dots) on the attached Torrance, CA, USGS topographic map.

Respectfully submitted,



Ken H. Osborne



Ken H. Osborne (permit #TE837760-7)
6675 Avenue Juan Diaz,
Riverside, CA 92509
(951) 360-6461
Euproserpinus@msn.com

April 7, 2012

Attn: Ms. Susie Tharratt,
USFWS Carlsbad Field Office
6010 Hidden Valley Road, Suite 101
Carlsbad, CA 92011

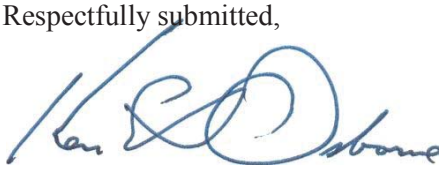
To Whom It May Concern:

I write to inform you of my observation of an adult Palos Verdes Blue Butterfly (*Gloucopsyche lygdamus palosverdesensis*), made during the course our scheduled biannual base wide survey of the Navy Fuel Support Depot (DFSP) in San Pedro, on the Palos Verdes Peninsula. Observations were made yesterday, April 6, between 1535 and 1540 hours (Daylight savings time). Conditions were sunny and warm (75° *F*) and generally calm.

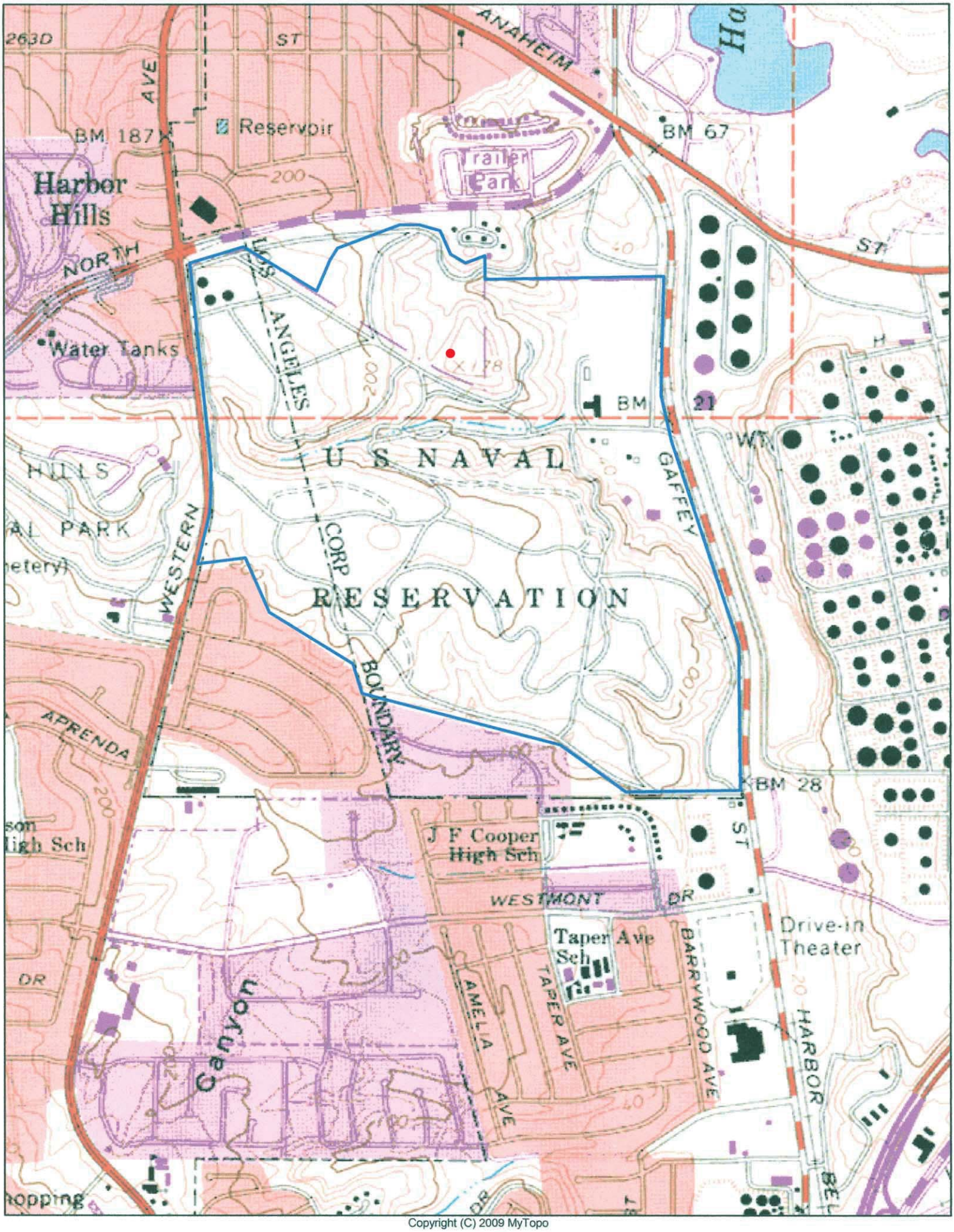
At 1535 hours, I observed a female PVB (ovipositing on *Lotus*) beginning at 33° 46' 35.87" N latitude, -118° 18' 7.78" W longitude, and flying, intermittently landing on *Lotus* to nectar or oviposit, to the north to 33° 46' 36.23" N latitude, -118° 18' 7.10" W longitude, thus traveling (over a chain link fence) into our survey polygon #6 in the Navy Housing area. Interestingly, this butterfly took a minute or so flying up against the fence before flying over it.

This PVB observation is approximately mapped (red dot) on the attached Torrance, CA, USGS topographic map.

Respectfully submitted,



Ken H. Osborne



THE URBAN WILDLANDS GROUP, INC.
P.O. BOX 24020, LOS ANGELES, CALIFORNIA 90024-0020, TEL (310) 247-9719

FINAL REPORT FOR PALOS VERDES BLUE BUTTERFLY YEAR 2012 CAPTIVE REARING FOR DEFENSE FUEL SUPPORT POINT, SAN PEDRO, CALIFORNIA

COOPERATIVE AGREEMENT NUMBER:
N62473-12-2-2101

January 27, 2013

Contracting Officer:
Linda Protocollo
Naval Facilities Engineering Command (NAVFAC), Southwest
1220 Pacific Highway
San Diego, CA 92132-5190
Tel: (619) 532-1159, Fax: (619) 532-1155
Email: Linda.protocollo@navy.mil

Agreement Representative:
Albert Owen, Ph.D.
Natural Resources Specialist
Naval Facilities Engineering Command (NAVFAC), Southwest
937 North Harbor Drive
San Diego, CA 92132-5190
Tel: (619) 532-3775, Fax: (619) 532-4160
Email: albert.owen@navy.mil

FINAL REPORT FOR
PALOS VERDES BLUE BUTTERFLY YEAR 2012 CAPTIVE REARING FOR DEFENSE FUEL SUPPORT POINT, SAN PEDRO, CALIFORNIA

Prepared By:
Jana Johnson, Quincy Sweeney, Dara Flannery, Jane Jones, Nicole Wilson, Tyler Wilson, Tanya Regan, Elizabeth Lopez, Lauralynn Clopp, Nikki Arringer, Matt Miller, Sandy Jabas, Roberta Brehm, Diane Werner, Katie Virun, and Travis Longcore
The Urban Wildlands Group
P.O. Box 24020
Los Angeles, CA 90024-0020

January 27, 2013

Recommended Citation:
Johnson, J., Q. Sweeney, D. Flannery, J. Jones, N. Wilson, T. Wilson, T. Regan, E. Lopez, L. Clopp, N. Arringer, M. Miller, S. Jabas, R. Brehm, D. Werner, K. Virun, and T. Longcore, 2012. Final Report for Palos Verdes Blue Butterfly Year 2012 Captive Rearing for Defense Fuel Support Point, San Pedro, California. Los Angeles: The Urban Wildlands Group (NAVFAC SW Agreement No.: N62473-12-2-2101).

EXECUTIVE SUMMARY

In 2012, the captive population of Palos Verdes blue butterfly (PVB) was reared at the Defense Fuel Support Point (DFSP) and The Butterfly Project at Moorpark College. Sufficient numbers of adults were available to conduct releases onto managed habitat areas. Key findings and outcomes are as follows:

- The focus of the rearing program continues to be on 1) releasing butterflies to the wild to augment or establish populations, 2) conducting research, and 3) maintaining a refugium population.

- 401 butterflies, 500–1000 larvae and 100 pupae were released to the wild in compliance with existing U.S. Fish and Wildlife Service permits.

- At the close of the season 2,048 pupae were in captivity: 1,731 new pupae were produced and in 2012 and 317 were remaining from previous years.

- Almost 1,000 plants were used to support the larvae. Since only the plants in the best condition are used, we consistently use fewer than we order from the Palos Verdes Peninsula Land Conservancy (PVPLC). We use all the second year flowering growth that they have available from February–April. We use all the young, fresh, and flowering growth they have to support the larval stock from late March through May as substrate for adult butterflies (nectaring, mating, oviposition). Production of more young, fresh, and flowering growth by cutting back potted plants to stimulate a second year of growth would help with the quality of the foodplant for rearing purposes.

- A new investigation into the longevity of pupae in the wild has been set up at DFSP with 100 PVB pupae glued to the bottom hollow of dead prickly pear pads (that serve as an igloo-like shelter).

TABLE OF CONTENTS

1. Introduction

The Palos Verdes blue butterfly, *Glaucopsyche lygdamus palosverdesensis* (Lepidoptera: Lycaenidae: Polyommatinae) (Figure 1), was thought extinct in 1983 when the last known population was bulldozed for a baseball field (Mattoni 1993). The subspecies was subsequently discovered on the Defense Fuel Support Point (DFSP) in San Pedro in 1994 (Mattoni 1995). Palos Verdes blue butterflies at DFSP were found to feed on both *Acmispon glaber* [=*Lotus scoparius*] and *Astragalus trichopodus lonchus* (both in the family Fabaceae) as larvae, which occurred there naturally and are found in revegetated coastal sage scrub (Mattoni 1995).

In 1994, a captive propagation program was established to guard against extinction (Mattoni et al. 2003). The number of pupae in captivity at the end of each season has varied from 93 to 4,513. The maximum production came from the 2008 season and represents unprecedented success in comparison with other lycaenid rearing reports (Herms et al. 1996). This report outlines the 2012 captive rearing season.

Figure 1. Captive reared, male Palos Verdes blue butterfly released to the wild (Linden H. Chandler Preserve) in 2010. Photo by Ann Dalkey.

The rearing project meets in part the conditions of the United States Fish and Wildlife Service's (USFWS) Biological Opinion on the Formal Section 7 Consultation for Routine Maintenance Operations, Defense Fuel Support Point, San Pedro, Los Angeles County, California (FWS-LA-08B0606-08F0704), dated July 2, 2010 (U.S. Fish and Wildlife Service 2010). The current captive propagation program utilizes methods developed by Johnson, Pratt, and Mattoni in line with recommendations by the USFWS (Mattoni 1988, Pratt and Stouthamer 2002, Mattoni et al. 2003, Johnson et al. 2008).

Rearing for the 2012 season was conducted under the authority of Dr. Jana Johnson as permitted under USFWS Biological Opinion 1-6-96-F-09 (U.S. Fish and Wildlife Service 2006). Additional care was provided by the subpermitees on List C of the Fifth Amendment to the Biological Opinion 1-6-96-F-11. Subpermitees received extensive training prior to handling the captive stock. The Biological Opinion permits rearing to take place at DSFP and at a secondary site at Moorpark College, Moorpark, California.

Captive stock was maintained at two locations in 2012. The laboratory facilities at DFSP were used for small portion of the stock. The remaining stock was reared at The Butterfly Project (TBP), which is a collaborative effort between The Urban Wildlands Group and Moorpark College, including America's Teaching Zoo and the Department of Biology, where Dr. Johnson is employed (authorized by Fourth Amendment to Biological Opinion 1-6-96-F-09, December 14, 2006). Since 2006, the PVB population has significantly increased by implementing a dynamic rearing approach with labor intensive methods performed by subpermitees. These methods are labor intensive and the majority of the production therefore occurs at the Moorpark College rearing site because of the availability of skilled student labor.

2. Captive Breeding Methods

2.1. Pupae and Eclosion Chambers

New pupae from the 2011 rearing season and pupae that remained in diapause from previous seasons were placed in refrigeration at the beginning of winter 2011 (November), with the exception of the stock held at DFSP. The refrigerated stock had the temperature of the refrigerator checked and recorded hourly during zoo hours. This was to insure a steady temperature. At DFSP, pupae have been unrefrigerated since 2007, and continued to be unrefrigerated, stored in the DFSP lab on the counter. The stock from 2009 was left unrefrigerated to increase the scope of this experiment, with permission from USFWS and NAVFAC. The window in the laboratory where the pupae are stored is screened and barred, and was therefore left open to allow the lab to equalize with ambient outdoor temperature. This allows the stock at DFSP to experience a more natural temperature profile throughout the year and increases the probability that observations made on this stock will be relevant to the wild population.

The pupae at Moorpark College were removed from refrigeration in one group. They were pulled on February 17, 2012. The pupae were subsequently sorted according to geneline and then weighed using an electronic scale to the nearest mg and recorded in a spreadsheet. We handled pupae with Bioquip featherweight forceps or fingertips. The subpermitees worked in pairs to ensure the accuracy of the data record. The weighed pupae were transferred into an individually assigned seat of a geneline-specific eclosion cup (Figure 3). The eclosion cups at Moorpark Col-

lege were the same as used in 2010 (Johnson et al. 2011), but with seat dividers improved to keep pupae separate and uniquely identifiable. These are foam seat dividers hot glued to the sides of a plastic cap from a soda bottle with a dowel rod hot glued to the bottom of the cap (to secure the device in the ground walnut shells in the bottom of the cup; Figure 2). Seat numbers were recorded on both foam sides of a seat's chamber to prevent any confusion. These were stored four cups to a tray with an eclosion box over them for secondary containment. The greenhouse served as tertiary containment.

Eclosion is associated with moisture, heat, light exposure, and possibly pheromones. Because of the large number of pupae, we did not need to maximize the number eclosing. We therefore did not mist the DFSP pupae with water to stimulate eclosion. Nor did we mist/heat pupae at TBP this year (but they did receive the large temperature cue of being removed from refrigeration and placed in the greenhouses).

Figure 2. Improved seat dividers that no longer collapse. The foam seats are hot glued to a drink cap that has a dowel rod hot glued to its base (to hold it in the ground walnut shells at the bottom of the cup). Seat numbers are recorded on both sides of the seat chamber to prevent any confusion.

Figure 3. Left: Eclosion cups in eclosion boxes in new greenhouse. **Center:** A handling box with an eclosion cup inside. **Right:** Demonstration of access to the eclosion cup through the sleeve entry.

Eclosion check was performed twice each day from the date of the "pull" (removal of the pupae from refrigeration) through the end of the eclosion period. Eclosion check was performed with the help of a penlight to insure adequate light on each and every pupa as it was examined for blu-

ing and eclosion. Daily eclosion checks were performed throughout the summer. Late eclosions were not bred, and were utilized for public education.

Upon eclosure, the eclosion cup containing adults was transferred into a handling box (Figure 3). This method allows for multiple subpermitees to process emerging adults in the same greenhouse without mixing the genelines (Johnson et al. 2010). The handling boxes had previously been used for manipulation of endangered stock in the field, the application to the lab has been one of the major advances for safety and control of the butterflies, efficiency in usage of lab space, and has decreased stress for the individuals involved in processing. The handling boxes are constructed out of plywood and mesh with an entry sleeve similar to a multiplant container (Figure 3).

This system for processing allows the handling container to serve as the first level of containment once the eclosion cup is opened and the greenhouse serves as the second level of containment. This is the first season that these two levels of containment were possible at all times.

Once the eclosion cup was open inside of the handling box, the newly emerged adults could be processed into holding containers. These holding containers have been standardized to a plastic container that we used to use for other purposes, but has proven itself valuable as a holding/sorting container (Figure 4). The holding/sorting container is geneline and sex specific and properly labeled. It is secured on the open side with mesh and a thick rubber band, then removed from the handling box and placed into the sorting area of the greenhouse (Figure 5).

Figure 4. Left: Five handling boxes in use by five student workers in the greenhouse. **Right:** Two Palos Verdes blue butterfly "sister" females being transferred from an eclosion cup to a holding/sorting container inside of a handling box.

Eclosions were recorded in the spreadsheet of individuals with the date of eclosion, and when possible, the sex of the individual. If multiple adults of both sexes were present in a single cup, the sex ratio was recorded, but sex was not assigned to individual seat numbers. Adults were identified to sex following the same procedures reported from the 2007 season (Johnson et al. 2008). In 2011, we started requiring all technicians to write out "male" and "female" both in the log and on the holding container to prevent mistakes with the symbols for the sexes.

One group of pupae had been involved in an experiment on parasitism in 2007 (Johnson et al. 2008) and adults from this group, as well as any adults with eclosion anomalies (e.g., wings failed to expand), were not bred and were used to educate zoo patrons and academic classes.

Figure 5. Sorting containers in the holding area of the new greenhouse. They are oriented upside down to allow for a feeding station providing a honey-water solution.

2.2. Adult Maintenance

Adults were maintained in multiplant and uniplant boxes. Multiplant boxes consist of a larger box with three or more potted foodplants inserted inside the box and kept above the ground by legs on the bottom of the box. Uniplant boxes have a single plant and allow for crosses of smaller numbers of PVB. The box has two sides of plywood with "sleeve" tunnels to allow access and two sides of mesh. The roof is solid clear plastic to eliminate threat from rain and allow sun. The legs are kept in soapy water containers to exclude predators (especially ants, which will kill adult butterflies). Due to reduced breeding and egg production in the mesh tents, this type of containment was abandoned this year. We increased security of the multi- and uni-plant boxes with foam tape and bungee cords. This security worked well and breeding and egg production recovered to pre-mesh tent breeding years.

The eclosed adults were sorted by geneline and sex and placed in the holding area of the greenhouse. Butterflies were fed daily while in the holding area while held in sex and geneline specific containers. Based on the distribution of individuals between genelines, crosses were established in multiplant boxes (same mass breeding and oviposition containers as the previous two seasons). The brothers from one geneline (preferably a couple of days old) were crossed with sisters from an unrelated geneline (preferably the same day of eclosion). The multiplant boxes were maintained ant free by immersing the feet in trays containing soapy water.

All adults were hand fed daily as previously described (Johnson et al. 2008). Captive adults were fed with specialty honey from the hives maintained by Lt.Col. Ramer (ret.), the former Commander at DFSP, thereby providing artificial nectar similar to nectar sources available on DFSP. Honey was used as a nutrition source following research in 2007 that showed adults fed honey lived on average 4.5 days longer than those fed with "Fierce Melon" Gatorade (Johnson et al. 2008). By physically placing butterflies on the provided honey-water solution, instead of just providing them access to it, longevity of individually caged adult butterflies has increased from 14 days (2005) to a maximum thus far of 38 days (2007). Adults were fed in their multiplant boxes. Butterflies in holding containers were fed in the holding area of the new greenhouse.

2.3. Breeding

The captive population is now large, so mass rearing techniques were employed. Per the agreement with the partners, and in consultation with USFWS, only part of the stock was bred. Genelines with limited individuals were maintained in sex specific holding containers in the holding area or released to the wild. All individuals were fed daily and maintained until they died of natural causes. The butterflies that were bred were housed in multiplant and uniplant boxes.

“Sisters” from one lineage would be combined with “brothers” from a separate lineage in each multibox to mate. Crosses were determined daily depending on which individuals eclosed that day. The crosses were designed to maximize diversity of nucleic DNA by mating the butterflies available on a particular day that were least related to each other (see Appendix for example data sheet supporting daily decisions on mating). With one wild population left and the main concern being to establish robust and self-sufficient new populations, we focused on overall diversity rather than inbreeding specific maternal lines. Releases to DFSP, Chandler Preserve and Friendship Park were from the holding stock that otherwise would not have been bred. We have documented breeding post-release in the past. Releasing holding stock that would not have been bred allows for a zero impact on the captive bred stock no matter the loss rate to predators and other selective agents in the wild.

2.4. Larval Rearing

DFSP was used as a refugium population in 2012. The unrefrigerated pupae were monitored throughout the season and the eclosions were moved to The Butterfly Project. This was favored due to increased security that made it difficult to have flexible visiting times and decreased labor available at DFSP. The Butterfly Project housed egg and larval stock in rearing containers in the greenhouse and multiplant boxes outside the greenhouse. Pupae were transported down from TBP to DFSP as necessary to maintain the refugium population at 500 individuals. This number corresponds to the rule of thumb for maintaining genetic diversity (Franklin 1980), especially when the effective population is kept a high proportion of the total population through captive mating, and provides a sufficient number to recover the captive population in a season should a catastrophic event result in the loss of the butterflies at Moorpark College.

All locations were protected from rain and defended against predators while allowing exposure to sunlight. Predator exclusion included but was not limited to placing the legs of tables and multiplant boxes in containers of soapy water, vigilant elimination of any substance that would attract predators, fine cloth that allowed ventilation while excluding pests, and the buildings themselves. Rearing chambers on the potted plants were checked daily for egg development and any signs of aphids or earwigs. Aphids and earwigs were removed by hand when discovered.

First instar Palos Verdes blue butterfly larvae were able to remain in their larval containers on the potted foodplant because organza cloth (reduced gauge material) effectively trapped them on the live foodplant. They were also reared in the multiplant boxes (Figure 6).

Figure 6. Process for providing live foodplant for ovipositioning butterflies. **Top:** preparing foodplant with barrier to use in oviposition container. **Bottom left:** "Doublestack" container developed for ease in managing butterflies, with increased height, meshed sides, and multiple sleeved entries. **Bottom right:** Access to foodplant, butterflies, and larvae through sleeved entries.

Figure 7. Maintenance of fourth instar Palos Verdes blue butterfly larvae. The old sticks (stems) and frass (1) gets tapped into a small trash receptacle (2), freshly groomed and cut foodplant (3) is added to the newly cleaned condo and the larvae is returned to the condo (4) and it is capped with a lid that is labeled with the mating box number it originated from (5). There are 45 condos per tray.

Upon reaching 4th instar, larvae were transferred into individual rearing containers to prevent cannibalism (Figure 8). The smaller instars experience high mortality in these small, limited ventilation individual containers, therefore the cannibalism is a tolerated risk for the smaller instars.

Figure 8. Storage of late-instar larvae in stacked "condos" of creamer cups.

When the larvae pupated, their container was emptied and left open to allow proper ventilation for pupal skin hardening (Figure 9). After complete hardening of the pupae, their containers were closed and were stored at ambient room temperature with the window open and no heating or cooling (DFSP) or greenhouse temperatures until hardened and then room temperature with air conditioning during the summer (TPB).

The pupae at The Butterfly Project will be placed into refrigeration at the beginning of November 2012 to simulate winter, limit moisture loss from the pupae, prevent premature eclosions, and aid in synchronizing the 2013 eclosion period.

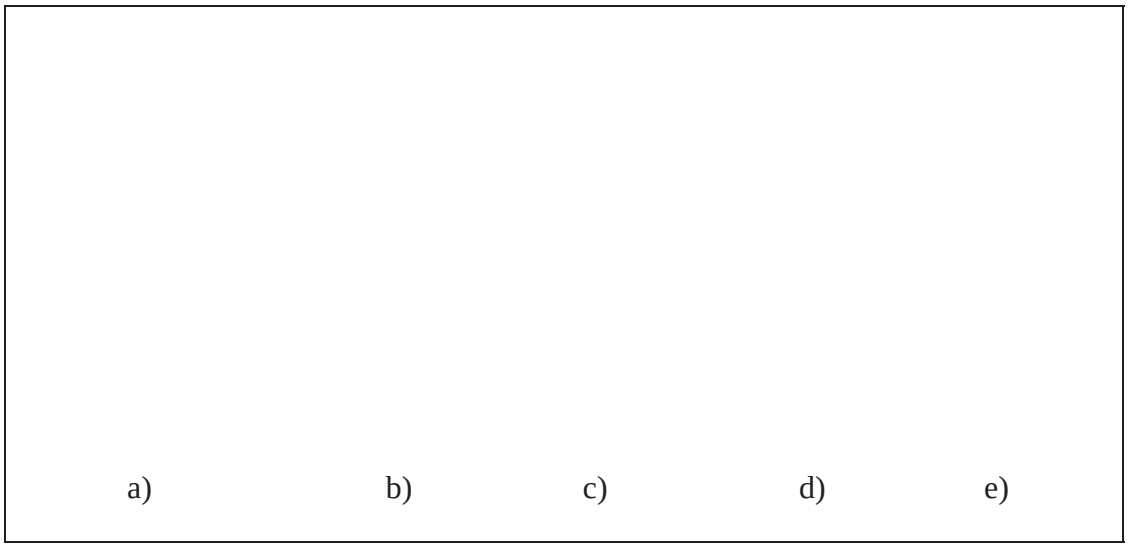


Figure 9. Pupation sequence. When the larva is prepupal (a, b) the condo is left open for ventilation to stimulate pupation. Once the pupae have hardened to the darker brown coloration (d, e), the majority of the vegetation may be removed from the cup and the cup resealed.

The refrigerator is held within the range of 40–50 ºF, as verified hourly by zoo staff during rounds. The recorded zoo staff notes on refrigerator temperature are reviewed by butterfly staff once/day. The zoo is on backup generators and all butterfly staff have been trained on the dedicated electrical circuit (location and how to reset) for the refrigerator.

2.5. Experiment to Determine Pupal Eclosion Rates Under Natural Conditions

During the past several years of captive breeding for Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*), we have undertaken an experiment to learn about the natural diapause pattern for the pupae. As part of this effort, cohorts of pupae have been left in ambient conditions in the laboratory at Defense Fuel Support Point, San Pedro with the window open, rather than being transferred to refrigeration as is usually done to synchronize spring eclosions. During 2011, the 484 eclosions from unrefrigerated pupae were from those that had pupated in 2009 and were never refrigerated, while only 14 of the 2009 pupae had eclosed in 2010. This adds support to previous results from 2009 that suggested the unrefrigerated pupae are more likely to eclose in their second season (after their second winter) rather than their first season (Johnson et al. 2010).

The duration of pupation in the wild is of considerable interest because it informs our understanding of how many live pupae may be in the soil, but not eclosing, during any given year. Our other research has shown gradual weight loss by pupae during the winter (even when refrigerated) and this loss (presumably water and respiration) will limit duration of pupal diapause in the wild. We therefore initiated an experiment at DFSP wherein pupae were be secured outside to be exposed to natural weather conditions and tracked for subsequent years to observe and record eclosion rates.

Figure 10. Weighing (left), attaching to Velcro (center), and re-weighing (right) Palos Verdes blue butterfly pupae in preparation for experiment measuring length of pupation in the field.

We affixed 100 pupae with glue to pads of prickly pear cactus (*Opuntia littoralis*). Five pupae were attached to each pad to simulate the possible production of a single, robust foodplant. We used 20 pupae from each of 5 genelines. Each pupa was numbered, weighed, then glued to a piece of Velcro, and weighed again (Figure 10). One of each geneline was affixed to each cactus pad and rotated "seat assignment" for each geneline (Figure 11). The use of Velcro to attach the pupae will allow re-weighing without disturbing the pupae so that annual weight loss can be determined. The pupae were located on the underside of the pad, with orange number on the prickly pear pad (Figure 12). These pads were then placed under a deerweed plant, pupae side down, and marked with a flag (Figure 13). The experimental area is located near the lookout tower at DFSP where we have released butterflies during the last two years, as approved by the Navy and U.S. Fish and Wildlife Service. Cactus pads were used to minimize the effects of predation; it should be difficult for larger predators to access pupae placed among the spines. We also believe this is an appropriate location for pupae based on our observations in the laboratory, where larvae not initially located within rearing cages gather underneath the pots to pupate (Figure 14), where they are later discovered.

Figure 11. Placement of Palos Verdes blue butterfly pupae on cactus pads with Velcro to track length of pupation.

Figure 12. Prickly pear cactus pads labeled in orange with five Palos Verdes blue butterfly pupae affixed to each with Velcro.

Figure 13. Placement of Palos Verdes blue butterfly pupae affixed to cactus pads under deerweed plants at DFSP at the end of May 2012. The experimental area is marked with white flags.

Figure 14. Larvae of Palos Verdes blue butterfly gathered on the underside of a nursery pot to pupate. Photograph taken by J. Johnson in May 2012 at Moorpark College.

3. Results of Captive Breeding

3.1. Pupae and Eclosion

At the start of the season, we had 2,367 pupae from the 2006–2011 breeding seasons (Table 1). Of these, those that weigh > 35 mg, either at the start or the end of the season are considered nonviable. These nonviable pupae were then placed in a Ziploc baggy, crushed, checked for fluid (there was none) and then discarded. We take these precautions to ensure that we do not dispose of a viable pupa that could then eclose and become an introduced species in another location.

Table 1. Number of pupae and eclosion rates for 2012 season.

Year Pupated	Number at Start of Season	Number Eclosed	Percent Eclosed	Number Did Not Eclose
2006	12	0	0	12 (all dead)
2007	45	0	0	45 (all dead)
2008	0	0	0	0
2009	103	3	2.9%	100 (all dead)
2010	270	195	72.2%	75 (43 dead)
2011	1,937	1245	64.3%	692 (407 dead)
Total	*2,367*	*1443*	*59.2%*	*884 (607 dead)*

Pupae decreased in weight during the winter. The total average loss for all pupae was 7.72 ± 9.78 S.D mg for both pupae that survived and those that died. If nonviable pupae were excluded, the weight loss was 6.02 ± 4.65 S.D. mg. The dramatic weight loss of those pupae that were not viable is readily apparent upon inspection of the per pupae weights for 2011 and 2012 (Figure 15).

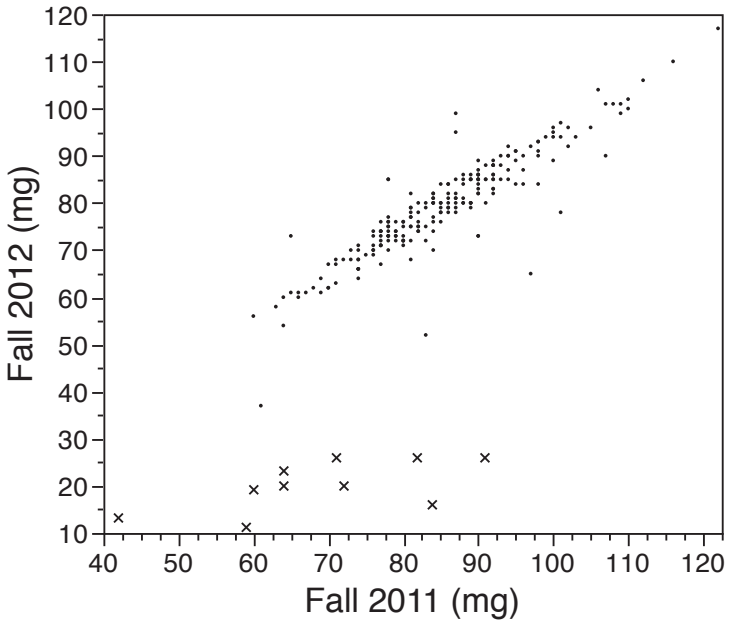


Figure 15. Relationship of fall 2011 pupal weights with fall 2012 weights. Those pupae that have died are marked with an X.

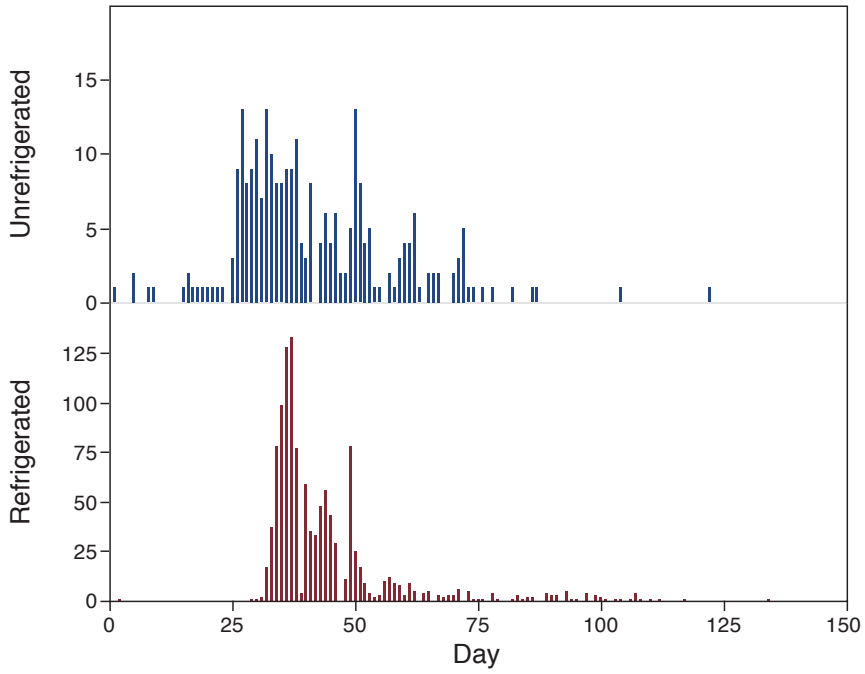


Figure 16. Eclosion curves for pupae that were unrefrigerated at DFSP and refrigerated at TBP.

The eclosion curve for pupae that were refrigerated was more compact than for those pupae that were not refrigerated (Figure 16). Our timing of removal from refrigeration resulted in an almost exact match of eclosion times with those pupae that were not refrigerated.

3.2. Adults

Overall, 1,443 butterflies eclosed with a sex ratio of 819 males: 619 females (1.32:1) and 5 unknowns (5 were recorded as eclosed, but no sex recorded. DFSP captive stock had a ratio of 161 males: 104 females (1.5:1) and 2 unknown. The Butterfly Project captive stock had a ratio of 658 males: 515 females (1.3:1) and 3 unknowns (sex not recorded). Peak eclosion was 27 days after the pull from refrigeration (February 17).

The new seat dividers were more stable and helped to decrease lost data due to pupae being disturbed between seats by eclosing butterflies. The eclosion rate was 59.2%. This is comparable to 74% in 2011, 50.8% in 2010, 74% in 2009 and 72% in 2008.

The adult butterflies exhibited surprisingly few aberrations. The usual two primary issues arose, failure to expand properly (these were maintained in gender specific multiplant boxes, cared for daily and used for educational purposes) and miniature stature (these were maintained separately). A small number of the butterflies failed to expand properly. Miniature stature arose in several gene lines and were placed into the gender specific box with the eclosions issues and not bred.

We continue to cross the lineages in order to create the greatest nucleic heterozygosity possible in the captive stock. No wild butterflies were brought in to the program.

Nineteen mating crosses were attempted. Crosses 12M01 and 12M02 were not observed to mate, the eggs were infertile and collapsed. These mating boxes were closed. Mating was observed in all of the subsequent crosses (12M03 – 12M19). Pupae were harvested from all boxes.

Figure 17. Mating Palos Verdes blue butterflies and first instar larvae from 2012 captive breeding.

Table 2. Mating crosses of captive Palos Verdes blue butterflies in 2012. The codes indicate the year in the first two characters, M for "mating" and the number of mating in that year (e.g., 10M2 is the second pairing from 2010). Full lineages are maintained in the studbook for the project.

Cross	Males	Females
12M01	10M13	10M12
12M02	10M17	10M16
12M03	10M5 & 10M11	09M14 & 10M17 & 10M6
12M04	10M2 & 10M6	10M5
12M05	11M14	11M4
12M06	11M12	11M14
12M07	11M16	11M12
12M08	11M9	11M16
12M09	11M15	10M12
12M10	11M11	11M20
12M11	11M5	10M11
12M12	11M4	11M15
12M13	11M20	11M9
12M14	11M19	11M11
12M15	11M17	11M6
12M16	11M7	11M19
12M17	11M6	11M17
12M18	11M26	11M5
12M19	10M12	11M7

3.3. Larvae

1,731 larvae survived to pupation in 2012 (Table 3). 500–1,000 were released (see below)

Table 3. Summary of pupae in storage and disposition of adults and larvae in 2012.

	Number
2010 Pupae (viable only)	32
2011 Pupae (viable only)	285
2012 Pupae (new)	1,731
Total Pupae in Storage	*2,048*

3.4. Releases

In consultation with USFWS and with the permission of the Navy, both adults and larvae were released in 2012. Most of the releases were at the Linden H. Chandler Preserve, owned and operated by the Palos Verdes Pensinsula Land Conservancy. Adults were also released at DFSP. For both sites, the releases represented the second year in a row that butterflies were released, which was done as an effort to ensure a stable established population if indeed wild butterflies have a tendency to stay in diapause as pupae for two years. Also, as described above, 100 pupae

were set out at DFSP as the start of a long-term experiment to determine the natural eclosion pattern for pupae in the field. The release of butterflies and the pupae experiment at DFSP were both located near the lookout tower in the northwestern portion of the base.

Releases at off-site locations are necessary to establish new populations of the butterfly, which will be essential to species recovery. Schultz and Hammond (2003) demonstrated that extinction risk decreased more with additional populations than with increasing populations at existing sites. Consequently, off-site release of Palos Verdes blue butterflies from the captive population should, if found to be successful, reduce overall extinction risk substantially. To date, butterflies have been released from the captive propagation program at three off-site localities that are permitted to receive the butterfly and managed for natural resource values. None of the landowners hosting the release efforts has yet to report establishment of an additional stable Palos Verdes blue butterfly population. Releases at DFSP can help re-establish butterflies in areas of the installation where they have disappeared or establish them where new habitat has been created. This combined strategy of reintroduction within the species range and augmentation at DFSP is essential to achieve the long-term goal of species recovery.

Table 4. Details of releases of captive-bred Palos Verdes blue butterflies in 2012. Locations were Defense Fuel Support Point, San Pedro and Linden H. Chandler Preserve.

Release Occasion	Date	Location	Males	Females
TV interview	3/21/2012	Chandler	8	4
Make-A-Wish	3/27/2012	Chandler	29	20
PVPLC Donors	3/31/2012	DFSP	89	44
Girl Scouts	4/7/2012	Chandler	29	26
Closing mating boxes for imagoes	4/15/2012	Chandler	38	51
Late eclosing adults released from holding	5/1/2012	Chandler	16	25
Late eclosing adults released from holding	5/10/2012	Chandler	15	7
Larval release	5/10/2012	Chandler	500–1000 larvae were released and allowed to disperse	
Pupal release	5/30/2012	DFSP	100 pupae were placed in field as a part of a study on eclosion timing under natural settings	

Freshly released butterflies were observed mating on March 27 and April 7 (Figure 18), and fertilized females were included in the April 15 release.

Figure 18. Mating captive-bred Palos Verdes blue butterflies following release on March 27, 2012 (top; photos by Frank Model) and on April 7 (bottom; photos by Gary Wilson).

Figure 19. Release of Palos Verdes blue butterfly larvae on cut foodplant. Cut deerweed is transported in a Ziploc bag (left) with larvae on the stems (center). The cut stems are placed in the foliage of deerweed at the release site (right).

On April 7, 2012, we released at Chandler with the Palos Verdes Peninsula Land Conservancy's Girl Scout volunteers (Figure 20). This was at sites where they did habitat restoration on the top of the hill. In future, it would be good to focus such events on slopes, since the butterflies do not tend to stay on hilltops.

On April 15, 2012, we released our unbred male and female butterflies at the Chandler Preserve, as well as imagoes from the mating boxes (both males and gravid females). Doing this allows the team to focus on larval rearing once sufficient eggs are obtained.

Figure 20. Mating Palos Verdes blue butterflies on an *Amsinckia* flower following release by Girl Scouts at Linden H. Chandler Preserve.

4. Discussion and Recommendations

We continue to be in the fortunate position of being able to produce more offspring than we are capable of rearing in captivity; therefore the number of butterflies produced continues to be dictated by the availability of reintroduction sites.

4.1. Pupal Weight Loss

The data suggest that refrigeration slows water loss from the pupal stage. The higher rates of water loss from the unrefrigerated pupae suggests that the previously reported captive rearing statistic of up to 5 years of longevity in the pupal stage (the "pupal bank") was artificially elevated by the refrigeration. A closer estimate to the wild would be 2–3 years. It is possible that water relations in the wild are different, with pupae able to stay moist in the duff and soil at the base of plants where they pupate (Longcore et al. 2005). But assuming that the water relations of pupae that have pupated in natural situations are similar to those maintained unrefrigerated in the laboratory, the annual weight loss we have recorded has a devastating ramification for estimates of the species' resilience to climatic variation because it suggests that pupae have a shorter window to "opt out" in sequentially bad years.

We do not have the resources to refrigerate the stock at both locations, currently. Previous backup power solutions at DFSP (e.g., battery systems) have not proved viable from a safety perspective. There needs to be a discussion of whether pupae at DFSP should continue to be unrefrigerated at DFSP (to collect data) despite the decreased longevity, or whether a larger refrigerator and backup generator should be considered for one of the buildings at DFSP.

Anecdotally, eclosion failures appear to be slightly lower in the unrefrigerated stock, but occur at such a low rate that this reason cannot be used to justify leaving the pupae without refrigeration.

We have not examined the effect of leaving a cohort of pupae refrigerated for a prolonged period of time as "banked pupae." This has been suggested by several lepidopterists (Rudi Mattoni, Ken Osborne, Gordon Pratt, pers. comm.) as something that might be investigated when production is greater than can be released to the environment (we have achieved that for multiple years now). Perhaps we should leave a cohort in the refrigerator from November 2012–February 2014 and compare eclosion/failure rates with individuals not exposed to extended refrigeration to plan for future scenarios where fewer resources are available for captive rearing each year.

4.2. Mating

We will proceed with mating between generations. With the skewed sex ratio in multiyear pupae (more females than males enter multiyear diapause) and the success of mating being higher when there are multiple males for each female, the primary way to mate multiyear females is with the next generation males.

4.3. 2013 Overview

We recruited students at the beginning of fall semester this year, so their training will have been underway for 6 months prior to helping with PVB. More intensive training documents have been developed and the team has already been exposed to caring for endangered foundresses, eggs and first instar larvae with Lange's Metalmark butterfly (the other species present at the project). There have been several changes (noted earlier) to our care and rearing protocol and we will continue to adjust it for the benefit of the species.

It has been four years since any wild stock has been brought into the captive stock, and we will be requesting permission to bring 5–10 wild larvae into the captive stock to provide wild stock for the 2013 season. Another option would be to capture wild females, swab them for genetic sampling, contain them for 24–48 hours (collecting their egg production), and then rerelease the females.

5. Public Outreach

Public outreach is important to the recovery of the butterfly because the other sites where populations might be established are open to the public. Support from the public to protect and restore these habitats is therefore essential. Even with extensive and ongoing conservation actions at DFSP, as is already occurring, the species will remain at risk if it is not reintroduced successfully through a significant proportion of the species' former range. Public outreach efforts thereby aid the military mission by providing conditions that would in the future allow for the species to be removed from the endangered species.

Releases of captive butterflies provided an opportunity to do public outreach and also assist partner organizations with fundraising. One release involved Dr. Johnson's nephew as part of a "Make A Wish" trip. He was suffering from brain cancer and one of his wishes was to release a Palos Verdes blue butterfly (Figure 21). Donors to the Palos Verdes Land Conservancy were

invited to another release at the Linden H. Chandler Preserve, which is owned and managed by the conservancy. The release at DFSP was attended by base personnel, who were able to participate in the event (Figure 22).

BFCI

Please welcome

Erik Runquist, Ph.D.

Butterfly Conservation Biologist

Minnesota Zoo

to the BFCI Steering Committee

Palos Verdes Blue Update

Jana Johnson, Ph.D.,
Lead Biologist, The Butterfly Project
Moorpark College

Captive rearing of the Palos Verdes blue butterfly continues to be successful for The Urban Wildlands Group, the butterfly, the Moorpark College (California) undergraduate students who work on the project, and for scientific inquiry. UCLA has confirmed that our population is not as inbred as we had feared (we maintain complex family trees to maximize heterogeneity, as we rarely have the opportunity to bring in wild caught genes for this species that still teeters on the brink of extirpation in the wild). A cooperative effort with the University of Florida found gender specific pheromones we hope to explore further.

Our novel approach to working with undergraduate students at Moorpark College has resulted in annual Palos Verdes blue production in the thousands with ample stock for releases to several spots within the historic range. The partnership has also benefited the students. Adam Clause, the very first undergraduate student to work on the Palos Verdes blue butterfly is starting on his Ph.D. this Fall 2012 at the University of Georgia as the Presidential grantee. Several other former butterfly interns are now progressing on to graduate school.

The most touching moment in my decade of involvement on this recovery came this spring. Will Lucas, as part of his Make-A-Wish trip, his sister Darcy and parents Sara & Tom Lucas joined us in the field. As the sun set, Will, steadied by his father and wearing his "Will Power" t-shirt had a male Palos Verdes blue imago crawl out of its holding container and onto his hand. It sunned itself and then lifted off for freedom. With Will Power, we can all help make this Earth a better place.

Will Lucas participates in the release of a Palos Verdes blue as part of his "Make-A-Wish" program experience.

Figure 21. Release of a captive-bred Palos Verdes blue butterfly as part of a Make-A-Wish trip. Which was featured in the Spring 2012 BFCI newsletter.

As part of one of the releases of captive-bred butterflies at Chandler Reserve, the television station for the City of Rancho Palos Verdes taped a segment for the program "Armchair Traveler" (Figure 23). Participation in this program was pre-approved by Navy, DLA, and partner organizations. The program is available in three parts on YouTube:

https://www.youtube.com/watch?v=2b0Ng4YJHuw

https://www.youtube.com/watch?v=lWVl8-Aaepw

https://www.youtube.com/watch?v=4D2qbq33EYA

Figure 22. Lt. Col. Tam Gaffney, Commander DLA Energy, Americas West, with a captive-bred Palos Verdes blue butterfly ready for release at DFSP.

Figure 23. Dr. Jana Johnson (UWG/Moorpark College) and Moorpark College students being interviewed as part of the Armchair Traveler program on City of Rancho Palos Verdes TV during a release of butterflies at the Linden H. Chandler Preserve.

Outreach to the general public is ongoing at The Moorpark College rearing site for the Lange's metalmark rearing project and for the Palos Verdes blue butterfly rearing project (which has adjacent but separate facilities). A tri-fold educational brochure is always available to the public along the external fence. We also provide Lange's metalmark and Palos Verdes blue butterfly "wings" along the fence that children can stand in front of to have their picture taken (some adults too). A shadow box with specimens and a description of the life history for each butterfly is also attached to the fence (Figure 24). A staffed table with free crafts was added for the Zoo's Spring Spectacular event.

Figure 24. Public outreach materials along the fence outside the rearing area for Palos Verdes blue at America's Teaching Zoo at Moorpark College. Our volunteers man table free with trifold information handouts and crafts for children on our busiest weekends.

A new round of articles was spurred by a public service lecture provided by Dr. Johnson at The Mountain Mermaid for interested members of the public in September 2012. Articles are expected in the *Moorpark Acorn*, *Topanga Messenger*, and *Palisades Post*.

6. Literature Cited

Franklin, I. R. 1980. Evolutionary change in small populations, pp. 135–149. *In* B. E. Wilcox (ed.), Conservation biology: an evolutionary-ecological perspective. Sinauer, Sunderland, Massachusetts.

Herms, C. P., D. G. McCullough, D. L. Miller, L. S. Bauer, and R. A. Haack. 1996. Laboratory rearing of *Lycaeides melissa samuelis* (Lepidoptera: Lycaenidae), an endangered butterfly in Michigan. Great Lakes Entomologist 29: 63–75.

Johnson, J., A. Lansing, M. Azemon, D. Renner, J. VanKempen, D. Amoroso, S. Foster, A. Romero, B. MacQuiddy, M. J. Handley, and T. Longcore. 2010. Final Report for Palos Verdes Blue Butterfly Year 2009 Captive Rearing on Defense Fuel Support Point, San Pedro, California and The Butterfly Project, Moorpark, California, pp. 1–24. Los Angeles: The Urban Wildlands Group (Defense Logistics Agency Agreement # N62473-08-LT-R0011), Los Angeles.

Johnson, J., A. Stangeland, D. Amoroso, A. Romero, J. VanKempen, T. Wilson, S. Foster, T. Hampton, J. Eccles, K. Virun, R. Minzer, B. Coomes, J. Mauck, D. Flanner, B. MacQuiddy, M. McNeil, M. Wagner, and T. Longcore. 2011. Final Report for Palos Verdes Blue Butterfly Year 2010 Captive Rearing on Defense Fuel Support Point, San Pedro, California and The Butterfly Project, Moorpark, California, pp. 1–21. Los Angeles: The Urban Wildlands Group (Defense Logistics Agency Agreement # N62473-08-LT-R0011), Los Angeles.

Johnson, J. J., A. Clause, C. Behringer, A. Lansing, and T. Longcore. 2008. Final Report for Palos Verdes blue butterfly year 2007 captive rearing at Defense Fuel Support Point, San Pedro, California and The Butterfly Project, Moorpark, California. (NAVFAC SW Cooperative Agreement # N6871-04-LT-A0017), pp. 1–28. The Urban Wildlands Group, Los Angeles.

Longcore, T., R. Mattoni, and A. Mattoni. 2005. Salvage of individual pupae as a mitigation measure for loss of Palos Verdes blue butterfly habitat. Journal of the Lepidopterists' Society 59: 116–117.

Mattoni, R., T. Longcore, Z. Krenova, and A. Lipman. 2003. Mass rearing of the endangered Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*: Lycaenidae). Journal of Research on the Lepidoptera 37: 55–67.

Mattoni, R. H. T. 1988. Captive propagation of California endangered butterflies. California Department of Fish and Game, Sacramento, CA.

Mattoni, R. H. T. 1993. The Palos Verdes blue, *Glaucopsyche lygdamus palosverdesensis* Perkins and Emmel, pp. 135–136. *In* T. R. New (ed.), Occasional Paper of the IUCN Species Survival Commission, No. 8. Conservation Biology of Lycaenidae (Butterflies). IUCN, Gland, Switzerland.

Mattoni, R. H. T. 1995. Rediscovery of the endangered Palos Verdes blue butterfly, *Glaucopsyche lygdamus palosverdesensis* Perkins and Emmel (Lycaenidae). Journal of Research on the Lepidoptera 31: 180–194.

Pratt, G. F., and R. Stouthamer. 2002. Quino checkerspot 2002 report: captive breeding.

Schultz, C. B., and P. W. Hammond. 2003. Using population viability analysis to develop recovery criteria for endangered insects: case study of the Fender's blue butterfly. Conservation Biology 17: 1372–1385.

U.S. Fish and Wildlife Service. 2006. Fourth Amendment to the Biological Opinion (1-6-96-F-09) for the Chevron 1-8" Pipeline and Associated Government Pipelines Project, Defense Fuel Support Point, San Pedro, Los Angeles County, California. U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, Carlsbad, California.

U.S. Fish and Wildlife Service. 2010. Formal Section 7 Consultation for Routine Maintenance Operations, Defense Fuel Support Point, San Pedro, Los Angeles County, California. U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, Carlsbad, California.

Palos Verdes Peninsula Land Conservancy

Defense Fuel Supply Point, San Pedro CA
Habitat Monitoring, Restoration and Invasive Species Control
FY 2012 Annual Report

January 15, 2013

PO Box 3427
Palos Verdes Peninsula,
California 90274
T 310-541-7613
F 310-541-7623
www.pvplc.org

Defense Fuel Supply Point, San Pedro, CA
Habitat Monitoring, Restoration and Invasive Species Control
FY 2012 Annual Report

Cooperative Agreement # N62473-08-2-0010, Modification 4

Prepared for:
Naval Facilities Engineering Command, Southwest
1220 Pacific Highway
San Diego, CA 92132-5190

Prepared by:
Palos Verdes Peninsula Land Conservancy
Contact: Danielle LeFer
January 15, 2013

EXECUTIVE SUMMARY

The Palos Verdes Peninsula Land Conservancy, under a cooperative agreement with the Naval Facilities Engineering Command, Southwest, restores and monitors habitat for two listed species: Palos Verdes blue butterfly (*Glaucopsychae lygdamus palosverdesensis*) and coastal California gnatcatcher (*Polioptila californica californica*). This report summarizes results of vegetation surveys conducted in June 2012 to quantify native plant cover, particularly *Acmispon glaber* (deerweed), the host plant for the Palos Verdes blue butterfly (*Glaucopsychae lygdamus palosverdesensis*) and habitat restoration activities that took place during fiscal year 2012.

Of the 24 transects in the management areas, 8 transects were in areas with coastal sage scrub (Figure 3). Of the 16 PVB habitat transects, 4 had deerweed percent cover of 10% or greater, and 3 had deerweed cover of 9%. Ten transects showed increases in deerweed cover of 3% or more compared to 2011. Deerweed cover has decreased over time due to the combined effects of maturing coastal sage scrub habitat and the presence of non-native invasive plants. Competition from native and non-native plants negatively affects this early-successional species.

Habitat management includes targeted invasive species control to improve habitat quality and to minimize the risk of habitat degradation. Targeted invasive species control in 2012 included: removal of ice plant, castor bean, and pampas grass from managed areas (Transects1-1, 1-2, 6-1, 6-2, 7-1, 7-3, 8-1, and 8-2).

Based on the results of 2012 monitoring, the PVPLC recommends continued invasive species removal and continued habitat manipulation to increase host plant densities. The priority in Fall 2012 through Summer 2013 will be to remove invasive species in areas where PVB currently occur. Before the 2013 flight season, PVPLC plans to clear ice plant from Transect 1-1 and 1-2; clear invasive trees and ice plant from Transect 5-1; clear castor bean from Transects 6-2 and 6-4; and clear peppertrees from transects 7-1, and 7-3. As time permits, peppertrees at 8-1 and 8-3 will also be cleared.

Table of Contents

1 INTRODUCTION AND BACKGROUND

The federally endangered Palos Verdes blue butterfly (PVB) was discovered at the Defense Fuel Support Point (Figure 1) in 1994 after ten years of presumed extinction (Mattoni 1994). The PVB was historically and is currently restricted to the Palos Verdes peninsula, Los Angeles County, California. PVB is found in open coastal sage scrub (CSS) vegetation that includes the larval host plants coast locoweed (*Astragalus trichopodus lonchus)* or deerweed (*Acmispon glaber)*. PVB require suitable larval host plants for oviposition and larval development. Both coast locoweed and deerweed are naturally distributed within disturbed patches in CSS communities on the Palos Verdes peninsula. Both plant species invade cleared areas following disturbance, and coast locoweed can sometimes persist in more mature scrub.

The PVB has a single adult flight period extending from late January through mid-April. Eggs are normally laid in the flower heads of either deerweed or coast locoweed, where the caterpillars will feed. When the larvae are mature, they crawl into the leaf litter at or near the base of the food plant to find a place to pupate. They remain as pupae through the summer and winter, emerging as adult butterflies early the following spring.

Historically the PVB host plant species were associated with natural occurrences such as fire, landslides and animal burrowing. With human intervention, this natural cycle of disturbance and growth has changed. Humans have introduced many highly adaptable annual exotic grasses that flourish in these same open areas inhabited by both coast locoweed and deerweed and out-compete the native species for both water and nutrients. In addition, fire suppression has resulted in the establishment of continuous bands of mature coastal sage scrub communities, whereby not only is species diversity decreased, but open areas required for the establishment and development of species such as coast locoweed and deerweed are decreased as well.

To maximize the potential for the continued presence of the two Palos Verdes blue butterfly host plant species, restoration efforts must follow a two-fold approach. First, is the establishment of additional Palos Verdes Blue butterfly habitat to provide the necessary resources to support the PVB. In addition, newly established habitat must be maintained on a continuous basis to ensure the continued existence of gaps within which provide the open areas necessary for both coast locoweed and deerweed species to persist. Since fire, in the form of controlled burns, is not an option at the site, open areas require regular on-going maintenance through mechanical means (Osborne 2002).

The Biological Opinion for DFSP outlines conservation measures to avoid, minimize, and offset impacts to the PVB and gnatcatcher, while allowing the installation to carry out its routine maintenance activities (U.S. Fish and Wildlife Service 2010). DFSP also participates in ongoing conservation and research benefiting the PVB and gnatcatcher that may impact individual PVB and gnatcatchers during their implementation (U.S. Fish and Wildlife Service 2010).

2 RESTORATION AND INVASIVE PLANT REMOVAL

Since the start of restoration activities at DFSP, a large proportion of restoration sites have matured to the point that coastal sage scrub dominates to the detriment of PVB host plants (Osborne 2002). The Biological Opinion provides guidelines for restoring PVB habitat, including areas where vegetation communities that have matured to a point that they no longer include open patches with PVB host plants, and support few or no PVB (U.S. Fish and Wildlife Service 2010). The restoration strategy is to mimic natural disturbance events that historically maintained PVB habitat. Restoration efforts follow guidelines set out in the Biological Opinion.

The Biological Opinion also directs the eradication of three invasive species from habitat areas: *Arundo donax* (giant reed), *Schinus molle* (Peruvian peppertree), and *Carpobrotus edulis* (Hottentot fig or ice plant); and high priority weed management of three other invasive species: *Euphorbia terracina* (spurge), *Ricinus communis* (castor bean), and *Cortaderia selloana* (pampas grass).

2.1 INVASIVE PLANT REMOVAL

The priority in 2011-2012 was to clear invasive species and weeds from sites with known PVB to create openings for deerweed establishment, based on results of vegetation surveys conducted in 2011.

In Fall 2011, gaps were created in PVB habitat by intensive weed removal (castor bean, pampas grass, ice plant) at Transects 6-1, 6-2, 8-1, and 8-2.

In Winter 2012, additional ice plant was removed from the area surrounding Transect 1-1 and 1-2, particularly near mature host plants. Along Transect 7-1 through 7-3, pampas grass and castor bean were removed.

During the 2012 flight season, staff hand-weeded near Transect 5-2 to open gaps and control mustard.

In August 2012, staff cleared weeds adjacent to Transects 6-1, 6-2 and 6-3 to create gaps for deerweed recruitment.

2.2 INVASIVE SPECIES MAPPING

Invasive species mapping was conducted in July 2012. The following invasive species are identified and mapped: giant reed, Peruvian peppertree, ice plant, spurge, castor bean, and pampas grass (Figure 2).

Figure 2. Invasive Plant Locations.

A large percentage of the remaining invasive species in the native habitat areas are on the edges of the habitat and along roads (Figure 2).

Within PVB habitat, ice plant covers a large area at Transects 1-1 and 1-2. Castor bean and peppertrees are along Transects 4-2, 6-2, 6-4, 5-1, 7-1, 7-2, 7-3, 8-1 and 8-3.

1 VEGETATION MONITORING

1.1 MONITORING METHODS

PVPLC conducts vegetation surveys annually, to assess the risk of habitat degradation within designated habitat areas and to inform management efforts (Figure 1). Surveys estimate percent cover of native plants, deerweed, nonnative grasses, nonnative forbs, and bare ground.

PVPLC staff began monitoring deerweed in 2006 by surveying transects established by the Soil Ecology and Research Group (SERG). The resulting assessments showed that the restored habitat transitioned into mature coastal sage scrub that could potentially support California gnatcatchers, but provided little in the way of quality habitat for PVB. Additionally, the data related poorly to the butterfly surveys because the butterfly transects followed easily walkable roads and culverts that often supported more host plants than the restoration sites. Therefore, in 2011, PVPLC proposed to conduct deerweed surveys along the PBV transects to better assess the host plant densities, with the intent of obtaining information that would provide better understanding of the mechanics behind the status of the Palos Verdes blue butterfly's population at DFSP.

Post-flight monitoring took place on June 2, 5, 12 and 21, 2012 by PVPLC staff (Ann Dalkey) and interns (Kaitlin Van Volkom, Harrison Kirner, Simone Boudreau). During each survey, the PVB survey transects were walked, the number of deerweed recorded, and an assessment of the overall species cover was made using California Native Plant Society (CNPS) standardized methodology (CNPS 2007). Transects followed PVB survey routes with slight variations at 1-1, 8-3, and 10-3 (Figure 1).

After each transect was surveyed, the respective polygon was visually assessed using CNPS vegetation assessment methodology. Relative percent cover of deerweed, other native plant species, non-native annual grasses (NNAG), non-native plants (NNP), as well as bare ground (no recognizable live plants) were recorded within the general vicinity of each transect segment.

Photographs were taken at the start of each transect to provide a visual record of general conditions of the sampling area and DFSP landscape for monitoring long-term change.

1.2 MONITORING RESULTS

Success criteria for PVB habitat consists of habitat with at least 10% cover of deerweed, and native woody shrubs maintained at 10%-20% (PVPLC 2011).

A summary of the deerweed counts and vegetation cover for numbers of deerweed, other native vegetation, non-native vegetation, bare ground, and the total counts are shown in Table 1.

The vegetation cover varied throughout the DFSP (Table 1). The highest densities of deerweed occurred at Transect segment 7-2 (15%) and 8-1 (15%) (Figure 1). Other native vegetation cover ranged from 5% to 97% and non-native plant cover ranged from 4% to 87%. Four transects met the success criteria of ≥10% deerweed cover (1-1, 1-2, 7-2, 8-1), and 3 transects were close to reaching success criteria, with 9% deerweed cover (6-1, 6-2, 6-4). 13 of the 26 transects had > 40% bare ground or litter, another component of success criteria. Deerweed cover in 10 of the 26 transects increased by at least 3 percentage points from 2011 numbers (Figure 3). Cover at transect 5-3 and 7-2 decreased from the previous year (Figure 3). Below is a description of each transect.

Transect 1-1 had 13% deerweed cover, and a large number of seedlings recruiting into the population. Deerweed cover increased from 2% in 2011 (Figure 3).

Transect 1-2 had 12% deerweed cover, and increased from 8% in 2011 (Figure 3).

Transect 2-1 and 2-2 had low deerweed cover (3% and 1%). However, these transects are located on boundaries of the Operations area, and there has been no attempt to improve habitat in these areas.

Transects 3-1, 3-2, 4-1, 4-2, 4-3 and 5-1 had high native plant cover, and are in high quality coastal sage scrub.

Transect 5-2 had 6% deerweed cover, and a high percentage of bare ground and litter, similar to 2011 (Figure 3). The presence of rabbit scat and evidence of herbivory indicate that rabbits may be feeding on deerweed seedlings, affecting recruitment.

Transect 5-3 had 6% deerweed cover, a decrease from the 13% in 2011 (Figure 3).

Transect 6-1, 6-2, and 6-4 had 9% deerweed cover, an increase from 3, 4% and 1%, respectively, in 2011. Transect 6-3 had 7% deerweed cover, an increase from 1% in 2011 (Figure 3). All four transects had large amounts of bare ground and litter.

Transects 6-5 and 7-1 were in high quality coastal sage scrub.

Transect 7-2 had 15% deerweed cover, a decrease from 20% in 2011 (Figure 3).

Transect 7-3 had 4% deerweed cover, a slight increase from 1% in 2011 (Figure 3).

Transect 8-1 had 15% deerweed cover, a high increase from 4% the previous year. This site was cleared of invasive species in Fall 2011 (Figure 3).

Transect 8-2 and 8-3 had only 1% deerweed cover.

Transect 9 had 7% deerweed cover and a high number of germinating seedlings one year after the soil removal in February 2011.

Transects 10-1 and 10-2 had 1% and 0 deerweed cover, respectively, and are in the Operations area.

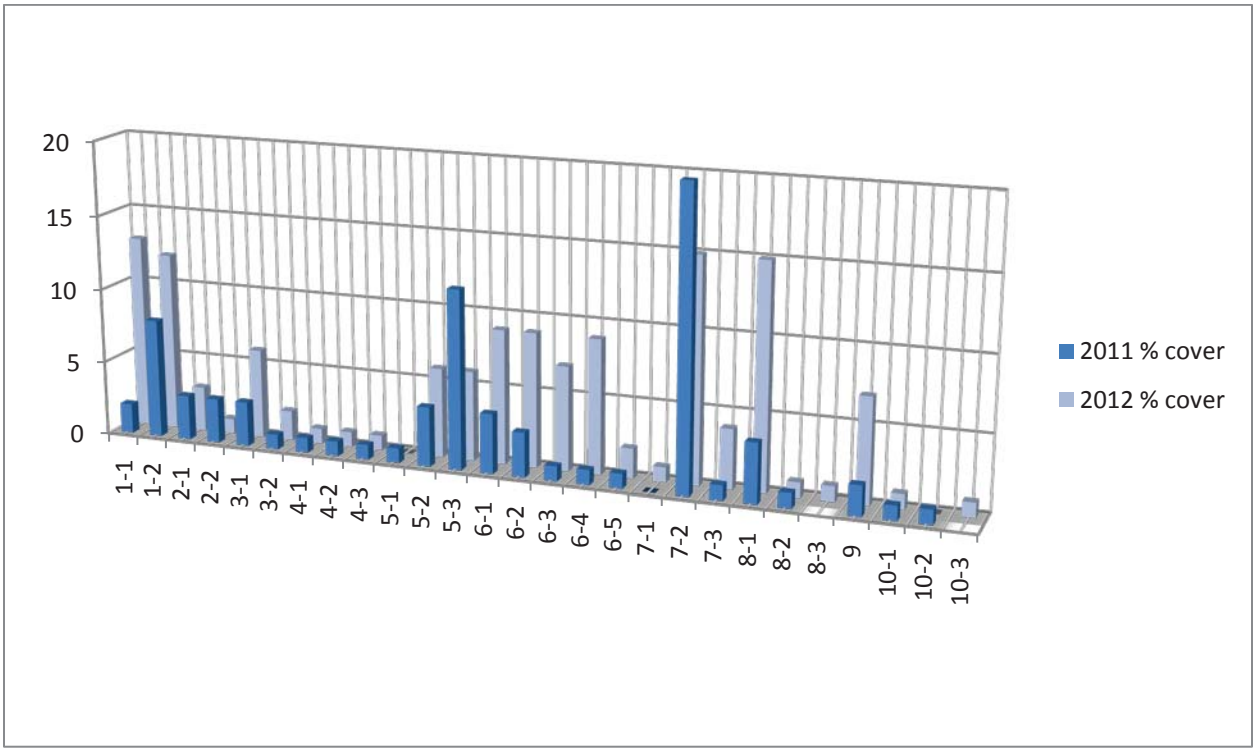
Transect 10-3 is in coastal sage scrub.

Table 1. Summary of *Acmispon glaber* (deerweed) counts and vegetation assessment canopy cover for post-flight surveys 2012.
Color code: Green: CSS; Blue: < 9% deerweed; Yellow: 9% deerweed; White: >10% deerweed

	Count	Canopy Cover (%)			
Transect	*Acmispon glaber*	*Acmispon glaber*	Other Native	Non-Native	Bare and Litter
1-1	>1000	13	22	42	30
1-2	>2000	12	5	36	45
2-1	40	3	13	12	73
2-2	32	1	22	23	54
3-1	315	6	52	28	14
3-2	245	2	42	10	46
4-1	3	1	91	6	2
4-2	7	1	89	11	1
4-3	109	1	92	6	2
5-1	0	0	97	4	2
5-2	110	6	27	23	44
5-3	59	6	63	14	19
6-1	55	9	41	18	39
6-2	84	9	65	8	38
6-3	166	7	31	32	35
6-4	99	9	32	20	40

	Count	Canopy Cover (%)			
Transect	*Acmispon glaber*	*Acmispon glaber*	Other Native	Non-Native	Bare and Litter
6-5	13	2	51	13	37
7-1	5	1	47	13	56
7-2	>1000	15	19	21	48
7-3	55	4	11	25	62
8-1	201	15	65	12	24
8-2	15	1	24	31	50
8-3	17	1	59	10	35
9	376	7	42	23	30
10-1	20	1	10	38	57
10-2	0	0	6	36	60
10-3	41	1	29	29	44

Figure 3. Deerweed percent cover in 2011 and 2012.



4 DISCUSSION AND RECOMMENDATIONS

Survey results indicate that 7 of the 16 transects that are in PVB habitat had deerweed cover that met criteria for quality PVB habitat.
Ten transects showed increases in deerweed cover of 3% or more compared to 2011. All but one of these transects (3-2) were the focus of habitat improvement activities.
In particular, at transect 9, an intensive soil removal of the top 6 inches of soil took place in February 2011, to remove the weed seeds, decrease nutrient levels that favor weed growth, and provide gaps for deerweed germination. This technique lead to an increase in deerweed at the site.

Based on the results of the 2012 habitat monitoring, the PVPLC recommends continued invasive species removal/control, continued host plant installation (planting and seeding), and continued habitat manipulation.

Invasive species control should be focused on those areas identified in Figure 2. PVPLC recommends that the following areas be addressed before the 2013 flight season:

- Clear ice plant from Transect 1-1 and 1-2
- Clear invasive trees and ice plant from Transect 5-1
- Clear castor bean from Transects 6-2 and 6-4
- Clear peppertrees from transects 7-1 and 7-3
- As time permits, peppertrees at 8-1 and 8-3 will also be cleared.
- Add rabbit exclusion fencing to transect 5-2.

PVPLC also recommends intensive soil removal similar to that completed in transect 9 at a new site in Fall 2012 (*See PVB Habitat Restoration Plan 2011-2012*). Soil removal duplicates disturbance conditions favored by the host plant, reduces weed seeds, and decreases nutrient levels favored by weed seeds.

PVPLC recommends that invasive species identified along the roadways in the operational areas be removed to support on-going efforts in the habitat areas. We recommend a holistic approach to invasive species management at DFSP San Pedro.

5 LITERATURE CITED

California Native Plant Society. 2007. Vegetation Program: CNPS Rapid Vegetation Protocol. http://www.cnps.org/cnps/vegetation/protocol.php. Accessed 17 December 2009.

CNPS. See California Native Plant Society.

Mattoni, R. 1994. Rediscovery of the endangered Palos Verdes blue butterfly, *Glaucopsyche lygdamus palosverdesensis* Perkins and Emmel (Lycaenidae). Journal of Research of the Lepidoptera 31:180-194.

Osborne, K. H. 2002. Population monitoring for the Palos Verdes blue on the Defense Fuel Support Point, San Pedro, California: year 2002 survey results, Riverside, California.

Palos Verdes Peninsula Land Conservancy. 2011. PVB Habitat Restoration Plan 2011-2012. Prepared for Naval Facilities Engineering Command, Southwest. December 2011.

Palos Verdes Peninsula Land Conservancy. 2012. 2011 Annual Report: Habitat Management Areas Defense Fuel Supply Point, San Pedro, CA. Prepared for Naval Facilities Engineering Command, Southwest. March 26, 2012.

Soil Ecology and Research Group. May 2008. Coastal sage scrub habitat development project at the defense fuel support point, San Pedro, California in support of the Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdensis*) and the California gnatcatcher (*Polioptila californica californica*). Final Report. Prepared for Naval Facilities Engineering Command, Southwest.

U. S. Fish and Wildlife Service. 2010. Formal Section 7 Consultation for Routine Maintenance Operations, Defense Fuel Support Point, San Pedro, Los Angeles County, California.

Appendix L: Agency Comments

This Page Intentionally Blank

Comments on Dec. 2013 DRAFT DFSP San Pedro INRMP
USFWS

Comment Number	Page Number	Line, Figure, or Table No.	Commentor	Comment	Answer/ Information	Changes to Document (include page/line)
1.	General		USFWS - EP	In general the level of commitment to implementing active habitat restoration cannot be identified for this species. The document states that if habitat management or restoration are to be implemented, DFSP San Pedro will follow the guidelines in the 2010 biological opinion. The biological opinion defines avoidance an minimization measures that should be applied during habeitat restoration,but it does not impose any requirements to conduct habitat restoration. The previous INRMP laid out a fairly detailed schedule for habitat restoration, and I recommend a similar level of commitment for the update.	Section 7 of the 2010 BO requires that a habitat restoration plan be submitted to the Service for their approval. The Navy and DLA are working on a restoration plan that will cover a time period of 3-5 years. Annual work plans prepared pursuant to that plan will be submitted to the Service for approval.	Sections added as described below: Page 4-1, Section 4.1.1.1 will be added with following sections renumbered accordingly. Section 4.1.1.1 Palos Verdes Blue Butterfly and Coastal California Gnatcatcher Pursuant to the requirements of the 2010 Biological Opinion, Section 7, a habitat restoration plan is being developed to cover restoration activities over the next 3-5 years. The plan will specifically address activities at DFSP San Pedro but will also provide a general background on the Palos Verdes Peninsula-wide recovery programs for these two species. The plan will be submitted to the USFWS for approval and will be evaluated and revised as needed as part of the annual INRMP metrics review. After approval of the Restoration Plan, specific annual work plans will be prepared and submitted to the Service for approval.
2.	Xvii	15		The listed entity is the coastal California gnatcatcher (*Polioptila californica californica)*	This will be corrected throughout the document	Changed as requested.
3.	2-1	15		Rolling Hills is to the West, not East.	This will be corrected throughout the document	Changed as requested.
4.	2-10	24		PVB were also released at Friendship Park and Trump National Golf Course	The text will be changed to include these locations	Changed as directed.

Comment Number	Page Number	Line, Figure, or Table No.	Commentor	Comment	Answer/ Information	Changes to Document (include page/line)
5.	Table 2-1			Please define "clear" in this context. How are the recent "scrapes" categorized? I suggest a separate category for this experimental effort.	The text will be clarified that "clear" means clearance of non-native and invasive vegetation. The scrape area in the vicinity of 14A on Map 2-4 will be identified and added to the table.	A separate category has been added for clearing. Clearing has been clarified with a superscript explanation.
6.	Map 2-6			Some features on this map are not explained in the legend. Also, it is not clear why data used for this map are limited to a brief window more than 10 years ago. Given the purpose of this map, I suggest all historical data should be included.	The map will be updated with all features identified in the legend.	Changed as requested.
7.	Map 2-7			NAVFAC and BRAC have not been comfortable with referring to the habitat in the former Naval housing area as "PVB Preserve". Consider an alternate name.	This will be deleted from the map as this area is outside of the DFSP San Pedro boundary and not covered by this INRMP.	Changed as requested.
8.	Map 2-10			This map does not match up well to the title or intent. I suggest removing host plant data and adding all PVB locations.	The map will be changed as requested.	Changed as requested.
9.	2-26	17		The City of Rancho Palos Verdes and the Palos Verdes Peninsula Land Conservancy have updated CAGN survey information for the City's entire preserve system. These data can be interpreted to update the current status of the species for the peninsula as a whole.	This paragraph will be updated.	Section has been updated with PVPLC survey info from 2012.
10.	2-28	11		Please check the plant palettes for SERG and PVPLC. I doubt they would have included Kellogg's Horkelia.	This will be checked and corrected as needed.	Section clarified. It is believed that species was most likely planted by accident as it was observed in a restoration site.
11.	2-28	19		The taxon should be "willow flycatcher" not "southwestern willow flycatcher".	This will be corrected throughout the document.	Changed as requested.

Comment Number	Page Number	Line, Figure, or Table No.	Commentor	Comment	Answer/ Information	Changes to Document (include page/line)
12.	2-28	19		Least Bell's vireo does not require extensive habitat patches for successful breeding. There is likely sufficient habitat on the DFSP San Pedro to support breeding. Geographic isolation from currently occupied habitat is likely the better explanation for the subspecies absence. If the current pattern of population expansion continues, the base may become occupied in the future.	Fragmentation and isolation of habitat will be added with an explanation that these are the more likely reasons that no breeding pairs of LVB have been seen at DFSP San Pedro.	Paragraph changed as requested.
13.	2-30	1		This paragraph is confusing and includes a suggestion that gnatcatchers are near extinction. At a minimum, it should be clear that gnatcatchers are near local extirpation, not range-wide extinction. More broadly, if the intent is to use the categories from Mattoni (1966), there should be a list of each species in each category	The paragraph will be revised as requested.	Paragraph has been clarified to ensure there is no confusion. CAGN are locally near extirpation, not range-wide.
14.	3-4	19		It is misleading to state that no take for PVB is identified in the 2010 BO. Instead take is quantified by habitat as a surrogate. It is true that no take for adults is authorized because this take could potentially be observed and is avoidable.	The language in the paragraph will be revised to clarify this point.	Changed as requested.
15.	4-6	1		I suggest additional discussion regarding IR sites. The intent is to avoid extensive habitat restoration on sites that may get disturbed later during the IR process. What about following clean-up of IR sites? I suggest these sites should eventually be included in the PVB management area and available for future habitat restoration. Also, part of clean-up should include some level of habitat restoration and PVB and gnatcatchers should be considered in that habitat restoration planning.	The text will be changed to clarify this	Page 4-6, lines 4-5 will read, "Prior to having a remedy in place, there will be no new restoration on IR sites or in areas that may be needed for access to an IR site to conduct studies or clean-up activities. During the Remedial Investigation/ Feasibility Study phase, consideration of habitat enhancement opportunities for PVB and CAGN will be included in the analysis of remedial alternatives." Changed as requested.

Comment Number	Page Number	Line, Figure, or Table No.	Commentor	Comment	Answer/ Information	Changes to Document (include page/line)
16.	4-11	8		Please summarize the content of Conservation Measure #6 from the 2010 BO here. The reader should understand the concept of ranking invasives and applying control techniques accordingly.	The text will be revised to include this summary.	Page 4-11, at the end of line 12 add this sentence. "This measure includes annual vegetation monitoring, a list of species to be eradicated, identification and prioritization of more highly invasive species and methods for controlling non-native vegetation." Changed as requested.
17.	4-11	24		What is the objective for soil productivity? Less productive soils are likely better if maintenance and restoration of native habitat is the goal.	The text will be revised with wording related to erosion since this is the topic of this section.	Page 4-11, line 24 change "soil productivity" to "soil stability". Changed as requested.

COMMENT MATRIX

COMMENT INCORPORATOR **Scott Harris CDFW**	**DATE** 02/10/2014
COMMENTER Scott Harris Environmental Scientist	**ORGANIZATION OF COMMENTER** California Department of Fish and Wildlife (DFW): South Coast Region Habitat Conservation Planning (HCP)
TITLE OF DOCUMENT Draft INRMP Defense Fuel Support Point San Pedro	**DATE OF DOCUMENT** December 2013

NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE TABLE NO.	COMMEN-TOR	RECOMMENDED CHANGES *(Exact wording of suggested change)*	INCORP? *(Yes/No)*	HOW COMMENT WAS INCORPORATED *(If not incorporated, why?)*
1.	xiii	N/A	17	N/A	Scott Harris	Change Signature block to: Edmund Pert, Regional Manager California Department of Fish and Wildlife South Coast Region San Diego, California 92123	Yes	Changed as requested.
2.	2-9	N/A	4		Scott Harris	Mowing should comply with the Migratory Bird Treaty Act to reduce impacts to native birds.	Yes	Navy complies with all applicable regulatory requirements.
3.	2-9	N/A	14	N/A	Scott Harris	Mowing within drainage channels should avoid sensitive riparian resources and consult with applicable federal agencies with jurisdiction over waters of the U.S.	Yes	Many of the drainage channels are cement lined and these are maintained to be free of sediments and weeds. Riparian areas occur within the designated habitat areas and are not mowed. The wording will be changed to clarify this. Changed as requested.
4.	2-9	N/A	18	N/A	Scott Harris	Fence posts should be capped or bolted to prevent birds and other wildlife from entrapment hazards.	Yes	All fence posts are capped.
5.	2-9	N/A	20	N/A	Scott Harris	Wildlife movement should be a consideration to allow access to on-site and off- site available habitats.	No	Fencing must meet Navy Security requirements and cannot be modified. It should also be noted that the area surrounding DFSP San Pedro is developed and industrial areas.

COMMENT MATRIX

NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE TABLE NO.	COMMEN-TOR	RECOMMENDED CHANGES *(Exact wording of suggested change)*	INCORP? *(Yes/No)*	HOW COMMENT WAS INCORPORATED *(If not incorporated, why?)*
6.	2-29	N/A	19	N/A	Scott Harris	Western burrowing owl should be discussed in the *Other Wildlife of Interest* section since Table 2.5 on page 2-35 states that grassland makes up 56.2% of the DFSP area. The biological resource analysis could also utilize resources that further document bird species presence such as the Cornell Lab of Ornithology's eBird website where volunteer citizen scientists enter sightings of birds. There are multiple checks on the accuracy of the data which should be used to supplement the description of sensitive species provided in the DEIR. See website: http://ebird.org/content/ebird/	Yes.	This section has been updated to say that there is potential burrowing owl habitat but no owls have been observed at DFSP San Pedro. If they are observed either incidentally or as part of regular avian surveys, appropriate management measures will be incorporated into the INRMP.
7.	2-30	N/A	25	N/A	Scott Harris	Were surveys conducted for fairy shrimp? Does appropriate habitat occur on site?		There are no vernal pools on the site.
8.	2-32	N/a	7	N/A	Scott Harris	Is there suitable habitat for spadefoot toad? If so, were surveys performed for spadefoot toad?		There may be habitat that is suitable for spadefoot toad. The INRMP does call for herpetological surveys and if they are detected appropriate management measures will be incorporated into the INRMP.
9.	2-32	N/A	21	N/A	Scott Harris	Are there any plans to manage for grassland birds such as horned-lark, meadow lark, burrowing owl? These species have been extirpated as breeding populations from much of coastal Southern California.		Much of the non-native grassland is located in the operational areas of the fuel farm and must be mowed so as not to exceed a height of 4" for fire safety, seriously curtailing natural resources management options. Text on page 2-37, lines 1-21 has been revised to include mowing requirements. Burrowing owls have not been observed at DFSP San Pedro but if they are observed during routine bird surveys, the Navy will add appropriate management measures to the INRMP. The remaining designated habitat areas are managed with an emphasis on the Palos Verdes blue butterfly and the California gnatcatcher. Additional language has been added discussing mowing and referencing appropriate section for additional details.

COMMENT MATRIX

NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE TABLE NO.	COMMEN-TOR	RECOMMENDED CHANGES *(Exact wording of suggested change)*	INCORP? *(Yes/No)*	HOW COMMENT WAS INCORPORATED *(If not incorporated, why?)*
10.	2-34	N/A	1	N/A	Scott Harris	Is there black-tailed jack rabbit or American badger habitat and/or sightings? Were focused surveys conducted for these species?		There have been no observations of either black-tailed jack rabbit or American badger. Due to the size of DFSP San Pedro and the large operational and administrative areas, and the surrounding developed and industrial areas, habitat for both the rabbit and badger is marginal at best.
11.	2-37	N/A	15	N/A	Scott Harris	Are there any endemic plants that can be managed for within the grasslands?		See response to comment #9, above. The grassland in the operational areas must be mowed to a height of less than 4".
12	3-8	N/A	1	N/A	Scott Harris	Pest management should avoid anticoagulants which can result in secondary poisoning to non-target species.		The Navy and DLA have a range of pest control options to utilize in accordance with the Integrated Pest Management Plan. We recognize the secondary poisoning effects that can occur with the use of anticoagulants and do everything we can to minimize their use. With respect to DFSP San Pedro, the anticoagulant Rozol is sometimes used in very small quantities around the administration building at the facility. The location of the administration building is shown within the white square on the attached figure. Rozol is only used when burrows are observed, approximately 6 times per year, and it is placed within the burrow. The quantities used are small; the last application used was a total of 2 oz. of Rozol laced bait. The remainder of the facility does have ground squirrels and gophers but no controls for these rodents are used in the grassland and other habitat areas at the facility. The Navy and DLA will continue to work together to minimize use of anticoagulants to control rodents at DFSP San Pedro.

COMMENT MATRIX

NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE TABLE NO.	COMMEN-TOR	RECOMMENDED CHANGES *(Exact wording of suggested change)*	INCORP? *(Yes/No)*	HOW COMMENT WAS INCORPORATED *(If not incorporated, why?)*
13	3-8	N/A	14	N/A	Scott Harris	There are approximately 188 acres of nonnative grassland on the DFSP. There may be potential for grassland ecosystem management for several species that have significantly declined in coastal Southern California as the result of habitat loss. These species include: western meadowlark, coast horned lark, western burrowing, American badger, San Diego black-tailed jackrabbit and loggerhead shrike. In addition, encouraging American badger and California ground squirrel habitation will facilitate burrow construction for western burrowing owl. California ground squirrel will also provide a prey base for predatory birds and mammals.		See responses to comments #9 and #11 regarding management of the grassland areas. Also as stated in the response to comment #9.management of the habitat areas will emphasize benefits to PVB and CAGN.
14	4-7	N/A	12	N/A	Scott Harris	See comments number 8 above for spadefoot toad.		See response to comment #8.
15	4-7	N/A	13	N/A	Scott Harris	The suitability of spadefoot toad habitat should be evaluated. Do they/did they occur in the area? Can spadefoot toad be induced to occupy appropriate habitat on DSFP site? Can seasonal pools be created?		See response to comment #8. The Navy will not deliberately introduce or create habitat for special status species that do not occur at the site.
16	4-7	N/A	19	N/A	Scott Harris	Is there fairy shrimp habitat on site? Could seasonal pools be created?		There is no documented fairy shrimp habitat on DFSP San Pedro. The Navy will not deliberately introduce or create habitat for special status species that do not occur at the site.
17	4-8	N/A	13	N/A	Scott Harris	Because nonnative grasslands occupy a large portion of the site and provides valuable habitat for wildlife species, there should be wider discussion of its habitat significance. Can maintenance be tailored to promote grassland wildlife and botanical species? Should/can areas be restored to native grassland species?		As stated in several responses to comments above, the grassland areas must be kept to a height of no more than 4". After line 21 this sentence will be added, "It should be noted that almost all of the grassland areas are located within designated operational areas and must be mowed to a height of less than 4" (Map 4-1). This requirement seriously curtails natural resources management options in these areas."

COMMENT MATRIX

NO.	PAGE NO.	PARA-GRAPH	LINE NO.	FIGURE TABLE NO.	COMMEN-TOR	RECOMMENDED CHANGES *(Exact wording of suggested change)*	INCORP? *(Yes/No)*	HOW COMMENT WAS INCORPORATED *(If not incorporated, why?)*
18	4-9	N/A	12	N/A	Scott Harris	Conducting a nine quadrangle California Natural Diversity Data Base (CNDDB) search surrounding a study area increases the chance of finding special status species that were documented within similar habitats to those found on the study area and may assist in any focused surveys within the DSFP. A CNNDB search should also be done for all other biota discussed in the DSFP study area. The Department's Biogeographic Data Branch in Sacramento should be contacted at (916) 322-2493 (www.dfg.ca.gov/biogeodata) to obtain current information on any previously reported sensitive species and habitats.		The Navy has programmed for wildlife surveys to be done in FY16. All appropriate research will be done in support of those surveys.
19	4-12	N/A	15	N/A	Scott Harris	Mowing should take grassland species management into consideration. See Comments 12,14,16		See response to comment #17.
20	4-13	N/A	17	N/A	Scott Harris	See Comment 17 pertaining to grassland management for wildlife.		Again, the fuel terminal must comply with fire safety guidelines. As the grasslands are within the fuel terminal operational areas, there is little opportunity for increasing habitat value in these areas.
21	D-1	N/A	1	N/A	Scott Harris	Are there plans to update species baseline lists on a regular basis?		Yes. The Navy has requested funding for baseline wildlife surveys in FY16. However, conduct of those surveys will be subject to available funding.
22	6-6		1		Scott Harris	Reference CNDDB since this was referenced on page 4-9, line12.	Yes	Reference added.
23	6-6		1		Scott Harris	The CNDDB should also be referenced for all other biota being addressed in this DSFP. The Department's Biogeographic Data Branch in Sacramento should be contacted at (916) 322-2493 (www.dfg.ca.gov/biogeodata) to obtain current information on any previously reported sensitive species and habitats. The biological resource analysis could also utilize and reference resources that further document bird species presence such as the Cornell Lab of Ornithology's eBird website where volunteer citizen scientists enter sightings of birds. There are multiple checks on the accuracy of the data which should be used to supplement the description of sensitive species provided in the DEIR. See website: http://ebird.org/content/ebird/		An updating of the biological resources information from all available sources will occur with the basewide update surveys that will occur in the FY 2016.