Integrated Natural Resources Management Plan

Naval Air Facility El Centro
El Centro, California

September 2014

Prepared for:

Naval Air Facility El Centro
Environmental Natural Resources Division
1605 3rd Street, Bldg. 504
El Centro, California 92243-5001
Point of Contact: Robert Powell, Natural Resources Specialist

Under Contract with:

NAVFAC Southwest
1220 Pacific Highway
San Diego, California 92132-5190
Point of Contact: Robert Palmer, Fish and Wildlife Biologist

And

Commander, Navy Region Southwest
937 North Harbor Drive
San Diego, California 92132-0058

Former Contract No. N68711-05-D-8004, D.O. 0072

Prepared by:

Tierra Data Inc.
10110 W. Lilac Road
Escondido, California 92026
Points of Contact: Elizabeth M. Kellogg, Stephanie Hines

And

NAVFAC Southwest
1220 Pacific Highway
San Diego, California 92132-5190
Point of Contact: Conception Flores, Natural Resource Specialist

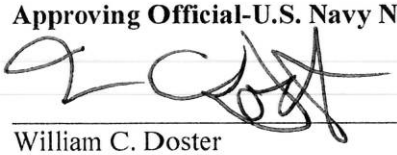
Map Disclaimer: All maps were compiled by Tierra Data Inc., except if noted, using data believed to be accurate at the time of publication. However, a degree of error is inherent in all maps. The maps are distributed "AS-IS," without warranties of any kind, either, expressed or implied, including, but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

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Naval Air Facility El Centro
El Centro, California

APPROVAL

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (16 U.S.C. 670a et seq.) as amended and DoDINST 4715.03 and OPNAVM-5090.1. This document was prepared and reviewed in coordination with U.S. Department of Interior, Fish and Wildlife Service, and California Department of Fish and Wildlife Inland Desert Region in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

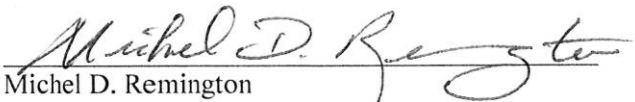
Approving Official-U.S. Navy Naval Air Facility El Centro



12/15/14
Date

William C. Doster
Captain, U. S. Navy
Naval Air Facility El Centro
El Centro, California

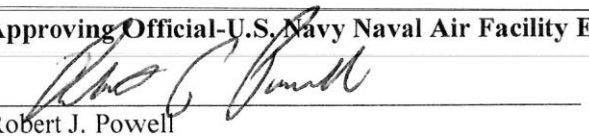
Approving Official-U.S. Navy Naval Air Facility El Centro



12/8/14
Date

Michel D. Remington
Installation Environmental Program Director
Naval Air Facility El Centro
El Centro, California

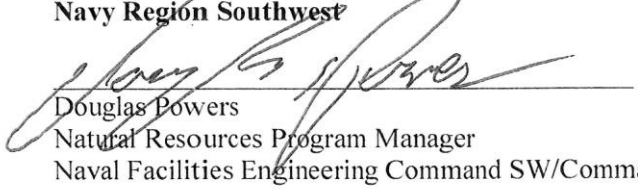
Approving Official-U.S. Navy Naval Air Facility El Centro



12/08/2014
Date

Robert J. Powell
Natural Resources Specialist
Naval Air Facility El Centro
El Centro, California

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



12/03/2014
Date

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

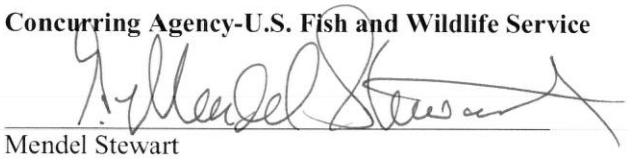
This page left intentionally blank.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Naval Air Facility El Centro
El Centro, California

APPROVAL

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (16 U.S.C. 670a et seq.) as amended and DoDINST 4715.03 and OPNAVM-5090.1. The U.S. Fish and Wildlife Service has participated in the review of this INRMP, in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

Concurring Agency-U.S. Fish and Wildlife Service



10/31/14
Date

Mendel Stewart
Field Supervisor
U. S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
Carlsbad, California

This page left intentionally blank.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
Naval Air Facility El Centro
El Centro, California

APPROVAL

This Integrated Natural Resources Management Plan (INRMP) fulfills the requirements for the INRMP in accordance with the Sikes Act (16 U.S.C. 670a et seq.) as amended and DoDINST 4715.03 and OPNAVM-5090.1. The California Department of Fish and Wildlife, as the designated state wildlife agency has participated in the review of this INRMP, in accordance with the 2013 Memorandum of Understanding for a Cooperative Integrated Natural Resource Management Program on Military Installations.

Concurring Agency-California Department of Fish and Game

David J Ebner For 10-29-14

Kimberly Nicol
Regional Manager
Inland Deserts Region
California Department of Fish and Wildlife
Ontario, California

Date

This page left intentionally blank.

Executive Summary

An Integrated Natural Resources Management Plan (INRMP) is a long-term planning document to guide the installation commander in the management of natural resources to support the installation mission, while protecting and enhancing installation resources for multiple use, sustainable yield, and biological integrity. The Sikes Act (as amended) requires the U.S. Department of Defense (DoD) to prepare and implement an INRMP for each installation that contains significant natural resources. The U.S. Department of the Navy (DoN) guides implementation of the Sikes Act (as amended) through Chief of Naval Operations Instruction 5090.1D dated 10 January 2014, *Environmental Readiness Program*. The Navy is required to ensure ecosystem management is the basis for all management of its lands (Sikes Act, as amended [16 United States Code {U.S.C} 670a]; Department of Defense Instruction [DoDINST] 4715.03). The purpose of this INRMP is to provide the guidelines, means, and mechanism for assuring long term sustainability and vitality of both the military mission and health of the installation's natural resources. This INRMP will help installation commanders effectively manage natural resources to ensure the sustainability of all ecosystems within the installation; ensure no net loss of the capability of installation lands to support the DoD mission; conserve and rehabilitate natural resources on military installations; sustain multipurpose use of the resources and public access to military installations; and participate as appropriate, in regional ecosystem initiatives.

Naval Air Facility (NAF) El Centro, target areas, ranges and its other properties encompass approximately 59,266 acres of mostly withdrawn acreage and some fee-owned acreage in Imperial County, California. NAF El Centro serves as a support air facility for fleet air squadrons and provides ranges and facilities for tactical air training. NAF El Centro does not have a permanently stationed aviation unit, but routinely supports visiting aviation units from across the country that use the NAF El Centro ranges. The majority of aircraft flown out of NAF El Centro are from detached units. The installation serves as a support facility for active or reserve units from each of the major DoD components (U.S. Navy, U.S. Marine Corps, U.S. Army, and U.S. Air Force), as well as units from the National Guard, Coast Guard, and international (allied/foreign) aviation units. In addition, the facility provides support to other federal agencies (U.S. Customs and Border Protection/U.S. Border Patrol). Air squadrons conduct realistic tactical air training such as field carrier landing practice and air-to-air and air-to-ground weapons practice. NAF El Centro is the winter training location for the Navy's Blue Angels Flight Demonstration Squadron. NAF El Centro is an inland diversion air field for coastal bases such as Marine Corps Air Station (MCAS) Miramar, Naval Air Station (NAS) North Island, and aircraft carriers operating off the coast of southern California.

This INRMP is structured to meet the goals defined in Chapter 1 and the objectives in Chapters 3 and 4. For each INRMP topic, specific key issues are identified, current management is described and its effectiveness assessed. Out of the identified issues and management assessment, objectives and specific management strategies are presented. From the management strategies, natural resource management projects to be implemented are identified, and appended to this document as a list of projects in Appendix A.

NAF El Centro is achieving a no net loss of training lands or reduction in operational flexibility and growth through implementation of this INRMP. The implementation of the natural resources management strategies presented herein will support current and future training and facilities projects. All projects and actions included in this INRMP to manage sensitive species, flora, and fauna are compatible with NAF El Centro's current mission requirements and will allow for any new operations that are compatible with the mission, without additional encumbrances.

This INRMP was prepared and organized in accordance with the Sikes Act (as amended), DoD Instruction 4715.03, *Natural Resources Conservation Program*, Chief of Naval Operations Manual 5090.1, *Environmental Readiness Program Manual*, and the most recent series of DoD, U.S. Fish and Wildlife Service, and Navy guidance on the Sikes Act and INRMPs (DoD 2010, 2011; DoN 2006, 2014).

The Navy will implement recommendations in this INRMP within the framework of regulatory compliance, Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. All actions contemplated in this INRMP are subject to the availability of funds properly authorized and appropriated under federal law. Nothing in this INRMP is intended to be, nor must be, construed to be a violation of the Anti-Deficiency Act (31 U.S.C. 1341 et.seq.).

TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Cont.)

TABLE OF CONTENTS (Cont.)

TABLE OF CONTENTS (Cont.)

LIST OF FIGURES

LIST OF MAPS

TABLE OF CONTENTS (Cont.)

LIST OF MAPS (cont.)

Page

LIST OF TABLES

TABLE OF CONTENTS (Cont.)
LIST OF TABLES (cont.)

Page

APPENDICES

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

DoD Template	NAFEC INRMP Table of Contents
DoD 1- Title Page	Title Page
DoD 2 - Signature Page	Signature Pages
DoD 3 - Executive Summary	Executive Summary
DoD 4 - Table of Contents	Table of Contents
DoD 5 - Overview	1.0 Introduction
DoD 5.a - Authority & Background	1.1 Purpose and Scope
DoD 5.a.1 - Purpose	1.1 Purpose and Scope
DoD 5.a.2 - Authority	1.2 Authority
DoD 5.b - Scope	1.1 Purpose and Scope
DoD 5.c - Responsibilities	1.7 Roles, Responsibilities, and Stakeholders
DoD 5.c.1 - Installation Stakeholders	1.7.1 Navy Roles and Responsibilities 1.7.2 Internal Stakeholders 1.7.4 NAFEC Chain of Command
DoD 5.c.2 - External Stakeholders	1.7.3 External Stakeholders
DoD 5.d - Goals and Objectives	1.6 INRMP Goals and Objectives
DoD 5.e - Management Strategy	1.8 Ecosystem Management
DoD 5.f - Stewardship and Compliance Discussion	1.10 Compliance and Stewardship Criteria for Implementing Projects
DoD 5.g - Review and Revision Process	1.9 Revision and Annual Review
DoD 5.h - Other Plan Integration and Preparing Prescriptions for Projects	1.11 Integrating Other Plans
DoD 6 - Current Installation Conditions & Use	2.0 Military Use and Other Land Uses
DoD 6.a - General Description	1.3 Location and Real Estate Summary
DoD 6.b - Regional Land Uses	2.4.2 Surrounding Vicinity
DoD 6.c - Abbreviated History and Pre-Military Land Use	2.1 Historical Land Use
DoD 6.d - Military Mission	1.4 Military Mission
DoD 6.e - Operations & Infrastructure	2.2 Current Operations and Activities 2.3 Other Land Uses 2.4 Future Land Use 4.3 Facility Infrastructure 4.5 Other Land Uses
DoD 6.e.1 - Population	2.2 Current Operations and Activities
DoD 6.e.1 - Cantonment Area	2.2 Current Operations and Activities
DoD 6.e.1 - Military Operations & Activities	2.2 Current Operations and Activities
DoD 6.e.1 - Training Lands	2.2.1 Facilities and Properties 2.2.2 Ranges and Air Space
DoD 6.g - Opportunities	2.2.1.1 NAF El Centro Land Use
DoD 6.g.1 - Internal Opportunities	2.2.1.1 NAF El Centro Land Use
DoD 6.g.2 - External Opportunities	2.2.1.1 NAF El Centro Land Use
DoD 6.g.3 - Opportunities Map	Map 2-3. Opportunities on NAF El Centro
DoD 6.h - Natural Environment	3.0 Natural Resource Condition and Management Strategies
DoD 6.h.1 - Climate	3.2 Climate and Climate Change
DoD 6.h.2 - Ecoregions	3.1 Ecoregional Setting
DoD 6.h.3 - Landcover	3.3 Physical Conditions 3.5.1 Vegetation and Land Cover Types
DoD 6.h.4 - Aquatic Habitats	3.5.2 Jurisdictional Waters and Wetlands
DoD 6.h.5 - Flora & Vegetative Communities	3.5 Terrestrial Habitats and Communities 3.5.1 Vegetation and Land Cover Types 3.6.1 Flora
DoD 6.h.6 - Fauna	3.6.2 Fauna
DoD 6.h.7 - Resources of Special Interest	3.6.3 Potential Federal Threatened and Endangered Species to occur on NAFEC 3.6.4 Other Special Status Species
DoD 6.h.8 - Ecosystem Services	1.8 Ecosystem Management

DoD Template	NAFEC INRMP Table of Contents
DoD 6.h.9 - Climate Change Vulnerability Assessment	3.2 Climate and Climate Change
DoD 7 - Natural Resources Management & Military Mission Sustainability	3.0 Natural Resource Condition and Management Strategies 4.0 Sustainability and Compatible Use at NAF El Centro
DoD 7.a - Integrating Natural Resources Management & Military Mission	1.5 Achieving Success and No Net Loss to the Military Mission 4.1 Integrated Military Mission and Sustainable Land Use
DoD 7.a.1 - Operations Planning & Review	4.3 Facility Infrastructure 4.7 Integrating Other Plans and Programs
DoD 7.a.2 - Natural Resources Management Actions	5.3 INRMP Project Programming and Budgeting
DoD 7.a.3 - Environmental Awareness	4.4 Environmental Awareness
DoD 7.a.4 - Sustainability Challenges	4.0 Sustainability and Compatible Use at NAF El Centro
DoD 7.b - Encroachment Management	4.9 Beneficial Partnerships and Collaborative Resources Planning
DoD 7.b.1 - Encroachment Partnering	4.9 Beneficial Partnerships and Collaborative Resources Planning
DoD 7.b.2 - Achieving No Net Loss	1.5 Achieving Success and No Net Loss to the Military Mission
DoD 7.b.3 - Encroachment Management	4.9 Beneficial Partnerships and Collaborative Resources Planning
DoD 7.c - National Environmental Policy Act	4.6 Regulatory Compliance
DoD 7.c.1 - Levels of Documentation	4.6 Regulatory Compliance
DoD 7.c.2 - Mitigation Measures	4.6 Regulatory Compliance
DoD 7.d - Consultation Requirements	4.6 Regulatory Compliance
DoD 7.e - State Wildlife Action Plans	4.7.3 Wildife Action Plan
DoD 7.e.1 - Geographic Area/Habitats of Interest	Map 3-10. Sensitive Biological Resources at NAF El Centro
DoD 7.e.2 - Species of Greatest Conservation Need & Priority Actions	3.6 Plant and Wildlife Populations
DoD 7.f - Public Access & Outreach	4.5.2 Outdoor Recreation and Public Access 4.5.3 Public Outreach 4.9 Beneficial Partnerships and Collaborative Resources Planning
DoD 7.f.1 - Public Access & Outdoor Recreation	4.5.2 Outdoor Recreation and Public Access 4.5.3 Public Outreach
DoD 7.f.2 - Public Outreach	4.5.3 Public Outreach
DoD 7.g - Partnerships	4.9 Beneficial Partnerships and Collaborative Resources Planning
DoD 8 - Natural Resources Management Program Actions	3.0 Natural Resource Condition and Management Strategies
DoD 8.a - Forest Management	N/A
DoD 8.a.1 - Forest Management Surveys	N/A
DoD 8.a.2 - Forest Management Practices	N/A
DoD 8.a.3 - Forest Management Strategies	N/A
DoD 8.a.4 - Forest Management Actions	N/A
DoD 8.b - Vegetation Management	3.5 Terrestrial Habitats and Communities
DoD 8.b.1 - Vegetation Surveys	Appendix M. Applicable Natural Resources Reports
DoD 8.b.2 - Vegetation Management Practices	3.5 Terrestrial Habitats and Communities
DoD 8.b.3 - Vegetation Management Strategies	3.5 Terrestrial Habitats and Communities
DoD 8.b.4 - Vegetation Management Actions	3.5 Terrestrial Habitats and Communities
DoD 8.c - Wetlands Management	3.5.2 Jurisdictional Waters and Wetlands
DoD 8.c.1 - Federal, State & Other Regulations	3.5.2 Jurisdictional Waters and Wetlands
DoD 8.c.2 - Wetland Management & Mitigation	3.5.2 Jurisdictional Waters and Wetlands
DoD 8.d - Soil & Water Management	3.3.3 Soil Resources 3.3.4 Water Resources
DoD 8.d.1 - Soil Surveys	Appendix F. Soil type descriptions on NAFEC
DoD 8.d.2 - Water Quality Surveys	N/A
DoD 8.d.3 - Soil & Water Management Practices & Strategies	3.3.3 Soil Resources 3.3.4 Water Resources
DoD 8.d.4 - Soil & Water Management Actions	3.3.3 Soil Resources 3.3.4 Water Resources
DoD 8.e - Coastal/Marine Management	N/A
DoD 8.f - Floodplain Management	3.3.4 Water Resources
DoD 8.g - Invasive Species Management	3.7 Invasive Species Management
DoD 8.g.1 - Invasive Species Surveys	Appendix M. Applicable Natural Resources Reports
DoD 8.g.2 - Invasive Species Management Practices	3.7 Invasive Species Management
DoD 8.g.3 - Invasive Species Management Strategies	3.7 Invasive Species Management
DoD 8.g.4 - Invasive Species Management Actions	3.7 Invasive Species Management
DoD 8.h - Fish & Wildlife Management	3.6 Plant and Wildlife Populations

DoD Template	NAFEC INRMP Table of Contents
DoD 8.h.1 - Fish & Wildlife Surveys	Appendix M. Applicable Natural Resources Reports
DoD 8.h.2 - Fish & Wildlife Management Practices	3.6 Plant and Wildlife Populations 3.6.2 Fauna
DoD 8.h.3 - Fish & Wildlife Management Strategies	3.6 Plant and Wildlife Populations 3.6.2 Fauna
DoD 8.h.4 - Fish & Wildlife Management Actions	3.6 Plant and Wildlife Populations 3.6.2 Fauna
DoD 8.i - Threatened & Endangered Species Management	3.6.3 Potential Federal Threatened and Endangered Species to Occur on NAFEC 3.6.4 Other Special Status Species
DoD 8.i.1 - Threatened & Endangered Species Surveys	Appendix M. Applicable Natural Resources Reports
DoD 8.i.2 - Threatened & Endangered Species Management Practices	3.6.3 Potential Federal Threatened and Endangered Species to Occur on NAFEC 3.6.4 Other Special Status Species
DoD 8.i.3 - Threatened & Endangered Species Management Strategies	3.6.3 Potential Federal Threatened and Endangered Species to Occur on NAFEC 3.6.4 Other Special Status Species
DoD 8.i.4 - Threatened & Endangered Species Management Actions	3.6.3 Potential Federal Threatened and Endangered Species to Occur on NAFEC 3.6.4 Other Special Status Species
DoD 8.j - Outdoor Recreation	4.5.2 Outdoor Recreation and Public Access
DoD 8.j.1 - Regulations & Recreation Permits	4.5.2 Outdoor Recreation and Public Access
DoD 8.j.2 - Access & Restrictions	4.5.2 Outdoor Recreation and Public Access
DoD 8.j.3 - Recreational Opportunities	4.5.2 Outdoor Recreation and Public Access
DoD 8.j.4 - Disabled Access Opportunities	4.5.2 Outdoor Recreation and Public Access
DoD 8.k - Pest Management	3.7.2 Pests and Disease Vectors
DoD 8.l - Bird/Animal Aircraft Strike Hazard Management	3.8.1 Bird/Animal Aircraft Strike Hazard Program
DoD 8.l.1 - BASH Focal Species	3.6.2.4 Birds
DoD 8.l.2 - BASH Natural Resources Hazards	3.6.2.4 Birds
DoD 8.l.3 - BASH Natural Resources Implementation	3.6.2.4 Birds
DoD 8.m - Natural Resources Conservation Law Enforcement	4.8 Natural Resource Law Enforcement
DoD 8.n - Wildland Fire Management	3.4 Wildland Fire Management
DoD 8.o - Geographic Information Systems (GIS) Management	3.9 Data Integration, Access, and Reporting
DoD 8.p - Agricultural Outleases	2.3.2 Agriculture Outlease 3.5.1.7 Agriculture
DoD 8.q - Other Leases	4.5.1 Leases and Real Estate Outgrants
DoD 8.r - Cantonment Area Natural Resources Management	3.0 Natural Resource Condition and Management Strategies
DoD 8.r.1 - Forest Management	N/A
DoD 8.r.2 - Vegetation Management & Sustainable Landscaping	3.7 Terrestrial Habitats and Communities
DoD 8.r.3 - Fish & Wildlife Management	3.6 Plant and Wildlife Populations 3.6.2 Fauna
DoD 8.r.4 - Outdoor Recreation & Green Space	4.5.2 Outdoor Recreation and Public Access
DoD 9 - Implementation	5.0 Implementation Strategy 5.3 INRMP Project Programming and Budgeting
DoD 9.a - Funding	5.3.4 Funding Sources
DoD 9.a.1 - Environmental Funding	5.3.4 Funding Sources
DoD 9.a.2 - Testing & Training Funding	N/A
DoD 9.a.3 - Forestry Reimbursable Funds	N/A
DoD 9.a.4 - Fish & Wildlife Reimbursable 21X Funds	N/A

DoD Template	NAFEC INRMP Table of Contents
DoD 9.a.5 - Agricultural Reimbursable Funds	5.3.4 Funding Sources
DoD 9.a.6 - Other DoD Funding Sources	5.3.4 Funding Sources
DoD 9.b - Staffing	5.1 Staffing and Personnel Training
DoD 9.b.1 - Federal & Contract Personnel	5.1 Staffing and Personnel Training 5.3.4.2 External Assistance
DoD 9.b.2 - Other Personnel	5.1 Staffing and Personnel Training
DoD 9.b.3 - Professional Development & Natural Resources Training	5.1 Staffing and Personnel Training
DoD 9.c - Cooperative Agreements & Partnerships	5.3.4.2 External Assistance
DoD 9.d - Metrics	5.2 INRMP Review, Metrics, and Adaptive Management Appendix L. Natural Resources Conservation Metrics
DoD 10 - Appendices	
Appendix 1. List of Acronyms	Appendix B. Acronyms and Abbreviations
Appendix 2. List of Natural Resources Management Legal Drivers	Appendix C. Applicable Laws and Regulations
Appendix 3. Tri-Partite Agreement	Appendix D. Memoranda of Understandings, Conservation and Cooperative Agreements
Appendix 4. Agency INRMP Review Letters	N/A
Appendix 5. Results of Annual Review	N/A
Appendix 6. Updates to Original Plan	N/A
Appendix 7. Training Area Acreages	1.3 Location and Real Estate Summary 2.2 Current Operations and Activities
Appendix 8. Landcover Types & Acreages	3.5.1 Vegetation and Land Cover Types
Appendix 9. Results of Planning Level Surveys - Flora	Appendix G. Species Documented at NAFEC
Appendix 10. Results of Planning Level Surveys - Fauna	Appendix G. Species Documented at NAFEC
Appendix 11. Results of Planning Level Surveys - Wetlands	3.5.2 Jurisdictional Waters and Wetlands
Appendix 12. List of Special Status Species	Appendix G. Species Documented at NAFEC
Appendix 13. List of Species of Greatest Conservation Needs	Appendix G. Species Documented at NAFEC
Appendix 14. INRMP Benefits for Migratory Birds	Appendix H. Reporting on Migratory Bird Management
Appendix 15. INRMP Benefits for Endangered Species	Appendix I. Reporting on Benefits for Endangered Species
Appendix 16. INRMP Benefits for Critical Habitat	Appendix I. Reporting on Benefits for Endangered Species
Appendix 17. Detailed Natural Resources Management Prescriptions	Appendix A. Implementation Summary Table
Appendix 18. List of Projects	Appendix A. Implementation Summary Table
Appendix 19. List of Research Requirements	5.3.5 Research Funding Requirements
DoD 11 - References/Literature Cited	6.0 References

1.0 Introduction

1.1 Purpose and Scope

The purpose of an Integrated Natural Resources Management Plan (INRMP) is to guide the installation commanders in managing natural resources effectively to ensure installation property and ranges remain available and in good condition to support the military mission. Designed to facilitate both stewardship and compliance with natural resource laws in the context of military mission requirements, this INRMP integrates natural resource components of existing Naval Air Facility El Centro (NAFEC) plans, environmental documents, and the requirements of all applicable U.S. Department of Defense (DoD), U.S. Department of the Navy (DoN), and installation regulations and guidelines.[1]

This INRMP provides the guidelines, means, and mechanism for assuring long term sustainability and vitality of both the military mission and health of the installation's natural resources. Required by the Sikes Act Improvement Act (SAIA) of 1997 (Sikes Act [as amended]) (16 United States Code [USC] 670a *et seq*.) for DoD, an INRMP is the primary means by which natural resources compliance and stewardship priorities are set, and funding requirements are determined. This INRMP fulfills the requirements of Chief of Naval Operations Manual (OPNAVM) 5090.1, the *Environmental Program Readiness Manual* dated 10 January 2014, which directs Navy installations, with land and water resources suitable for conservation and management, to prepare and implement a comprehensive INRMP that fulfills the requirements of the Sikes Act (as amended) as well as the Department of Defense Instruction (DoDINST) 4715.03 *Natural Resources Conservation Program* dated 18 March 2011.

The Sikes Act (as amended) stipulates that this INRMP provide for:

- Conservation and rehabilitation of natural resources;
- Sustainable, multipurpose use of resources;
- Public access that is necessary and appropriate for the use described above, subject to safety and military security requirements;
- Specific natural resource goals and objectives, and time frames for acting on them;
- Fish and wildlife management, land management, and forest management;
- Fish and wildlife habitat enhancement or modifications;
- Wetlands protection, enhancement, and restoration where necessary, for support of fish, wildlife, or plants;
- Integration of and consistency among various activities conducted under the INRMP;
- Sustainable use of natural resources by the public, to the extent that use is consistent with needs of the fish and wildlife resources;
- Enforcement of natural resource laws and regulations;

[1] Note that all acronyms are presented in Appendix B.

- No net loss in the capability of the military installation lands to support the military mission of the installation; and,
- Such other activities as the Secretary of the Navy (SECNAV) determines appropriate.

By direction of the Office of the Undersecretary of Defense memo of 08 August 1994, *Implementation of Ecosystem Management in the Department of Defense*, INRMPs are required to ensure that ecosystem management is the basis for all future management of DoD lands and waters. Based on an ecosystem approach, this INRMP takes a large geographic view to ensure the overriding purpose of protecting the properties and functions of natural ecosystems (DoDINST 4715.03 dated 18 March 2011).

Additionally, this INRMP provides a practical framework to support decisions of the Commanding Officer (CO) and specified management activities implemented by the Environmental Division of the Public Works Department. The INRMP's function is to provide for ecosystem management within the constraints of the military mission.

INRMPs, as formalized under the Sikes Act (as amended), are developed jointly by the Navy, state fish and wildlife agencies such as the California Department of Fish and Wildlife (CDFW), the U.S. Fish and Wildlife Service (USFWS), and other resource agencies as appropriate. Mutual agreement from these agencies is sought for the fish and wildlife component of natural resource management identified in the INRMP, and a review for operation and effect every five years is required. In addition, an annual review with these agencies to discuss Navy installation-wide natural resources is mandatory.

This document updates the INRMP, prepared in 2001 by Tierra Data Systems, to update the resource goals and objectives of NAF El Centro. It also integrates the recommendations of the Integrated Pest Management Plan (IPMP) updated in 2009 and the Final Integrated Cultural Resources Management Plan (ICRMP) updated in 2012.

1.2 Authority

The Sikes Act (as amended) directs the DoD to take the appropriate management actions necessary to protect and enhance the land and water resources on all installations under its control. DoDINST 4715.03 has been implemented to establish fundamental land management policies and procedures for all military lands to preserve the military mission while simultaneously protecting the natural resources. Office of the Chief of Naval Operations Manual (OPNAV-M) 5090.1, *Environmental Readiness Program Manual*, 10 January 2014, Chapter 12 Natural Resources Conservation (DoN 2014), further establishes program responsibilities and standards for complying with resource protection laws, regulations and Executive Orders (EOs) to conserve and manage natural resources on Navy installations in the U.S. and its territories and possessions. The U.S. Navy Chief of Naval Operations (CNO) INRMP Guidance for Navy Installations, *How to Prepare, Implement, and Revise INRMPs*, April 2006, supplies guidelines on the process and procedure for developing an INRMP.

National Environmental Policy Act (NEPA) documentation in the form of an Environmental Assessment (EA) was completed for the 2001 NAFEC INRMP. This document is an update of the 2001 INRMP and only limited revisions are required that are not expected to "result in biophysical consequences materially different from those anticipated in the existing INRMP and analyzed in an existing NEPA document" (DoD 2011). As this is the case for this INRMP, additional NEPA analysis is not required (DoD 2011). Other federal legal requirements that are the primary drivers for natural resources management are listed in Appendix C (USC, Public Laws [PL], EOs, and Code of Federal Regulations [CFR]).

Organization of this INRMP is consistent with the 2010 DoD Template for INRMPs (DoD 2010), and the 2011 DoDINST 4715.03 (DoD 2011). The outline of this INRMP is also consistent with Navy guidance (both the CNO Guidance of April 2006, and OPNAVM-5090.1) to ensure compliance with all guidelines (DoN 2006, 2014; DoD 2010, 2011).

1.3 Location and Real Estate Summary

NAFEC is located in south-central Imperial County, California, approximately 120 miles (mi) east of San Diego, and 60 mi west of Yuma, Arizona. It is located approximately seven mi west of the city of El Centro, seven mi north of the Mexican border and 16 miles south of the Salton Sea (Map 1-1). Main access is by U.S. Interstate Highway 8 (I-8).

This INRMP exclusively includes Navy fee-owned and withdrawn lands including the main installation, the ranges, and other properties. Table 1-1 summarizes real estate associated with NAFEC and the ranges. NAFEC and the ranges are managed annually by 314 military, 219 civilian and 220 contractor personnel with an annual budget of $22.5 million. The air field portion of the installation encompasses approximately 2,803.2 acres (ac) owned by the Navy. This property supports the airfield and its buffer area, agricultural areas, and on-base housing as well as administrative, maintenance, supply and storage facilities.

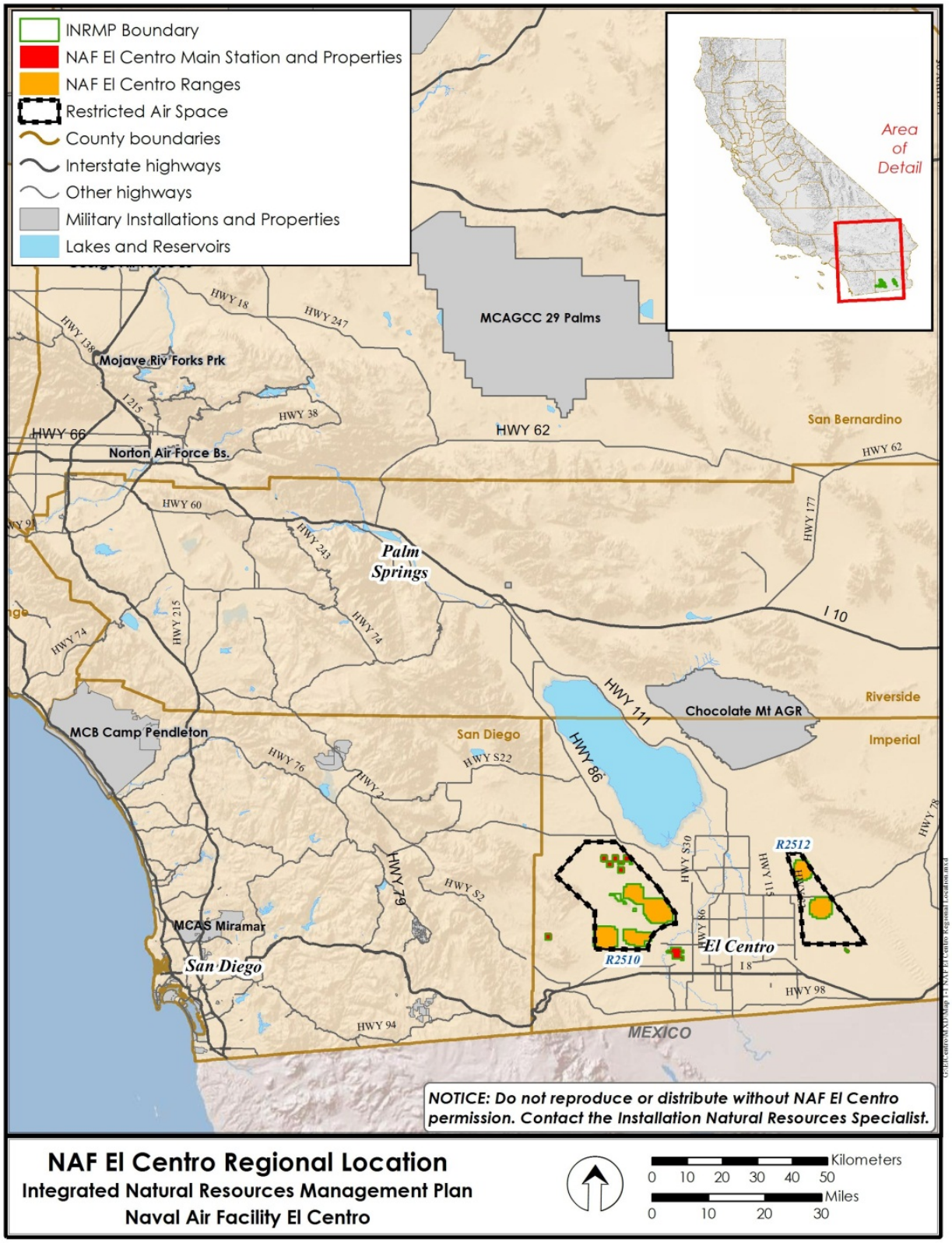
The NAFEC ranges are situated to the southwest and southeast of the Salton Sea and they are a set of operating and maneuvering areas with defined air and ground components (Map 1-2). The NAFEC ranges consist of two Restricted Areas (RA) of airspace, called R-2510 and R-2512, which are used for aviation and ground target training. Four Navy-controlled ground target areas lie under R-2510 (Targets 101 and 103 on West Mesa) and R-2512 (Targets 68 and 95 on East Mesa). A Navy-controlled Parachute Drop Zone (PDZ) lies under R-2510 on West Mesa. Ground range facilities support the training activities on the ranges.

The West and East Mesa ranges consist of Navy-administered lands (Map 1-2) that are mostly owned by the Bureau of Land Management (BLM). These lands were withdrawn for the Navy's exclusive use under Public Law 104-201 September 23, 1996 National Defense Authorization Act for Fiscal Year 1997, Subtitle B: *El Centro Naval Air Facility Ranges Withdrawal Act*. The total Navy-controlled target lands associated with the El Centro ranges is approximately 50,865 ac (Table 1-1). NAFEC also controls other public lands that are withdrawn by congressional mandate (Public Land Order 283 [1945], 1111[1955], and 4880 [1970]).

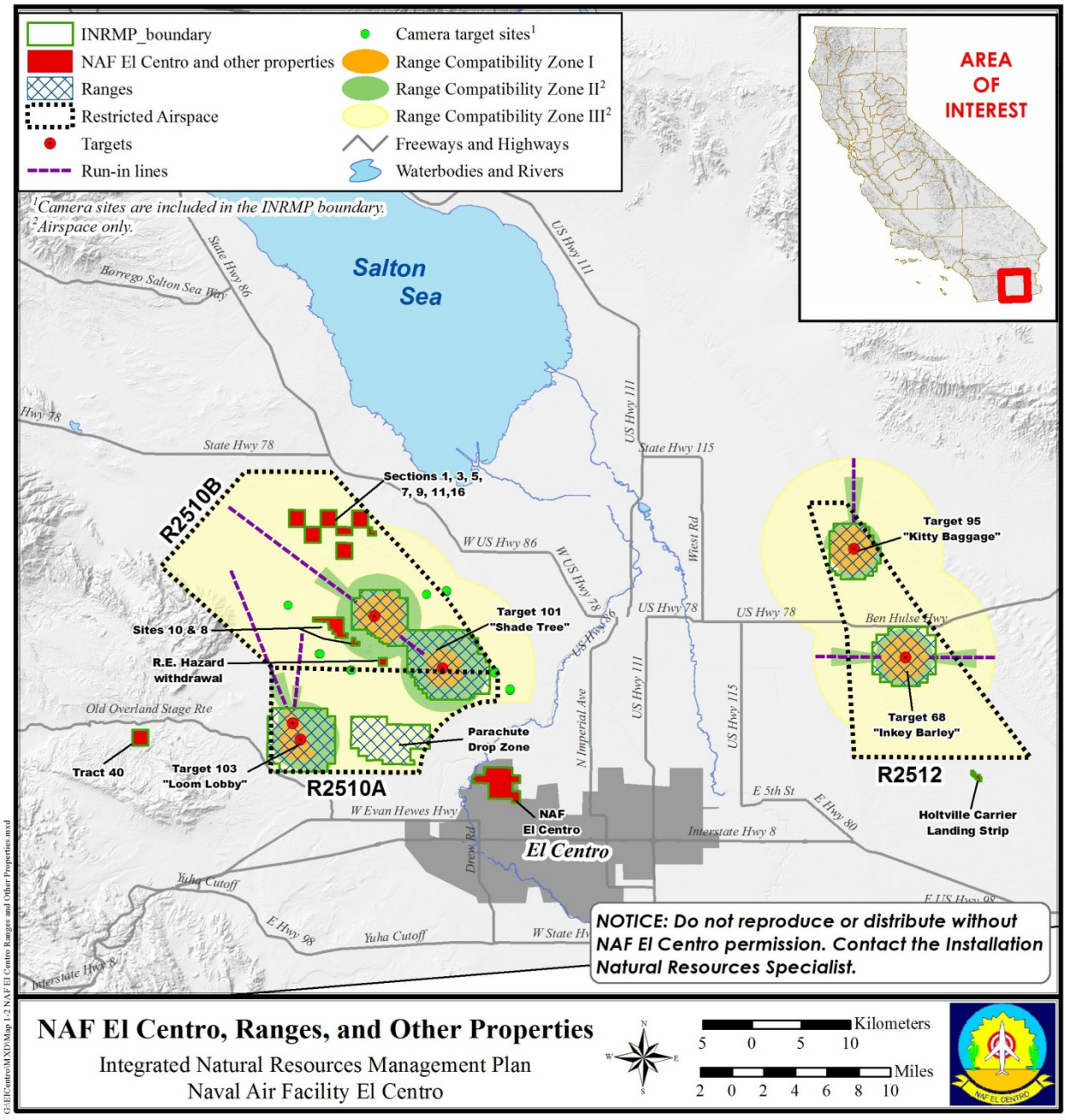
R-2510 is located approximately five mi northwest of NAF El Centro, and is composed of two vertical layers, R-2510A and R-2510B. R-2510A includes Target 101 "Shade Tree" (19,206 ac, fee-owned and withdrawn land), Target 103 "Loom Lobby" (10,274 ac, withdrawn land), and Parachute Drop Zone (7,349 ac, withdrawn land) on West Mesa. The vertical range of restricted airspace within R-2510A is from the surface to 15,000 feet (ft) mean sea level (msl). R-2510B overlies the northern half of R-2510A, with a vertical range of restricted airspace from 15,000 to 40,000 ft msl.

R-2512 is located approximately 25 mi northeast of NAFEC. R-2512 includes Target 68 "Inkey Barley" (7,847 ac, fee simple and withdrawn land) and Target 95 "Kitty Baggage" (6,189 ac, withdrawn land) on East Mesa. R-2512's vertical range of restricted airspace is from the surface to 23,000 ft msl.

For land use planning purposes, Range Compatibility Zones (RCZ) define areas based on a level of protection to public health, safety, and welfare and to recommend compatible land uses to prevent encroachment from degrading the operational capability of the ranges (see Map 1-2).



Map 1-1. Regional location of Naval Air Facility El Centro, CA.



Map 1-2. Naval Air Facility El Centro, Ranges and Other Properties.

Besides the ranges, NAFEC controls other areas that are fee-owned or withdrawn (Table 1-1; Map 1-2). These properties include, in the West Mesa, Sections 1, 3, 5, 7, 9, 11, and 16 (3,661 ac, fee-owned), the R. E. Hazard Construction Site property (160 ac, withdrawn land), Site 10 (880 ac, withdrawn land), Site 8 (120 ac, withdrawn land), and Camera Sites 1-7 (27.5 ac total, withdrawn land). The R. E. Hazard Construction site, Sites 10 and 8, and the Camera sites are shown on a few maps in this INRMP due to the large scale of the maps and small size of the properties. Just outside of West Mesa, Tract 40 is a 640 ac isolated parcel of Navy land (fee-owned) in the southwest part of the former Carrizo Impact Area (CIA) in the Carrizo Badlands. Tract 40 is located about 25 mi west of NAFEC and northwest of Ocotillo, California. Other property in the East Mesa includes the Holtville Carrier Landing Strip (110 ac, withdrawn land) (Map 1-2).

Table 1-1. Real Estate Summary of NAF El Centro and Ranges (in acres)

Land Area	**Fee-Owned**	**Withdrawn [a]**	**Total Acreage [b]**
NAF El Centro (Main Facility)			
Airfield Operations and Support	2,115.1	--	2,115.10
Agricultural Outlease	688.1	--	688.1
Total			**2,803.2**
R-2510/West Mesa Target Area (RCZ-I, RCZ-II, RCZ-III)			
Target 101 “Shade Tree”	4,005	15,201	19,206
Target 103A “Loom Lobby”	--	10,274	10,274
Parachute Drop Zone	--	7,349	7,349
Sub-total			*36,829*
Other Properties in West Mesa			
R.E. Hazard Construction Site	--	160	160
Sections 1, 3, 5, 7, 9, 11, 16	3,661	--	3,661
Site 10		880	880
Site 8		120	120
Camera sites 1- 7	--	27.5	27.5
Sub-total			*4,848.5*
Total			**41,677.5**
R-2512/East Mesa Target Area (RCZ-I)			
Target 68 “Inkey Barley”	160 Fee Simple	7,687	7,847
Target 95 “Kitty Baggage”	--	6,189	6,189
Total			**14,036**
Other Property Areas			
Tract 40 of Former Carrizo Impact Area	640	--	640
Holtville Carrier Landing Strip	--	110	110
Total			**750**
Total Acreage	11,269.20	47,997	59,266.70

[a] Navy withdrawn lands include lands beneath Range Compatibility Zone (RCZ) I. Lands beneath RCZ-II and III are possessed and managed by BLM and BUREC in accordance with an MOU with the US Navy.
[b] All acreages are approximate.

1.4 Military Mission

1.4.1 Naval Air Facility El Centro

The mission of NAFEC is to support the combat training and readiness of the Warfighter. NAFEC is a shore activity that is part of the Commander, Navy Installations Command (CNIC). It serves as a support air facility for fleet air squadrons and provides ranges and facilities for tactical air training. (Official website www.cnic.navy.mil/regions/cnrsw/installations/naf_el_centro.html accessed April 15, 2014).

No squadrons are permanently assigned to NAFEC. The installation serves as a support facility for active or reserve units from each of the major DoD components (U. S. Navy, U.S. Marine Corps, U.S. Army, and U.S. Air Force), as well as units from the National Guard, Coast Guard, and international (allied/foreign) aviation units. In addition, the facility provides support to other federal agencies (U.S. Customs and Border Protection/U.S. Border Patrol) and international armed forces (e.g., Great Britain's Royal Air Force Parachute Training and Testing Unit). Air squadrons conduct realistic tactical air training such as field carrier landing practice and air-to-ground weapons practice. NAFEC is the winter training location for the Navy's Blue Angels Flight Demonstration Squadron. It is an inland diversion air field for coastal bases such as Marine Corps Air Station (MCAS) Miramar, Naval Air Station (NAS) North Island, and aircraft carriers operating off the coast of southern California.

NAFEC's mission has, overall, been relatively compatible with sound natural resource management. The requirement for large safety buffers around the target ranges has precluded options for development, restricted ORV access, and left large, contiguous areas of native habitat largely intact. Future changes in military requirements can be accommodated while continuing to provide sanctuary to wildlife and plant communities.

1.4.2 NAF El Centro Tenant Commands

A summary of mission statements of major NAFEC tenants is presented in Table 1-2. This information is based on information provided in the NAFEC Activity Overview Plan (2005) and updated with current information.

Of the tenant commands supported by NAFEC lands and facilities, Table 1-2 details those tenant commands that conduct activities on the ground and have the potential to affect or be affected by natural resources and their associated environmental regulations. The individual missions of these commands guide the activities of the tenants.

Table 1-2. Tenant Missions and Activities at NAF El Centro

Tenant	Mission	Activity
Blue Angels Aerial Demonstration Team	Enhance Navy recruiting, represent Navy and Marine Corps aviation to the people of the United States, and represent the armed forces to the people of the United States and other countries as international ambassadors of goodwill.	Trains from January to mid-March at NAF El Centro
Branch Dental Clinic	Provide the highest quality dental care to the operational forces, their families, and to those who served their country in the past as an annex to the Navy Regional Medical Center San Diego, Dental.	Provides dental care

Tenant	Mission	Activity
Branch Medical Clinic	Provide the finest medical care to the operational forces, their families, and to those who served their country in the past as an annex to the Navy Regional Medical Center San Diego.	Provides medical care
Defense Commissary Agency (DECA)	Deliver premier quality of life to the armed services to enhance recruiting, retention, and readiness by providing exceptional savings, products, and services.	Operates Navy commissary
Facilities Engineering Acquisition Division (FEAD)	Contracting arm of the Public Works Department and holds the authority and responsibility to execute and administer facility contracts.	Administers facility contracts
Naval Pacific Meteorology Oceanography Detachment (NAVPACMETOC DET)	Provide war-fighting advantage through the application of the oceanographic sciences.	Operates Naval weather station
Navy Exchange	Provide customers with quality goods and services to support quality of life.	Provides goods and services to Navy personnel
Navy Munitions Command-CONUS West Division Detachment El Centro	Responsible for ordnance logistics and management of assigned activities.	Provides ordnance logistics
Naval Air Support Equipment Facility (NAVAIRSEFAC)	Provide facilities, direction, and guidance for support of depot level of aviation support.	Provides support of depot-level rework of aviation support
Personnel Support Activity	Provide consolidated pay and personnel services to Navy members attached to specified commands and activities, settle civilian travel claims, and provide passenger transportation services to all Navy sponsored travelers in a geographic area.	Provides personnel services
VFA 122 Detachment El Centro	Maintain aircrew training environment by providing exceptional triple platform organizational level maintenance support.	Provides support of depot-level rework of aviation support

1.5 Achieving Success and No Net Loss of the Military Mission

The military mission, derived from Title 10 of the USC, requires the Navy to “maintain, train and equip combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas.” In keeping with the principal use of military installations to ensure the preparedness of the U.S. Armed forces, the Sikes Act (as amended) mandates that the INRMP shall provide for no net loss of the capability of the installation’s lands to support the military mission.

1.5.1 INRMP Implementation

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

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

The common principal between national security and public land stewardship is the concept of sustainability. Sustainability is a relative condition of the ecosystem and the military mission that can be measured; however, measures of sustainability are scale-dependent. Sustainability may be considered as having at least several measurable components in the context of this INRMP: military use facilitation, soil and water resource protection, ecological integrity, cultural resource protection, and base safety for current and future use. For this INRMP, an impact to the mission occurs when any of the above are constrained or when one of these conditions occurs:

- Quality of military training is impacted by natural resource restrictions.
- Training qualification objectives are significantly delayed or conflict with natural resource constraints.
- Environmental issues hamper scheduled operations.
- Conflict resolution impacts training intensity or tempo and the range resource condition is impacted.
- Soil and water resources are impaired such that realistic training is problematic and damage has occurred. Managing for sustainability means preventing damage that will eliminate the use of an area for the foreseeable future, or for which restoration or mitigation is excessively costly.
- Ecological integrity is irretrievably harmed. Compliance under the Sikes Act (as amended) for mission sustainability ("no net loss") is also defined in this INRMP to include the ecological integrity of training lands, since this integrity will carry these lands into the long-term with all the elements that allow self-recovery to remain intact. Keeping all the pieces (habitats and species) that allow the ecosystem to function at various scales and at the highest level possible, given the mandate for land and water use, is one component of protecting sustainability.
- Current and future use is impaired because of hazardous material impacts. The ability to keep the base free from hazardous material aids in assuring the safety of the base for current training purposes and any potential alternate future uses.

Under the Sikes Act (as amended), NAFEC must ensure mission sustainability and see that there is no net loss to the military mission due to implementation of this INRMP. To do this, the link between the installation's military mission and land use must be maintained by identifying and partitioning the requirement of resource protection and the military missions of the landowner and its tenant users. Management of natural resources can support the military mission by avoiding unnecessary conflicts

between mission requirements and legal mandates regarding natural resources, promoting positive public relations, and enhancing the quality of life for site personnel.

1.6 INRMP Goals and Objectives

1.6.1 Planning Definitions

INRMPs have goals that are shaped by DoD guidelines and directives, pertinent laws and regulations, public needs, public values, ecological theory and practice, and management experience. The planning terms used in this document such as "goal," "objective," and "strategy" cover a gradient of specificity and durability, ranging from a very broad, enduring goal to specific implementation or strategies as presented in Table 1-3.

Table 1-3. Planning definitions used in the INRMP.

Level in Hierarchy	Definition
Goal	Broad statement of intent, direction, and purpose. An enduring, visionary description of where you want to go and a final outcome. A goal is not necessarily completely obtainable. It does describe a desired outcome related to the mission, rather than an activity or a process.
Objective	Specific statement that describes a desired future end-state or successful outcome that supports an INRMP goal or Navy Policy. Can be quantitative or qualitative. Should be followed by a "standard," that is an observable indicator by which successful attainment of a condition stated in the objective is measured. Should be good for at least 5 years.
Strategy	Explicit description of ways and means chosen to achieve objectives. "What are we going to do about it?"
Action	Specific step, practice, or method to get the job done, usually organized sequentially with time lines and duty assignments. These go out of date quickly and should be updated annually.

Under each goal are many objectives. An objective is a more specific statement that describes a desired condition, which may or may not be measurable, and should be lasting for at least five to ten years. Each natural resource subject discussed in the INRMP usually has an objective for guidance.

The ways and means chosen to achieve the objectives are defined as "strategy" in the narrowest sense. Policy is actually the formally adopted strategy or decision to carry out a course of action. Different levels of policy exist, again ranging from broad (1st-level) to narrow (2nd- or 3rd-level) detailed statements of action. Under each objective are many policies. Below the policy level are individual actions, which can describe specific steps, practices, or methods to get the job done. These actions are usually short-lived and need to be updated annually to be tied into budgeting needs. To be effective, each action must be directed toward accomplishing a particular policy. Funding to accomplish actions outlined in this INRMP will be requested by NAFEC on an annual basis, but the accomplishment of specific actions is contingent on funding.

1.6.2 Goals

GOALS----The goals set forth in this INRMP are compatible and consistent with the DoD's natural resources program goals (DoDINST 4715.03, OPNAV-M 5090.1) and the goals defined in the DoN's *Natural Resources Conservation Strategic Plan* (DoN 1994).

GOAL 1: Manage for no net loss to the operational carrying capacity of NAFEC lands and accommodate increased military mission requirements for use of these lands, while meeting all environmental compliance responsibilities.

GOAL 2: As responsible stewards of the land, preserve, protect, and enhance natural ecosystems and biodiversity while guaranteeing continued access to NAFEC's land, water, vegetation, and wildlife resources for the military mission.

GOAL 3: Provide the organizational capacity, support, and communication linkages necessary for effective strategic planning and daily administration of this INRMP and NAFEC's natural resources.

The objectives are to integrate fish and wildlife management, land management, and outdoor recreation management as much as is practicable and compatible with the military mission and Navy-approved land uses.

The INRMP addresses the legal mandates protecting specific natural resources and ensures Navy compliance with these mandates. Identification of protected resources, such as federally listed threatened or endangered species and sensitive habitats, allows planning of mission requirements to avoid possible conflicts with natural resources' legal mandates. If an activity is planned that may affect federally listed species, the Navy shall consult with the USFWS pursuant to Section 7(a) 2 of the Endangered Species Act (ESA). Navy policy encourages cooperation with state authorities to protect state-listed species. While federal cooperation with regional efforts to manage resources is not compulsory, in order to promote habitat and multi-species conservation and ensure meeting the Navy's own natural resource management goals and objectives, coordination with the CDFW will occur to the extent feasible if state listed species may be affected by a proposed activity.

1.6.3 Key Issues

A number of issues were identified during the scoping process and categorized in three broad categories: Programmatic Agreements, Species Management, Range Management.

- Programmatic Agreements -- Development of programmatic agreements with agencies to expedite routine or repetitive activities that may affect the environment or cultural resources. Agencies may include USFWS, BLM, Natural Resource Conservation Service (NRCS) (on wetlands) and the State Historic Preservation Office (SHPO). Consultation is required for routine activities which may affect endangered or threatened species, or historic or archaeological properties. A programmatic agreement with BLM on co-management of lands under the current Conservation Agreement may be beneficial.
- Species Management -- Control of invasive plant species that have the potential to impact sensitive species or degrade habitat is an issue. Also, migratory birds are protected under the Migratory Bird Treaty Act (MBTA). Some migratory and resident birds are a hazard to air flights, so the NAFEC Bird Aircraft Strike Hazard (BASH) Plan (NAFEC 2000, 2012) was implemented to ensure safety while complying with the MBTA. NAFEC signed a Conservation Agreement (CA) to comply with the *Flat-tailed Horned Lizard Rangewide Management Strategy* (http://www.fws.gov/southwest/es/arizona/Flat.htm). The Rangewide Management Strategy (RMS)

represents a multi-agency effort to conserve the lizard to preclude federal listing. As a result of the RMS and the CA, the first proposed federal listing in July 1997 was withdrawn. Per 50 CFR 17, Vol. 76, No. 50, dated 15 March 2011, the latest proposed rule to list the flat-tailed horned lizard (FTHL) (*Phrynosoma mcallii*) as threatened was also withdrawn. NAFEC continues to comply with the RMS.

- Range Management -- Trespassing metal "scrappers" and ORVs are a problem on the ranges and need to be deterred.

1.7 Roles, Responsibilities and Stakeholders

Much of the natural resource management on NAFEC is shared across adjoining jurisdictions. Close collaboration and partnering is required between the Navy and external stakeholders, in order to be cost effective, provide consistent management across jurisdictions, avoid redundancy, and optimize the use of scarce resources.

1.7.1 Navy Roles and Responsibilities

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

Chief of Naval Operations (CNO) — CNO serves as the principal leader and overall Navy program manager for the development, revision, and implementation of this INRMP. CNO regularly updates policy and issues specific implementing guidance based on new or changing laws and regulations for the development, revision, and implementation of the INRMP and associated NEPA documentation. CNO addresses and coordinates resolution of natural resources issues affecting the Navy mission. Additionally, CNO approves all INRMP projects prior to submittal to regulatory agencies for signature.

Commander of Navy Installations Command (CNIC) — CNIC reviews the entire INRMP. Their role is to ensure all lands under the control of Navy are evaluated for significant natural resources. CNIC ensures that those installations with significant natural resources prepare, maintain, and implement a Natural Resources Management program. This includes development, implementation, review and necessary updates and revisions of INRMPs. CNIC maintains and upgrades as necessary a web-based Navy Conservation website, which includes EPR-web. EPR-web is the web based program in which all installations submit their natural resources projects for approval during the Program Objectives Memorandum (POM) cycle. POM is the Navy's annual process to budget funding four years in advance.

Navy Region Southwest (NRSW) — Regional Commanders ensure that installations comply with DoD, Navy, and CNO policy on INRMPs and their associated National Environmental Policy Act (NEPA) documentation. They ensure that installations under their purview review their INRMPs for operations and effect. They ensure the programming and budgeting 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. NRSW maintains close liaison with the INRMP signatory partners (USFWS and CDFW) and other INRMP stakeholders. NRSW also endorses INRMPs prior to finalization and promotes and coordinates their implementation through CNIC.

Naval Facilities Engineering Command Southwest (NAVFAC Southwest) — NAVFAC Southwest is responsible for the planning, engineering/design, construction, real estate (including the acquisition and disposal of), environmental services, in a six state area on the West Coast. The command also provides

public works services such as transportation, maintenance, utilities/energy delivery, facilities management and base operations support to Navy and Marine Corps Installations within its geographic area of responsibility, as well as support to other federal agencies. NAVFAC Southwest assists in implementing Navy policy to ensure stewardship of Navy lands and resources and compliance with natural resources laws and regulations. It also provides technical expertise to evaluate and validate funding requests for natural resources projects. NAVFAC Southwest provides contracting authority, technical oversight, planning documents, and contracts (including Cooperative Agreements) for installations within its jurisdiction.

1.7.2 Internal Stakeholders

The following is a list of internal stakeholders that support the development, revision, and implementation of this INRMP. Approving Officials review and approve the INRMP.

Commanding Officer
The NAFEC CO is responsible for managing and operating NAFEC and all associated property. Operational health and safety is a primary concern, so the CO must ensure that the natural resources management program supports the military mission and that it does not pose risks to pilots or other personnel. Navy policy for safety is to manage for a zero mishap rate.

The CO ensures the preparation, completion, and implementation of INRMPs and associated NEPA documentation. Their role is to:

- Act as stewards of natural resources under their jurisdiction and integrate natural resources requirements into the day-to-day decision-making process; ensure natural resources management and INRMPs comply with all natural resources related federal regulations, directives, instructions and policies;
- Ensure implementation of the INRMP through annual evaluations of the natural resources metrics.
- 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 (Appendix D), as well as coordination with subordinate commands, installations, and other federal and state agencies;
- 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 the CO's signature.

Public Works Department
NAVFAC Southwest's NAFEC Public Works Department (PWD) plans, designs, constructs, repairs, and maintains all real property facilities and utility plants on NAFEC, in addition to providing housing and basic services (utilities, refuse collection, insect and rodent control, fire protection, and custodial services) for all personnel in support of the NAFEC community. The PWD also researches, develops, and implements the NAFEC Master Plan, in which the INRMP is seen as a support document.

Environmental Division
NAFEC Public Works Department's Environmental Division (ED), as delegated by command directive, is responsible for the preparation and implementation of this INRMP. Acting through the Natural Resources Manager (NRM), the ED is responsible for management of natural resources as part of the overall NAFEC environmental program. Areas of responsibility include NEPA, air and water resources,

solid and hazardous waste, cultural resources, and natural resources, including agriculture, pest management, wildlife management, and outdoor recreation. The NAFEC ED staff provides technical support. This INRMP is the direct vehicle for accomplishment of many of the responsibilities of the CO. See Appendix D for NAFEC's NRM Designation Letter.

Approving Officials
Installation Commanding Officer
NRSW Natural Resources Program
NAVFAC SW Natural Resources Program
NAVFAC SW Public Works Department Environmental Division

Other Internal Stakeholders
All NAFEC departments
NAF El Centro tenant commands
NRSW N40
NRSW Public Affairs Office
NRSW Office of Counsel
NAVFAC SW Public Works Department
NAVFAC SW Office of Counsel
NAVFAC SW Integrated Product Team (IPT)

1.7.3 External Stakeholders

External Sikes Act Stakeholders review and sign the INRMP. Other External Stakeholders have the opportunity to review the INRMP.

1.7.3.1 External Sikes Act Stakeholders (Concurring Officials)

The Sikes Act requires the Secretary of the Navy to prepare INRMPs in cooperation with the U.S. Fish and Wildlife Service (USFWS) and state wildlife agency, which in California, is the California Department of Fish and Wildlife (CDFW). An INRMP reflects mutual agreement of the parties concerning the conservation, protection, and management of fish and wildlife resources. Mutual agreement should be the goal with respect to the entire INRMP. No element of the Sikes Act is intended to either enlarge or diminish the existing responsibility and authority of the wildlife agencies concerning natural resources management on military lands. A Memorandum of Understanding (MOU), signed in July 2013, established a cooperative tripartite agreement between the DoD, the U.S. Department of the Interior (DoI), USFWS, and the state fish and wildlife agencies as represented by the International Association of Fish and Wildlife Agencies recognizing the partnerships necessary to prepare, review, and implement INRMPs on military installations. The tripartite agreement is presented in Appendix E.

This INRMP has been prepared in accordance with the Sikes Act and in cooperation with USFWS and CDFW. Implementation of this INRMP and any changes in planned activities will be undertaken with the cooperation and agreement of USFWS and CDFW. This INRMP is a living document and will be updated to reflect improved management practices, changes in proposed actions within NAFEC and agency comments or concerns about ongoing or proposed activities. DoD policy requires installations to review INRMPs annually in cooperation with 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 INRMP, as well as establish a realistic schedule for undertaking proposed actions. As this INRMP is considered a long term document with no set expiration date, the annual review process allows a yearly opportunity for updating the plan when necessary.

1.7.3.2 Other External Stakeholders

U. S. Bureau of Land Management
Imperial County

1.7.4 NAF El Centro Chain of Command

Organization at NAFEC is divided into components of Administration and Operation. The CO administers NAFEC, while other departments provide support to all users, including tenants and itinerant air squadrons. The Operations Department oversees and maintains the target areas in East Mesa and West Mesa. Its responsibilities include control, management, safety, and security of the land and airspace within the Range Compatibility Zones (RCZ I-III).

Figure 1-1 shows the military chain of command for NAFEC and the target areas. While NAFEC maintains maintenance responsibility for the target areas, range scheduling is conducted by Marine Corps Air Station (MCAS) Yuma. Figure 1-2 is NAFEC's organizational chart.

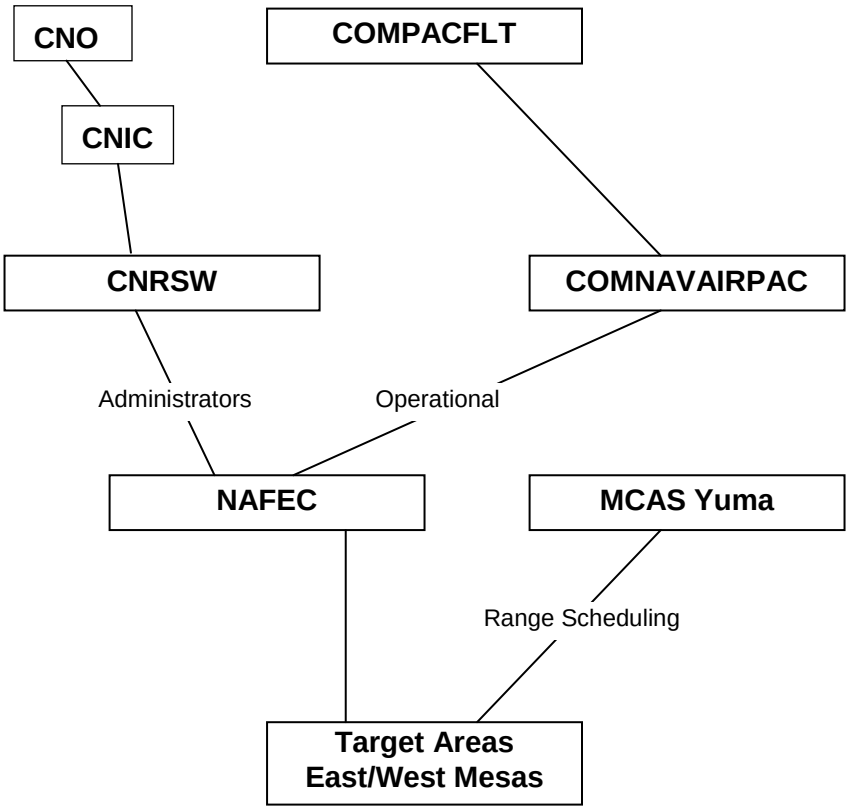


Figure 1-1. Military chain-of-command for Naval Air Facility El Centro and target areas.

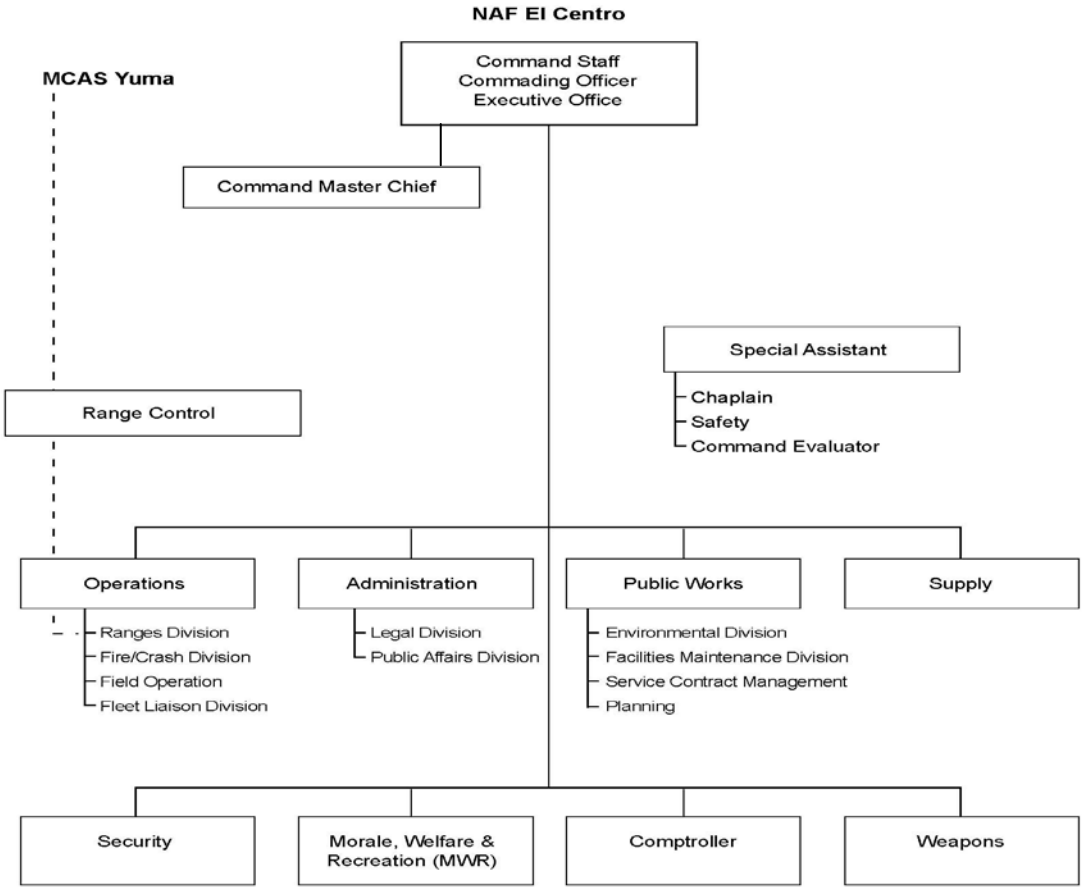


Figure 1-2. Naval Air Facility El Centro organizational chart.

1.8 Ecosystem Management

The DoD and the Navy have adopted a policy of ecosystem management for INRMPs. The DoD (DoDINST 4715.03, *Natural Resources Conservation Program*) describes ecosystem management as, "a process that considers the environment as a complex system functioning as a whole, not a collection of parts, and recognizes that people and their social and economic needs are a part of the whole." The DoD goal with regard to 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." DoD and Navy Instructions and Manuals mandate an ecosystem framework and approach for the INRMP (DoDINST 4715.03 and OPNAV-M 5090.1). 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 conserve 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). Managing for sustainability and ecosystem management are approaches that attempt to integrate long-term goals with short-term project lists.

The ecosystem mandate is accomplished by applying principles of sustainable use at several scales—emphases on partnerships, public outreach, long-term monitoring, and adaptive management. Consistent with Navy policy (OPNAV-M 5090.1 and DoDINST 4715.03), ecosystem-based management shall include:

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

An adaptive management approach is a requirement for INRMPs under DoDINST 4715.03, and is defined as: "The process of implementing policy decisions as scientifically driven management experiments that test predictions and assumptions in management plans and using the resulting information to improve the plans" (DoD 2011).

An adaptive management approach includes the following systematic procedures (DoDM 4715.03M):

- Identify and assess military mission operating and facility requirements.
- Analyze and assess risk to natural resources.
- Complete needs assessment survey.
- Monitor and prepare needs assessment of results.
- Update natural resources inventories to ensure information is current.
- Reanalyze and reassess risk to natural resources.
- Adjust the overall program, as necessary.

Adaptive management is partly implemented through the Navy's Environmental Management System (EMS) to integrate environmental considerations into day-to-day activities across all levels and functions of Navy enterprise. EO 13423, "Strengthening Federal Environmental, Energy, and Transportation Management" (24 January 2007), required each DoD component to adopt an EMS. An EMS is a formal management framework that provides a systematic way to review and improve operations, create awareness, and improve environmental performance. Systematic environmental management as an

integral part of day-to-day decision making and long-term planning processes is an important step in supporting mission readiness and effective use of resources. The most significant resource for every organization is their senior leadership's commitment and visibility in EMS implementation and sustainability. A robust EMS is essential to sustaining compliance, reducing pollution and minimizing risk to mission. The Navy's EMS has a concerted focus on preventing pollution, consistent regulatory compliance, and reducing environmental impacts, including environmental practice for energy and transportation functions, using a "plan-do-check-act" management model (OPNAV-M 5090.1). It conforms to the International Organization for Standardization (ISO) 14001:2004 EMS standard.

Adaptive management is implemented as part of the INRMP annual review and revision process described in section 1.9.

1.9 Revision and Annual Review

DoD policy (DoDINST 4715.03) requires installations to review INRMPs annually in cooperation with the two primary parties to the INRMP, the USFWS and the CDFW, and other appropriate federal agencies. Annual reviews facilitate "adaptive management" by providing an opportunity for the parties to review the goals and objectives of the INRMP, and establish a realistic schedule for undertaking proposed actions. To facilitate an annual review, this INRMP has been developed so that historical data is in the text of the substantive chapters of this document while appendices allow for insertion of annual updates.

Section 101(b)(2) of the Sikes Act [16 U.S.C. 670a(b)(2)] specifically directs that the INRMPs be reviewed "as to operation and effect" by the primary parties "on a regular basis, but not less often than every five years", emphasizing that the review is intended to determine whether existing INRMPs are being implemented to meet the requirements of the Sikes Act (as amended) and contribute to the conservation and rehabilitation of natural resources on military installations. The Office of the Secretary of Defense (OSD) (17 May 2005) guidance 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 DoD Natural Resources Conservation Program Instruction (DoDINST 4715.03 18 March 2011) and by OPNAV-M 5090.1, Environmental Readiness Program Manual (10 January 2014).

The following policy memoranda clarified procedures for INRMP reviews and revisions:

- Deputy Undersecretary of Defense for Installations and the Environment (DUSD [I&E]) Policy Memo 10 October 2002 that replaced a 1998 policy memorandum.

- Assistant Deputy Undersecretary of Defense (ADUSD) for Environment, Safety and Occupational Health (ESOH) Policy (01 November 2004 memo).

The DUSD (I&E) memorandum (10 October 2002 memo) 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 added new tracking procedures, called metrics, to ensure proper INRMP coordination occurred and that projects were implemented.

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. As the Sikes Act directed earlier in this section, a formal review must be performed by "the parties" at least every five years. This guidance further states that informal annual reviews are mandatory to facilitate

adaptive management, during which INRMP goals, objectives, and "must fund" projects are reviewed, and a realistic schedule established to undertake proposed actions.

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

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

1.10 Compliance and Stewardship Criteria for Implementing Projects

For the purposes of this INRMP, the terms compliance and stewardship have specific meanings as criteria for implementing project lists. Project rankings are assigned based on whether an activity fulfills a mandatory obligation for compliance with a legal requirement such as the ESA, Clean Water Act (CWA), or MBTA. Alternatively, a project may be considered good land stewardship but is not considered an obligation for NAFEC to be found in compliance with environmental laws. High priority compliance projects to comply with legal obligations are generally funded within annual budget constraints, but future federal budgets could decrease available funding for both compliance and lower ranked stewardship projects. Annual funding for all conservation projects are ranked on a regional basis and each project must compete for available funds among multiple Navy installations. It's the Navy's policy to promote long term mission and environmental sustainability measures, including good stewardship practices, and all valid compliance and stewardship requirements are submitted for consideration during budget programming cycles.

The budget programming hierarchy for this INRMP is based on both DoD and Navy funding level classifications. The DoD programming and budgeting priorities for conservation programs are detailed in the DoDINST 4715.03 Natural Resources Conservation Program. The Instruction divides programming and budget requirements into two categories: Recurring and Non-recurring. Recurring natural resources management requirements refers to costs of projects necessary to meet applicable compliance requirements in Federal and State laws, regulations, EO's, and DoD policies, or in direct support of the military mission. Non-recurring natural resources management requirements refer to projects and activities needed to manage, maintain, rehabilitate, and improve natural resources under DoD control through a comprehensive program that provides for long-term stewardship of DoD natural resources while ensuring sustainability of the military mission.

The Navy programming hierarchy is based on DoD funding level classifications. The projects recommended in this INRMP have been prioritized based on the Navy programming hierarchy of

Environmental Readiness Levels (ERLs) (DoN 2006). ERL 3 & 4 projects are compliance driven and ERL 1 & 2 projects are under the stewardship category. Section 5.3.1 Funding Classifications, describes ERL levels in more detail. Funding is routinely programmed three years in advance of project implementation.

1.11 Integrating Other Plans

The INRMP provides guidance and direction for natural resources management activities and provides a framework for plan implementation. The INRMP is consistent with, and integrates other planning documents from a variety of sources listed below.

The need for the INRMP to be consistent with different planning processes, such as any applicable USFWS recovery plans and state wildlife action plans, is not mandatory. However, the INRMP must state whether it is consistent with these plans. If the development of this INRMP is used to preclude the designation of Critical Habitat for federally threatened and endangered species from the USFWS, an explanation is required as to how NAFEC is participating in the recovery of the species.

This INRMP is intended to be compatible with other NAFEC planning processes. Certain related or neighboring planning processes may affect this INRMP, and NAFEC will assess this Plan's consistency with the plans described below.

This INRMP supersedes the 1987 Natural Resources Management Plan and updates the 2001 INRMP.

NAFEC Master Plan (2014). The Master Plan provides planning guidelines for future growth of the installation through coordination of previous planning efforts, evaluation of existing facilities, and recommendations of actions necessary to preserve and enhance mission capability (KTU+A 2014).

Air Installation Compatible Use Zones (AICUZ) (2010). The AICUZ was developed to 1) allow an adequate margin of safety between aircraft operating out of NAFEC's airfield and other aircraft transiting in the vicinity and 2) ensure compatibility of land uses with aircraft operations.

Bird/Animal Aircraft Strike Hazard Plan (2012). The BASH Plan provides management and control strategies designed to reduce the bird aircraft strike hazard and minimize the risk of bird strikes that cause damage to pilots and aircraft. The NAFEC Environmental Department has been implementing relevant parts of the document. This INRMP creates a management strategy for complying with DoN BASH policy and streamlining NAFEC's process to coordinate better BASH management.

Encroachment Action Plans (EAPs) (2011). Revisions to the current EAP were recently initiated. For this purpose, two are being completed for NAFEC: one for the Installation proper and another for the ranges. The EAP is an internal Navy document that assesses the potential challenges and impacts that non-Navy actions in the vicinity of a particular installation may have on mission readiness.

Integrated Cultural Resources Management Plan (ICRMP) (2012). An ICRMP describes how an installation intends to integrate cultural resources stewardship and compliance with various legal mandates, including the National Historical Preservation Act (NHPA), into its mission-related activities. The previous guidance document for cultural resources was completed in 1984. This ICRMP will include a complete inventory of cultural resources on the Installation, including the ranges. A complete ICRMP will assist in effective management between natural and cultural resources.

Integrated Pest Management Plan (IPMP) (2009). A revised IPMP has currently been initiated. The current IPMP captures all the pest management and pesticide-related activities conducted on the property. Pest management activities on NAFEC provide protection of health and environmental resources, maintain facilities, and improve personnel quality of life to ensure that the NAFEC accomplishes its operational mission. The IPMP includes pest control and grounds maintenance for administrative and industrial facilities, lessee pest control, agricultural outlease, and natural resources protection. This plan adds value by developing compliance systems and streamlining operations involving the use of pesticides including applications, storage, and the archiving records.

Range Complex Management Plan (RCMP) (2013). The RCMP is designed to support the sustainment of military training and Research, Development Testing and Evaluation (RDT&E) current and future requirements associated with the Navy controlled lands and Restricted Airspace of the El Centro ranges. The RCMP contributes to protecting the operational capability of the range complex from encroachment, environmental regulation non-compliance and range infrastructure obsolescence, while enhancing range complex management processes.

Range Installation Compatible Use Zones Study (RAICUZ) (in draft, expected to be completed 2014). The RAICUZ was an update for R-2510 and R-2512 and when completed serves as a compatible land use strategy for East Mesa and West Mesa.

This page left intentionally blank.

2.0 Military Use and Other Land Uses

2.1 Historical Land Use

The following sections summarize the use of NAFEC natural resources pre- and post-Navy ownership.

2.1.1 Historical Non-Military Land Use

Lack of water has played a pivotal role in settlement throughout historic periods in the El Centro area. Desert Kumeyaay hunter-gatherers occupied territory that expanded outwards from the New River and Alamo River sloughs.

In May 1901 the California Development Company opened the first irrigation canal into the valley area, attracting settlements, farms, and towns. By 1904, the Alamo Canal had badly silted, and a second canal was needed. This second canal entry was improperly cut below the original canal. In early 1905, high flood waters from the Colorado eroded the improper cut near the Mexican border until the entire Colorado River was diverted into the valley. The flood waters poured in, destroying farm lands and filling the Salton Sea. In early 1907 engineers were able to close the break.

The New River drains northward into the Salton Sea, fed by irrigation runoff from both sides of the border and sewage and industrial waste originating from the Mexican side of the border. The Salton Sea has continued to recede due to irrigation transfers from agricultural activities in the Coachella and Imperial valleys, and is the largest inland body of water in California.

In 1907, settlement of the Imperial Valley had grown such that citizens formed Imperial County from the eastern portion of San Diego County. The Imperial Valley's status and prosperity as an agricultural center increased in the 1930s due to several major projects such as Boulder Dam and the All-American Canal. Both projects improved reliable water delivery to farmers and continue to support the primary basis of the regional economy.

2.1.2 Historical Military Land Use

The Naval Air Facility El Centro has served as Fleet support since its inception. It was originally commissioned as a Naval Auxiliary Air Station in 1946. Many of the structures at the station were built during the 1940's. Located at the site of a Civil Aeronautics Administration airport, the site was easily adapted to a military air facility. From 1942 to 1946 as part of the war effort, the station was used to train Marine Corps aviators, serving as a Marine Corps Air Station. After the war, the station was transferred back to the Navy and almost decommissioned before being adopted for the Navy's Parachute Experimental Unit in 1947. The facility evolved to become the Joint Parachute Training Facility, a center for parachute testing and research for the Navy. It was eventually called the National Parachute Test Range (NPTR). During the 1950s the facility set records for weight of equipment dropped by parachute and number of jumps by individuals. Use as the NPTR ended in 1979 with its transfer to China Lake, California (DoN, WestDiv 1987). After the transfer of NPTR, the use of the range for military parachute training began to take on the frequency and pattern seen today. Aerial gunnery practice was conducted from 1945-1959 in the area known as the Carrizo Impact Area (CIA). Today aerial gunnery practice continues at all remaining (non-CIA) targets on NAFEC.

In 1964, NAFEC became the Naval Aerospace Recovery Facility. Since 1967 NAFEC has been the winter home of the U. S. Navy's world-renowned Blue Angels Flight Demonstration Squadron.

Since the closure of the NPTR, NAFEC's primary mission has been fleet support. An intended effect in the relocation of NPTR was to allow facility upgrades for the purpose of accommodating fleet deployment training cycles (DoN, WestDiv 1987). As strong urban growth placed more pressure on coastal airfields, such as NAS North Island, MCAS Miramar, and NAS Lemoore, increased training which involved high performance jet aircraft was moved to NAFEC's remote location and clear, sunny weather (DoN, WestDiv 1987).

2.2 Current Operations and Activities

2.2.1 Facilities and Properties

Ideal year-round training weather, a diverse desert landscape, relative urban isolation, and convenient access to ordnance ranges Range-2510 (West Mesa), Range-2512 (East Mesa), and Range-2507 (Chocolate Mountain Aerial Gunnery Range managed by MCAS Yuma) combine to support NAFEC as a top Naval training facility. The topography and barren terrain of the desert makes it an excellent place to conduct a variety of low-level aerial training exercises.

2.2.1.1 Naval Air Facility El Centro Land Use

The majority of NAFEC land is used for aircraft operations, aircraft maintenance, and the agricultural out-lease program. Other land uses include housing, administration, recreation, utilities, general maintenance, and supply and storage. Some NAFEC land remains undeveloped. A Master Plan for NAFEC was just completed and the existing land uses are depicted in Map 2-1.

C130–Hercules during training 'Touch-and-Go' Exercises. Source: RECON

To comply with the DoD INRMP template a "Constraints" and "Opportunities" map was created for NAFEC. The areas on the installation where restrictions on training or the mission occur due to natural resources-related issues are depicted as a "Constraints Map" in Map 2-2A and Map 2-2B. Potential constraints may be due to listed species, soil erosion, invasive species or wetlands and jurisdictional waters and, thus, limit access to or use of the area. The areas on the installation where there are little to no restrictions on training are depicted as an "Opportunities Map" in Map-2-3. These areas of opportunity do not have restrictions placed on them from natural resources or encroachment, and may be enhanced by partnerships with neighboring land managers.

The installation provides an airfield which supports a variety of flight operations. There are two operational runways used in aerial flight training. Of the two active runways, 8L/26R and 12L/30R, runway 8L/26R is the longest, measuring 9,500 feet. Due to its length and east/west orientation, which accommodates prevailing wind conditions, 8L/26R is used most for takeoffs and landings, Field Carrier Landing Practice, and 'touch-and-go' exercises. Runway 12L/30R is shorter than the main runway at 6,823 feet, restricting its use for most types of aircraft. Runway 12L/30R is primarily an emergency and crosswind runway. A normal day at NAFEC could include visual and instrumented departure/landing practice, aircraft equipment calibrations, survey/photo missions, and supply and personnel flights.

NAF El Centro encompasses approximately 2,803.2 acres. This property supports the airfield and its buffer area, agricultural areas, and on-installation housing as well as maintenance, supply, and storage facilities. The Master Plan focuses on the installation.

Land uses on a military installation are expressions of the Category Code Numbers (CCNs) of the majority of the facilities within that zone. The Navy's Shore Facility Planning System (SFPS) provides two summarization categories related to CCN: Shore Task (ST) (more specific) and Shore Capability Area (SCA) (more general). For the planning purposes of the master plan, land uses are analyzed in terms of SCA and displayed on Map 2-1. Land uses are used to paint a broad picture of the uses in that area; some individual facilities may have a different SCA than the land use zone in which they lie. Below is a list of the 12 SCAs:

1. Airfield Ops
2. Base Support
3. Command, Control, Communications, Computers, Combat Systems, Intelligence, Surveillance, and Reconnaissance (C5ISR) Operations (Primarily communications infrastructure)
4. Expeditionary Ops (None at NAF El Centro main station)
5. Intermediate/Depot Level Maintenance
6. Logistics and Supply
7. Ordnance/Weapons Ops
8. Research, Development, Acquisition, Test, and Evaluation (RDAT&E) (None at NAF El Centro main station)
9. Sailor and Family Readiness
10. Training
11. Utilities
12. Waterfront Ops (None at NAF El Centro main station)

2.2.1.2 Other Properties

The Carrizo Impact Area (CIA) was used from 1945–1959 as a bomber and gunnery training area for DoD aircraft crews (USACE 1997). The over-30,000-acre CIA included at the time over 16,000 acres of lands leased from the State of California and at least 10,000 acres of federal lands managed by the BLM. Over the 14-year active military use of the CIA, there were no restrictions on the type of ordnance fired or launched into the area. Targets in the form of old field pieces and abandoned tanks were also established on the site; however no additional structures or observation posts were erected. In 1962 the State of California closed the CIA to public access.

The land known as Tract 40 (640 acres, fee-owned) in the CIA is located in the southwestern part of the CIA (Map 1-3) and was sold to the U.S. Navy in October 1965 at the Navy's request. About two thirds of the surface area of Tract 40 consists of earthen mountains or mud hills and one third of flatlands intersected by several small washes. Efforts to determine the extent of contamination of the site were initiated by the Navy in 1994. In 1996 a surface sweep and disposal of unexploded ordnance were conducted on primarily the flat terrain (USACE 1997). Also conducted were subsurface anomaly location and mapping to try to determine the extent of unexploded ordnance contamination on the parcel. The mud hill area of Tract 40 is thought to be especially dangerous due to the terrain and the lack of recent ordnance disposal.

The remainder of the lands in the CIA surrounding Tract 40 was transferred to the State of California and became part of the Anza-Borrego Desert State Park. The entire 30,000 acre CIA, including Tract 40, is signed as off-limits to the public due to unexploded ordnance. The recommendation from the 1996 sweep

to clear the entire Tract 40 to a depth of four feet before allowing public access was considered to be prohibitively costly at that time. Currently, further clean-up of Tract 40 is being planned.

NAFEC still retains Tract 40 but it is not currently used by NAFEC for any military or non-military activities, and there are no activities being considered or planned for the future. Transfer of Tract 40 from the U.S. government (via DoN) to the State of California has been discussed, but has not been successfully negotiated; nor is being actively pursued by either party.

In the West Mesa, Sections 1, 3, 5, 7, 9, 11, and 16 (3,661 ac, fee-owned) are located north of Target 101 in the Superstition Hills (Map 1-2). No record has been found to explain why the Navy purchased these sections. There is no sign of historical use, and there are no buildings or fences. The R. E. Hazard property (160 ac, withdrawn land) is an old construction site most likely used as an aggregate pit for sand and gravel for concrete. The property has not been used for this purpose for over 20 years and there are no buildings or fences. This area is only shown on some maps in this INRMP due to the large scale of the maps and small size of the property. Site 10 (880 ac, withdrawn), Site 8 (120 ac, withdrawn), and seven camera sites (27.5 ac total, withdrawn land) are associated with Target 101. The cameras were originally part of the National Parachute Testing Facility and were used to photograph and film experimental parachute testing. When Target 101 was converted to a bombing target in the 1980's, only two camera sites were used. These camera sites are a part of the Weapons Impact Scoring System (WISS) used to score bombing missions. These sites are also only shown on some maps due to their small size (each camera site is approx. 2.5 or 5 ac).

Other property in the East Mesa includes the Holtville Carrier Landing Strip (110 ac, withdrawn land). This is a remote asphalt airstrip with no facilities, but the asphalt is in no condition to land fixed wing aircraft. With no development nearby, the low light conditions are ideal for helicopter night vision goggle training. This airstrip is not fenced. Plans are underway to renovate the area for use by the Marine Corps.

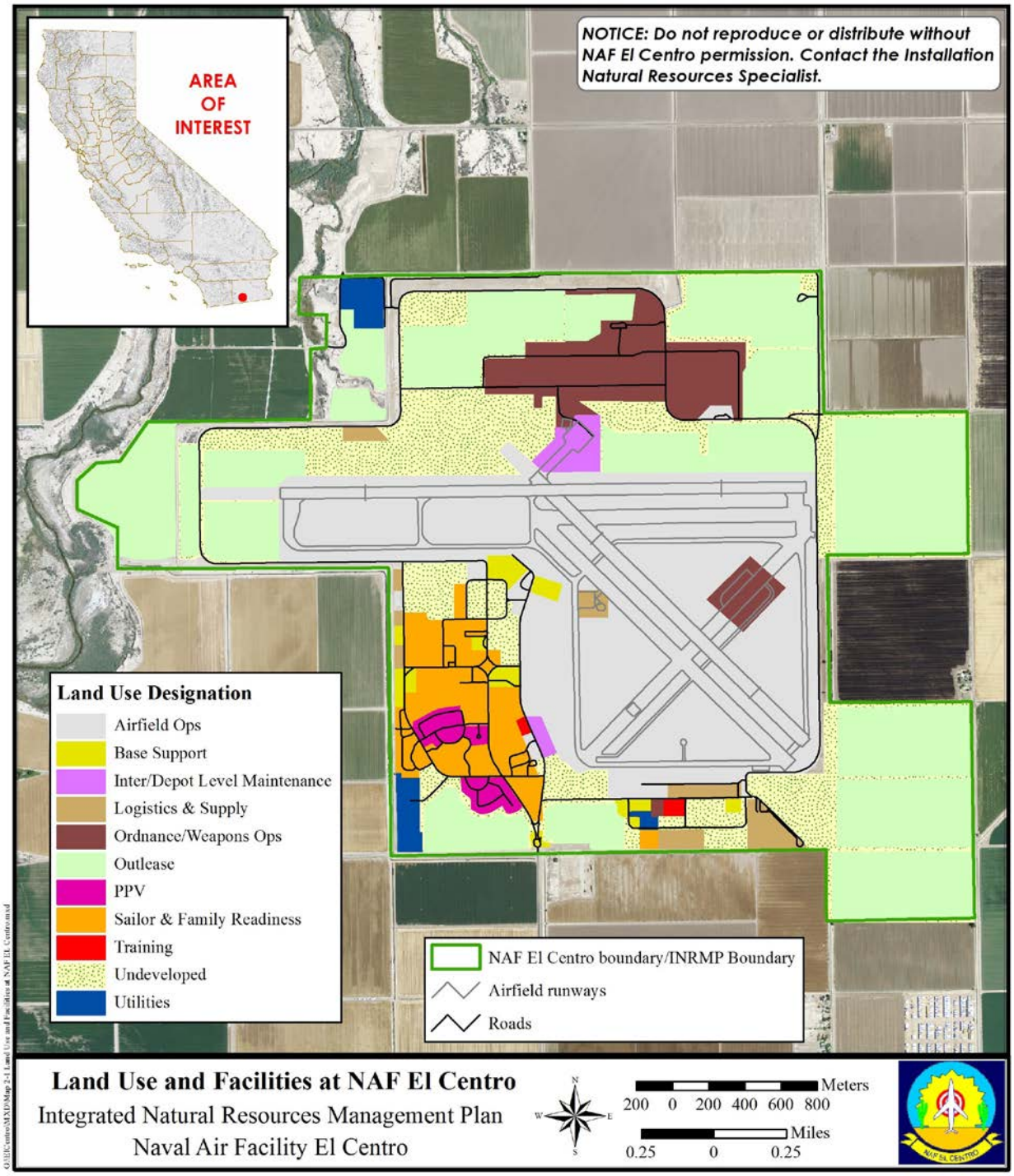
2.2.2 Ranges and Airspace

2.2.2.1 Operational Users

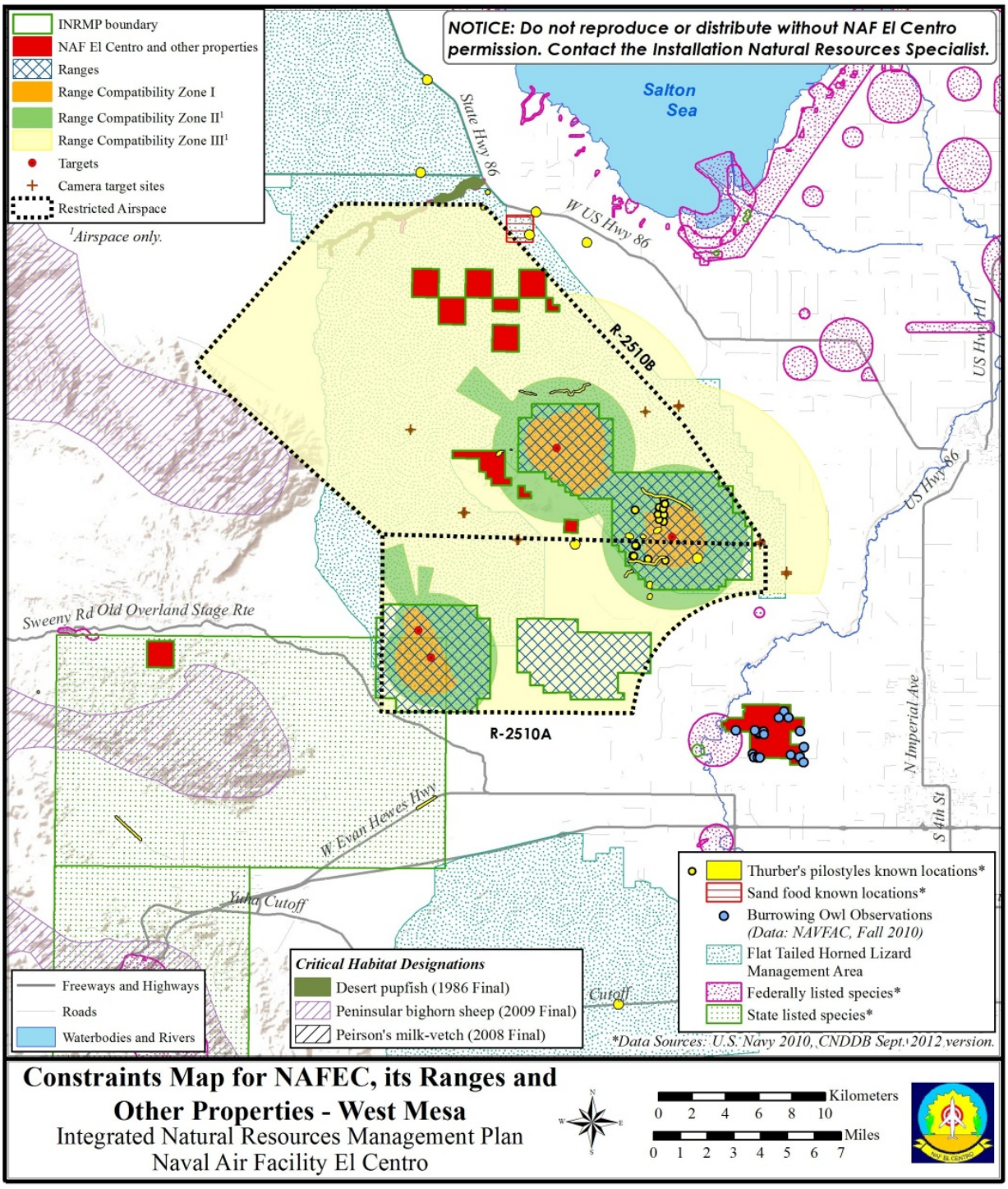
NAFEC has no permanently based aircraft. Consequently, all flight operations are by "itinerant aircraft." Because of the transient nature of these operations, the mix of aircraft using the airspace and landing field varies substantially each day. Aircraft arrive from many different bases in the United States and may consist of Navy, Marine Corps, and Air Force active and reserve units, as well as Coast Guard, National Guard, and other allied forces.

Training uses include Field Carrier Landing Practice (FCLP), "touch-and-go" air combat maneuvering, close air support, high-level and low-level ordnance delivery training, parachute drops, and air defense exercises. The demand placed on NAFEC in support of fleet requirements fluctuates directly with the ability of aircraft crews to receive training at other air stations. Generally, operations at NAFEC reach its highest levels during winter months when inclement weather affects other coastal air stations. Units detached at NAFEC prior to deploying overseas will also significantly increase operations.

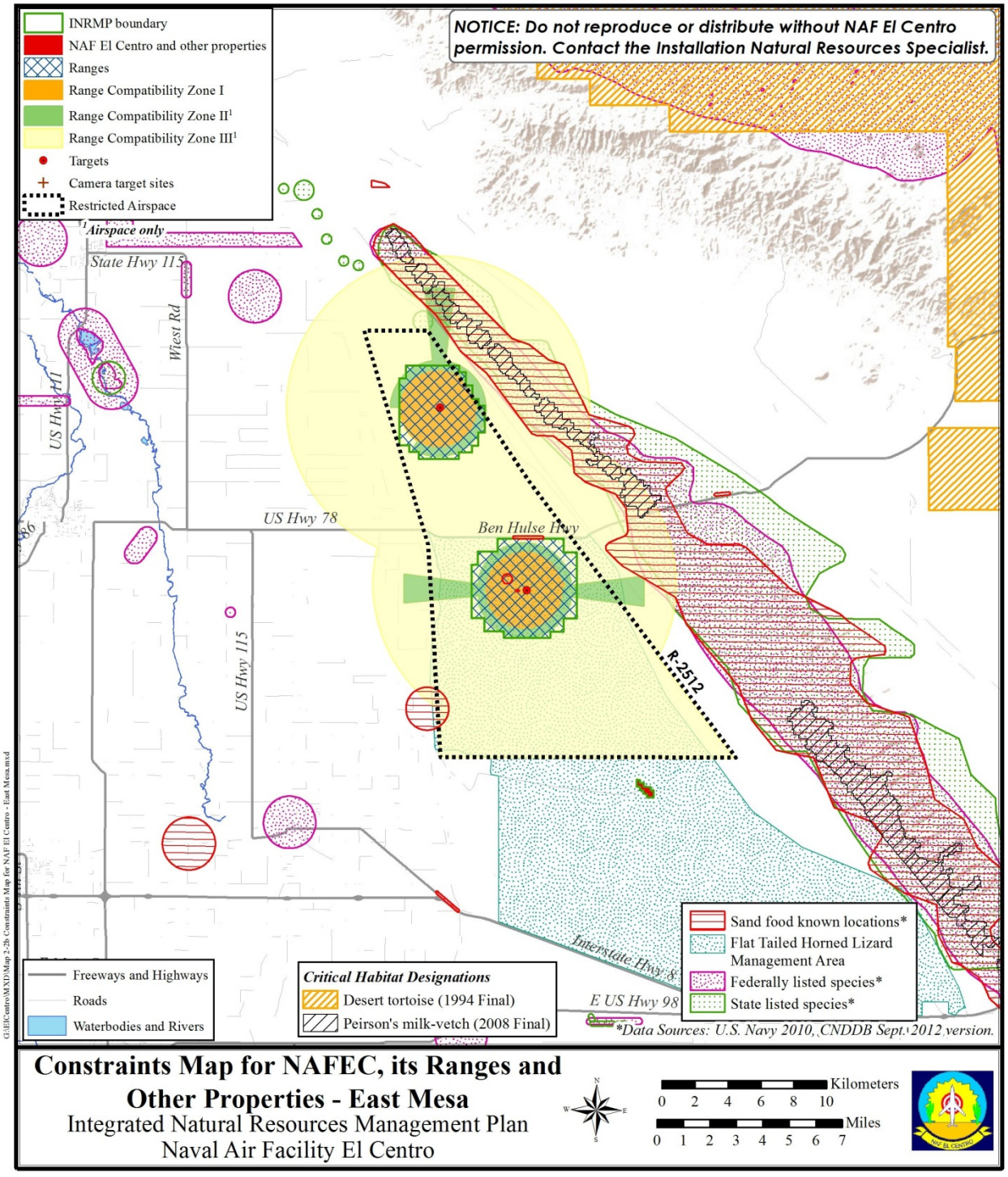
AV-8B Harrier II refueling for training exercises
Source: RECON



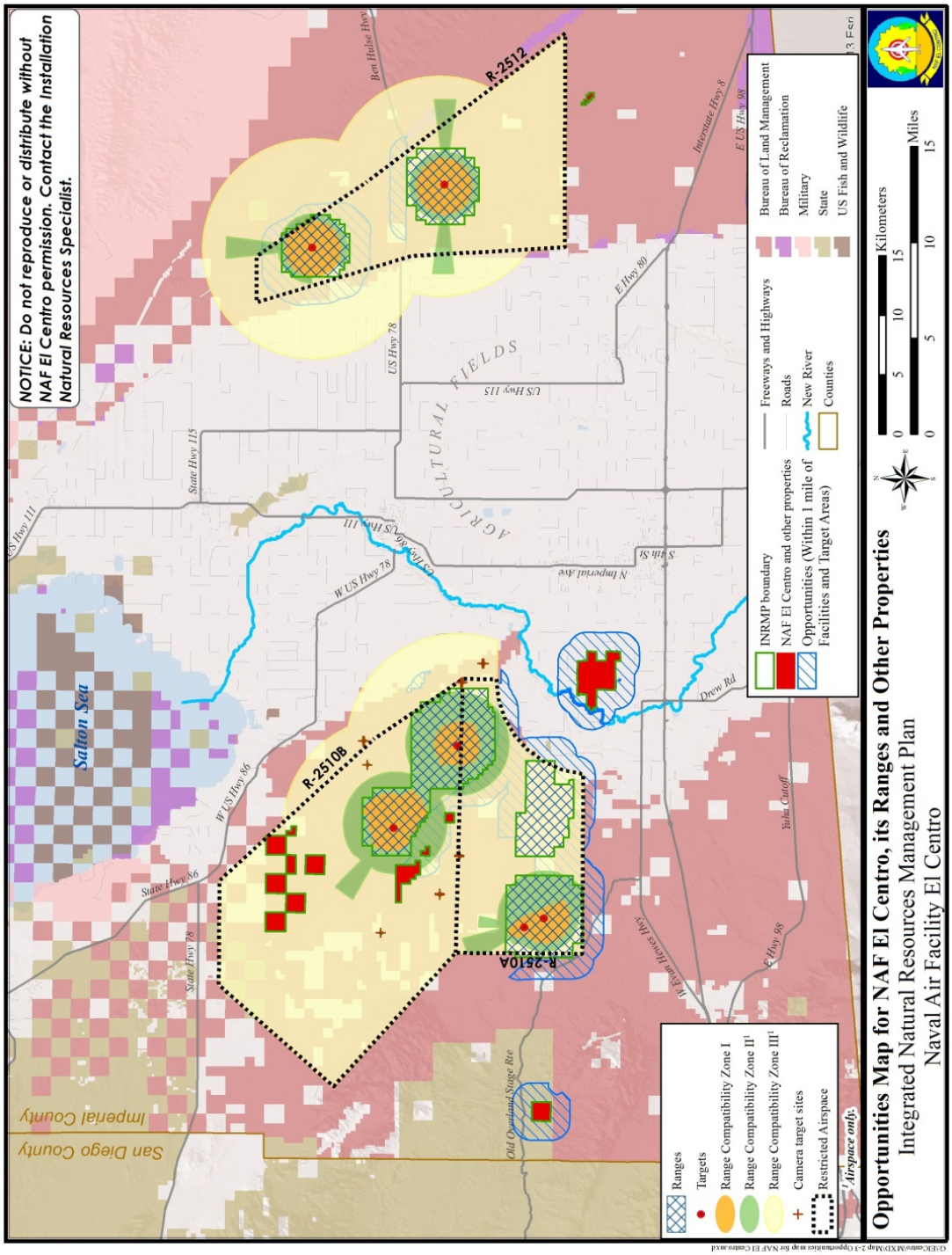
Map 2-1. Existing Land Use and Facilities at Naval Air Facility El Centro,CA.



Map 2-2a. Constraints on NAF El Centro, its Ranges and Other Properties – West Mesa.



Map 2-2b. Constraints on NAF El Centro, its Ranges and Other Properties – East Mesa.



Map 2-3. Opportunities on NAF El Centro, its Ranges and Other Properties.

2.2.2.2 Land Use at Ranges/Target Areas

The Navy uses public lands on West Mesa and East Mesa under a congressional mandate that withdraws these lands for military (as opposed to other public use) use (Public Law 104-201 [1997], Public Land Order 283 [1945], 1111[1955], and 4880 [1970]). Effective October 1996, as part of the Appropriations Act of 1997, the agreement for DoD use of withdrawn lands was renewed by Congress for a period of 25 years (PL 104-201). In 1997, a Memorandum of Understanding (MOU) between the DoN, BUREC, and BLM, was adopted "With regard to the Defense related uses of Federal lands in conjunction with the El Centro Naval Air Facility Ranges Withdrawal" (Appendix E). PL 104-201 and the MOU identified Range Safety Zones (RSZ) as zones that prioritize relative hazard risks and safety requirements with respect to noise, drop hazard, and aircraft accident potential. Three RSZ's were identified for NAFEC ranges (A, B, and C). NAFEC has exclusive use of the lands beneath RSZ A. Land and natural resources management beneath RSZ A is the responsibility of the Navy. The BLM is the responsible federal agency for multiple use and sustained yield management of federal lands in RSZ B and RSZ C, unless the land is privately owned. A map of the RSZ's is available within PL 104-201.

Bull's-eye at Target 101
Source: RECON

OPNAVINST 3550.1A addressed the Range Air Installations Compatible Use Zones (RAICUZ) Program. From this, "the RAICUZ Program includes range safety and noise analyses, and provides land use recommendations which will be compatible with RCZ's and noise levels associated with the military range operations. RCZ-I defines the area of greatest potential safety hazard and designates the minimum range surface area needed to contain all ordnance delivered at air-to-ground ranges. RCZ-II defines the area of armed over flight. RCZ-III is the area under the restricted airspace used by aircraft for tactical maneuvering over the range. RCZ's are not predictors of safety hazards but depict areas where mishaps are likely to occur if they occur." See Map 1-2 for RCZ's.

Military Uses

Typical training operations at the target areas include: aircraft familiarization flights, air-to-air refueling, strike warfare (for air-to-ground bombing and rocket firing, and strafing), air combat maneuvering, parachute drops, and search and rescue. Only light inert ordnance is permitted. Flares are permitted on the West Mesa only.

NAFEC oversees and manages R-2510 (West Mesa) and R-2512 (East Mesa) (Table 2-1). The terms West Mesa and East Mesa commonly are used in regional and local documents to refer to the general areas within which the El Centro Ranges are located, and are so used in this document. West Mesa includes Target 101 "Shade Tree", Target 103 "Loom Lobby", and the Parachute Drop Zone (PDZ). East Mesa includes Targets 68 and 95. All targets have run-in lines (Map 1-2). Run-in lines are designated by RCZ-II and guide aviators onto the target. Run-in lines are particularly important in basic ordnance delivery training for inexperienced pilots and a common feature on such ranges. At NAFEC, run-in lines serve an additional safety function: with the encroachment of other human activities, West Mesa and East Mesa are much less isolated than they were thirty years ago. Off-road vehicles

Typical run-in line to the Target. Source: DoN 2001a

(ORVs) operate quite close to the target areas, especially East Mesa, and an erroneous miss by an inexperienced pilot could result in serious consequences. Run-in lines, therefore, serve as a critical safety function.

Target 101 lies northwest of NAFEC and is actually a complex of three targets used in air-to-ground bombing, rocket, and strafing exercises and a Mobile Land Target (MLT) track (DoN, WestDiv 2004). Scoring for Targets 101, 103, and 68 are available six days a week (closed Sunday); Monday-Saturday from 0700 to 2300. Targets 95 is not scorable. MCAS Yuma Range Scheduling is responsible for scheduling all air activities for all four target ranges and the PDZ. NAFEC is responsible for all ground access and training.

WEST MESA

Target 101 "Shade Tree". Target 101 has three targets that are used for air-to-ground bombing, rocket and strafing exercises, and a Mobile Land Target (MLT) track. Ordnances are limited to MK-76 and Bomb Dummy Units (BDU)-48 practice bombs, inert 2.75-inch (in) rockets, and strafing with inert rounds. BDU deliveries are authorized within Target 101, but not on the primary targets. Night lighting is provided.

Target 103 "Loom Lobby". Target 103 provides for air-to-ground bombing, and rocket, strafing exercises. Ordnance is limited to MK-76 and BDU-48 practice bombs, Laser Guided Training Rounds, inert 2.75-in rockets, and strafing with inert rounds. Night lighting is provided.

Parachute Drop Zone (PDZ). The PDZ is located in the southeastern corner if West Mesa on 7,345 ac of Navy-controlled land within RCZ-III. The land surrounding the PDZ is uninhabited desert. To the east, the PDZ is adjoined by lands that are in agricultural use, but which have been proposed for urban development. Approximately one mile to the west is Target 103 and, beyond that, Anza Borrego Desert State Park.

The PDZs include "Camelot", "Bullhead," and "Superstition". Camelot and Bullhead PDZs are located in the southern part of West Mesa to the southeast of Target 101. The PDZ and other portions of West Mesa formed part of the Superstition Mountain Recreation Area before being withdrawn for Navy use. Therefore, previous impacts from heavy ORV use remain. These areas are gradually recovering.

Table 2-1. NAF El Centro Ranges Land and Airspace.

	AREA	DESCRIPTION	NAVY	DESCRIPTION
LAND AREAS		The R-2510 airspace is located approximately five mi northwest of Naval Air Facility (NAF) El Centro. Target 101, Shade Tree, is located in the southeastern portion of R-2510 (formerly the Parachute Recovery Test Range). Target 103, Loom Lobby, is	Target 101 (Shade Tree)	Located approximately ten miles (mi) northwest of NAF El Centro. Consisting of 19,206 ac of Navy-controlled lands. The main target is a 40- ft-diameter bull's-eye with 75-, 100-, 300- and 2,000-ft concentric rings, electric lights, and weapons impact scoring system (WISS) scoring for bombing and rocket firing, a scored strafing target, a Bomb Dummy Unit (BDU) target, and a Mobile Land Target track.

	West Mesa	located southwest of Target 101. Parachute Drop Target is located in the southeastern corner of R-2510. It contains two Parachute Drop Zones (PDZs): Camelot and Bullhead. A 200-foot (ft) by 200-ft cement helicopter pad is located at the Parachute Drop Target. A third PDZ, Superstition, is located northwest of Target 101.	Target 103 (Loom Lobby)	Located approximately 14 mi northwest of NAF El Centro. Consisting of 10,274 ac of Navy-controlled lands. It contains a scored strafe target, a remotely scored conventional bombing and rocket target, and a Laser Training System. The bomb target consists of a 30-ft-diameter bull's-eye mound with concentric circles of 75-, 150-, and 300-ft radii, with electric lights for night bombing. Bombs and rockets are scored by a WISS.
			Parachute Drop Zones (PDZs)	Located on 7,349 ac of Navy-controlled lands. Live parachute jumps are conducted in the southern part of R-2510 to the southeast of Target 101 in Bullhead and Camelot PDZs.
	East Mesa	The R-2512 airspace is located approximately 25 mi northeast of NAF El Centro. Target 68, Inkey Barley, is located in the south-central portion of R-2510. Target 95 is located north of Target 68 in the north-central portion of R-2512.	Target 68 (Inkey Barley)	Located on 7,847 ac of Navy-controlled lands. It is an unattended, instrumented (WISS) conventional weapon air-to-ground rocket, bomb, and strafing target, consisting of a 20-ft-diameter bull's-eye with concentric circles of 75-, 150-, and 300-ft radii, and a strafe target directly north of the bull's- eye, adjacent to the outer ring.
			Target 95 (Kitty Baggage)	Located on 6,189 ac of Navy-controlled lands. It is an unattended, non- instrumented conventional weapon air-to-ground rocket, bomb, and strafing target, consisting of a 20-ft-diameter bull's-eye with concentric circles of 75-, 150-, and 300-ft radii.
RESTRICTED AREA	R-2510 A/B	R-2510 covers 154,473 ac. R-2510A operates on a daily basis from the surface to 15,000 ft mean sea level (MSL). R-2510B overlies the northern half of R-2510A and is available on the weekend from 15,000 to 40,000 ft MSL.		
	R-2512	R-2512 covers 63,357 ac. R-2512 operates on a daily basis from the surface to 23,000 ft MSL.		

EAST MESA

The targets on East Mesa, Target 68, "Inkey Barley", and Target 95, "Kitty Baggage", are multi-purpose targets used for air-to-ground and rocket and strafing exercises.

Target 68 "Inkey Barley". Target 68 provides for air-to-ground bombing, and rocket and strafing exercises. Ordnance is limited to MK-76 and BDU-48 practice bombs, inert 2.75-in rockets, and strafing with inert rounds.

Target 95 "Kitty Baggage". Target 95 provides for air-to-ground bombing, and rocket and strafing exercises. Ordnance is limited to MK-76 and BDU 48 practice bombs, inert 2.75-in rockets, and strafing with inert rounds.

Non-military Uses

A 161-kilovolt (kV) power line traverses the northeastern corner of RCZ-I within Target 101. A 92-kV power line borders the northeast corner of the PDZ. Other sites within West Mesa include the Anza and Superstition electrical substations. Irrigation structures cross the southern and eastern portions of West Mesa, and the New Coachella and East Highline canals line portions of East Mesa. These canals are outside of RCZ-I for both East Mesa target areas.

The U.S. Gypsum Company has a narrow-gauge railroad that traverses Target 103. The rail cars carry mined materials from the Fish Creek Mountains, located to the northwest of West Mesa Range, to a gypsum board manufacturing plant in Plaster City.

Oil and gas leases and applications for leases cover most of RCZ-I targets on both East Mesa and West Mesa. However, only the northern portion of Target 103 has been evaluated as having moderate potential for oil and gas; other areas are rated as having low potential (BLM 1980).

Off-Highway vehicle (OHV) activity occurs to the north near Superstition Mountain, and to the south in the Plaster City OHV Open Area. Sporadic camping also occurs north and south of the Superstition Mountains. The Algodones Dunes is a popular recreational area, and occasional trespass may occur on Targets 68 and 95 despite warning signs of danger near targets.

2.2.2.3 Airspace

A mosaic of Federal Aviation Administration (FAA) corridors, Military Operations Areas (MOAs), Restricted Airspace and Control Zone designations define the airspace environment in the Imperial Valley. MOAs are established by the FAA to alert transient or cross-country pilots that there may be a higher volume of pilot training or unusual aerial activity. MOAs are not restricted, but pilots using these areas should use extreme caution to avoid potential collisions. Restricted Airspace areas are intended for military training and testing. These areas are closed to general aviation traffic during specified operating times. Control Zone airspace areas are generally circular designations with an airport as the central point and a radius extending approximately five miles. Control Zones are further modified to extend to areas outside of the five-mile radius which require instrument departure and arrival paths. Some weather, altitude, and visibility restrictions apply in this zone. Federal Aviation Administration flight corridors traverse MOAs and Control Zones.

NAFEC's Control Zone is combined with that of the Imperial County Airport. NAFEC airspace adjoins Imperial County Airport airspace approximately 2.5 miles to the east. The close proximity of this boundary has had an impact on the flexibility of NAFEC operations. For instance, military aircraft

approaching Runway 8L/26R from the north must hold at 3,000 feet above ground level (AGL) over Imperial County Airport airspace and descend rapidly to 1,500 feet AGL for the break pattern. Tower coordination is required between the NAFEC airfield and Imperial County Airport for overall operational flexibility to be maintained without hazard at either airfield.

From OPNAVINST 3550.1A, RCZs are further defined as follows.

RCZ-I defines the area of the greatest potential safety hazard and designates the minimum range surface area needed to contain all ordnance delivered to ranges.

RCZ-II defines the area of armed overflight. These areas define the run-in lines for fixed wing aircraft and helicopter engagement pattern areas where the master arm switch is in the "on" mode. RCZ-II airspace surrounds or adjoins RCZ-I. The land below RCZ-II airspace is under the jurisdiction of the Bureau of Land Management, Bureau of Reclamation, the State of California, or is privately owned. Land use activities are limited in RCZ-II (Appendix E). Aircraft flying at low elevations and traveling at high speeds preclude various ground activities.

RCZ-III is the area under the restricted airspace used by aircraft for tactical maneuvering over the range. This is the largest zone, allowing the airspace to serve as a buffer around the more hazardous I and II zones. RCZ-III has fewer land use limitations than RCZ-I and RCZ-II, and fewer hazards exist in this zone. However, population density and the height on ground activities (e.g., building size) are limited. The BLM and BUREC are responsible for land management beneath RCZ-III.

Owners of the lands underlying R-2510 and R-2512 include the Navy, Bureau of Land Management (BLM), and private parties (Map 2-4).

2.3 Other Land Uses

2.3.1 Installation Restoration and Munitions Response Program Sites

To date, eighteen Installation Restoration (IR) sites have been located on NAFEC. Of those eighteen sites, thirteen have been completely cleaned up, and three sites are in the process of being cleaned up (B. Fischer, *pers. comm.*). Map 2-5 identifies IR sites on NAFEC.

The Military Munitions Response Program (MRP) was established by the DoD to address munitions and explosives of concern (including unexploded ordnance [UXO] and discarded military munitions) and munitions constituents at other than operational military ranges and other sites (Malcolm Pirnie, Inc. 2005). There are 5 other than operational ranges on NAFEC. These include the Small Arms Range, the Skeet and Trap Range, the Turret and Skeet Ranges, the Aircraft and Machine Gun Bore Sight Range, and Tract 40 of the former CIA (Malcolm Pirnie, Inc. 2005). Map 2-5 identifies the first 4 ranges and Map 1-2 identifies the location of Tract 40.

2.3.2 Agricultural Outlease

The agricultural outlease program presently allows 688.1 acres of agricultural lands to be leased out on a five-year term. This area includes about 556.8 acres of farmable land and about 131.3 acres of maintenance area (Map-2-6). About 315.1 acres are located at the periphery (outside) of NAFEC fence boundary (Map 2-6). Alfalfa (*Medicago sativa*), bermuda grass (*Cynodon dactylon*) and Sudan grass (*Sorghum bicolor*) crops are the mainstay of this program. The crops incidentally serve to control dust

and weeds around the installation. However, if managed improperly, these may attract birds to the vicinity of the airfield, which can cause bird/animal aircraft strike hazards (BASH) (DoN, SWDIV 2000).

2.4 Future Land Use

2.4.1 Naval Air Facility El Centro

NAF El Centro Master Plan

The Naval Air Facility (NAF) El Centro's installation-wide Master Plan was completed in 2014 and provides information on the installation's existing conditions, conducts analyses to identify planning actions, and establishes a development plan and capital improvements plan. The Master Plan promotes the importance of mission and vision of NAF El Centro as a Fleet Training Complex. The Master Plan provides a defensible investment strategy and long-range vision that aligns with regional infrastructure investment objectives and the Navy's mission readiness requirements to ensure optimum use of resources.

The capital improvements plan identifies needed projects that are important to NAF El Centro's mission for continued success. The following project information represents the most recent information available for user requirements and available assets. The process of matching users to existing assets or new projects is on-going, however, and the details provided for each of the following projects are not intended to constrain future iterations/evolutions.

These projects are identified as five different types of NAF projects: 1) military construction (MILCON) (P); 2) Station (ST); 3 & 4) Repair/Maintenance (RM); or 5) Master Plan (MP). Proposed projects are provided in Table 2-2.

Table 2-2. List of Naval Air Facility El Centro projects from Master Plan.

FY	Project #	Name
FY14	P244 (Alt. of RM14-0019)	Recapitalization South Flightline
FY14	RM12-1200	Compressed Air Leaks Repair/Elec to Gas Appliances
FY14	RM12-1219	Interior Lighting Replacement
FY14	RM12-1236	End of Life HVAC Repair by Replacement
FY14	RM12-1243	Insulate Attics/Ext Ductwork and Weatherstripping
FY14	RM13-01221	Exterior Lighting Replacement
FY14	RM13-1806	Fire Rescue Station Temp Replacement Structure
FY15	P242	Surveillance Radar Installation
FY15	RM13-0741	Building 496 Solar Thermal DHW & Sunshades
FY15	RM13-0762	Barracks Weatherstripping and Shields
FY15	RM13-0803	Exterior Lighting Replacement
FY15	RM13-1841	BQ Controls Improvements
FY16	RM14-0161	Install Automatic Pool Cover, solar Thermal HW
FY16	ST13-1148	Pavement Repairs - Taxiways "A through H"
FY16	ST2-02	Repair Runway 12/30
FY17	P249 (Alt. of RM14-0549)	Relocate/Consolidate Public Works Facilities
FY17	P262	Structural and Aircraft Rescue Fire Station
FY17	P266	Replace Wastewater Treatment Facility

FY	Project #	Name
FY17	RM12-2122	Upgrade Security Building (B-565) HVAC
FY17	RM12-2203	Lightning Strike Protection/Grounding Magazine 150
FY17	RM14-0019 (Alt. of P-244)	Consolidate Operational Storage Facilities into One Facility
FY17	RM14-0549 (Alt. of P-249)	Consolidate Maintenance Buildings into Warehouses
FY17	ST12-3641	LR 102-13, Elect. High volt Loop Safety Shut Off Repair
FY17	ST13-0270	Repair Roadways and Parking Lots
FY17	ST13-1160	Airfield Drainage System Repairs
FY17	ST17-XXXX	Land Acquisition for CALA Expansion
FY18	MP-3	Consolidate FRC Storage, Relocate Other Storage Uses
FY18	MP-4	Moves Associated with P-265
FY18	MP-5	Reserve Site for Solar Panel Power Plant
FY18	MP-7	Reserve Site for Secondary Arming Point
FY18	MP-8	Reconstruct Main Gate (partial information provided by
FY20	MP-1	Construct Arm-Dearm Pads
FY20	P223	Ordnance Load Pads Phase III
FY20	P263	Air Operations and ATC Tower
FY20	P265	Bachelor Enlisted Quarters and Enlisted Dining Facility
FY20	P701B	Hangar Alterations for F-35 Training Mission
FY20	P701B	Hangar Alterations for F-35 Training Mission
FY20	RM13-1909	Repair Telecommunications System
FY25	MP-2	Construct Additional Playground
FY25	MP-6	Reserve Site for Natural Gas Peaker Plant
FY25	P210	Underground Electrical Utilities

Department of Navy Renewable Energy Initiative

In October 2009 Secretary of the Navy promulgated five energy goals for the Department of the Navy (DoN). Among these is that, by 2020, DoN will produce 50 percent of its energy from alternative sources. In support of this alternative energy goal, the Secretary chartered the 1 Gigawatt Task Force (1GW TF) to enable DoN to procure one gigawatt (GW) of renewable energy generation capacity by 2020. Through frequent working group meetings, conferences and consultations with industry, coordination with other Federal agencies, lessons learned from recent and ongoing energy projects, and reviews of germane studies, the 1GW TF assessed renewable energy (RE) challenges and opportunities facing Navy and Marine Corps installations around the globe.

DoN must continue its efforts in reducing energy demand, however challenging renewable energy goals demand increased focus and attention on RE generation project development. For the purposes of the 1GW TF, DoN will consider all sources of renewable energy. DoN definition of renewable energy: energy produced from solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions [Energy Policy Act 2005 Sec. 203 (b)(2)]. Among currently available technologies, several are well suited for almost any military installation while others may only be useful at some locations. As part of their energy plans, installations and regions should carefully assess which technology or technologies will be most suitable and cost-effective in their areas. Each region and installation is required to build an energy plan to help achieve these goals.

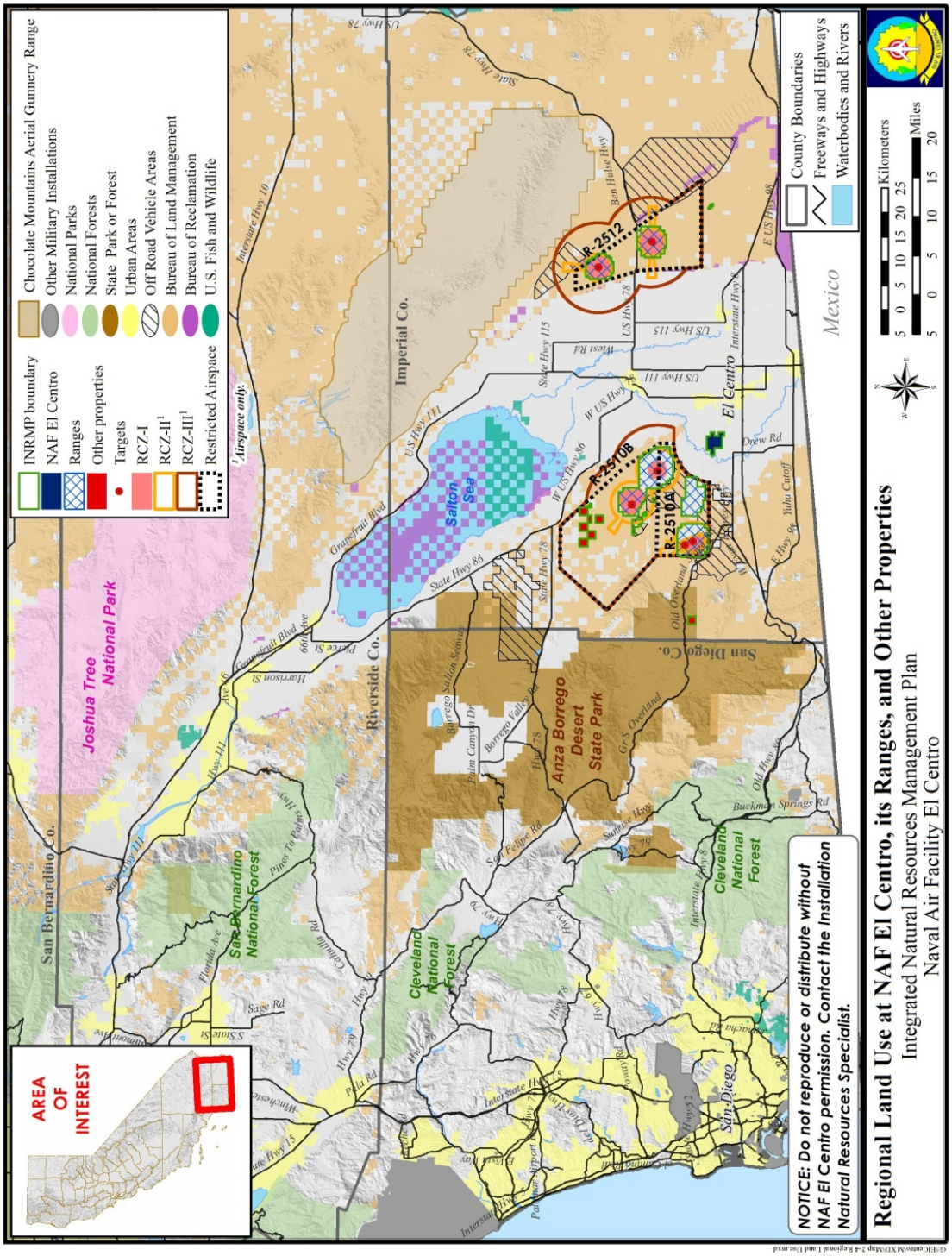
Geothermal Energy Exploration
The Navy's Geothermal Program Office (GPO) located at Naval Air Weapons Station (NAWS) China Lake, California, with the assistance the Environmental and Natural Resources Division at NAFEC, California, has drilled a temperature gradient core hole on a prospect in the southwest portion of "Shade Tree" range near Superstition Mountain. This test hole was drilled to between 3,000 and 4,000 feet deep and is intended to search for high temperature and other evidence of the presence of a geothermal resource in this area. The GPO believes that a geothermal resource may be present here and be of sufficient quality to support the operation of a 12 to 35 megawatt electric power plant. Operationally this appears to be excluded as a viable option.

Solar Energy Initiative
NAFEC is on track to convert 17 acres of a former agriculture field into a photovoltaic site. Recently, through the formation of the Navy's Renewable Energy Program Office, additional sites were going to be proposed for photovoltaic sites. NEPA documentation is about to begin for these sites.

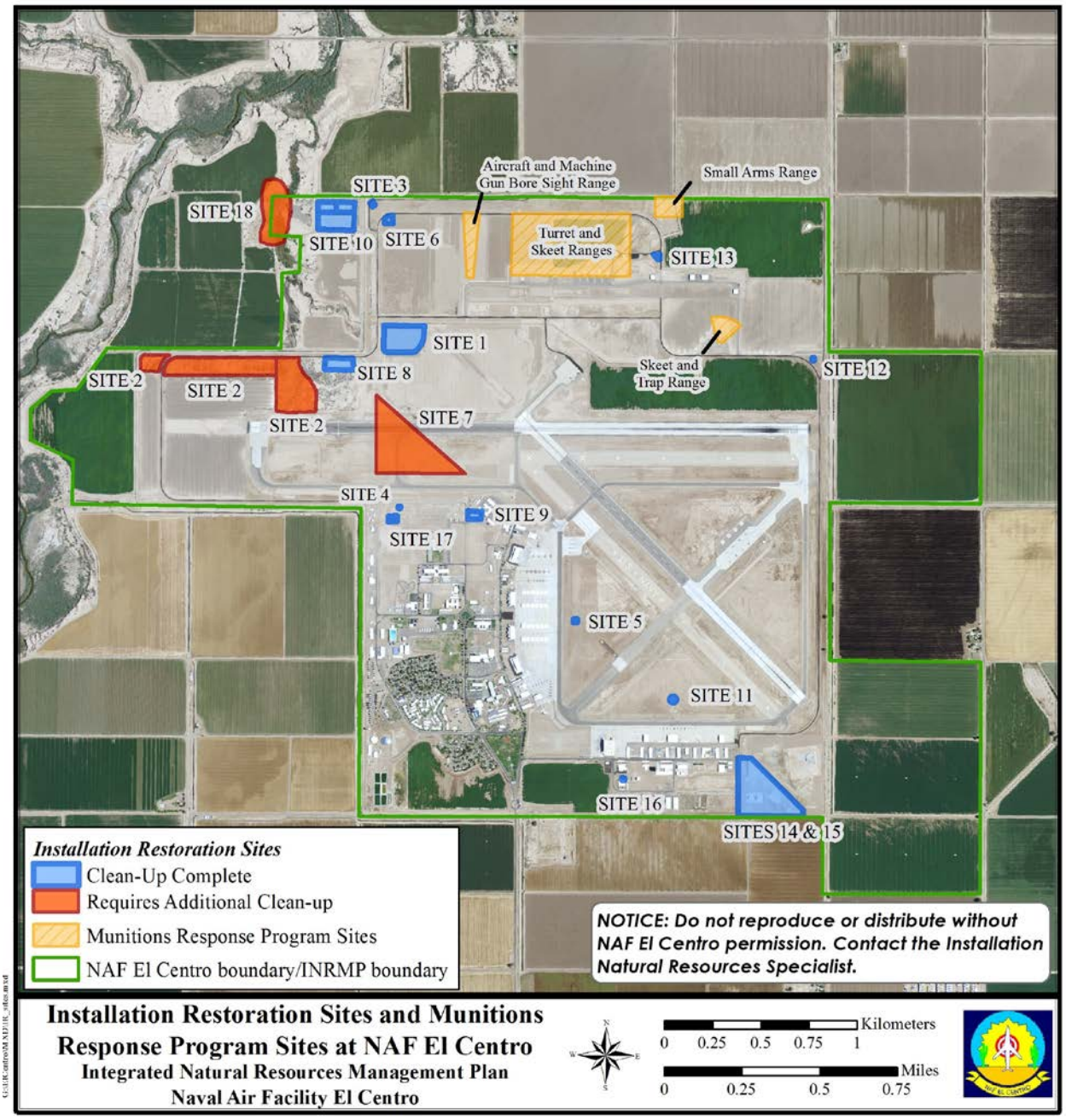
2.4.2 Surrounding Vicinity

The land surrounding NAFEC is currently categorized as Prime Farmland and Farmland of Statewide Importance, but these categories are not regulated by provisions or controls. Several projects in the surrounding areas, which could potentially affect natural resources on NAFEC, have been proposed for implementation over the next several years. Each of the projects is briefly described below.

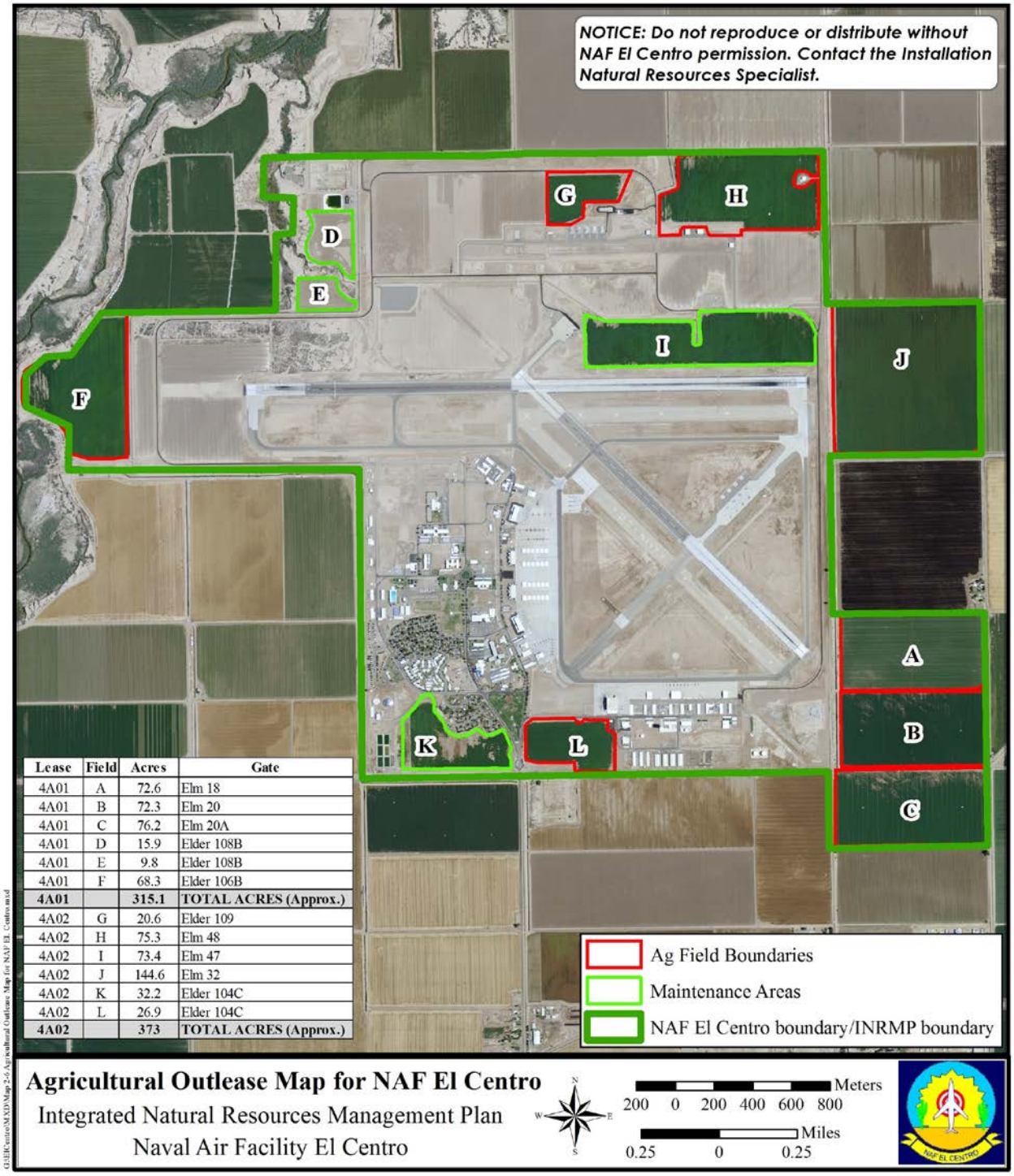
1. **Forrester Road Corridor Improvements**. CalTrans has proposed road improvements to Forrester Road, a key north–south corridor for transporting agricultural goods and cross-border traffic. Significant improvements to this road near NAFEC could potentially trigger development to the west of Austin Road.
2. **Salton Sea Authority Master Plan Concept.** The Salton Sea Authority is planning restoration of the Salton Sea leading to resident development of the Salton Sea. This could impact NAFEC in two ways. First, the increase in population due to the building of 200,000 homes and influx of 500,000 residents. Second, the development areas proposed by the Salton Sea Authority are directly under military training routes (MTRs). The current DoN policy on MTRs states that due to noise and safety concerns residential development under MTRs is not a compatible land use and is strongly discouraged.
3. **NAF El Centro Joint Land Use Study.** The NAF El Centro (NAFEC) Joint Land Use Study (JLUS) is a joint effort between the cities of El Centro and Imperial, Imperial County, and NAFEC. The JLUS was developed to guide planning and development in local governments surrounding NAFEC. NAFEC provides training (including practice gunnery, bombing, carrier landings and air combat) to active and reserve military, other U.S. forces and allied units, and its ranges provide primary training for naval student pilots. Allied forces have long recognized the cost efficiencies of training at NAFEC. Because these activities are vital to continuing the military mission in California and the nation's security, the land associated with these activities must be protected. Landowners with property near NAFEC, and residents and business owners in areas surrounding NAFEC and its training ranges must also be protected from adverse impacts that could result from training activities performed at NAFEC. Joint planning efforts on the part of the local governments and NAFEC will establish recommended strategies to equally protect all affected parties.



Map 2-4. Regional Land Use at Naval Air Facility El Centro, its Ranges and Other Properties.



Map 2-5. Installation Restoration Sites and Munitions Response Program sites at Naval Air Facility El Centro, CA.



Lease	Field	Acres	Gate
4A01	A	72.6	Elm 18
4A01	B	72.3	Elm 20
4A01	C	76.2	Elm 20A
4A01	D	15.9	Elder 108B
4A01	E	9.8	Elder 108B
4A01	F	68.3	Elder 106B
4A01		**315.1**	**TOTAL ACRES (Approx.)**
4A02	G	20.6	Elder 109
4A02	H	75.3	Elm 48
4A02	I	73.4	Elm 47
4A02	J	144.6	Elm 32
4A02	K	32.2	Elder 104C
4A02	L	26.9	Elder 104C
4A02		**373**	**TOTAL ACRES (Approx.)**

Map 2-6. Agriculture Outleases at Naval Air Facility El Centro, CA.

4. **Desert Springs Resort Development.** The Desert Springs Resort Specific Plan would be a master planned outdoor desert recreational resort community on approximately 1,105 acres of undeveloped land in an unincorporated area of Imperial County, northwest of El Centro, California. Specifically, the area is located northwest of the intersection of Boley Road and Westmorland Road, and adjacent to the Westside Main Canal. This community would include up to 411 water sport lots, up to 792 recreational vehicle lots, up to 22 estate lots, up to 150 vacation villas, and up to 100 garage villas. A series of interconnecting lakes and navigable waterways would connect the residential units with other resort features: a clubhouse with a restaurant and pool, a boat dock, spa facilities, satellite recreational facilities, open space, and an executive golf course. The last major feature of this master planned community would be a racetrack/road course, which would include a garage pit area, commercial lots, retail/food court, and road course administration facilities. The Desert Springs Resort is scheduled to open in 2015 (County of Imperial 2010). This development will be located to the southeast of the PDZ, just outside of RCZ III airspace.

3.0 Natural Resource Condition and Management Strategies

3.1 Ecoregional Setting

Naval Air Facility El Centro is located in the Imperial Valley and the Colorado Desert region, in the northwest Sonoran Desert. The ranges and properties on the West Mesa are mainly in the Borrego Valley-West Mesa Ecoregional subunit. The ranges and property in the East Mesa are located in the East mesa – Sand Hills Ecorgional subunit (CDFG 1994) (Map 3-1). NAFEC's northern boundary consists of a gradual ecotone into the Mojave Desert, where winter rains predominate. Subject to low, sporadic precipitation and high evaporation levels, this is one of the hottest, most arid desert environments in North America.

Imperial Valley extends southward for 50 miles (80 kilometers [km]) from the southern end of the Salton Sea into Mexico. Part of the valley is almost entirely below sea level - 235 feet (72 meters [m]) below at the edge of the Salton Sea. It was once a part of the Gulf of California, from which it was cut off by the dam-like deposits of the Colorado River Delta Fan as it carved out the Grand Canyon. Bordered by sand dunes and barren mountains it was largely uninhabited until 1901, when the Imperial Canal was opened and diverted Colorado River water into the valley through Mexico. The valley is bordered by the Colorado River to the east and, in part, the Salton Sea to the west. Farther west lays the border with San Diego County and to the south the international boundary between the U.S. state of California and Baja California, Mexico (Map 3-1).

The inland desert environment is conducive to military operations as the weather allows training for more than 95 percent of the year. The wide open spaces and rarity of low cloud cover make this an ideal place to consistently carry out a variety of flight activities.

Urban isolation also suits military needs. However, nearby California desert communities are experiencing growth that places pressure on NAFEC buffer areas. State prisons have been constructed in Calipatria and Seeley. The county population has grown 18 percent from 142,737 in 1999 to 174,528 in 2010 (U.S Census Bureau 2011). Land use immediately surrounding NAFEC is agricultural. The three closest areas of substantial development are the city of El Centro, the city of Imperial and the city of Seeley, located approximately five miles to the southeast and northeast and three miles to the southwest, respectively.

Regional water issues involve some of the most difficult in the state, with innovative approaches spawned to solve water delivery and pollution problems. One-half million acres of farmland in the Imperial Valley, creating 1,000,000 acre-feet of irrigation runoff, cause major pollution problems in the New River, Alamo River, and Salton Sea. Pollutants include suspended solids, insoluble pesticides, selenium, soluble pesticides, fertilizers, and bacteria. The New River is considered the most polluted river in North America. Other pollutant sources include raw sewage, industrial toxics, and other materials dumped in across the international border in Mexicali, Mexico, a city with a metropolitan area population

Overview of Target 101 site with Salton Sea in distance. Source: RECON

of 936,826 (2010) population, less than 20 miles away.

The Salton Sea to the north was artificially filled early in the 20th century in the area once occupied by the ancient Lake Cahuilla, which most recently dried up about 1650 A.D. The Salton Sea is a 230,400-acre saline lake. Development around the sea of consists of agriculture and urban development as well as nature preserves and wildlife refuges. It is fed by irrigation and storm run-off from the Imperial, Coachella, and Mexicali valleys. This affects NAFEC by providing a stopover for many thousands of migratory birds, which become a potential BASH problem (DoN, SWDIV 2000).

3.2 Climate and Climate Change

Regional Climate

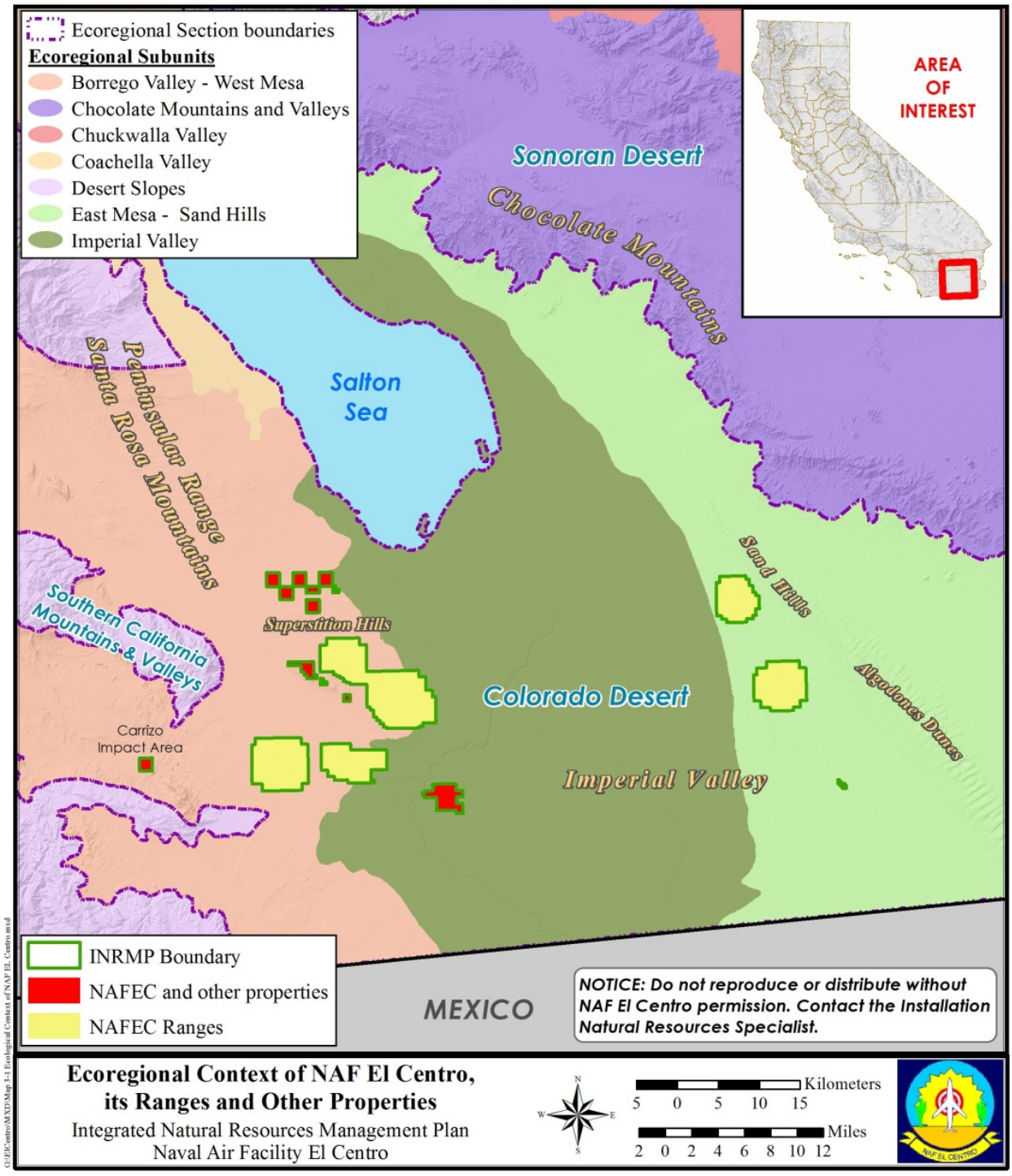
The subtropical desert climate of Imperial County is characterized by dry, hot summers and mild winters. Weather patterns are largely uniform throughout the valley with the exception of elevated humidity in irrigated areas and local differences in wind due to topography.

Precipitation in the Imperial Valley is bi-seasonal and sporadic, occurring both as winter showers and summer thunderstorms; the average annual rainfall is 2.92 inches (in) (7.4 centimeters [cm]). Figure 3-1 illustrates the disparity between rainfall and evaporation in El Centro, with the area between the two curves representing the moisture deficit characteristic of an arid environment. High solar radiation, winds, and temperature all contribute to the high rate of evaporation.

In winter, storms originating from the Pacific Ocean dissipate as they move inland and eastward, losing energy as they come up against the Peninsular Range rain shadow. Winter precipitation falls predominantly as low-intensity prolonged rainfall extending over large areas at a time. In 1939, a little over 8.5 in (21.6 cm) of precipitation fell, making it the wettest year in the history of Imperial County. Summer monsoonal rainfall develops as Pacific Ocean storm cells move northward, allowing weather systems that originate in the Gulf of Mexico to take precedence. These convectional showers become more frequent and reliable moving eastward across the low-elevation Colorado Desert into Arizona; thus, the West Mesa ranges are generally drier than East Mesa ranges. The showers tend to be brief, intense, and localized. They quickly wet the soil surface during the first few minutes, making the soil repellent to additional water. This may result in a high level of erosion, an inability of water to get to the root zone to nourish plants, and flash floods.

The coastal mountains prevent the intrusion of cool, damp air from the more marine-influenced San Diego coast. Because of a characteristic lack of cloud cover, solar radiation levels are extremely high which contributes to rapid heating of soils during the day. Clear skies also facilitate quick cooling of the desert surface at night, as thermal energy is readily radiated skyward. Rapid heating and cooling of the desert surface, results in high temperatures by day and quick cooling by night. Daytime temperatures in the desert range from lows in the mid-30 degrees Fahrenheit (˚F) (5˚Celsius [C]) in winter months to highs up to 110+ ˚F (43˚C) in July and August.

Frosts in the Imperial Valley are generally light and infrequent with an average of eight days of frost per year. The growing season ranges from 300 to 365 days. Mild winter temperatures and warm weather are key to the productivity of crops in the area, as the long growing season allows multiple cropping.



Map 3-1. Ecoregional Context and Physical Setting of Naval Air Facility El Centro, CA.

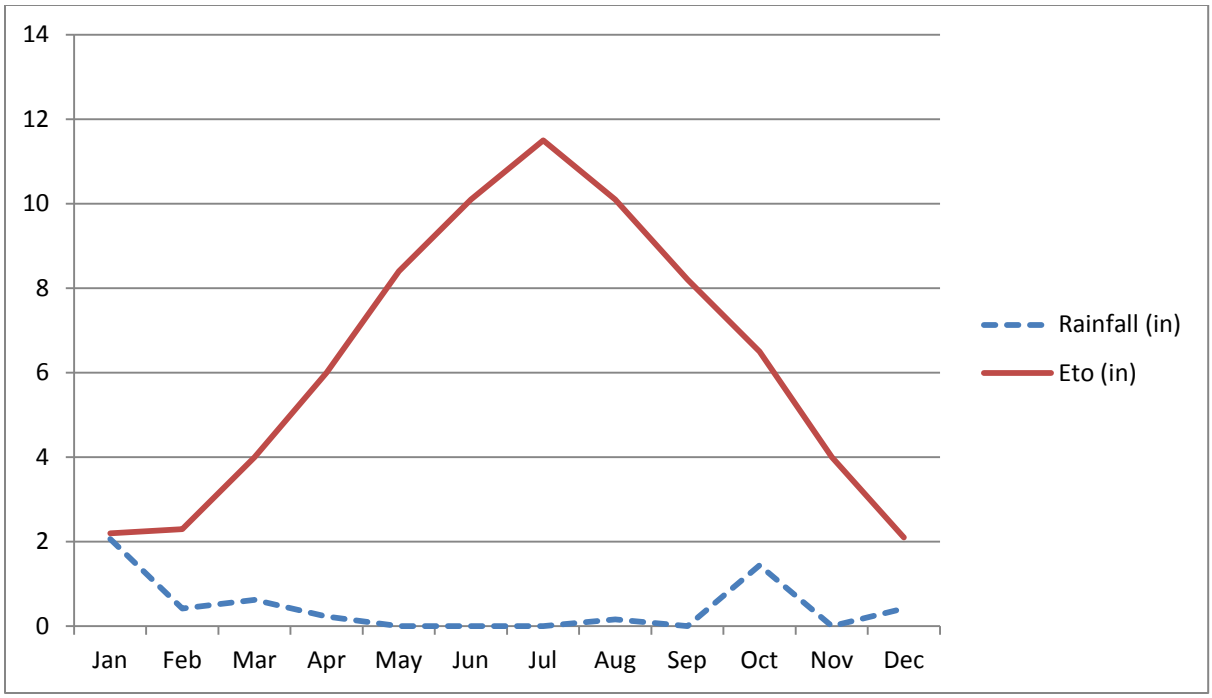


Figure 3-1. Disparity between rainfall and evaporation (Eto) in 2010 at El Centro, CA.

Wind direction is variable throughout the year. Gentle summer breezes are southeasterly in orientation, carrying in moisture-laden air from the Gulf of California. Winds in the winter and spring are generally mild, coming from the west. However, springtime north winds commonly reach velocities of 15 to 20 miles per hour (mph) (24-32 km per hour) and may exceed 30 mph (48 kph). Sand and dust churned into the air at these times cause air quality problems and are a nuisance to humans.

Climate Change

Climate change has the potential to impact NAFEC natural resources. The Navy has not conducted a formal climate change vulnerability assessment for NAFEC. However, some scientific models have been created that focus on the effects of climate change in desert regions. Climate models show a slow warming of the Mojave and Sonoran Desert regions, especially at night (Redmond 2009). This warming is likely to alter precipitation regimes and weather patterns, which could alter plant cover and productivity, and affect ecosystem functions, species distribution, and community composition (Smith et al. 2009; Intergovernmental Panel on Climate Change [IPCC] 2007). Desert ecosystems are particularly sensitive to change in atmospheric carbon dioxide. Future rises in atmospheric carbon dioxide will affect rates of plant photosynthesis and water loss, and are predicted to increase efficiency and productivity in desert plants (Smith et al. 2009; IPCC 2007). Increased plant productivity, especially the productivity of invasive grasses, could increase the incidence of wildfire in the desert (Brooks and Matchett 2006; IPCC 2007). Increased variability, more episodic climatic events, and more severe and persistent droughts are predicted for desert ecosystems worldwide (IPCC 2007). Therefore, climate change has implications for plants and their pollinators, wildlife species, and ecosystem processes, and may exacerbate impacts from current stressors.

Assessing the impacts of climate change is best approached by identifying an environmental baseline for the future that considers the differences in landscape form and function caused by climate change and other stressors on the landscape. Conducting a climate change vulnerability assessment may guide

essential monitoring requirements, as well as develop appropriate adaptive management strategies. However, the abundance and distribution of species and habitats on Navy properties may be too small in scale to address comprehensive climate change vulnerabilities. Therefore, regional partnerships may be the most appropriate means to conduct such assessments and in developing and implementing adaptation strategies.

3.3 Physical Conditions

The topography, geology and seismicity as well as management of soil, water resources, and wildland fire are discussed in the following sections.

3.3.1 Topography

NAFEC and East Mesa and West Mesa target areas are situated in Imperial Valley, a low-lying basin of the Salton Sea Trough. Elevation of NAFEC is 43 feet (ft) (13 meters [m]) below sea level. The southern extension of the Salton Sea Trough harbors the Gulf of California, delineating the basin's southern boundary. The northernmost boundary is just south of the mountains which form the southern boundary of Joshua Tree National Park.

The Salton Sea Trough is bordered on the west by the Santa Rosa Mountains in the Peninsular Range (attaining a height of approximately 6,000 ft [1829 m] above sea level) and on the east by the Chocolate Mountains (attaining a height of approximately 2,500 ft [762 m] above sea level). Portions of West Mesa target areas contain the Superstition Hills, which rise to 600 ft (183 m) above sea level. Similarly on the east side, the Algodones Dunes border the target areas (Map 3-1).

3.3.2 Geology and Seismicity

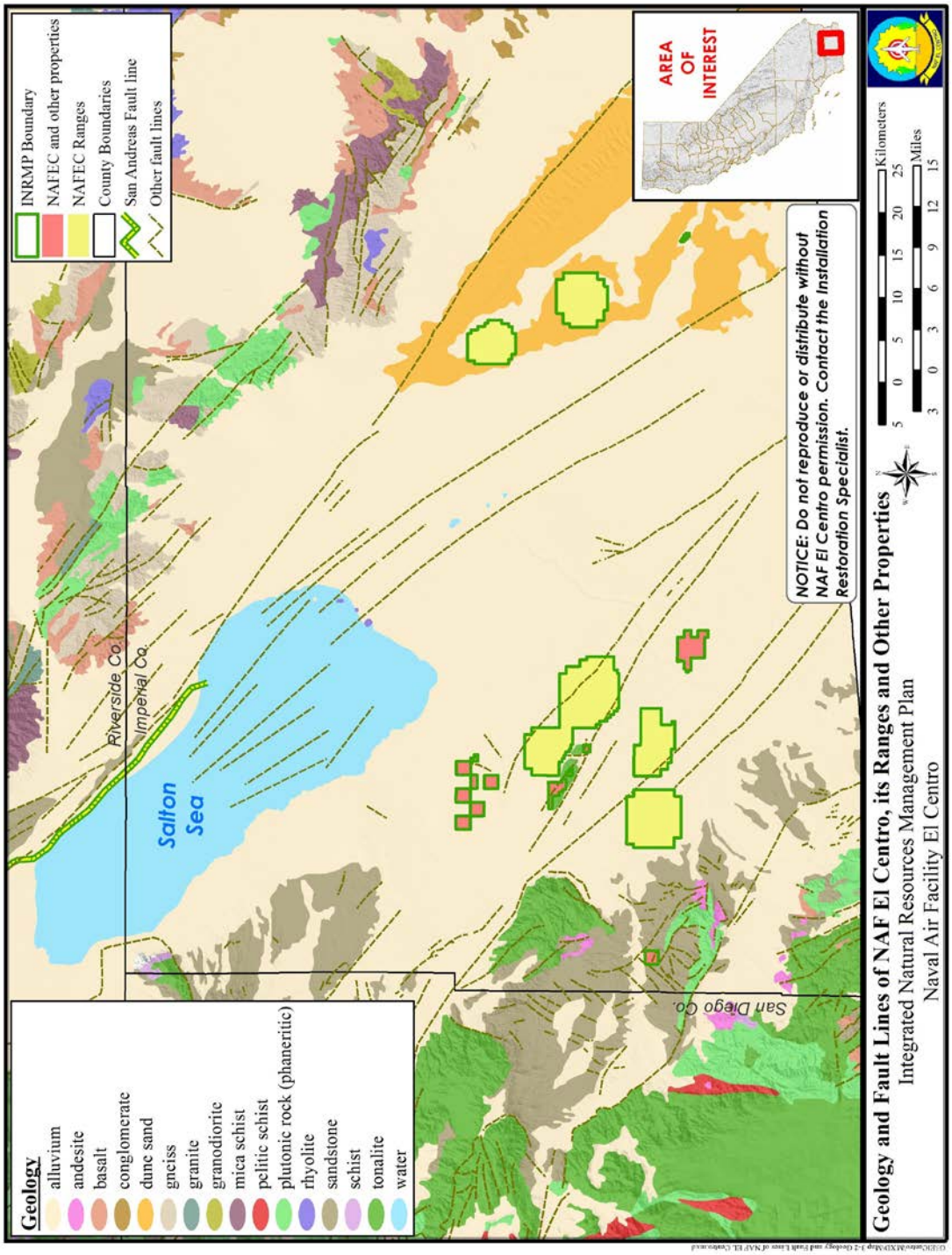
The sediment of Imperial Valley is more than one mile deep, as the valley was formed several million years ago. The lowest part of this trough was the location of prehistoric Lake Cahuilla. At times Lake Cahuilla occupied nearly the entire valley with a shoreline 35 to 40 feet above mean sea level. West Mesa and East Mesa are located on terraces of the old Lake Cahuilla.

The San Andreas Fault borders the east side of the Salton Trough just east of the Sand Hills (Map 3-1 & Map 3-2). In addition, two active faults, the Superstition Hills Fault and Superstition Mountain Fault, pass within 4.5 miles northwest of NAFEC. The Imperial Valley region experiences earthquakes of small to moderate size with magnitudes of 4.0 and greater (Map 3-3).

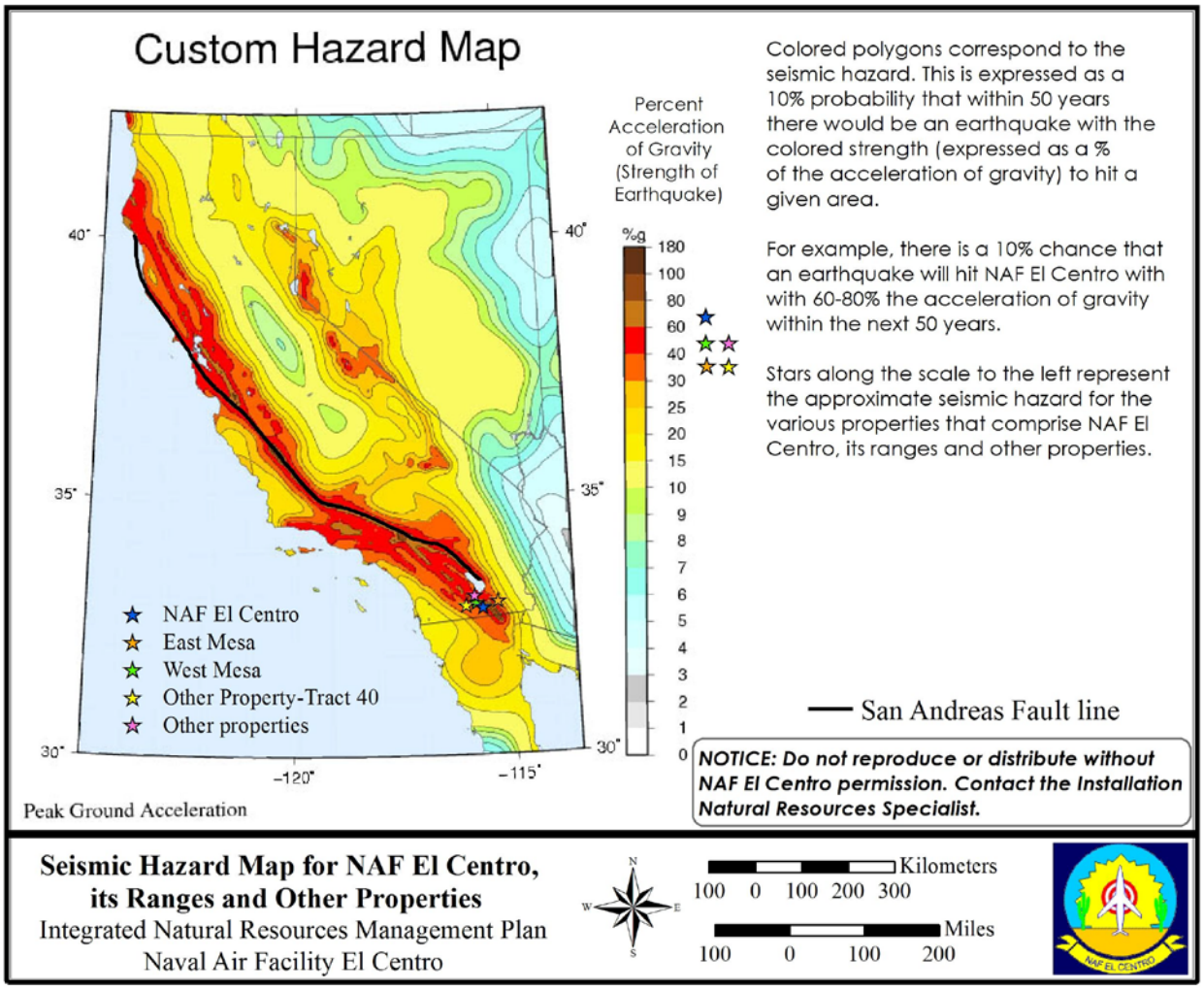
3.3.3 Soil Resources

Generally, the water-holding capacity (indicated by increasingly fine soil textures) and alkalinity of soil increase from the margins toward the center of a basin. This is shown by plant community patterns on the target areas with sand dunes ringing the outer perimeter of the basin in the lee of prevailing winds, sand and gravel deposits along the margins of ancient Lake Cahuilla, then silt and clay sediments in the dry playas. Map 3-4 depicts soil types on the NAFEC main installation and Appendix F lists the description of soil types.

Disturbance by vehicular traffic can break the sometimes deceivingly fragile surface and initiate erosion channels. Map 3-5 depicts the soils on the West Mesa target areas, and Map 3-6 depicts the soils of the East Mesa target areas (Target 101 and portions of the Target 103 do not have soils mapped to date).



Map 3-2. Geology and fault lines of Naval Air Facility El Centro, CA.



Map 3-3. Seismic hazard at Naval Air Facility El Centro, CA.

Soils have also not been mapped for the other property areas in West and East Mesa. A complete list of soil types and their descriptions for the target areas appear in Appendix F. Soil maps in this INRMP are to be used for planning purposes only; soil tests should always be conducted for site-specific projects.

The East Mesa target areas have deep, sandy soils, including relict dune types. They adjoin the modern Algodones Dunes on the eastern perimeter of the basin. In contrast, soils formed in old lake deposits such as those that occur on portions of West Mesa are composed of finer sediments and may be poorly drained.

In the desert, often air quality is affected by soil erosion before water quality. While the El Centro landscape was at one time carved by water, the predominant modern erosion force is wind. Unconsolidated soils are the most susceptible, such as fine sands, or the silt-laden soil types at the margins of playas and underlying desert pavement. A portion of the eroded material enters suspension and becomes part of the atmospheric dust load, obscuring visibility and polluting the air. Disturbance, such as by vehicles, disrupts the pebble pavement surface or the biological crust of filamentous blue-green algae that seal desert soil surfaces exposing the soil below. Vehicular disruption of desert soils increases the severity and intensity of dust storms, being directly related to lowered threshold velocities for wind erosion of a given surface (Rowlands 1980). Loss of soil crusts changes the nitrogen economy of a site, modifies soil temperature regimes, and affects water infiltration and penetration.

Soils of NAFEC, including associated agricultural lands, tend to be heavy silt or clay loams, poorly permeable, and excessively saline or sodic in most places. Although fertile, the clay component is of the shrink-swell type, cracking with dryness and sealing up after wetting, which prevents adequate percolation of water through the soil profile. Additionally, by design, some localized areas contain enough residual herbicide to prevent plant growth for many years.

Sand and gravel resources occur along the margins of ancient Lake Cahuilla. Under the current land withdrawals by the U.S. Navy and BUREC, Navy withdrawn lands beneath RCZ-I are not available to locatable mineral exploration or development. Oil and gas development has limited potential; presently, there are no leases or lease applications pending.

Specific Issues

- Erosion from land use practices on NAFEC ranges could threaten the integrity of adjacent natural desert habitat.
- OHV activity may lead to increased soil erosion and degradation of wildlife habitat.
- Agriculture land use practices on NAFEC may contribute to soil erosion.

Current Management

Federal agencies must manage lands to control and prevent erosion and conserve natural resources by conducting surveys and implementing soil conservation measures. The Sikes Act (as amended), the Clean Water Act, DoDINST 4715.03, and OPNAVM-5090.1 require best management practices (BMP) for soil and water resources on federal lands. The Clean Air Act also restricts particulate matter emissions that result from soil disturbance.

Assessment of Current Management

Soil conservation is needed to provide the ecological structure necessary for terrestrial habitats and communities to function and perform the ecological services that support the Navy's current use of NAFEC. The threshold beyond which an area loses its capability to sustain its original training load is loosely termed the carrying capacity. Protection of soil and water resources will protect the capacity to support plants and animals and provide a realistic training environment. Soil surface stabilization is needed to minimize erosion, and maximize opportunities for soils to self-stabilize after disturbance. Water supply, natural hydrologic processes, and water quality are essential to most ecological functions including recoverability from disturbance.

Military construction projects and training activities that include soil movement (grading, digging, etc.) necessitate BMP's to control soil loss, and better oversight and review to ensure that adequate soil conservation measures are included in the project.

Objective: Implement best management practices to prevent and control soil erosion.

Strategy:

I. Consider projects to conduct restoration on unauthorized OHV routes.

II. Promote the innovative and effective use of BMPs to prevent and control erosion and protect sensitive natural and cultural resources.

Actions:

A. Stay informed and up-to-date on improved methods for preventing environmental impacts during maintenance activities and on revisions in laws, regulations, and policies.

III. Use the specific guidance for selecting BMPs as presented in the *California Storm Water Best Management Practices Handbooks* (CASQA 2003), and other proven techniques, with the following strategy:

A. Minimize site disturbance;
B. Stabilize site disturbance;
C. Protect slopes and channels;
D. Control site perimeter;
E. Control internal erosion;
F. After construction, add source-control BMPs and treatment-control BMPs; and,
G. Require reviews of BMPs that involve re-vegetation, by appropriate staff at NAFEC, to ensure no non-native species are used. The NAFEC Landscape Plant Selection Guide-Approved Plant List is the initial guideline for identifying the appropriate landscaping to be used at NAFEC.

IV. Minimize disturbance by locating staging areas in disturbed areas only.

V. Implement Low Impact Development (LID) techniques in landscaping and infrastructure design, such as water capture and strategically-placed basins, to reduce soil erosion.

VI. Stabilize disturbed sites with appropriate erosion control plants or protective materials. Regional native desert plants should be used for stabilization when feasible.

VII. Minimize the grading of run-in lines to the degree essential to pilot safety and training. Criteria for re-grading would be when the run-in lines are no longer visible from the air. This minimization measure would reduce erosion, improve air quality, avoid mortality to the flat tailed horned lizard, and improve habitat values for other species.

3.3.4 Water Resources

The Imperial Valley watershed (as depicted in Map 3-1) encompasses about 5,500 square miles. Primary rivers are the New and Alamo, which originate in Mexico and flow northward from the Colorado River. The Colorado River water quality is naturally poor due to high salt content and is degraded further by the addition of irrigation, sewage, and industrial waste runoffs. Water originating from the Colorado River has been steadily declining in quality due to development by upstream users.

The New River flows near the northwest corner of NAFEC. About one-third of the total flow of the New River is from the Mexicali area, containing large amounts of raw and partially treated sewage, agricultural runoff, and some ill-defined industrial wastes. This ephemeral drainage would not flow naturally except for a short time after a storm. However, due to the runoff, this drainage is constant.

The Alamo River flows nearby east of NAFEC between the East and West Mesa target areas. The Alamo River originates approximately two miles south of the International Boundary with Mexico and is dominated by agricultural return flows from Imperial Valley. It also carries treated wastewater from point sources in Imperial Valley.

The single most important factor supporting the Imperial and Coachella Valley economies is the damming and diversion of the Colorado River, which flows along the eastern border of Imperial County. The Colorado River provides water for both domestic and agricultural usage in Imperial County, which is transported by four primary canals: Central Main, East Highline, West Side Main and All American.

The U.S. Geological Survey (USGS) has estimated that 1.1 billion acre-feet of usable and recoverable water exists in the Imperial Valley, including geothermal waters. In the Imperial Valley, the main sources of groundwater recharge are seepage from canals and excessive irrigation water application. In the past, widespread water logging from over-watering of agricultural fields (to wash salts carried by the water from the plant root zone) spurred the installation of tile drains and ditches to carry off the excess. Shallow groundwater levels are now stabilized at depths ranging from five to 20 feet (Bill Kagele, *pers. comm.*).

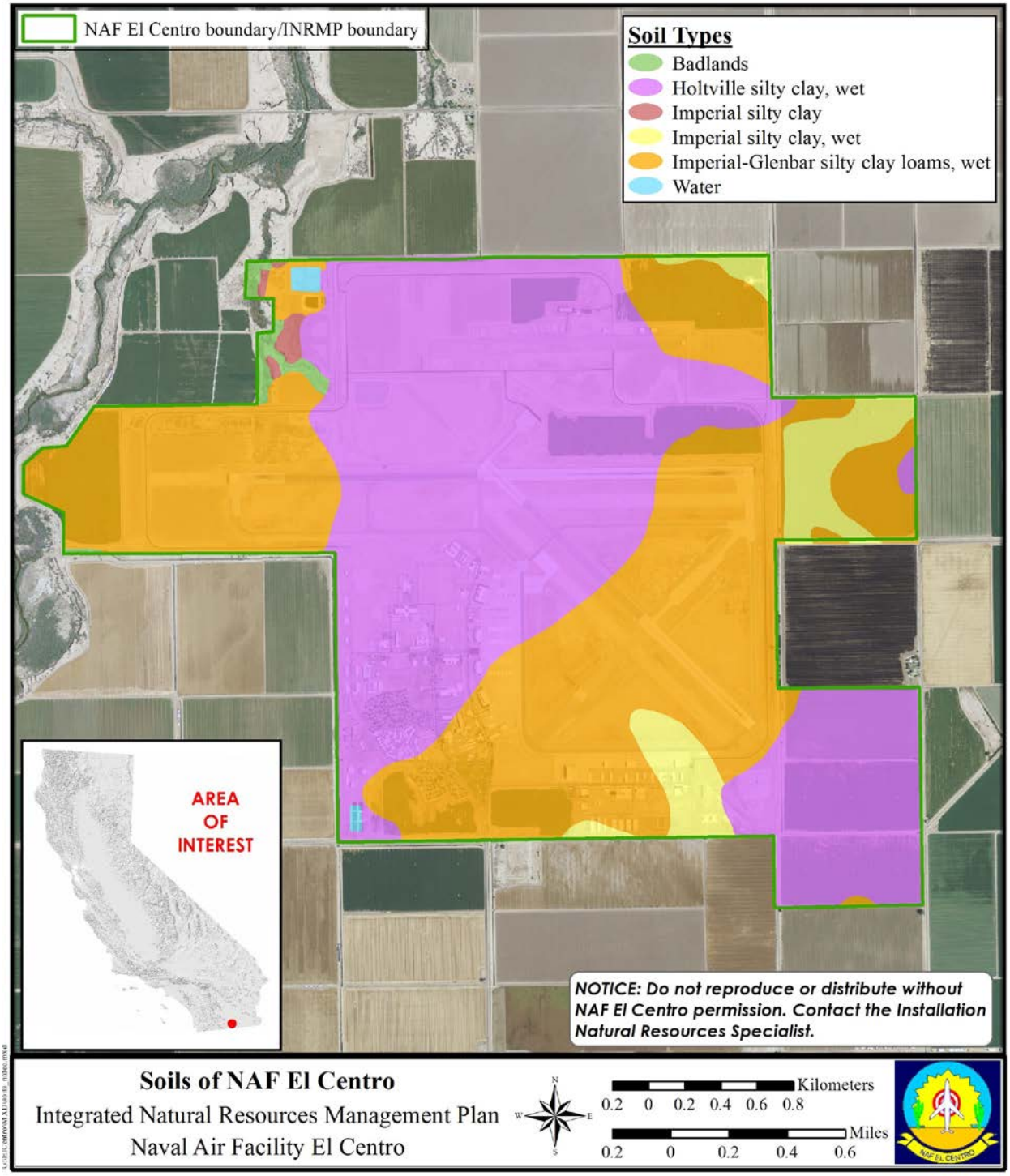
With the exception of the mouth of San Felipe Creek, much of the alluvium in the valley is fine-grained and does not readily yield water to wells. The conditions necessary for developing substantial quantities of usable groundwater are unfavorable, consisting of low yields and poor quality. Most groundwater in the valley contains minerals in excess of Public Health Drinking Water Standards. However, water quality in the southern East Mesa area is considered good enough to warrant study by the Colorado River Board of California as a strategic groundwater reserve for irrigation water (Imperial Irrigation District 1986). Since the Imperial Irrigation District (IID) has been lining its canals to prevent seepage as part of its water conservation program, a primary source of groundwater may be reduced.

3.3.4.1 Surface and Stormwater Management

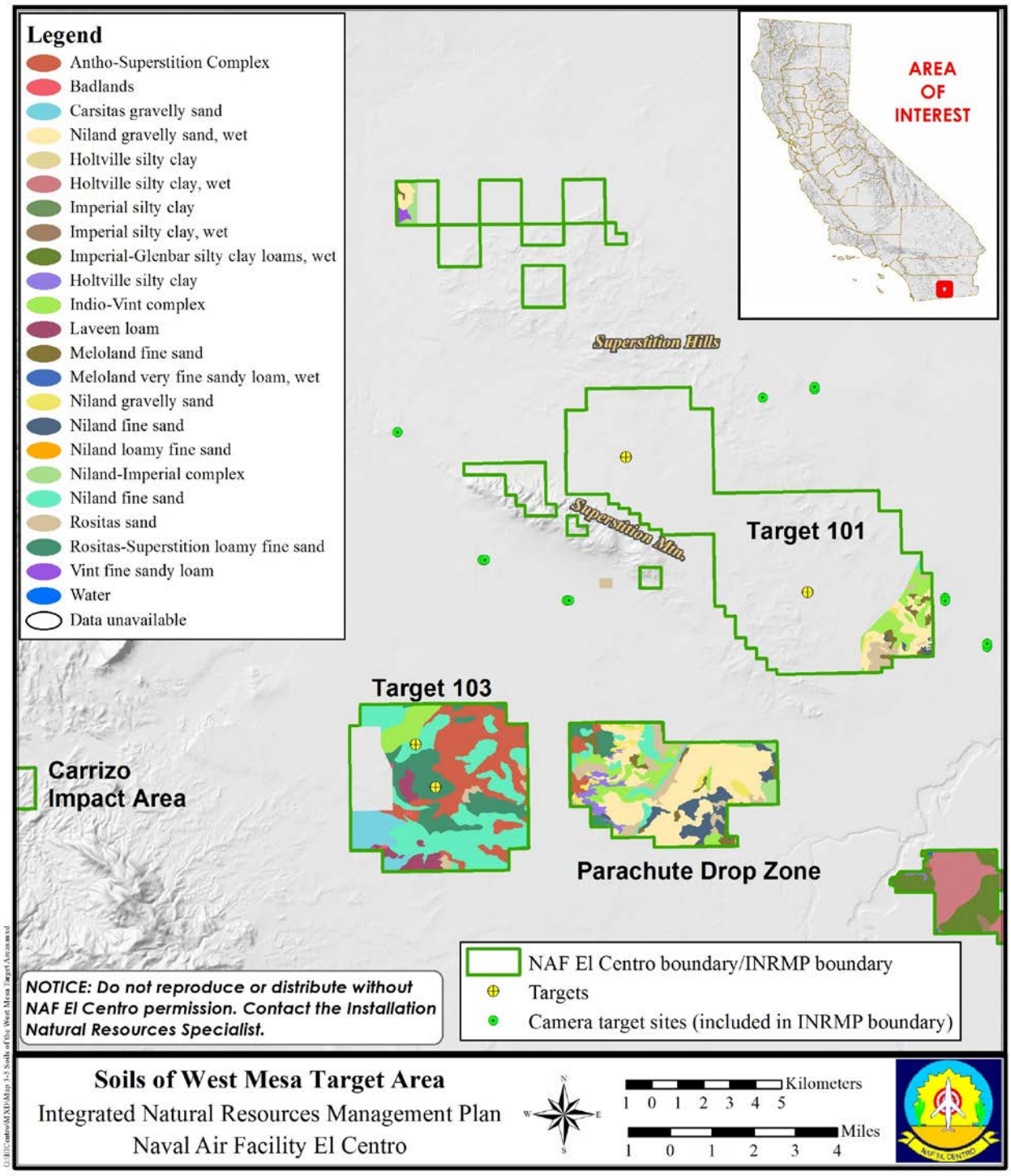
NAFEC receives drinking water by canal, and has primary and secondary treatment facilities that include a settling basin with flocculation and sedimentation chambers. Effluent is released into a tributary of the New River. Water is chlorinated, and basic testing is conducted under Title 22, Chapter 4, of the California Code of Regulations.

Federal agencies are required to take specific, cost-effective action to conserve energy and water at their facilities, as mandated in EO 13423—*Strengthening Federal Environmental, Energy, and Transportation Management*. However, water and wastewater treatment costs at NAFEC are currently fixed in the Base Operating Services Contract (BOSC) and in the flat rate paid for “raw” water from the IID. This billing structure allows no economic incentive for water conservation. If the commodity billing procedures were changed so that the contractor gets paid based on water produced, water costs would then be reduced with conservation (Fauth and Smith 1996).

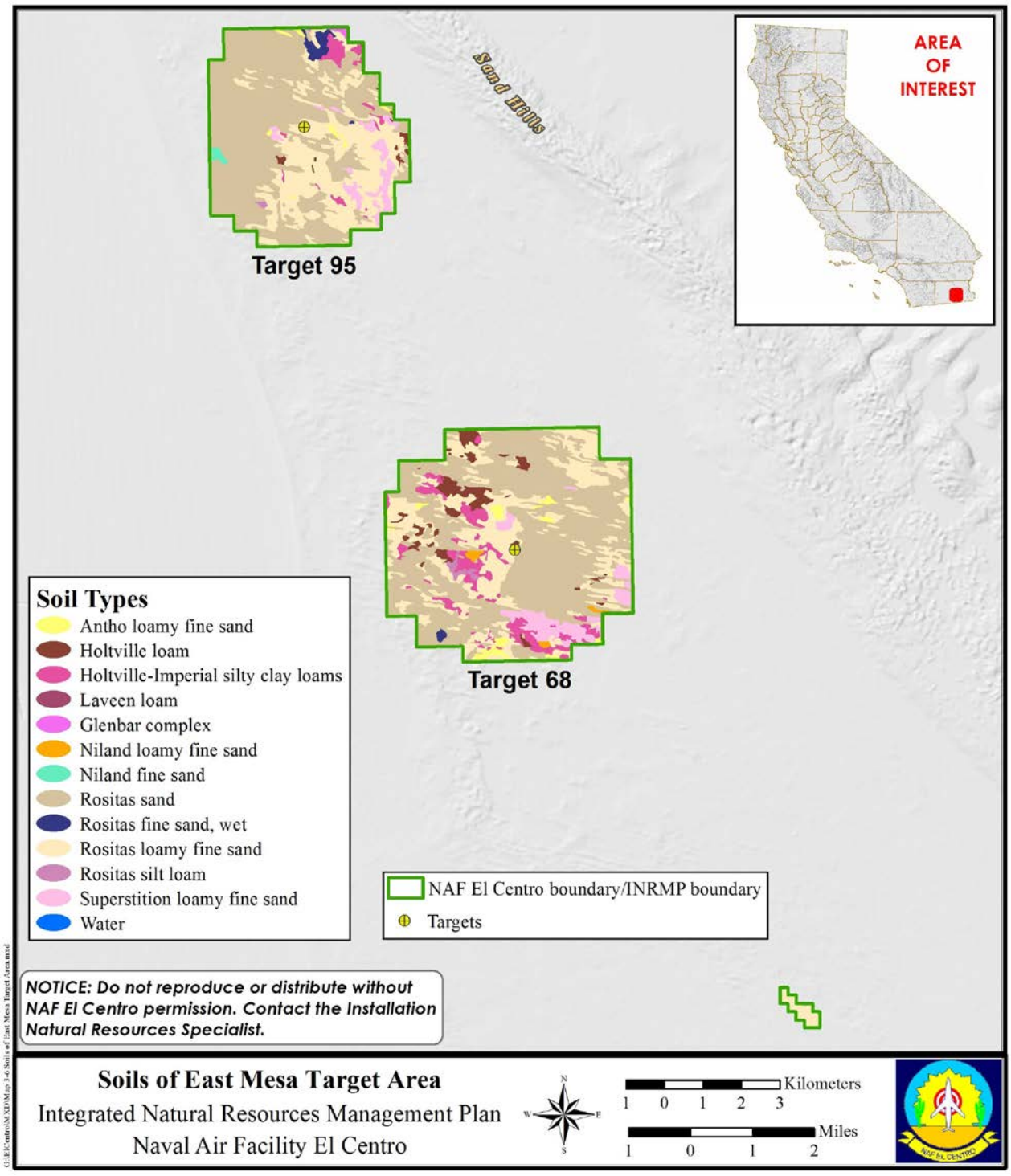
Areas immediately adjacent to the New River and Alamo River are considered by the California Division of Mines to be natural floodplains. This includes a small portion of NAFEC’s northwestern boundary. Potential flooding is limited to an area along the western boundary extending approximately 1,200 feet onto NAFEC. Flash flooding during storms is generally restricted to washes having a width of 200 feet or greater, especially in areas with poor drainage or steep, rocky areas. Target 101 is partially within a large wash and is subject to flooding.



Map 3-4. Soil types on Naval Air Facility El Centro, CA.



Map 3-5. Soil types on the West Mesa Target Areas of NAF El Centro, CA.



Map 3-6. Soil types on the East Mesa Target Areas of NAF El Centro, CA.

The NAFEC Storm Water Discharge Management Plan (SWDMP; DoN 2001) describes the non-storm water discharge elimination and prevention program, storm water pollution prevention plan, and monitoring and reporting plan for NAFEC. The SWDMP outlines the program to identify and eliminate prohibited and unauthorized non-storm water discharges, identifies potential sources of storm water pollutants, and identifies BMPs for reducing or preventing the discharge of pollutants into storm water runoff. The SWDMP will be revised and updated whenever there are changes that 1) may significantly increase the quantities of pollutants in storm water discharge, 2) cause a new area of industrial activity at NAFEC to be exposed to storm water, or 3) begin an industrial activity that would introduce a new pollutant source to the installation.

Water Quantity and Quality

The Colorado River Basin Project Act of 1968 limited California's priority right of Colorado River water to 4.4 million acre-feet annually. In 1989, the Colorado River basin first approached full use of the 7.5 million acre-feet allocation it projected for consumption. A reduction in annual water delivery to the Imperial Valley is expected to occur in the future, especially in below-average precipitation years. The Imperial, Palo Verde, and Coachella Irrigation Districts have lost rights to 300,000 acre-feet of second priority water. Farmed area in the Imperial Valley is expected to roughly remain at its current usage throughout the year 2020 (California Water Plan 1997).

Since San Diego has negotiated direct purchase of water from the IID, the speculative value of water in the Imperial Valley has increased. There are reports of large land purchases in the area purely for the expected increase in water costs.

Closely associated with reduced quantities of water available from the Colorado River is the continuing problem of water quality. Water quality of Colorado River water has steadily declined over the past years due to increasing development by upstream users. The measure of this deterioration is higher concentrations of dissolved mineral salts. The increased salinity may significantly affect the type of crops grown and the total productivity within the Imperial Valley. High salinity increases the amount of water required to irrigate a given unit of land because large amounts of water are needed to leach out the salts.

Methods for mitigating the increasing salinity of Colorado River water are currently being studied. These measures include water salvage projects and augmentation of river water with low-saline water. Should desalinization of geothermal brines prove practical, the introduction of this water to the Colorado River may reduce overall salinity.

The U.S. Army Corps of Engineers (USACE) is currently studying the polluted New River, its health, and hydrodynamics in hopes of creating a system of drops and settling basins to improve its condition.

An agreement for a joint U.S.–Mexican solution to this environmental problem, well-recognized to be among the worst along the border, is currently in place. If all the planned treatment facilities are established and industrial toxics are identified and addressed, flows of the New River are expected to be drastically reduced as Mexico will deem to use the water to irrigate its agricultural fields. This will result in losses of inputs to the Salton Sea, and likely accelerate the demise of its important bird habitat. The wildlife refuges of the Imperial Valley have some rights to the Colorado River water, which will help to partially offset this loss.

Currently there are water transfer agreements between IID and coastal water users which will lead to a decline in agricultural drain water to the Salton Sea beginning in 2017. Future phases of these agreements will lead to increased agriculture field fallowing, less runoff into the Salton Sea, and degradation of wildlife habitat. The state is working on remedies to alleviate some of the potential problems caused by

this decline by development of Species Conservation Habitat projects around the Sea (http://www.water.ca.gov/saltonsea/habitat/eir2001.cfm)

Specific Issues

- Water rights should be protected to continue the beneficial uses of water on NAFEC and target areas/ranges.

- NAFEC's water sources should be protected for consumptive, agricultural, and landscape uses.

Current Management

NAFEC receives all of its water from the IID; there is no use of wells or other ground water. The Elder Canal runs along the west border of NAFEC, and the Elm Canal along the east. Both are part of the All-American Canal system which connects to the Colorado River. Water is withdrawn from the Elder Canal, then treated with a series of settling ponds and other facilities, and pumped into two large, concrete reservoirs with a combined capacity of 2.5 million gallons. There is an additional 155,000-gallon, elevated distribution reservoir. The PVC main distribution lines were upgraded in 1996–1997 under MILCON P-213. The sewage effluent is unsuitable for irrigation, so it is discharged into the New River just west of NAFEC (Fauth and Smith 1996).

Assessment of Current Management

The NAFEC SWDMP (DoN 2001) describes a non-storm water discharge elimination and prevention program, a storm water pollution prevention plan, and a monitoring and reporting plan for NAFEC. The SWDMP outlines the program to identify and eliminate prohibited and unauthorized non-storm water discharges, identify potential sources of storm water pollutants, and identify BMPs for reducing or preventing the discharge of pollutants into storm water runoff.

Objective: Ensure the adequate supply and reliable delivery of water to support the domestic, agricultural and landscaping requirements of NAFEC and target areas.

Strategy:

I. Reduce use of water for landscaping while continuing to provide a quality environment to NAFEC personnel.

Actions:

A. Reduce water usage on lawns by designating irrigation hours, ensuring areas are only watered as necessary, prohibiting water runoff onto streets or sidewalks, and converting areas to drought-tolerant landscapes.

B. Consider investing in water lines for irrigating lawns with water directly from canals rather than treated water.

C. Measure water consumption to obtain and provide records of actual usage as an incentive for conservation.

D. Implement low impact development (LID) techniques for landscaping, such as water capture, to reduce water use.

Objective: Conserve energy and water as required by law.

II. Improve water treatment plant efficiency as described in the *NAFEC Water Conservation Guide* (Fauth and Smith 1996) by ensuring that back washes are only performed as needed.

III. Adjust water billing procedures as suggested in the *NAFEC Water Conservation Guide* so that incentive is provided for water conservation.

Objective: Ensure protection of water rights to continue the beneficial uses of water on NAFEC and target areas.

IV. Participate in a regional DoD strategy to protect the military installations access to a reliable and adequate supply of quality water in the context of increased population growth in the desert.

Objective: Protect the quality of NAFEC's surface water for consumptive, agricultural, and landscape uses.

V. Follow the existing NAFEC Storm Water Discharge Management Plan (SWDMP) (DoN 2001) that identifies potential sources of storm water pollutants, and identifies BMPs for reducing or preventing the discharge of pollutants into storm water runoff.

VI. Revise and update the SWDMP (DoN 2001) whenever there are changes that 1) may significantly increase the quantities of pollutants in storm water discharge, 2) cause a new area of industrial activity at the facility to be exposed to storm water, or 3) begin an industrial activity that would introduce a new pollutant source to the facility; incorporate DoN LID Policy for Storm Water Management (DoN 2007).

VII. Review storm water movement from infrastructure and implement LID techniques to reduce storm water runoff and costs for treatment.

3.4 Wildland Fire Management

Specific Issues

- A potential increase in invasive plant species due to increased precipitation as predicted in climate change models may increase potential wildland fire on NAFEC ranges.

Wildland fire in the desert is rare due to the sparse growth of natural vegetation; therefore, plants tend to not have evolved adaptations to survive fire. Succulent plant types, such as cacti, are particularly sensitive to fire effects. Annual plants have some tolerance to fire due to their coincident adaptation to drought. However, with high desert winds and the widespread naturalization of aggressive European annuals, such as Mediterranean grass, which at times may provide for more than half of plant cover as a fuel source, fire has a better opportunity to spread.

The indirect effects of fire in a desert ecosystem where plants are not adapted to it can lead to a conversion of the plant community to other dominant species. Invasive plants, such as tamarisk, can gain a foothold after a fire event, disrupting the natural progression to creosote or alkali sink scrub. The temporary loss of native vegetation and potential replacement by non-natives could affect native wildlife species.

Human population growth in the desert areas has risen sharply over the last twenty years (BLM 1996); and as the El Centro vicinity becomes more populated, the risk of human-caused fire ignition increases. In addition, the risk of fire ignition also increases as targets see higher usage. As more high-value facilities are built on the ranges, the chance of monetary loss also increases. In habitats that contain species such as the FTHL, the chances for mortality due to wildfire, also increases.

Current Management

Fire may start incidentally from ordnance delivery, aircraft crashes, ORVs or by lightning. The hazard is highest in Target 95, which has a denser plant community than the other target areas, and is where a 3600-acre fire was documented in 1992. Winds are the most important factor influencing fire behavior in this zone (BLM 1996). Santa Ana north and east winds are common during the fall and early spring and greatly influence fire behavior (BLM 1996). After a season of good plant growth, especially of non-native annual grasses, which can fill the interspaces between shrubs much more densely than native plants, high winds and exceptional plant cover can fuel a wildfire in areas where it is not typically a hazard. However, the main base of NAFEC is not highly susceptible to burning. NAFEC and the target areas consist mostly of bare ground.

In 2006, a Wildland Fire Management Plan (WFMP) for NAFEC was prepared to provide guidance on the protection of personnel, facilities, and natural and cultural resources from the impacts of wildland fire; prioritize assets to be protected in the event of a fire; ensure the perpetuation of native terrestrial habitats and rare species; and minimize the total cost of fire pre-suppression and suppression practices on lands owned or managed by the DoN. The scope of the WFMP addresses fire management in the natural wildland areas of NAFEC and in the interface between the wildland and built environments (DoN NAVFAC SW 2006).

Assessment of Current Management

The BLM Resource Advisor (as First Responder) and the NAFEC CO have the overall responsibility for the execution of the fire management program at NAFEC and the target areas. Responsibility for wildland fire suppression on the target areas lies with the BLM and its cooperators through mutual aid agreements (DoN NAVFAC SW 2006). The NAFEC Federal Fire Department is responsible for fire suppression on the main base of NAFEC. Vegetation on a vast majority of the ranges is so sparse that wildfire can't be supported.

Objective: Prevent and contain loss of human life, facilities, natural and cultural resources, and military readiness values due to wildfire.

Strategy:

I. Human safety is the first priority. Use preventative measures as the initial line of defense.

Actions:

A. Continue to restrict the use of live or illumination-type ordnance on targets when vegetative densities would carry a fire or during high winds.

B. Consider diverting aircraft to less hazardous targets during high fire hazard conditions, to the extent consistent with operational needs.

C. Ensure that range users know how to report a fire to shorten response time for fire suppression.

II. Enhance effectiveness of wildland fire response to suppress and contain wildfire.

A. Stop fires before they endanger human life, reach weapons storage areas, or escape onto private property as outlined in the *Wildland Fire Management Plan NAFEC*.

B. Work with the BLM to cooperatively anticipate and plan for increased fire suppression needs.

III. Implement the goals and management strategies of the *Wildland Fire Management Plan NAFEC* (DoN NAVFAC SW 2006).

3.5 Terrestrial Habitats and Communities

The composition of vegetation communities reflects ecosystem health. Vegetation communities provide the necessary components of wildlife habitat and support and contribute to biodiversity. The internal number and arrangement of species within plant communities is stable in some cases, dynamic in others. Within a short time frame, annual plants, which are more responsive to seasonal weather variations than perennials, may be abundant then not be apparent for several consecutive years. The composition of shrubs, trees, and herbaceous plants may be stable or perturbed by natural or anthropogenic stimuli. Similarly, boundaries among plant communities may be stable or in a state of flux, depending upon many factors such as fire, flooding patterns, and soil types. In addition, pollinators provide an essential ecosystem service – pollination – to plants and crops worldwide.

In the Imperial Valley, natural plant communities are affected by two primary factors, extreme weather (high temperatures and paucity of rainfall) and position in the landscape in relation to the boundaries of ancient Lake Cahuilla (which is tied to water availability, salinity, and alkalinity). A characteristic of desert shrub communities is that, except perhaps for those in washes, they often lack any obvious seedlings or young individuals, consisting almost entirely of older, established plants. Restocking of populations occurs only after exceptional rainfall. Even plants that seed annually often lack the ability for seeds to survive long periods in the soil (Zedler 1981).

The introduction of non-native plants into the Colorado Desert has also affected ecosystem dynamics. In the desert, the early pioneer successional role played by annuals in more mesic systems is usurped by short-lived perennials. As desert lands deteriorate, the proportion of weedy annuals and short-lived perennials increases in relation to long-lived plants as ground disturbance, wind erosion, and dust storms increase in frequency and intensity, physically removing the top, most fertile portion of the soil.

NAFEC and its ranges lie in the Colorado Desert, where vegetation is sparse. The following sections present a description of natural habitats and species found in the terrestrial communities. Terrestrial communities are described and classified according to the dominant vegetation community present. Vegetation classification is based on *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). Summary descriptions of flora and fauna associated with the habitats are provided. Full flora and fauna species lists produced from biological inventories are in Appendix G.

3.5.1 Vegetation and Land Cover Types

In desert communities, plants have evolved to receive water when water is available and conserve it for use during drought periods. The sparseness and unpredictability of rainfall and soil alkalinity control plant community character, cover, and composition. Desert plants must adapt to low and unpredictable rainfall, alkalinity or salinity, extreme temperatures, and intense light.

Generally, soil water holding capacity (indicated by increasingly fine soil textures) and alkalinity increase from the margins toward the center of a basin. This is evidenced in plant community patterns on the target

ranges. Moderate-textured soils on intermediate bajadas are dominant locations of the creosote scrub community.

Portions of the West Mesa have soils overlaid with desert pavement. The soil surface is armored with pebbles and cemented with calcium carbonate remaining from water evaporation. Disturbance by vehicular traffic can break the sometimes deceivingly fragile surface and initiate erosion channels. These surfaces are extremely hot because of their dark color, and few plants can tolerate living in them.

Plants adapt to desert conditions by dropping leaves during dry periods (drought deciduousness), conserving water in plant parts (succulence), developing large or deep root systems, having underground organs that go dormant during drought, or by evolving an ephemeral life history and growing only for short periods when water is available.

A complete inventory of vegetation communities on NAFEC and the target areas has not been conducted. In 1996, Tierra Data, Inc. mapped vegetation on a portion of the site. From this study, ten plant communities are evident on NAFEC and its target areas; however some of these communities were combined to create six plant communities. See Table 3-1 for vegetation community acreages by target site mapped to date. Map 3-7 depicts the vegetation communities on the NAFEC main installation. Map 3-8 illustrates West Mesa vegetation communities and Map 3-9 shows East Mesa vegetation communities. It is recommended that a complete inventory of vegetation communities on the installation occur.

Approximately two-thirds of Tract 40 of the former CIA is devoid of vegetation and the balance (northern portion) of the parcel consists of flatlands intersected by several small washes. The sandy desert of Tract 40 is dominated by creosote (*Larrea tridentata*) interspersed with ocotillo (*Fouquieria splendens* var. *splendens*) and jojoba (*Simmondsia chinensis*) (USACE 1997). Creosote and Mormon tea (*Ephedra* spp.) occur in the washes. Vegetation information for Tract 40 is not shown on the map (Map 3-8). Vegetation information for the other property areas is not available and not shown on the maps (Map 3-8 & Map 3-9).

Table 3-1. Vegetation types by acre mapped in 1996 on Naval Air Facility El Centro, CA.

Vegetation Community	Tract 40	NAFEC	R2510B Target 101	R2510A Target 103A	R2512 Target 95	R2512 Target 68	Total
Creosote Scrub	640		2,740	1,161	494	1386	6,421
Mesquite Mound					2	< 1	3
Dunes					9	14	23
Riparian		16					16
Agriculture		688					688
Developed/ Landscaped		1,551					1,551
Bare Ground			481	114		2	597
Total	640	2,255	3,221	1,275	505	1,403	9,299

Acreages were obtained from the vegetation community map developed by Tierra Data Systems from 1996 vegetation survey conducted on portions of the target areas. Vegetation maps are not available for entire target areas. In addition to the agricultural fields on the facility, approximately 362 acres of Navy-owned agricultural land are being used (not directly on the installation and not included in the count above).

3.5.1.1 Creosote Scrub

Moderate-quality creosote scrub habitat outside target sites in West Mesa.
Source: RECON

The most prevalent community of the Mojave and Colorado deserts, creosote scrub, constitutes the majority of the East and West ranges; 80 percent of the mapped area of West Mesa and 99 percent of the mapped area of East Mesa. Productivity of the creosote community varies by geographical location. Targets 101, 103, and the PDZ have relatively low cover, while Targets 95 and 68 support stands of tall, healthy creosote. Targets 101 and 103 are dominated by creosote and white bursage (*Ambrosia dumosa*) with some rhatany (*Krameria* sp.), indigo bush (*Psorothamnus emoryi*), spineflower (*Chorizanthe rigida*), plantain (*Plantago ovata*), galleta grass (*Pleuraphis rigida*) and Mediterranean grass (*Schismus* spp.). Cover data obtained in the 1996 vegetation survey show less than 10 percent absolute cover of creosote and white bursage for Target 103. Large washes and gullies run through portions of Target 101. The sandy substrate provided by these washes support sparse plant cover and is composed of similar species to the creosote scrub community.

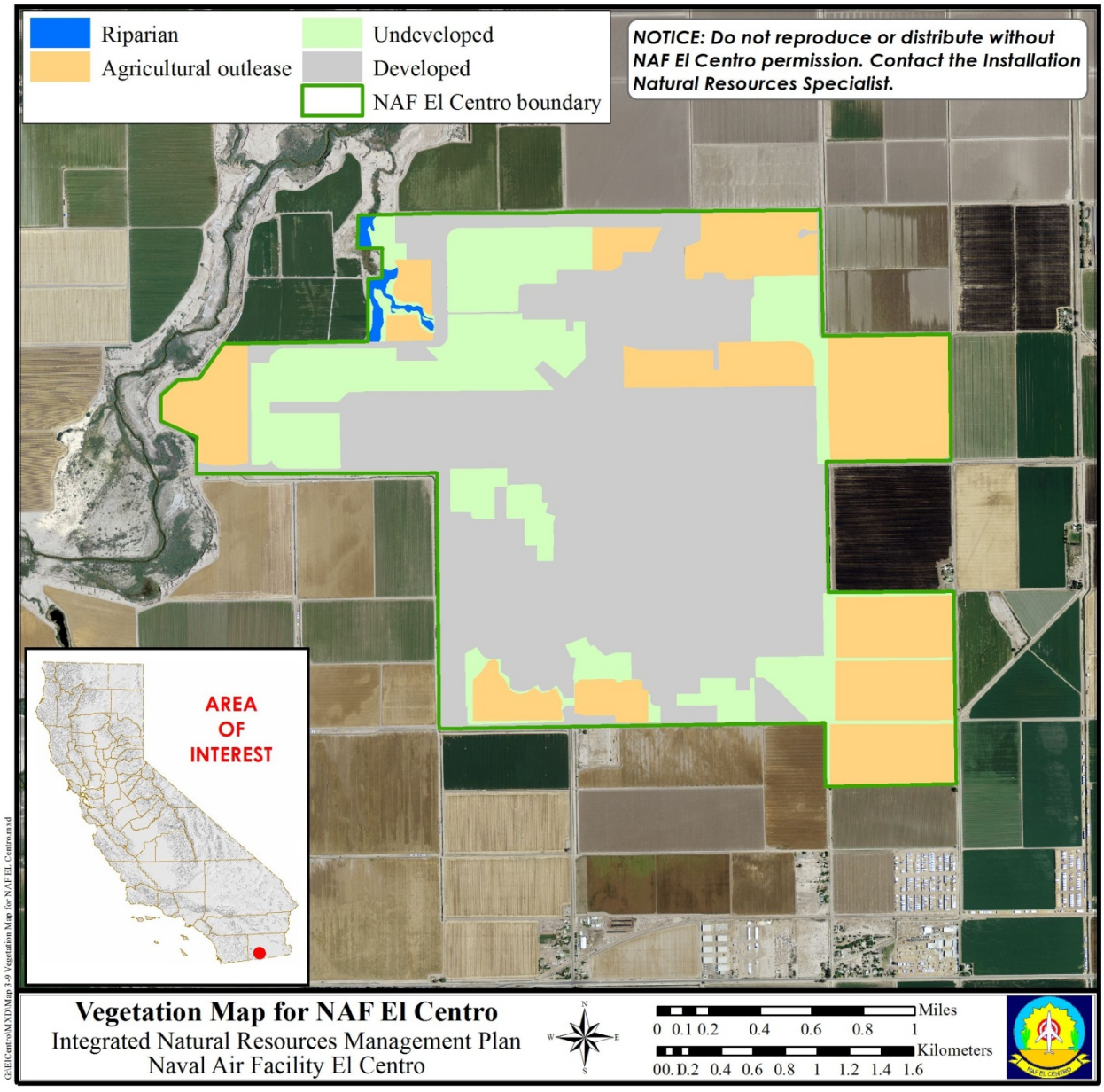
Creosote scrub communities on Target 95 and 68 are primarily creosote and mixed desert forbs. Mature creosote is commonly on low, sandy mounds. Target 95 supports very robust creosote plants which commonly reach heights of 8 to 12 feet and have diameters of 15 feet. Cover data acquired in the 1996 survey show creosote ranging from 16 to 25 percent, and Mediterranean grass providing 22 to 30 percent of the absolute cover. Other associated species typically include Mormon tea, popcorn flower (*Cryptantha* sp.), fiddleneck (*Amsinckia* sp.), sun cup (*Camissonia ovata*), plantain, mustard (*Brassica* spp.) and three-awn (*Aristida* spp.). Four-wing saltbush (*Atriplex canescens*) is a prominent component of creosote bush scrub in Target 95, providing 12 percent of the cover.

The Superstition Mountains support the creosote community on both the uplands and washes. This difference in relief seems to have an effect on relative species cover, but not on composition. Creosote and white bursage cover in the Superstition Hills is typically sparse, less than 15 percent. Some of the mostly sandy substrate of these hills supports little or no vegetation. Plants of the Superstitions are dominated by creosote and white bursage with scattered desert trumpet (*Eriogonum inflatum*). Typical species include wire-lettuce (*Stephanomeria pauciflora*), mustard, Mediterranean grass, and plantain. Plants which occupy upland dune areas are desert buckwheat (*Eriogonum deserticola*), croton (*Croton californicus*), dicoria (*Dicoria canescens*), devil's lantern (*Oenothera deltoides*) and tiquilia (*Tiquilia palmeri*). Species found in wash creosote scrub include sweetbush (*Bebbia juncea*), dicoria and tiquilia.

Creosote usually reproduces asexually by vegetative segmentation. It is rare to see a seedling. Clonal groups (consisting of the same genetic material) may appear as rings from the air and can be thousands of years old. A clonal group near Yuma has been carbon dated at 18,000 years old; essentially as old as the Colorado Desert itself. Considering that the individual shrubs are actually one living plant, they are by far the oldest of living things, having germinated in the wet years following the last ice age (Schoenherr 1992).

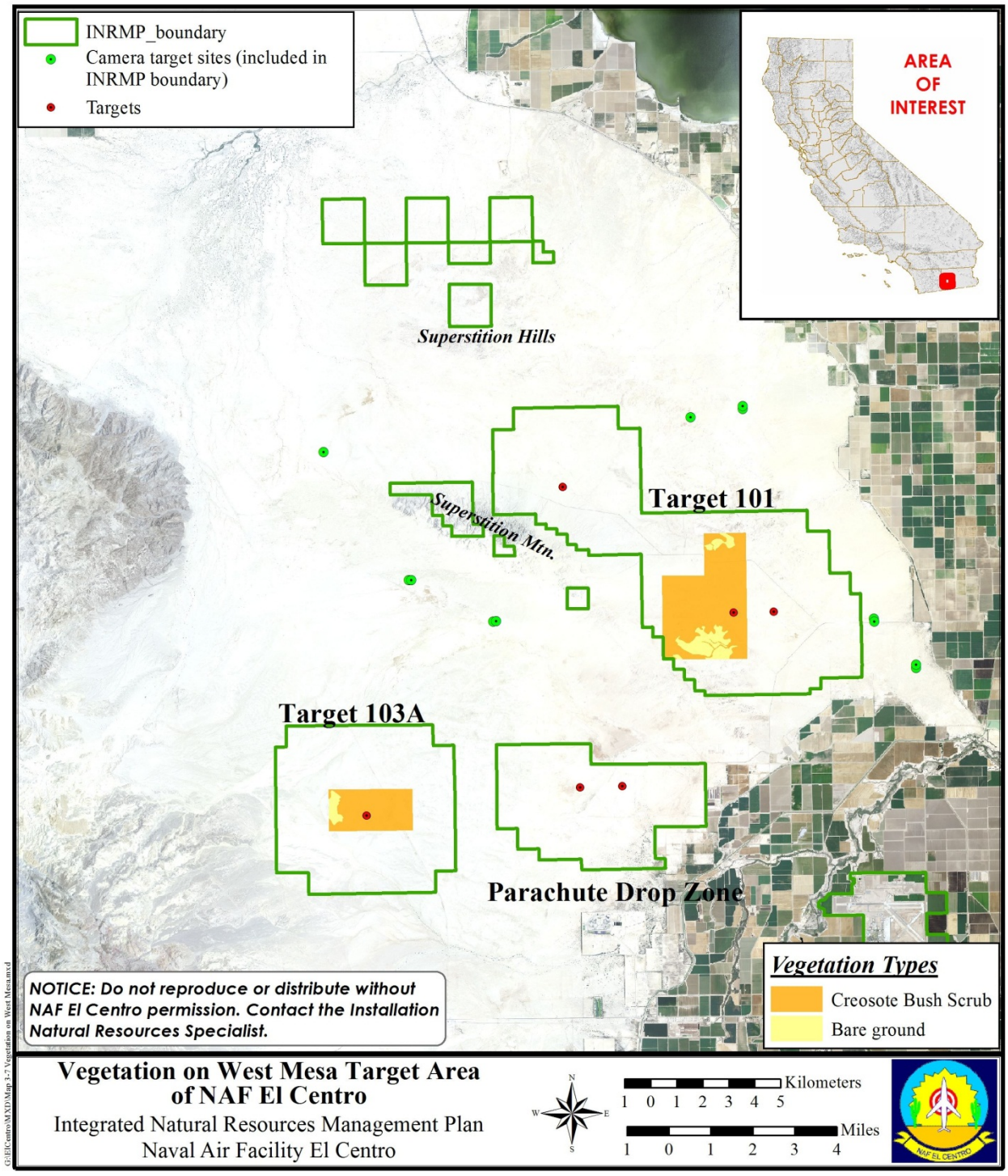
Specific Issues

- Continue to conserve creosote scrub plant community.

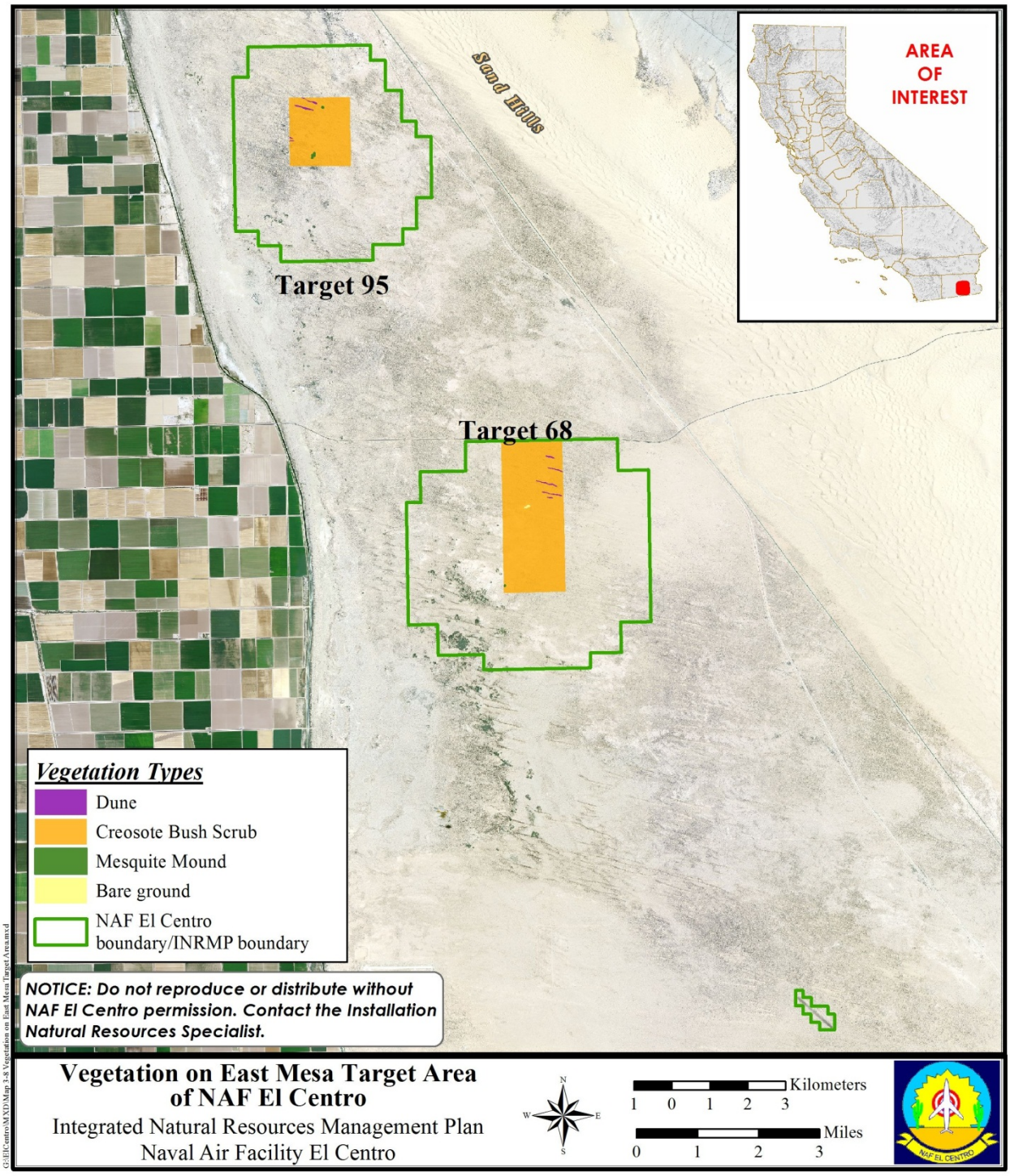


*Vegetation data from Tierra Data Systems 1996

Map 3-7. Vegetation on Naval Air Facility El Centro, CA.



Map 3-8. Vegetation on the West Mesa Target Areas of NAF El Centro, CA.



*Vegetation data from Tierra Data Systems 1996

Map 3-9. Vegetation on the East Mesa Target Areas of NAF El Centro, CA.

Current Management

Currently there is no active management taking place in creosote scrub.

Assessment of Current Management

Monitoring of creosote scrub should be conducted.

Objective: Conserve the creosote scrub plant community on NAFEC and its ranges.

Strategy:

I. Ensure proposed future infrastructure development and target siting is located in previously disturbed creosote scrub.

Actions:

A. Complete an inventory of the creosote scrub vegetation community.

3.5.1.2 Mesquite Mounds

Mesquite mounds are distinguished by the presence of Western honey mesquite (*Prosopis glandulosa* var. *torreyana*) on small dunes. At least five mesquite mounds are located on Target 95, the majority of which are located southwest of the target area. Several mesquite mounds are found near the boundary of Target 68. The mounds are small and interspersed by flat areas of creosote scrub. Cover data for this community in Target 68 shows 40 percent cover of mesquite, 19 percent cover of creosote, and 23 percent cover of Mediterranean grass. Other species of this community include desert buckwheat, white bursage and mentzelia (*Mentzelia* spp.). Mesquite mounds are currently avoided by run-in lines and targets.

Mesquite mound community on Target 68 with creosote in the foregound. Source: DoN 2001

Specific Issues

- Continue to conserve mesquite mound plant community.

Current Management

Currently there is no active management taking place in mesquite mounds.

Assessment of Current Management

Monitoring of mesquite mounds should be conducted.

Objective: Conserve the mesquite mound plant community on NAFEC and its ranges.

Strategy:

I. Attempt to keep future proposed target siting away from mesquite mounds.

Actions:

A. Complete an inventory of the mesquite mound vegetation community.

3.5.1.3 Dunes

Relict dunes are found on Targets 68 and 95. At least three longitudinal dunes encroach onto Target 68 from the west. These dunes are small, widely spaced, and impassively stabilized by vegetation. Similar northwest–southeast lying dunes are located in the northwestern corner and along the western boundary of Target 95. This community is characterized by creosote, indigo bush, desert buckwheat, dicoria, coldenia (*Tiquilia plicata*) and sun cup.

The western border of Target 101 consists of larger dunes which continue westward and northwest into the Superstition Hills. Stabilized dunes are currently avoided by run-in lines and targets.

Active dunes develop when sand accumulates and becomes partially stabilized by evergreen and or deciduous shrubs, scattered low annuals, and perennial herbs or grasses. The Algodones Dunes run along the southeast margins of Range 2512 in East Mesa. A small portion of the dunes occur on the target area.

On Navy property the three most common species occurring on the dunes are Mediterranean grass, popcorn flower, and indigo bush. Active dunes are currently avoided by run-in lines and targets.

Specific Issues

- Off Highway vehicle (OHV) use during planned events disturbs vegetation establishment and dune stabilization.
- Native desert plant composition and cover should be monitored.
- Invasive plant species should also be monitored in case they are replacing native plant species.

Current Management

There is little active management for dunes other than avoidance by run-in lines and targets.

Assessment of Current Management

Reducing access to OHV users promotes desert vegetation establishment and dune stabilization, and reduces potential impacts from anthropogenic disturbance. In addition to OHV use restrictions for the vegetation communities, continued monitoring efforts will contribute to the conservation of the communities.

Objective: Conserve and enhance the ecological integrity and native diversity of native vegetation and dune habitat on NAFEC and its ranges.

Strategy:

I. Implement vegetative community mapping on all NAFEC ranges and target areas.

Actions:

A. Establish baseline plant composition, plant cover, and soil cover in order to monitor trends of NAFEC plant communities, especially non-native and invasive species.

II. Prevent unnecessary damage or disturbance to native plant communities.

A. Minimize surface disturbance at target areas by siting new targets in previously used areas if possible and requiring vehicle use on established routes.

B. Monitor and control invasive plants along run-in lines and targets.

3.5.1.4 Riparian

A wetland delineation of a portion of NAFEC was conducted in 1996. The 1996 delineation focused on the desert riparian habitat located on the northwest portion of the installation where agricultural fields occur adjacent to a tributary of the New River. Vegetative cover observed during the 1996 delineation was predominantly bare ground but included screwbean mesquite (*Prosopis pubescens*), tamarisk (*Tamarix aphylla*), cattail (*Typha spp.*), quailbush (*Atriplex lentiformis*), arrowweed (*Pluchea sericea*) and phragmites (*Phragmitis australis*). Since this delineation occurred most of the agriculture fields draining into it have been taken out of production. Currently only a small stream of effluent from the water treatment plant is the only perennial water source on Navy property in this area.

Loss of this vegetation type has occurred due to past farming. Some of these areas were deemed as jurisdictional wetlands in the 1996 wetland delineation. They are regulated as wetlands under the Food Security Act, as amended by the Food Conservation Agricultural Trade Act (FACTA) of 1990. Non-agricultural wetlands come under the jurisdiction of the Army Corps of Engineers and the CWA. Any alteration of jurisdictional waters or wetlands, including any movement of soil, must be accomplished with a permit issued by USACE.

Specific Issues

- Invasive plant species control would enhance the riparian area along the New River and improve the area for native wildlife.

Current Management

Currently invasive species control is regularly undertaken in the riparian area.

Assessment of Current Management

The majority of the riparian vegetation in this area has died due to the fact that most of the agriculture water draining into this area has ceased.

Objective: Seek to conserve the ecological integrity and native diversity of riparian habitat on NAFEC and its ranges.

Strategy:

I. Continue periodic invasive vegetation removal and cleanup.

Actions:

A. Restore tributary to the New River by invasive plant eradication and cleanup of the toxic waste site located here.

B. Coordinate invasive plant control efforts with adjacent landowners.

3.5.1.5 Agriculture

Specific Issues

- Occasionally, agriculture practices serve as BASH attractants.

Current Management

Crop land in and around the periphery of NAFEC is leased out under the agricultural outlease program (Map 2-5). The crop type consists primarily of crops such as alfalfa, Bermuda grass, and Sudan grass.

The goal of the outlease program is to control dust and weeds around NAFEC, thereby contributing to the military mission. There are approximately 688.1 acres of agricultural lands outleased, most of which are under cultivation and approximately 131.3 acres are designated as maintenance areas.

The Navy is authorized to outlease lands when it is compatible with the military mission under Title 10 Section 2667 of the U.S. Code. In addition, DoD and DoN policy allow leasing of lands to reduce maintenance costs. Leases are required to contain a Soil and Water Conservation Plan, which dictates BMPs or conservation measures for protecting the environment. The lessee may also be required to perform certain management activities or install improvements, such as fencing or watering devices or noxious weed control, on a cost-reimbursable, cost-sharing, or rental credit basis. The Soil and Water Conservation Plan (SWCP) is reviewed and updated prior to issuing a new lease. The leases have five-year terms, and at the conclusion of the five years the SWCP is reevaluated and updated. The SWCP was last updated in 2012. Agriculture practices, such as timing of irrigation, have at times attracted birds, causing a BASH issue.

Agriculture practices, such as timing of irrigation, have at times attracted birds, causing a BASH issue. This is mitigated by the lessee's adherence to certain irrigation practices and by prohibiting some crops which would attract birds.

Assessment of Current Management

The agriculture leases at NAFEC were awarded in October 2012 for a term of 5 years. The lessee continues to work with the NAFEC point of contact who in turn continues to work with NAFEC and NAVFAC SW Real Estate and Natural Resources staff.

Objective: Ensure the long-term viability and compatibility of the agriculture leases in conjunction with the military mission and natural resource protection.

Strategy:

I. Continue to promote agricultural outleases along with other secondary uses of land to the maximum degree compatible with operational requirements (DoN 1987).

II. Continue to review the current Soil and Water Conservation Plan when the agricultural lease comes up for renewal.

III. Agricultural leases should continue to be reviewed through the NEPA process (OPNAVM-5090.1). NEPA documentation needs to be prepared for each new or proposed agricultural outlease.

IV. Provide oversight, inspection, and monitoring of outleases for compliance with environmental protection laws.

Actions:

B. Implement policies to include specific environmental compliance actions in agricultural outleases issued aboard NAFEC.

C. Continue to work with NAVFAC SW Natural Resources and Real Estate to ensure periodic inspections of agricultural outleases and to implement an effective action plan to address violations.

D. Institute policies to ensure that future installation plans, which may impact or be impacted by any outgrants, include the considerations of relevant outgrants.

E. Continue to require maintenance of invasive plant and noxious weed species on outleased agricultural lands.

3.5.1.6 Bare Ground

Bare ground refers to areas that have few if any perennial shrubs.

3.5.2 Jurisdictional Waters-Wetlands

Specific Issues

- An updated wetland delineation could be completed for potential wetlands on the entire installation and its target areas based on the current USACE Guidelines.

Current Management

A wetland delineation of a portion of NAFEC was conducted in 1996. The 1996 delineation apparently focused on the northwest portion of the installation where agricultural fields occur adjacent to the New River. However, since this delineation occurred most of the agriculture fields draining into it have been taken out of production. Currently only a small stream of effluent from the water treatment plant is the only perennial water source on Navy property in this area.

Under EO 11990, *Protection of Wetlands*, all federal agencies are directed to "take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands." Additionally, under Navy policy (OPNAVM-5090.1), there shall be "no net loss" of wetland habitat on NAFEC and its target areas. Placement of fill or movement of earth of any kind is prohibited unless pursuant to a permit.

A Section 7 consultation with USFWS pursuant to the ESA is required if any wetland impacts may affect federally endangered species. Under authority of the ESA, USFWS requires federal agencies to ensure that any proposed federal action does not jeopardize the continued existence of a federally listed species or adversely modify the species' critical habitat. USFWS therefore must be consulted when activities proposed within wetlands supporting federally listed species may cause adverse effects to the listed species.

Objective: Protect the natural and beneficial functions of NAFEC wetlands by ensuring no net loss of area, function, or value as required by federal regulation.

Strategy:

I. Project proponents will conduct a wetland delineation on NAFEC and its target areas if projects are near wetlands.

II. Activities affecting jurisdictional waters of the U.S. and wetlands must be permitted through the USACE and NRCS, as appropriate. This includes any movement or deposition of soil within the jurisdictional boundary.

III. Any action affecting the New River, or other waters of the U.S. found on-site, shall require an environmental review per the current NEPA Instruction and OPNAVM-5090.1.

IV. Protect the natural ecological integrity, structure, and functional values of wetlands.

Actions:

A. Support actions that protect wetland resources on the installation, including the New River.

V. Enhance populations of wildlife and plants dependent on wetlands.

A. Complete a natural resources inventory of plants and wildlife occurring on the installation, including the wetland resources. The inventory should also assess the potential for sensitive plants and wildlife not directly observed during surveys on-site.

3.6 Plant and Wildlife Populations

The following sections address plant and wildlife populations at NAFEC.

3.6.1 Flora

3.6.1.1 Sensitive Plant Species Populations

No federally listed plant species are known to occur on NAFEC or its target areas. An inventory of plant species was conducted in 1996 for a portion of the target areas. A summary of plants observed during this study is provided in Appendix G. An updated and more complete inventory of rare plants potentially occurring on NAFEC and its target areas was completed in 2009-2010 (Muller and Januk 2010). Many of the potentially occurring rare plants are expected to occur on active or relict dunes. It is prudent to protect this habitat on NAFEC, since endemic wildlife species may also reside there. Two species considered rare by the California Native Plant Society (CNPS) occur within the ranges.

3.6.2 Fauna

3.6.2.1 Invertebrates

There is intense effort by other agencies to monitor invertebrate populations that affect agriculture resources in the region.

Specific Issues

- The presence of special status and non-native species is unknown and is a data gap for natural resource management decision making processes.

Current Management

Currently, invasive and exotic monitoring is being conducted on base. Incidental observations of ant mounds have been made as ants are a primary food source for the FTHL. Future surveys may discover presently unknown populations of these species. Native pollinators may be important to habitat and rare plant management.

Assessment of Current Management

Invertebrates are minimally managed.

Objective: Continue to support and work with regulatory agencies currently monitoring diversity and population levels of invertebrates in the Imperial Valley and on NAFEC property.

Strategy:

I. Support efforts to monitor invertebrate species on NAFEC.

II. Continue to encourage partnerships to monitor insect populations on agricultural lands.

3.6.2.2 Pollinators

Specific Issues

The issues that could negatively impact pollinator populations and their habitats at NAFEC are;

- Improper use of pesticides
- Anthropogenic disturbances
- Invasive flora and fauna
- Erosion and sedimentation
- Climate change

Current Management

Pollinators are not specifically managed on base. Their habitats are managed through habitat enhancement and invasive plant control.

Assessment of Current Management

Because NAFEC is not currently managing for pollinator species an assessment of current management cannot be made. Assessment of habitat management is described in Section 3.5, Terrestrial Habitats and Communities.

Objective: Maintain and enhance pollinator populations and their habitats when not in conflict with the military mission.

Strategy:

I. Continue to require conformance with county and state requirements to utilize agricultural practices which conserve pollinators.

II. Apiaries will not be required to relocate unless in close proximity to residences and schools.

III. Discourage wild Africanized bee colonies by promptly cleaning up wild hives.

3.6.2.3 Reptiles and Amphibians

At least 13 species of lizards and 15 species of snakes are known to occur in the Imperial Valley. The spiny softshell turtle (*Trionyx spiniferus*), an aquatic turtle, was introduced into the Colorado River system around 1900 and has since spread its range into the Salton Sea. The turtle is probably found in irrigation systems throughout the Imperial Valley (Stebbins 1985) and may make an appearance at NAFEC. In addition, widespread development of agriculture has brought aquatic amphibians into the valley, including the bullfrog (*Rana catesbeina*), woodhouse toad (*Bufo woodhousei*) and possibly the tiger salamander (*Ambystoma tigrinum*).

Reptile species common on NAFEC ranges include the flat-tailed horned lizard (FTHL) (*Phrynosoma mcallii*) and the Colorado Desert fringe-toed lizard (*Uma notata*).

Current Management

Reptiles were detected on the ranges in the 1996 surveys; four reptile species sighted in 1994 were not found in 1996. In 2012, a reptile survey was conducted on all ranges and detected seven species of lizards, three species of snakes, and one toad (Tierra Data Inc. 2013).

Assessment of Current Management

Much of the range habitat is threatened by urban development, agricultural development, ORV activity, energy development, military activities, introduction of non-native plants, pesticide use and habitat degradation. Currently, NAFEC maintains two targets as portions of FTHL Management Areas (MA's) as outlined in the FTHL Rangewide Management Strategy (RMS). NAFEC will continue to participate as an interested agency in the FTHL RMS in order to conserve the lizard's habitat on the ranges. Funding will be prioritized to continue the inventorying and monitoring of FTHL populations and population demographics to provide data in support of the conservation effort. Vehicle access continues to be limited and off-road race events are prohibited within the MA's. Users are encouraged to keep on existing routes and discouraged from creating new routes or adding to existing routes. Proposals for non-mission essential projects with associated habitat disturbance will continue into the future. NAFEC will continue to evaluate projects and will strive to minimize the impacts of these projects on FTHL habitat. Projects which support the mission will be prioritized with impact minimization measures carried out and those

projects which are not mission related and will result in FTHL habitat disturbance within MA's will be encouraged to occur elsewhere.

Objective: Monitor population to ensure persistence of reptile diversity on NAFEC.

Strategy:

I. Conduct an inventory of amphibians and reptiles once every 10 years in order to obtain a more comprehensive list of the species using NAFEC and its target areas.

Actions:

A. Encourage study sites for research by local university professors and graduate students.

II. Determine the population status of each resident species with emphasis on sensitive species, such as the FTHL and Colorado fringe-toed lizard, to support management decisions that fulfill the needs of the military mission while protecting these species.

A. Conduct periodic surveys, focusing on sample sites selected to detect diversity of species.

B. If population declines are found, determine the cause and take appropriate action.

III. Protect fauna from habitat damage and predation by invasive species.

A. In FTHL management areas, post speed limit signs, minimize grading of targets and run-in lines to the extent practicable.

B. Monitor invasive species and manage as appropriate including the control of invasive weedy species in disturbed areas.

IV. Continue to execute the 2003 FTHL *Rangewide Management Strategy*.

A. Continue inventory and monitoring by coordinating with the ICC to monitor habitat quality and population trends and any changes within FTHL use patterns.

B. Rehabilitate damaged and degraded habitat within the FTHL MAs.

3.6.2.4 Birds

This section addresses the presence and management of migratory birds that, under the federal directive of the MBTA (16 USC § 703 *et seq.*) and EO 13186, includes federally listed and non-listed species. Specific measures for management of special status species are detailed in Section 3.6.4.20, Special Status Species Management.

Most native birds on NAFEC and the target areas are neotropical migratory species as substantial migratory bird activity occurs in the vicinity. The Imperial Valley is located within the Pacific Flyway and is an active area for migratory birds due to the presence of the Salton Sea, a critical stopover point for neotropical migrants. Appendix H highlights the INRMP benefits to migratory birds. The Sonny Bono Salton Sea National Wildlife Refuge, situated at the southern end of the Salton Sea and approximately 25 miles north of NAFEC, “supports one of the most diverse avian compositions in the United States,” with more than 400 avian species recorded at the Refuge, including numerous federally-listed species (http://www.fws.gov/saltonsea/wildlife.html).

General avian surveys conducted periodically at NAFEC support baseline data. A comprehensive survey of birds would be expected to yield similar sightings to those recorded throughout the Imperial Valley and Refuge.

Specific Issues

- A general avian study has not been conducted on NAFEC ranges in recent years.

Current Management

General surveys conducted in 2010 on NAFEC-proper and the agricultural fields detected 46 avian species in four quarterly surveys (NAVFAC SW 2011). Species richness varied from 23 species in the summer to 32 species in the spring survey. Potential burrowing owl predator species were detected. Three species observed are listed by Partners in Flight (PIF) as a continental but not regional, concern; one additional species is listed by PIF as requiring management attention. (Partners in Flight is self-described as "a cooperative effort involving partnerships among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals" (http://www.partnersinflight.org/description.cfm). The DoD participates in this international cooperative and has developed its own PIF program to secure bird populations while maintaining the military mission.)

NAFEC is planning a base-wide bird survey every five years. This survey could include the ranges.

A burrowing owl management plan was updated in 2010. It includes impact minimization measures. Burrowing owl presentations are periodically given to interested parties and, on occasion, all personnel on NAFEC. The current Base Operations Services contractor has agreed to conduct base-wide yearly tree trimming outside of the breeding bird season. NAFEC conducts a yearly runway bird/animal survey and non-lethally moves resident birds away from the runways to avoid collisions with aircraft. BASH minimization measures are carried out in compliance with the MBTA. An example of this is the destruction of cliff swallow nesting colonies as they are being constructed by the birds, not after eggs or chicks are present. Project impact and facility maintenance impact minimization measures are carried out in accordance with MBTA. Injured birds, such as heat stressed pelicans in summer, are turned over to the USFWS for rehabilitation.

Assessment of Current Management

Currently periodic bird surveys are conducted on NAFEC airfield and ranges. Avian activity, especially during migratory seasons and of large, slow-flying birds, on and in the vicinity of NAFEC creates additional and substantial BASH issues. Because of their vulnerability to bird collisions, a Bird Avoidance Model (BAM) was developed for use by military aircraft at NAFEC. Likely and known bird movement predicted by the BAM is used to alert pilots and airfield operations to potential hazards, allowing them to plan aircraft activity accordingly.

Objective: Maintain diversity and abundance of native bird species.

Strategy:

I. Conduct surveys periodically for general and sensitive bird fauna in order to obtain a comprehensive list of the species using NAFEC and its target areas.

Actions:

A. Encourage study sites for research by local university professors and graduate students.

B. Update general and breeding avian surveys every five years.

C. Integrate surveys conducted by local birders - a variety of species observed by bird enthusiasts at the Salton Sea will also use the habitats at NAFEC.

II. Determine and regularly monitor the status of sensitive bird species. If species decline in numbers, seek to determine the cause and take appropriate actions to arrest the decline.

A. Conduct habitat assessments and general surveys once every five years for the presence of other sensitive species.

B. Conduct annual surveys for the mountain plover.

C. Conduct focused surveys once every five years for the Yuma clapper rail and southwestern willow flycatcher using the USFWS survey protocol if potential habitat is found on-site.

D. Quantify habitat quality and assess the feasibility to restore habitat to promote native and declining species. (Any modification of jurisdictional wetlands for restoration purposes must be coordinated with the appropriate regulatory agencies.)

E. Conduct annual base-wide surveys for the burrowing owl.

Objective: Promote the conservation of migratory bird populations consistent with Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, and the associated Memorandum of Understanding.

III. Determine the species present and general habitat use of neotropical migratory birds.

A. Conduct general avian surveys base-wide every five to ten years.

B. Consider participating in the annual Audubon Christmas Bird Count.

IV. Comply with the MBTA, Migratory Bird Rule, EO, and MOU with USFWS and DoD.

A. Obtain required permits for intentional take of migratory birds (e.g., for depredation).

B. Avoid and minimize the unintentional take of migratory birds, as practicable.

1. Restrict access into and disturbance of nesting and breeding grounds during critical periods.

2. Dead tree snags used for perching and nesting by raptors should be considered for preservation.

C. Protect bird populations from the lethal effects of human facilities and activities, where this does not conflict with aviation safety and other safety concerns.

1. Provide raptor protection modifications to existing power poles with known or potential hazards to raptor nesting or perching activity. Incorporate the appropriate modifications into new power pole projects. Coordinate this effort with Public Works.

2. Continue to restrict the use of rodenticides in areas outside of the administrative section of the facility. Remove, or have the contractor remove, any dead or dying rodents from a treated area to reduce the possibility of secondary poisoning through raptor predation of poisoned rodents.

D. Consider migratory bird populations when reviewing projects on NAFEC.

3.6.2.5 Mammals

The status of some of the largest animals occupying NAFEC and target area lands is perhaps the least known. The primary carnivore is the coyote. The greatest diversity of mammals is found at NAFEC where water is available and on East Mesa where a nearby canal provides access to water.

As a result of the 1994 and 1996 surveys and incidental sightings during site visits in 2001, nineteen species of mammals have been determined, by observation or sign, to occur on NAFEC and its target areas. Again, there was higher diversity on East Mesa than West Mesa, but the greatest diversity was at NAFEC itself, where water is plentiful. Bats have not been inventoried, but there are bat species expected to occur on-site, including the Yuma myotis (*Myotis yumanensis*), California myotis (*Myotis californicus*), western pipistrelle (*Pipistrellus hesperus*), pallid bat (*Antrozous pallidus*) and Brazilian free-tailed bat (*Tadarida brasiliensis*).

In February 2011, a new mammal pest species, California ground squirrel (*Spermophilus beecheyi*), was first documented in Imperial County. This pest was first detected on NAFEC in January 2013.

Specific Issues

- A minimal inventory of mammals has been conducted at NAFEC.
- The minimal data on mammals present on base is a data gap for natural resource management decision making processes.

Current Management

Native mammals are not actively managed on NAFEC.

Assessment of Current Management

Since it was detected on NAFEC, California ground squirrel management has been implemented (sanitation of forage areas, destruction of burrows to control infestations). Past management strategies of California ground squirrel has been successful in eliminating infestations. Currently this is the only mammal management in place on NAFEC. An updated inventory of mammals in all habitat types should be performed. The information provided would help to assess the current status of mammal species and identify goals for conservation management.

Objective: Assess current management of mammal species on NAFEC.

Strategy:

I. Complete an inventory to determine which mammal species are on NAFEC, then utilize that information to help manage habitat.

Actions:

A. Identify and protect wildlife movement corridors that allow mammals to move within their large home ranges.

B. Identify uses of habitat that may present BASH concerns and develop appropriate animal abatement in those areas.

II. Conduct general surveys of small mammals to obtain a comprehensive species list for the property.

A. Gather information on the species and their relative abundance.

III. Conduct a baseline bat survey.

A. Minimize impacts to the population if bat pest management becomes necessary.

1. Inspect for presence of roosting bats before implementing any building and demolition projects.

2. Encourage the relocation of bat colonies to alternative roosting sites.

3. Educate personnel about the need for non-lethal control measures and the benefits of sustaining bat populations.

IV. Discourage bat habitation of occupied buildings through appropriate and biologically acceptable measures.

A. Exclude access to bat roosting sites after maternity season and before winter hibernation.

B. No attempt to move animals shall be made during vulnerable periods of seasonal occupancy.

C. Explore potential for rodent exclusion devices for facilities as a priority to eliminate cost of cleaning and worker health risk.

3.6.3 Potential Federal Threatened and Endangered Species to Occur on NAFEC

The species described below have potential to occur at NAFEC and its ranges and are either listed under the federal ESA as threatened or endangered. Currently, no threatened and endangered species occur on NAFEC.

3.6.3.1 Peirson's milk vetch (*Astragalus magdalenae* var. *peirsonii*)

Peirson's milk-vetch is a federally listed threatened plant species. A petition to delist the species was denied in 2008. It is a state endangered species and a CNPS List 1B.2 species (rare, threatened, or endangered in CA and elsewhere). Reports of its occurrence on the Algodones Dunes south of Highway 78 indicate a potential for it to occur on Target 68. It was not located in surveys during winter and spring of 1981/1982 and mid-March of 1983 conducted by Modoc Associates or during surveys in April and early May 1996 conducted by Tierra Data, Inc. Active dunes in RCZ-I of Range 2512 were included in the surveys. Target Areas 95 and 101 were surveyed for its presence in 2009-2010 and it was not found on Navy lands. Unconsolidated dunes, its' likely habitat, revealed no plants. Methods consisted of a visual inspection of as much as possible of the study areas, as well as identifying and recording principal plant communities, topography, geology, and other factors which could help determine areas that may be suitable for rare and endangered or threatened plants. All plant communities were visited, and representative sections were carefully searched for rare plants, particularly in areas of plant community overlap. Target 95 and 68 are located just to the east of critical habitat for Peirson's milk-vetch (Map 3-11).

Peirson's milk vetch (*Astragalus magdalenae*)
Source: calflora.net

3.6.3.2 Desert tortoise (*Gopherus agassizii*)

Desert tortoise (*Gopherus agassizii*)
Source: deserttortoise.org.

Desert tortoise is federally listed as threatened in this extent of its range. The desert tortoise has been surveyed for on the target ranges, but it is not expected to occur on Navy-controlled lands (DoN SWDIV 1994). The known range of the federally threatened desert tortoise begins outside of the target ranges north and east of the Algodones Dunes and at the base of the Chocolate Mountains (DoN SWDIV 1994).

3.6.3.3 Peninsular bighorn sheep (*Ovis canadensis nelsoni*)

This species is federally endangered and is named after the Peninsular Mountain Ranges that it inhabits at the northern end of the Baja Peninsula from southern California south into Mexico. A distinct population segment occurs in the United States' portion of the Peninsular Mountain Ranges. The Peninsular bighorn is a "desert bighorn" associated with steep slopes typically below 4,593 feet and associated canyons and washes (USFWS 2001). Escape terrain in the form of steep, rugged slopes are particularly important because bighorn rely on their climbing ability rather than speed to escape ground-based predators (USFWS 2000). This terrain is also valuable for safe lambing areas and provides important thermal cover in the hot, dry climate. Intermountain alluvial fans and washes are also important to bighorn populations for access to foraging areas, sources of water, and as travel corridors connecting to higher elevation habitats and providing avenues for gene flow among subpopulations.

Penisular bighorn sheep (*Ovis canadensis nelsoni*)
Source: wildnatureimages.com

The state of California listed bighorn sheep (*O. canadensis)* inhabiting the Peninsular Ranges of California as "rare" in 1971 and "threatened" in 1984. A range of factors was listed as the causes of population reduction and endangerment, including predation, urban related sources of mortality, low rates of lamb recruitment, disease, habitat loss and human-related disturbance. The species was federally listed in 1998 and in October 2000, the USFWS released the recovery plan (USFWS 2000), followed by the designation of critical habitat for the species in February 2001 (USFWS 2001). Critical habitat was revised and reduced in size to 376,938 total acres in 2009 (USFWS 2009).

Tract 40 of the former CIA is approximately one mile north of the northern boundary of critical habitat for the Peninsular bighorn sheep (USFWS 2009). About two thirds of Tract 40 consists of "mud hills" of unstable silt largely devoid of vegetation, while the remainder of the parcel is flatlands intersected by several small washes. The flat terrain is confined to the northern part of Tract 40 and consists of sandy desert dominated by creosote bush interspersed with ocotillo and jojoba (USACE 1997). Creosote, Mormon tea and jojoba occur in the washes. Tract 40 is not currently used by the Navy for military activity and is signed off-limits to the public due to the danger of unexploded ordnance from historic military use. Tract 40 and the CIA have not been designated critical habitat because of lack of suitable habitat and lack of data showing their use of the area (R. Powell, *pers. comm.* 2011).

Bighorn sheep have not been observed in Tract 40 or the immediate vicinity (USACE 1997; USFWS 2000). The consistent lack of sighting in the vicinity over the years, including data from aerial surveys, may indicate little relative value for supporting resident bighorn sheep. However, the area may be used as a travel corridor between the Coyote Mountains directly to the south of Tract 40, and the Fish Creek Mountains, to the north. It is likely that their use of the area may increase as the subpopulations grow in size, especially due to the presence of year-round and ephemeral water sources (J. Collins, *pers. comm.* 2011).

3.6.3.4 Willow flycatcher (*Empidonax traillii*)

Willow flycatcher encompasses three separate subspecies in California, of which one – the southwestern willow flycatcher (*E. t. extimus*) – is listed as federally endangered. In addition, the CDFW considers the entire species as endangered on its breeding grounds in the state, including *E. t. brewsteri* along the western slopes of the Sierra Nevada and westward to the coast in northern California, as well as *E. t. adastus* breeding along the eastern slopes of the Sierra Nevada (Craig and Williams 1998).

Willow flycatcher (*Empidonax traillii*) Source: ucsantacruz.ucnrs.org

This species is an obligate riparian nester, relying on a dense cover of willows, cottonwoods, and other native and non-native (e.g. tamarisk) vegetation occurring along streams and wet meadows to breed (Craig and Williams 1998). This species was recorded as being present in previous surveys at NAFEC, although its breeding status is unclear. It likely does not breed due to the lack of large amounts of suitable riparian habitat, but may move through the area during migration to its Mexican wintering grounds.

3.6.3.5 Yuma clapper rail (*Rallus longirostris yumanensis*)

Yuma clapper rail is federally listed as endangered and state listed as threatened. This bird breeds in freshwater marshes along the Colorado River from Needles, California to the Colorado River delta and also occurs at the Salton Sea. It typically occupies emergent marsh vegetation types, such as pickleweed and cordgrass, though in the Salton Sea area the Yuma clapper rail frequents mature stands of bullrush and cattail. High water levels may force them into willow and tamarisk stands. Tamarisk is also used after breeding and in winter at some sites. Nests are built between March and late July in clumps of living emergent vegetation over shallow water. Home ranges average greater than 17 acres and are larger after the breeding season and in winter. Habitat destruction and depredation by mammals and raptors have caused population declines. It is also possible that increased selenium concentrations from agricultural runoff are affecting reproduction.

Yuma clapper rail (*Rallus longirostris yumanensis*) Source: fws.gov/nevada

Currently, the Yuma clapper rail is not expected to occur on the installation; however, this assessment should be revisited during a complete inventory of natural resources on NAFEC. The wetland habitat in the northwestern corner of NAFEC could potentially provide habitat for the federally endangered Yuma clapper rail. This species was not detected in 1996 surveys or by USFWS surveys of irrigation canals in the surrounding area in 1996. The wetlands are adjacent to the water treatment ponds and receive tertiary water and untreated agricultural drainage water. Except for the low flow of treated sewage, water flow is ephemeral. Vegetation is dominated by the invasive species common reed (*Phragmites australis*) and tamarisk, with occasional native vegetation such as screwbean mesquite.

3.6.3.6 Potential Federal Threatened and Endangered Species Management

Specific Issues for Threatened and Endangered Species

- Minimal or no surveys have been conducted to determine the presence or absence of some potentially occurring federally listed species.

Assessment of Current Management

At this time, no federally threatened or endangered species have been documented at NAFEC. Future surveys to be conducted on the installation may identify federally listed species leading to development of specific management plans in consultation with the USFWS. In the meantime, current management of potentially suitable habitat for federally threatened and endangered species populations at NAFEC is addressed in the INRMP. Habitat enhancement monitoring proposed in other sections of the INRMP contributes opportunities to detect any previously undocumented federally listed species at NAFEC. Such surveys and monitoring are necessary to identify existing (and periodically or indirectly utilized) habitat for those species, and to assist in the determination as critical habitat.

Should any federally listed species be identified at NAFEC, appropriate conservation efforts, management strategies and plans should be developed in consultation with the USFWS and implemented through approval and funding from the NAFEC command and follow recognized monitoring methodologies (Appendix I). Annual INRMP metric updates provide a formal means to utilize adaptive management and review progress made for protecting and conserving any federally threatened and endangered species that may exist at NAFEC.

Objective: Assess the status of federally listed species, species proposed for listing, and federal candidate species for listing.

Strategy:

I. Conduct surveys (using established methodology) of listed species to determine presence or absence of species during regular species surveys, including newly listed species.

II. Continue to survey for federally listed threatened and endangered species potentially occurring at NAFEC as part of regular species surveys, including newly listed species.

III. Track the listing status of species being proposed for listing under the federal ESA.

Objective: Protect and conserve federally listed species, species proposed for listing, federal candidate species for listing, and their habitats that occur on NAFEC in accordance with ESA.

IV. If any federally listed species are confirmed present at NAFEC, appropriate management plans and monitoring activities shall be developed for them in consultation with the USFWS, and incorporated into the natural resources management program and the INRMP.

V. Implement habitat management approaches described in this INRMP, which benefit native and listed species.

VI. Seek opportunities to develop partnerships with institutions, organizations, and other researchers to develop and improve knowledge and management of federally listed species at NAFEC and to contribute to regional initiatives for those species.

VII. Continue to maintain signage prohibiting public use and work with the BLM and California State Parks to enforce the prohibition of public use of Tract 40 to minimize impacts to Peninsular bighorn sheep, which may transit the area.

VIII. Work with the BLM and California State Parks to pursue the transfer of Tract 40 for

inclusion in the State Park system.

IX. Provide logistical and financial support to research and track projects for Peninsular bighorn sheep recovery.

3.6.4 Other Special Status Species

Plants and animals which may be found at NAFEC and which are species of concern are described here. No designated critical habitat exists on NAFEC or its ranges, and no Biological Opinion is in place for base activities, as no listed species are common. Birds of Conservation Concern are migratory and non-migratory birds that " without additional conservation actions are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973" (Fish and Wildlife Conservation Act amended 1988). The Migratory Bird Treaty Act (MBTA) makes it unlawful "by any means or manner, to pursue, hunt, take, capture [or] kill" any migratory bird except as permitted by regulation. The number of bird species covered by the MBTA is extensive, includes listed and non-listed species, and is listed at 50 CFR § 10.13. The regulatory definition of "migratory bird" is broad and includes any mutation or hybrid of a listed species and includes any part, egg, or nest of such bird (50 2874 CFR §10.12.). A Species of Special Concern (SSC) is a species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:

- is extirpated from the State or, in the case of birds, in its primary seasonal or breeding role;
- is listed as Federally-, but not State-, threatened or endangered;
- meets the State definition of threatened or endangered but has not formally been listed;
- is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status; or
- has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.

3.6.4.1 Sand food (*Pholisma sonorae*)

Sand food, a former Category 2 candidate for federal listing and a California Rare Plant Rank 2 (formerly CNPS List 1B.2 species [rare, threatened, or endangered in CA and elsewhere]), is known to occur in southeastern California (Imperial County), southwestern Arizona, Baja Norte in northwestern Sonora, Mexico and Baja California, Mexico (Arizona Game and Fish Department 2005).

Sand food (*Pholisma sonorae*). Source: RECON

The above-ground portion of the sand food plant resembles a small, gray mushroom cap, approximately one to six inches in diameter. The inflorescence, the only portion of the plant visible at the surface of the sand, is attached to the haustorium (the perennial portion of the parasite that persists within the host root) by a brittle, succulent stem (Kuijt 1966). It is parasitic on the roots of nearby shrubs.

An overview of the location of sand food is depicted on the sensitive biological resources map of NAFEC (Map 3-10). Twenty to twenty-five of this mushroom-like, perennial herb were located on a dune in Target 68 in 1982 field surveys (Modoc Associates 1982), but not observed in 1996. In the 2009-2010 plant surveys, 69 inflorescences

clustered in 11 aggregates were observed in Target 68 (Muller and Januk 2010).

3.6.4.2 Thurber's pilostyles (*Pilostyles thurberi*)

Thurber's pilostyles is a perennial herb that has no federal status but is a California Rare Plant Rank 4 (formerly CNPS List 4 [plants of limited distribution–a watch list]). In 1982 it was reported from the Superstition Mountains. A population of the plant was located in 1996 parasitizing many of its host shrub, indigo bush, on Target 101. The 2009-2010 survey revealed populations of the plant on Targets 68 and 101 (Map 1-3). On Target 68, five occurrences observed. This area is a new observation, not recorded in previous surveys. Twenty four occurrences were recorded on Target 101. It may be more widely scattered, as its appearance is unpredictable from year to year; however, scarring on older plant tissue of its host plant may indicate its presence in years during which surveys are not conducted. An overview of Thurber's pilostyles locations are also depicted on the sensitive biological resources map (Map 3-10).

Thurber's pilostyles (*Pilostyles thurberi*) Source: calflora.net

3.6.4.3 Wiggins' croton (*Croton wigginsii*)

Wiggins' croton is a California Rare Plant Rank 2 (formerly CNPS List 2.2 species [rare in California, but more common elsewhere]) and is known to occur in the Algodones Dunes near Range 2512. It has not been located on Navy land, but searches conducted in 1996 were during a very dry year. Surveys in 2009-2010 on Target Areas 68, 95 and 101 did not reveal any plants, mainly because of lack of likely habitat in unconsolidated dunes.

Wiggins' croton (*Croton wigginsii*) Source: calflora.net

3.6.4.4 Flat-tailed horned lizard (*Phyrnosoma mcallii*)

The FTHL is a small iguanid lizard which occurs in the desert valleys of south-central and southeastern California, extreme southwestern Arizona, and adjacent areas of Sonora and Baja California, Mexico. Its habitat is primarily sandy, low-lying plains of the Lower Colorado River valley in some of the driest areas of the Sonoran Desert, including the East and West Mesa target areas. This species is most often associated with creosote-white bursage series of the desertscrub. FTHL is vulnerable due to habitat loss and degradation, direct mortality due to vehicular use on and off-road.

Possessing an abundance of open, relatively undisturbed lands, NAFEC and its target areas have become significant as areas of habitat supporting the FTHL, which has been periodically proposed for federal listing as threatened in 1997, 2003, 2006 and 2011. It is a California state species of concern (SSC). The first withdrawal from proposed federal listing in July 1997 was due in part to the FTHL *Rangewide Management Strategy* (RMS) and the ensuing *Conservation Agreement*. In 2003, the RMS was revised to establish new monitoring techniques (FTHL ICC 2003). Substantial portions of two of the MAs designated in the RMS (the East and West Mesa MAs) are NAFEC lands (7% and 22%, respectively); additional portions in both MAs fall under the withdrawn lands for RCZ-I in which training activities may affect FTHL activity and management (Map 3-10).

Flat-tailed horned lizard (*Phyrnosoma mcallii*). Source: RECON

NAFEC has partnered with a number of agencies and has signed a *Conservation Agreement* (CA) on the FTHL (Appendix E). In addition, management of the FTHL is also addressed in the FTHL RMS. NAFEC

has gone above and beyond conservation requirements and has contributed greatly to the preservation of this species through their joint efforts and sharing of funds with other agencies in the implementation of the RMS. NAFEC's adherence to strategies outlined in the RMS, and consented to in the CA, will benefit the FTHL by minimizing losses or degradation to habitat and by minimizing activities that disturb surfaces or cause mortality. Dedicated involvement with other land management agencies in the RMS will also help sustain FTHL populations and habitat to prevent federal listing of the species.

3.6.4.5 Colorado Desert fringe-toed lizard (*Uma notata*)

Colorado Desert fringe-toed lizard (*Uma notata*). Source: DoN 2001

Colorado Desert fringe-toed lizard is a California SSC. This species has been documented in 1996 surveys from the sand dunes in the Superstition Mountains and occurs along the western edge of Target 103, where these dunes encroach onto the edge of Navy-controlled property (West Mesa). The Colorado Desert fringe-toed lizard also occurs in the Algodones Dunes and has been documented on R-2512 (DoN SWDIV 1994).

3.6.4.6 Barefoot gecko (*Coleonyx switaki*)

Barefoot gecko was listed as a California state threatened species in 1980 (CDFG 2011). Little is known about the species. It occurs in rock cracks and crevices, and has a limited habitat in areas of massive rocks and outcrops at the heads of canyons (Murphy 1974). Its range is thought to be along the east face of the Peninsular Ranges, perhaps wider. Its existence is threatened by the black market pet trade. Although the barefoot gecko has not been surveyed on NAFEC, the California Natural Diversity Database (CNDDB) describes potential habitat within the southwestern portion of Target 103 on the West Mesa range of NAFEC (CDFG 2011).

Barefoot gecko (*Coleonyx switaki*)
Source: geckosunlimited.com

3.6.4.7 Western Burrowing owl (*Athene cunicularia*)

Burrowing owl is a bird of conservation concern (BCC) and a California SSC. Western burrowing owls are primarily restricted to the western United States and Mexico. Habitat for the western burrowing owl includes dry, open, short grass areas often associated with burrowing mammals (Haug *et al.* 1993). Its long legs and boldly spotted and barred plumage distinguish the small sized (9–11 inches) western burrowing owl from other ground-dwelling owls.

Western burrowing owl (*Athene cunicularia*). Source: RECON

The burrowing owl is largely nocturnal and perches during daylight at the entrance to its burrow or on low posts. Nesting typically occurs from March through August. Burrowing owls form pair bonds for longer than one year and exhibit high site fidelity, reusing the same burrow year after year (Haug *et al*. 1993). The female remains inside the burrow during most of the egg laying and incubation period and is fed by the male throughout brooding. Western burrowing owls are opportunistic feeders consuming a diet that includes arthropods, small mammals, and birds, and occasionally amphibians and reptiles (Haug *et al*. 1993). Urbanization has greatly reduced the amount of suitable habitat for this species.

California has one of the largest populations of resident burrowing owls, with the largest concentrations in the Imperial Valley due to habitat created from agricultural practices. The burrowing owl population at NAFEC was monitored in 2006 as part of a DoD Legacy funded-project evaluating migratory linkages of

burrowing owls in western North America. In 2006, biologists located twenty-four occupied burrows and banded forty-nine individuals, including twenty males, twenty-one females, and eight juveniles (Conway and Finley 2006). Two burrows were removed due to proximity within active runways and refueling area critical zones. In 2010, three burrowing owl surveys were conducted at NAFEC (January, April and July). The number of birds observed ranged from 26-51 individuals, and both adults and juveniles were observed during the summer breeding season (Powell, unpublished data, January, April and July 2010). The majority of birds burrow in the agricultural areas on the eastern side of the installation; while a few individuals typically burrow in the central part of the installation and near the runways from where they must be relocated. NAFEC maintains a buffer around critical zones in order to minimize the likelihood that owls will stray onto the runway or be accidentally drawn into the engines of aircrafts. Map 3-10 provides an overview of the occupied burrows detected on NAFEC.

3.6.4.8 Prairie falcon (*Falco mexicanus*)

Prairie falcon is a BCC and a California SSC. This species has been observed on R-2510 and R-2512 in 1996. Nationwide populations have been reduced by grassland conversion, falconers, collectors, pesticide poisoning, and shooting. This raptor is found throughout its range in the western United States in open rangeland, ridges, mountains, and deserts. The prairie falcon does not build nests, but lays eggs directly on cliffs, ledges, or rocky bluffs (Unitt 2004). In the Anza-Borrego Desert, seven breeding pairs have been identified on the rocky hills or badlands (Unitt 2004). Prairie falcons move in response to food availability rather than to conventional migration. In the summer, most falcons leave deserts where rodents estivate (similar to hibernation) due to the warm temperatures (Unitt 2004).

Prairie falcon (*Falco mexicanus*) Source: utahbirds.org

3.6.4.9 LeConte's thrasher (*Toxostoma lecontei*)

LeConte's thrasher is a BCC and a California SSC. This bird is a resident from Anza-Borrego Desert in San Diego County and the eastern base of the Peninsular Ranges south to the Mexican border and east to the Colorado River (Small 1994). LeConte's thrasher is absent from the cultivated areas of Imperial County (Small 1994). This thrasher prefers creosote bush-dominated desert scrub, particularly with cholla patches for breeding. It also uses alkali desert scrub and open desert washes (Zeiner et al. 1990). This shy bird inhabits some of the hottest and driest portions of California (Small 1994). The diet of the LeConte's thrasher includes insects and terrestrial arthropods, and occasionally seeds, small lizards, and other small vertebrates. This thrasher forages on the ground by probing and digging in soil and litter with its bill (Zeiner et al. 1990). Because this species is exceptionally wary of humans, it is vulnerable to off-road activity, other disturbance, and removal of habitat for agriculture or other development (Zeiner et al. 1990). This species was detected on West Mesa during the 1996 surveys.

LeConte's thrasher (*Toxostoma lecontei*) Source:allaboutbirds.org

3.6.4.10 Mountain plover (*Charadrius montanus*)

Mountain plover is a federal bird of conservation concern. It was federally proposed as threatened until the proposal was withdrawn in 2003 and 2011. This bird is a California winter resident from September through March and is found on short grasslands and plowed fields of the California Central Valley, San Joaquin Valley and Imperial Valley (Knopf and Rupert 1995). There is potential that the species could use fallow or recently planted agricultural fields of alfalfa and Bermuda grass at NAFEC. Mountain plover breeds from northern Montana and North Dakota south to southeastern New Mexico and Texas (Knopf 1996). The average

Mountain plover (*Charadrius montanus*) Source: goggle.com

breeding territory measures 40 acres and the same territory may be occupied in successive years. The mountain plover's decline may be attributed to loss of habitat, agricultural practices, pesticide use, and decline of native herbivores. This species should be included in the focused bird surveys associated with the recommended natural resources inventory.

3.6.4.11 Costa's hummingbird (*Calypte costae*)

Costa's hummingbird is a bird of conservation concern. A desert hummingbird, Costa's hummingbird breeds in the Sonoran and Mojave Deserts of California and Arizona. It departs the desert in the hottest days of summer, moving to chaparral, scrub, or woodland habitat. It is a small hummingbird with green upperparts. Males have an iridescent violet crown and gorget (throat patch). Females have a white throat and underparts, sometimes with some violet feathers. This hummingbird was observed at the West Mesa and East Mesa ranges during the winter and spring in 1996.

Costa's hummingbird (*Calypte costae*) Source: allaboutbirds.org

3.6.4.12 Lucy's warbler (*Oreothlypis luciae*)

Lucy's warbler is a BCC. One of the smallest warblers, the Lucy's warbler is a bird of the Sonoran desert. It occupies the driest habitat of all the warblers breeding in that area. It is a small gray songbird that summers in riparian mesquite landscapes of Utah, Nevada, California, Arizona, New Mexico, and Texas. This species uses natural cavities in mesquite and other trees as well as loose bark on cottonwoods and willows under which to nest. This strictly insectivorous bird dines mostly on caterpillars, beetles, and leafhoppers. This species was observed on the East Mesa in the spring in 1996.

Lucy's warbler (*Oreothlypis luciae*) Source: google.com

3.6.4.13 Long-billed curlew (*Numenius americanus*)

Long-billed curlew is a BCC. North America's largest shorebird, the long-billed curlew breeds in the grasslands of the Great Plains and Great Basin, but winters on the Pacific coast, southern California, Texas, the Florida coast and Mexico. It has an extremely long, down-curved bill and is buffy brown in color with a plain crown. This species was observed on NAFEC proper during the spring 2010.

Long-billed curlew (*Numenius americanus*) Source: google.com

3.6.4.14 Whimbrel (*Numenius phaeopus*)

Whimbrel is a BCC. One of the most wide-ranging shorebirds in the world, the whimbrel breeds in the Arctic in the eastern and western hemispheres, and migrates through the southern California desert to South America. It uses its long, down-curved bill to probe deep in the sand of beaches for invertebrates, but also feeds on berries and insects. This is another large shorebird with a long neck and long legs and is streaked and buffy overall with a crown that is dark and a distinct light stripe in the middle. This species was also observed on NAFEC proper during the spring in 2010.

Whimbrel (*Numenius phaeopus*) Source: allaboutbirds.org

3.6.4.15 Loggerhead shrike (*Lanius ludovicianus*)

Loggerhead shrike is also a BCC and a California SSC. This species breeds across the North American continent in shrublands and grasslands, where they hunt for insects and other prey from exposed perches. It prefers areas with a mixture of open ground and trees and bushes in which to nest. The species is present year-round in southern portions of California, where it is considered fairly common in desert areas, with breeding populations augmented by migrants from the north (Shuford and Gardali 2008). The species has been recorded in all portions of NAFEC and its associated ranges in 1996.

Loggerhead shrike (*Lanius ludovicianus*) Source: allaboutbirds.org

3.6.4.16 Crissal thrasher (*Toxostoma crissale*)

Crissal thrasher is a California SSC. It is an uncommon resident in Imperial Valley that mainly ranges from the Coachella Valley as far west as Palm Springs and occurs along the Colorado River from the Nevada border to Yuma, Arizona (Small 1994). This thrasher requires large contiguous stands of dense desert scrub with intermittent small trees and larger shrubs, and is partial to dense stands of mesquite and other large shrubs (Small 1994). The crissal thrasher forages on the ground using its bill to dig in friable soil and probe in litter. Its diet consists of insects, berries and other small fruits, seeds and occasionally small lizards (Zeiner et al. 1990). The crissal thrasher is also extremely sensitive to human disturbance and encroachment, habitat fragmentation, and the introduction of salt cedar into its habitat.

Crissal thrasher (*Toxostoma crissale*) Source: allaboutbirds.org

3.6.4.17 Vermilion flycatcher (*Pyrocephalus rubinus*)

Vermilion flycatcher is a California SSC. For breeding habitat, this species requires lowland desert scrub, preferably mesquite that is close to a water source. Foraging and roosting habitat consists of riparian scrub or woodlands along a water course and occasionally local parks (Small 1994). The current known range of the vermilion flycatcher along the Colorado River is near Blythe, Riverside County, and very locally south of Blythe (Small 1994). This local resident is rare in the Imperial Valley (Zeiner et al. 1990). The vermilion flycatcher forages for bees and other insects (Zeiner et al. 1990). Loss of habitat is the primary threat to this species (Zeiner et al. 1990).

Vermillion flycatcher (*Pyrocephalus rubinus*) Source: allaboutbirds.org

3.6.4.18 Pallid bat (*Antrozous pallidus*)

Pallid bat is a California SSC. It is a locally common yearlong resident of low elevations throughout most of California. This bat occupies a variety of habitats including grasslands, shrublands, woodlands and forests at elevations ranging from sea level up through mixed conifer forests. The species occurs most commonly in open, dry habitats and prefers rocky areas for roosting. The sturdy skull and dentition of this species enables it to consume large, hard-shelled prey items such as beetles, grasshoppers, cicadas, spiders, scorpions, and Jerusalem crickets. The bats forage low over open ground, approximately 1.6 to 8 feet above ground level. Pallid bats are social, commonly roosting in multi-species groups of 20 or more. The day roosts, such as caves, crevices, and mines, must protect the bats from high temperatures. Pallid bats are very sensitive to disturbance of the roosting sites, as these roosts are crucial for metabolic economy and juvenile development.

Pallid bat (*Antrozous pallidus*) Source: google.com

3.6.4.19 Yuma myotis (*Myotis yumanensis*)

Yuma myotis is a California SSC. It is widespread and common in most of California with the exception of the Mohave and Colorado Desert regions. It occurs in a wide variety of habitats ranging commonly from sea level to 8,000 feet and rarely up to 11,000 feet. The optimal habitats for this bat are open forests and woodlands with water sources. The Yuma myotis roosts in buildings, mines, caves, or crevices. It has also been noted roosting in abandoned swallow nests and under bridges. This bat feeds on an assortment of small flying insects detected by echolocation. Feeding usually occurs over water sources, which ties distribution of the species to the proximity to bodies of water.

Yuma myotis (*Myotis yumanensis*) Source: goggle.com

3.6.4.20 Special Status Species Management

Specific Issues

- Threats to special status species (flora and fauna) at NAFEC and its ranges include disturbance from human activities such as training and habitat destruction by ORV use or development.

Current Management

Although NAFEC is not required to manage for sensitive species warranting stewardship, the Navy recognizes the value of maintaining diverse ecosystems. The Navy recognizes that it is prudent to protect rare species as a proactive strategy to prevent future federal listings. To the extent that resources are available to support the management of such species, NAFEC intends to implement the following objectives and strategies.

Assessment of Current Management

The habitat based and species specific management measures proposed in this INRMP provide a sufficient level of natural resource management to protect and conserve species warranting Navy stewardship at NAFEC and its ranges.

Flora

Objective: Conserve sensitive plant species and their habitats to contribute to the recovery or help prevent the federal listing of sensitive species.

Strategy:

I. As a first priority, protect sufficient habitat to preserve essential ecological and evolutionary processes.

Actions:

A. If possible, plan to conduct botanical surveys in normal-to-above-normal-rainfall years.

B. Control non-native plant species to the extent possible.

C. Identify and protect active and relict dunes, sand sources, and mesquite mounds, as most likely locations for potential but unconfirmed sensitive plants and wildlife.

II. Keep a cumulative map and record of surveys and findings on sensitive species in order to enhance understanding of their needs and status.

A. Using a global positioning system (GPS), map plant locations in order to develop a GIS database.

Fauna

Objective: Conserve special status species in the habitats where they may occur.

Strategy:

I. Fund and conduct surveys for special status species, using qualified biologists certified to conduct special status species surveys.

II. Incorporate data into natural resource management databases.

Objective: Provide for the recovery, enhancement, and protection of species warranting Navy stewardship, as a proactive strategy to prevent federal listings.

III. Based on results of surveys, species warranting Navy consideration and the habitats that support them should be protected to the extent practicable by giving them consideration during the land use planning processes.

Actions:

A. Maintain contact with regional specialist and regulatory agencies regarding the listing status of unique species known or thought to occur at NAFEC.

B. Continue to participate in the USFWS review and listing process for species known or thought to occur at NAFEC that are being considered for listing under the ESA.

C. Stay updated on agency decisions, published material, and meetings that change the listing status of species.

IV. Continue to resolve baseline biological data gaps.

A. Support ongoing and new research on distribution and ecology of species warranting Navy stewardship. Encourage academic institutions to facilitate resource data collection.

B. Continue to inventory and map existing species warranting Navy stewardship.

Objective: Ensure populations of FTHL continue to persist on Navy lands.

V. In FTHL management areas, post speed limit signs, minimize grading of targets and run-in lines to the extent practicable and control invasive plant species in disturbed areas.

VI. Continue monitoring and inventory by coordinating with the Interagency Coordinating Committee (ICC) to execute the 2003 FTHL Rangewide Management Strategy.

VII. Monitor habitat condition and any new disturbances using aerial photos.

VIII. Rehabilitate damaged and degraded habitat within the Management Area (MA).

Objective: Monitor and strive to maintain a stable population of burrowing owls at NAFEC in areas not subject to BASH concerns.

IX. Conduct annual winter runway areas and spring monitoring surveys for the burrowing owls in and around NAFEC proper.

X. Avoid impacts to BUOW by conducting surveys prior to construction or maintenance in areas where burrows or owls may be present.

3.7 Invasive Species Management

Non-native invasive plants and animals can pose a serious long-term threat to desert habitats. Several possess 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 plants. Without the natural enemies of their original habitats, non-native invasive species can spread rapidly and out-compete California native species. Invasive plants can alter ecosystem processes, transport disease, or cause cascading impacts to native populations, potentially impacting multiple trophic levels. Whether introduced unknowingly by early settlers hundreds of years ago, or more recently by global commerce and travel, the spread of non-native invasive species throughout California is the second greatest threat to biodiversity next to direct habitat destruction. On a local level, the Navy has the potential to contribute to the spread of invasive species across NAFEC, through everyday activities such as transport of cargo and equipment by land and air. On installations, construction and military readiness activities have the potential to spread invasive species from developed areas into natural areas.

EO 13112 (Invasive Species) (03 February 1999) requires federal agencies to prevent the introduction of invasive species and restore native species and habitats that have been invaded. EO 13112 defines an invasive species as “an alien whose introduction does or is likely to cause economic or environmental harm or harm to human health.”

The Noxious Weed Control Act requires that federal land managers cooperate with state and federal agencies to manage undesirable plants. It mandates that a program and a person be assigned to deal with unwanted plants, funding, cooperative agreements, and the use of integrated pest management systems. The military point of contact for the act is the Armed Forces Pest Management Board (established by DoDI 4150.07). The instruction states the Navy’s pest management policy and requires a comprehensive Pest Management Plan, the contents of which are stipulated. Coordination requirements are not stated. The instruction discusses the need to control pest outbreaks which affect the military mission, damage property, or impact the welfare of people. Chapter 24 of OPNAV-M 5090.1D requires that the use of pesticides comply with applicable regulations to prevent pollution.

Descriptions of invasive terrestrial species documented at NAFEC, and management objectives and strategies are provided below.

3.7.1 Invasive Terrestrial Plants

Mediterranean grass is a small, tufted winter annual grass, which germinates in early winter following rainfall and emerges about two weeks later. Mediterranean grass reproduces by seed only, which disperse into small cracks and depressions in the soil (Gutterman 1994). Only a fraction of the seed bank germinates during a given year, leaving most seeds in reserve for future years when the cohort may die prior to reproduction (Gutterman 1994). Mediterranean grass can compete effectively for limited nutrients with native annual plants that occupy spaces between shrubs (Brooks 1998). Fire is readily carried across

inter-shrub spaces by the dead stems of Mediterranean grass (Brooks 1998), which may have contributed to the increasing frequency and extent of fire in recent decades in California deserts.

An additional invasive plant becoming exceedingly common throughout arid and semi-arid regions of the Southwest is Saharan mustard (*Brassica tournefortii*). This winter annual species quickly invades disturbed areas and increases fire frequency and fuel load. Mustard is found throughout the target areas of NAFEC, especially of note is its presence in the areas where the two rare plants located in the target areas of NAFEC are found (Targets 68 and 101) (Muller and Junak 2011). Mustard is difficult to control because of its tendency to easily dislodge after its seeds have ripened, thus spreading seeds as it tumbles across the landscape.

Mediterranean grass, along with filaree (*Erodium* spp.) and mustard are ubiquitous in the modern desert landscape and are 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.

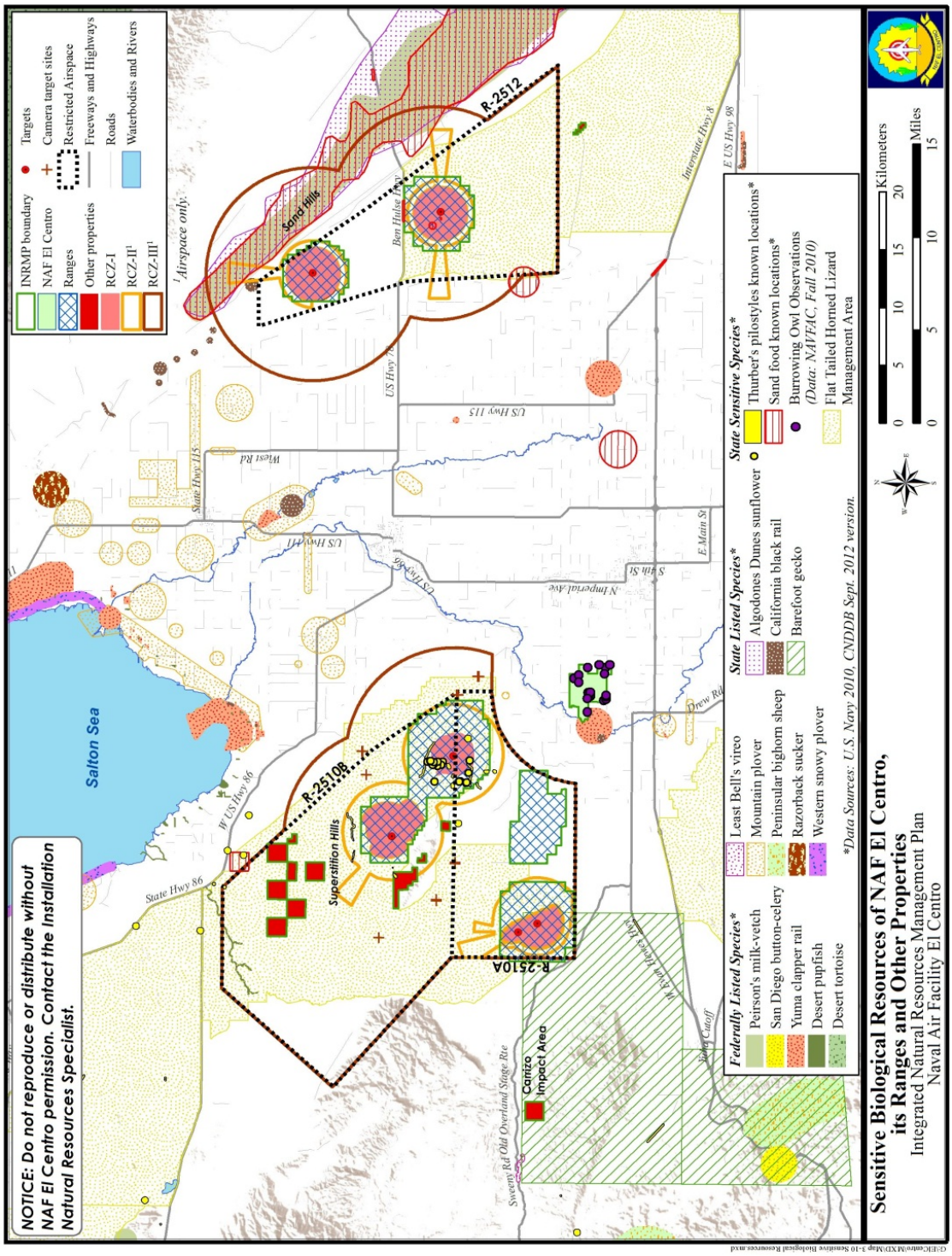
Other plants that occur in very low numbers or seem innocuous for years may expand their range dramatically and become a difficult pest under the right environmental conditions. These conditions might include a year with very late rains or a flood that results in heavy sedimentation of drainages in the case of riparian weeds.

Because “noxious” plants, under the Noxious Weed Control Act, generally refer to agricultural weeds, NAFEC includes the maintenance of these plants within their agricultural leases. Lessees must mechanically or chemically control for noxious weeds in and adjacent to the leased parcels, even when the fields are fallow.

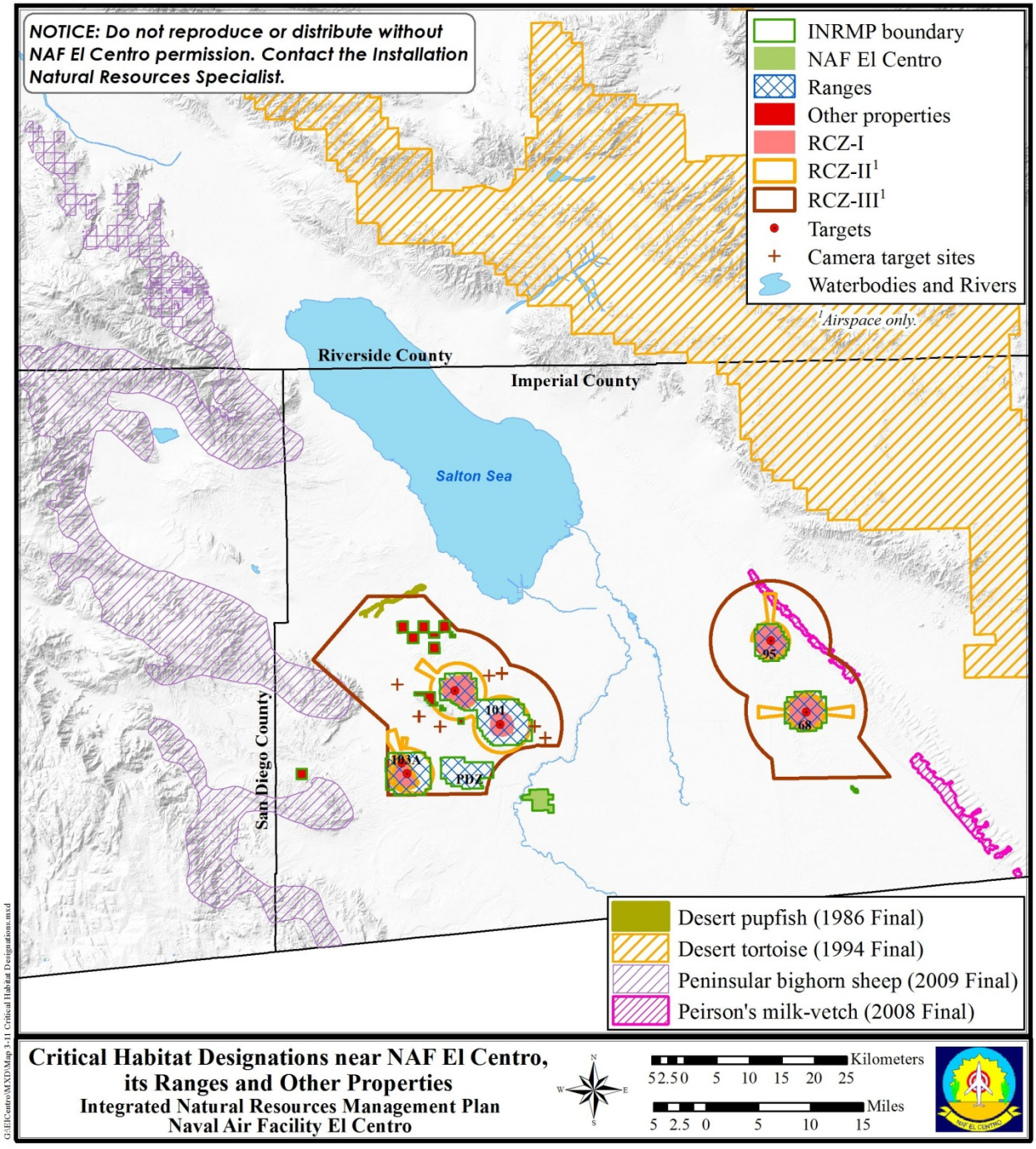
Tamarisk is a rhizomatous invasive plant that may occur from spotty to heavy infestations along drainages and the shores of water bodies. Tamarisk is found throughout much of central Asia, and may have been introduced into North America by the Spaniards. In the 1800s it was planted for erosion control, windbreaks, shade, and as an ornamental. It spreads by seed and by vegetative growth. An individual plant can produce 500,000 seeds per year.

Tamarisk can have devastating effects on the native habitats where it is found, including dramatically narrowing stream channels and sediment trapping, lowering water tables, increasing soil salinity and fire frequency, changing plant community composition, and causing a decline in native wildlife diversity.

Most of the tamarisk that occurred on main base NAFEC was found in the small riparian stream bed located at the northwestern corner of the facility, where numerous extremely dense stands of tamarisk were found. This dense stand has since been removed and continued monitoring has kept the area free of tamarisk. Tamarisk is established in thickets on Targets 95 and 68, possibly in the wake of a fire, and is found in Target 101. It has also been identified at the outlet of the wastewater treatment facility. Tamarisk and phragmites thickets pose management concerns as invasive species and as the precursor to BASH issues by harboring wildlife pests. Tamarisk stands next to the airfield have been known to provide cover for coyotes, which can cross runways in the airfield. Tamarisk stands and phragmites thickets may provide nesting areas for birds, which then present airstrike hazards. Other pest fauna on NAFEC include starlings (*Sturnus vulgaris),* pigeons (*Columba livia)* (both of which present BASH concerns), Eurasian doves (*Streptopelia decaocto*) and feral cats (*Felis catus*).



Map 3-10. Sensitive Biological Resources at Naval Air Facility El Centro, CA.



Map 3-11. Critical Habitat designations near Naval Air Facility El Centro, CA.

Specific Issues

- Invasive plant species are present throughout the natural habitats of NAFEC and its ranges and threaten the integrity of these communities.
- Habitats or communities are not monitored regularly to identify new occurrences of invasive species.
- Management strategies are not guided by an Invasive Species Management Plan.
- Invasive species have the potential of being transported from NAFEC to other areas.

Current Management

Invasive weed species on NAFEC are usually controlled by the BOS Contractor. Natural resource funds are also used to control invasive species, particularly tamarisk, on NAFEC and the ranges. Tamarisk is periodically cleaned up on the ranges and the airfield. Large tamarisk trees are cut with a chain saw and piled on site to serve as cover for wildlife. The seed heads are cut off and disposed of off-site to prevent seeds from propagating. Remaining stumps are treated with herbicide to prevent re-sprouting.

Assessment of Current Management

Resprouting of tamarisk on NAFEC is at a minimum due to re-treatment by the weed control contractor.

Objective: Eradicate or control the spread and introduction of invasive and noxious plant species with priority on those with the greatest potential for impacts to sensitive species or habitat degradation.

Strategy:

I. Continue to implement invasive plant control.

Actions:

A. Annually, conduct invasive plant abatement actions beginning with the highest priority species.

B. Monitor the efficacy of weed abatement actions.

C. Adhere to all applicable environmental regulations. For example, control weeds in riparian and wetland areas outside sensitive species breeding seasons in order to minimize the potential to impact nesting birds.

D. Restoration and management programs should include contingencies for removing invasive species as they appear and for implementing new control measures as they become available.

E. Continue to encourage state and county monitoring on NAFEC property for pests such as, Johnson grass, dudaim melon and creeping swinecress. These species should be monitored for by the lessee and eradicated if discovered on Navy agricultural lands.

F. Control programs should cause the least possible disturbance to indigenous species and communities and, for this reason, may be phased out over time.

II. Develop a GIS database of invasive species on the installation and its target areas. Maintain the GIS database to add new infestations or remove successfully treated sites.

III. As conditions warrant, monitor invasive and noxious weeds and those which have the potential to become so by remapping every five years.

Objective: Eradicate or control the spread and introduction of wildlife pests with priority on those with the greatest potential for impacts to sensitive species or BASH.

IV. Control wildlife pests and those which have the potential to become so.

A. Maintain control of invasive plants in proximity to the airfield.

B. Annually monitor the use of structures in proximity to the airfield by bird species and remove any nests, compliant with MBTA.

Objective: Prevent the spread of tamarisk on NAFEC and its ranges.

V. Monitor the condition and trend of tamarisk within NAFEC and the Target areas.

VI. Prevent unnecessary disturbance to native plant communities.

A. Minimize surface disturbance at target areas.

B. Monitor and control invasive plants along run-in lines and targets.

3.7.2 Pests and Disease Vectors

The DoD Pest Management Program of 2008 (DoDINST 4150.07) defines pests as arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds, and other organisms (except disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; or attack or damage real property, supplies, equipment, or vegetation.

The DoD Pest Management Program of 2008 (DoDINST 4150.07) defines disease vectors as organisms capable of transmitting the causative agent of a human disease; serving as an intermediate or reservoir host of a pathogenic organism; or producing human discomfort or injury.

Disease vectors and pest wildlife populations that are known or expected to occur at NAFEC are described below.

Mosquitoes that occur in the Imperial Valley include *Culex tarsalis*, which can transmit West Nile virus and other mosquito-borne viruses to humans.

The deer mouse (*Peromyscus maniculatus*), a native species, can be a host of hantavirus, a virus often fatal to human beings. This species is primarily responsible for an outbreak of the virus in 1993 in the southwestern United States. Deer mouse populations are widespread in the United States and may occur on NAFEC. Rodents are managed under the pest control program.

California ground squirrels (*Spermophilus beecheyi*) occur at NAFEC and can cause damage to roadways, structures, croplands, and landscaping. They can carry the bacteria that cause plague. However, the risk of the human disease in desert areas is low due in part to the lack of fleas on the squirrels.

Certain birds, such as pigeons (in the hangars and at the hazardous waste facility), starlings, sparrows Eurasian collared doves, swallows and crows, may become pests around buildings and the airfield. Removal and exclusion of birds in buildings may have to wait until after their breeding season. Methods are needed that are less likely to affect non-target animals. Bird netting can be used to discourage both sensitive and non-sensitive species from moving in. For instance, bats, swallows, and many other species breed between 15 February and 15 August, so control measures such as bird netting can be installed outside of this time period.

Current Management

Priorities and management strategies for pest control at NAFEC are outlined in the Integrated Pest Management Plan (IPMP). NAFEC last revised their IPMP in 2009.

The position of Integrated Pest Management Coordinator is housed in the NAFEC PWD. This position entails coordination of all pest control activities on the installation to ensure compliance with IPMP and other mandates. Pest control activities are managed and conducted by PWD pest control contractors, Lincoln Military Family Housing pest control contractors, and the agricultural lessee.

Assessment of Current Management

Pest species should continue to be controlled in developed facilities.

Objective: Control vertebrate species that pose a nuisance or potential health hazard.

Strategy:

I. Assess the need for vertebrate pest control.

Actions:

A. Identify the species causing damage and assess the damage.

B. Define criteria for conditions under which control measures should be implemented (health and safety, nuisance, economic damage).

C. Where feasible, provide alternative habitats for bats.

D. Ensure consistency with the existing IPMP for NAFEC policies.

II. Develop management of invasive species control.

A. Using the above assessment, develop a vertebrate management strategy that effectively prevents or minimizes the damage caused by the pest while minimizing the impact on non-target species. The strategy should take into consideration the periods in which the pest and non-target species are present.

B. Use Integrated Pest Management to control pests by using non-chemical control methods first and, if pesticides must be used, use low toxicity chemicals and formulations and apply protective measures (e.g. rodent bait-stations) to prevent impact on non-target species and increase human safety.

C. Develop a strategy for controlling vertebrate pests which avoids permit requirements.

D. Provide species-specific control strategies.

1. Mammals

a. Determine if coyotes on the airfield continue to be an occasional BASH problem and determine reason for attractiveness of the airfield.

b. Bat management:

i. All building and renovation projects should be preceded by an inspection to ensure no bats are roosting, to avoid unnecessary killing of the bats.
ii. Follow general guidelines for removal or exclusion from buildings. No exclusion can begin during the maternity period (May–August) or during winter hibernation.
iii. Use information and education as a management technique.
iv. Experiment with alternate roosts or bat houses to assist the bats in survival without interfering with humans.

2. Birds (pigeons [rock doves], barn and cliff swallows, starlings, and house sparrows).

a. Collect information on areas which have specific conflicts with nesting birds preferably in the non-breeding season.

i. Determine which species use these areas and establish remedies for each situation on an annual basis.
ii. To prevent establishment of habitual use by pigeons in undesirable locations (hangars and buildings at hazardous waste facilities) apply Nixalite®, tactile repellents, exclusion netting, or other management strategies.
iii. To control swallows during the building phase, destroy nests while birds are constructing them. Install exclusionary netting or screening with holes less than one-half inch and strip gaps in doors.

b. New areas of use should be identified during the breeding season, and be monitored by users. Nests being constructed in conflict areas should be destroyed.

i. Unless dealing with pest species, areas where nests have eggs and young are not to be disturbed unless they are an MBTA exempt species or necessary permits are obtained; make a note to Public Works for evaluation for next non-breeding season remedies.

c. Bird conflicts that are not excluded from MBTA should be evaluated to determine proper permit requirements and the most appropriate exclusionary procedures.

3.8 Wildlife Damage Prevention and Control

3.8.1 Bird/Animal Aircraft Strike Hazard Program

Bird/Animal Aircraft Strike Hazard (BASH) plans are necessary for military installations where there is a potential for a conflict between military activity and wildlife. Usually BASH plans contain installation specific guidelines to minimize collisions between aircraft and birds or other animals.

Bird aircraft hazards vary by season, altitude, temperature, rainfall patterns, and surrounding land use. Flocking species are the most problematic. Different tactics are needed for each kind of species and generally for waterfowl flyways, migrating passerines, and local bird movements as described in the BASH Plan for NAFEC (DoN, SWDIV 2000). Because of their vulnerability to bird collisions, a Bird Avoidance Model (BAM) was developed for use by military aircraft at NAFEC. Likely and known bird movement predicted by the BAM is used to alert pilots and airfield operations to potential hazards, allowing them to plan aircraft activity accordingly.

In 2002, a BAM was developed for NAFEC by biologists from Utah State University to provide those involved in aircraft operations on the Installation (pilots, schedulers, air traffic controllers, and Air Safety Operations) with data on predicted movements of birds that pose potential hazards for airstrikes (Zakrajsek and Bissonette 2002). The BAM can also inform airfield managers when bird control measures should be taken. Daily and seasonal migrations of birds, the elevations of the flight patterns, and species are all available in the BAM data, reports of which can be generated daily. Although it is not possible to state how many bird-aircraft strikes have been prevented using the BAM, its use should be continued to reduce or prevent these collisions.

The Air Operations Department shall be responsible for writing, revising, and implementing the BASH Plan for NAFEC. In June 2012, the Air Safety Operations finalized the BASH Plan using the 2010 CNIC BASH Manual (T. Turner, *pers. comm.* 2011). While the BASH manual provided thorough guidance on devising BASH operations for an Installation, it did not include Installation-specific standard operating procedures (SOPs) or concerns. Installation-specific elements of the 2000 BASH Plan for NAFEC were incorporated into the 2012 update.

Current Navy guidelines dictate that visiting squadrons at NAFEC report any BASH collisions to the Navy Safety Center. Implementation of the BASH Plan should include more coordination between bird/animal strikes and NAFEC Operations, as well as coordination amongst NAFEC departments.

Specific Issues

- Lack of coordination between NAFEC Operations and other departments hinder efficient management of BASH data and ultimately hinder actions to manage hazards.

Current Management

The NAFEC BASH Program is designed to minimize bird hazards and to provide increased levels of safety during the critical phases of flight. NAFEC Instruction 5090.10C dated 11 June 2012 implemented the current BASH Plan (Appendix J). This plan establishes specific procedures to reduce known and future bird hazards, as well as roles and responsibilities. The BASH Plan also establishes a Bird Hazard Working Group to implement and monitor NAFEC's BASH Plan and allows stakeholders the opportunity to meet and discuss issues and solutions. The Aviation Safety Officer is the Chair of the Working Group. Active participation by Air Operations and the Environmental Division is crucial to ensuring success of the program. The Commanding Officer is responsible for the BASH Program and is the approving authority for all Working Group recommendations. The BASH Plan is reviewed and updated biannually by the Operations Officer.

Assessment of Current Management

The BASH Plan for NAFEC complies with DoD and Navy directives, and is implemented through NAFEC Instruction (NAFEC Instruction 5090.10C). Improved and systematic monitoring of BASH species would be beneficial in assessing and tracking daily and seasonal strike hazards. The NAFEC

Environmental Division and Air Operations will continue to manage BASH potential in accordance with the updated BASH plan.

Objective: Reduce the potential for bird and other animal collisions with aircraft.

Strategy:

I. Adapt the principles of reducing bird aircraft hazards to the local ecology and operational requirements at NAFEC and target areas.

Actions:

A. Determine which agricultural areas pose the greatest risk to aircraft safety. Determine if certain types of crops or certain agricultural practices provide more of an attractant to birds.

B. Determine which NAFEC activities or landscapes pose a risk to aircraft safety.

C. Disperse birds in the vicinity of the airfield that pose an aviation hazard and serve as an attractant to other birds.

D. Adjust aviation activities during critical periods.

E. Improve detection, documentation, and reporting of bird/animal collisions with aircraft.

F. Enhance awareness of bird aircraft strike hazards during critical periods.

G. Improve coordination of bird aircraft strike information for El Centro regionally and nationally.

H. Support research that will enhance safety of pilots with respect to bird aircraft strikes.

3.9 Data Integration, Access, and Reporting

Natural resource information management is complex, because ecosystems and spatial data are complex. Computers have greatly enhanced access to land-based information. In particular, GIS and image interpretation software help in the efficiency and effectiveness of environmental analysis and review. Compiling planning and natural resources data into a single, accessible system provides a critical natural resources management tool, enabling managers to identify resources, conflicts, opportunities, and facilitating natural resources decision-making management.

Specific Issues

- GIS maps and shapefiles may not have appropriate metadata that identifies who, when, and for what purposes the data were collected.

- Natural resource management decisions could be misguided if there are information gaps in the natural resources database, or if the database is not kept current.

Current Management

NAFEC has used an EMS program to track natural resources. NAFEC's EMS is a conformance requirement for the Navy's environmental program and contributes to standardized methods for data integration, access, and reporting.

GIS and data management for INRMP updates and revisions are supported on the regional level (Navy Region Southwest, San Diego) by maintenance of a central database for all GIS files and associated plans and reports, for each installation.

Assessment of Current Management

The intent of the EMS data management program at NAFEC is to provide a central clearinghouse of resource-related data that is continually systematically updated and organized. Proper use and management of the EMS will ensure resource managers, base planners, other base personnel, appropriate base contractors, and outside agencies have access to the latest information on natural resources at NAFEC so these resources are properly protected according to the INRMP.

Data collected for future additions to the GIS database for NAFEC should be compatible with the GIS software and coordinate systems, and compatible for use on Windows based computers.

Metadata for the GIS overlays at NAFEC currently do not exist. Annotation of all GIS overlays with Federal Geographic Data Committee metadata using a predefined metadata template is recommended. The National Biological Information Infrastructure (NBII) biological metadata standard should be used for describing biological data (NBII MetaMaker Version 2.20). Development of a Metadata Dictionary for all of the data developed for the GIS database at NAFEC is also recommended.

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.

Strategy:

I. Seek standardization of the approach to communicate research and monitoring results.

Actions:

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

II. Coordinate the integration of natural resource information with mission-related planning.

A. Use installation master plans to integrate natural resources management objectives with mission activities and facilities development on Department of the Navy lands.

B. Write a policy for the sharing of NAFEC's land use data. Control the dissemination of GIS data. Develop provisions and policies for sharing appropriate natural resource information with federal and state agencies, non-governmental organizations, researchers, and the general public (DoD 1996).

III. Continue to develop and maintain NAFEC's data management capabilities.

4.0 Sustainability and Compatible Use at Naval Air Facility El Centro

Sustainability takes a long-term view of natural resources stewardship, Navy mission accomplishment, social responsibility, and economic prosperity into the future. For this INRMP, the topic of sustainability encompasses:

- Sustainability of the Navy mission at NAFEC with respect to how natural resources support this mission.
- Resource-specific best practices, consistent with the Navy's EMS for the use of renewable and non-renewable resources and how pollution and wastes are prevented and processed. The practices may address energy, water, water quality, air quality, greenhouse gas management, reducing natural and human threats, and securing habitat for special status and indicator species. This topic is more fully developed in specific INRMP sections.
- Preparing for climate change and regional growth.
- Using resources in the built environment.

4.1 Integrated Military Mission and Sustainable Land Use

A successfully implemented INRMP will meet two basic purposes:

1. It will ensure the sustainability of all natural resources at an installation, and,

2. It will ensure no net loss of the capability of installation lands to support the DoD mission into perpetuity.

These two purposes are closely related and not mutually exclusive. Healthy ecosystems support realistic military training and testing needs by providing large open space, buffers, stable soils, clear air, clean water, and a range of natural conditions available for the indefinite future.

Disturbances that characterize NAFEC include:

- Facilities
- Roads
- Targets and ranges
- Historic waste sites
- Agricultural fields

To facilitate sustainable land use decisions during operations planning and review, opportunities and constraints in NAFEC have been identified and mapped, as required in the INRMP Template (DoD 2010). Maps 2-2a and 2-2b are constraints map which show locations of sensitive resources and regulatory limitations on land use. This map is intended to show all areas on the installation where restrictions on training or mission occur due to natural resources-related issues such as wetlands or listed species.

Map 2-3 is an opportunities map, the opposite of a constraints map. These show areas where there are little to no restrictions on the mission. These maps also illustrate potential encroachment partnering areas.

Specific Issues

- Management units could be defined that would allow for analyzing sustainability at a finer scale than all of the base and its surrounding waters at once.

- Sustainability in siting and resource use is only beginning to be considered a metric of successful project design.

Current Management

Sustainable land use and the protection and enhancement of the remaining habitats on base, are mutually compatible. To date, sustainability has been applied in military installations somewhat narrowly to the built environment and focused mostly on energy and recycling. It is beginning to be applied to stormwater management such as with low impact development (LID) approaches, and to ecological sustainability of habitats, species, and ecological functions.

Future land use planning at NAFEC incorporates sustainability concepts with its emphasis on confining facility renovations in existing footprints. This practice also has an economic benefit, as using existing facility sites enables the re-use of existing instrumentation and infrastructure and avoids economic and environmental costs associated with establishing new areas. There is always the possibility of a change in mission which could lead to a degradation or development of natural resource areas.

Sometimes the natural resources staff provides on-site monitoring of a military operation to ensure environmental compliance. The NEPA process is further addressed in Section 4.6, Regulatory Compliance.

Each year the CO of NAFEC must answer, as part of the INRMP metrics review, questions on how the INRMP supports the installation mission. For the 2013 INRMP metrics review, the CO was asked to respond to the following questions:

- The natural resources program effectively considers current mission requirements?

- What is the level of coordination between natural resources personnel and other installation departments and military staff?

- To what extent has the INRMP successfully supported other mission areas? (e.g. encroachment, BASH, range support, port operations, air operations, facilities management, etc.)

- To what extent has there been a net loss of training lands or mission-related operational/training activities?

Assessment of Current Management

The Sikes Act (as amended) guidance indicates the need to focus on improving the ties between natural resource management and military readiness. While the “no net loss” policy of the Sikes Act and DoD guidance is broadly accomplished by the Range Complex Management Plan and Environmental Impact Statement (EIS), there remain unfulfilled opportunities to facilitate the connection between natural

resources and the mission. More locally specific planning criteria could be used for site selection criteria such as using landform, soil recoverability, plant community condition and sensitivity, and considering the timing and intensity of use.

Objective: Achieve no net loss of military mission by aligning current and future land and water use (location, extent, timing, and intensity) with environmental value protection.

Strategy:

I. Develop management units or areas to facilitate planning of priorities and reconcile conflicts, to ensure sustainability of the military mission and natural resources.

II. Maintain and enhance existing land uses to support training and mission-support capabilities through coordinating of all facilities siting, relocation, expansion, or change in use by the use of a site approval process.

III. The placement of continuing and evolving military land uses, to the extent practicable, should be in previously disturbed areas to fully use existing operational areas and minimize potential effects to sensitive resources.

IV. Ensure compliance with statutes and regulations to protect sensitive natural resources, to maintain environmental quality and to exercise responsible stewardship of public lands.

V. Maintain and enhance coordination and cooperation with neighboring communities, agencies, and organizations to ensure compatibility of base natural resource uses with the Navy's mission.

VI. Provide reasonable accommodation of compatible nonmilitary land use to the extent practicable.

VII. Maintain healthy and intact habitats that self-recover from disturbance, using principles of ecosystem management and sustainability to balance short-term projects with long-term goals.

Actions:

A. Ensure water quality improvement and protection measures are fully implemented, which will contribute to overall ecosystem health.

B. Align infrastructure to contribute to the military mission, concentrating it in operations areas, and integrating it with the environment with proper siting and sustainability practices.

C. Use criteria in each natural habitat area to define the resilience of the area to various types of use or disturbance patterns to set restoration priorities.

VIII. Address long-term threats to the stability of the natural environment including but not limited to soil erosion, invasive species, climate change, and habitat fragmentation.

A. Assess the hydrology of the base and existing condition of natural areas, for

opportunities to create or enhance natural area buffers, to allow for shifts in habitats and percolation, storage, or drainage of flood waters.

B. Avoid the addition of hardscape. Continue to develop in existing footprints and use LID concepts in all facility renovations.

C. Avoid and minimize road or traffic characteristics that promote plant invasions, or result in significant habitat fragmentation for animals.

IX. Continue to use NEPA documentation, including cumulative effects analysis, to guide specific projects and document choices.

X. Ensure the CO's preparedness to answer as part of the INRMP metrics review, the questions identified above, in Current Management.

4.2 Sustainability in the Built Environment

Sustainable development practices produce highly efficient and cost effective buildings that reduce the use of natural resources such as water and oil, decrease pollution, and provide a healthier indoor environment. This type of development takes into account the full life cycle cost of a project, including broader concerns such as its effect on the environment and the community, not just the financial cost.

In support of promoting sustainability in the built environment, the National Institute of Building Sciences, in collaboration with federal agencies, private sector companies, non-profit organizations and educational institutions, developed a set of sustainability principles and design guidelines set forth in the Whole Building Design Guide (WBDG 2011). To evaluate objectively, whether a building project meets the definition of "sustainable," in 1994 the U.S. Green Building Council (USGBC) developed the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. The LEED program is one of several ratings systems for energy performance. It includes a checklist of various "green" options for building design and construction, developed through a consensus by a consortium of industry groups. It evaluates environmental performance from a "whole building" perspective over a building's life-cycle, providing a definitive standard for what constitutes a "green building." The LEED rating system's six credit areas for new construction are:

- Sustainable Sites (includes site selection, site resource protection, landscaping, and stormwater management);
- Water Efficiency (water efficient landscaping, water conservation, and innovative technologies);
- Energy and Atmosphere;
- Materials and Resources;
- Indoor Environmental Quality; and
- Innovation and Design Process (includes exceptional performance beyond the LEED requirements).

For sustainable water management, the EPA developed several documents that include a literature review, concepts, case studies, and guidance in LID, that are becoming requirements in some stormwater permits.

On 20 January 2005, the State Water Resources Control Board adopted sustainability as a core value for all California Water Boards' activities and programs, and directed California Water Boards' staff to consider sustainability in all future policies, guidelines, and regulatory actions. Additional information on EPA guidance for LID can be found at www.epa.gov/owow/nps/lid/.

While standards exist for sustainable structures—"green buildings" and "water management"— there are no comprehensive guidelines and performance benchmarks for those who want to create and measure sustainable landscapes in the built environment (SSI 2010). The Sustainable Sites Initiative (SSI) is an interdisciplinary effort by the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center at the University of Texas at Austin, and the U.S. Botanic Garden to create voluntary national guidelines and performance benchmarks for sustainable land design, construction, and maintenance practices (SSI 2010). For more information refer to www.sustainablesites.org

Specific Issues

- The true long-term cost of choices is not as visible to leadership as it could be because natural resources assets are not assigned a value, and thresholds or tipping-points of change in their value are not known.

- There is a need, for those involved in executing development projects, for education about costs and technologies to understand the difference in environmental approaches and choices. This uncertainty hampers the adoption of more projects that meet sustainability criteria.

Current Management

EO 13423 "Strengthening Federal Environmental, Energy and Transportation Management" (January 2007) directs the federal government to conduct their environmental, transportation, and energy-related activities in an environmentally, economically, and fiscally sound and sustainable manner.

In the Navy, the first requirement of facilities is mission support; however, as stated in NAVFACINST 11010.45, "Sustainable development is required by law and policy, and is a requirement for the Navy" up to and including completion of project documentation (DD Form 1391). The Navy's goal is to exceed the LEED "certified" level where justified by life cycle costs (NAVFACINST 11010.45). The Navy uses LEED as a tool in applying sustainable development principles and as a metric to measure the sustainability achieved.

The Navy was the first federal agency to participate in the LEED program. The Navy continues to pursue sustainable development in its facilities requiring all applicable projects to meet the LEED Certified level, unless there are justifiable conditions that limit accomplishment of the LEED credits necessary. With the USGBC, the Navy supports development of the LEED for Homes Committee. Submission to the USGBC for certification is recommended for high visibility and to showcase projects.

Much sustainability planning in the Navy occurs in the Regional Shore Infrastructure Plan (RSIP) process, because this is the tool where facility needs are evaluated, and siting options are examined. One of the stated Navy goals of the RSIP process is (as stated in NAVFACINST11010.45): "Recognizing the environmental association of all planning recommendations and providing ecologically sustainable solutions that support and enhance the regional shore establishment." Properly following the RSIP process means that a planner is already taking a longer-term approach (NAVFACINST 11010.45).

NAVFACINST 11010.45 adds the LEED and National Governors Association (NGA) New Community Design checklist requirement to the RSIP process.

Assessment of Current Management

Across nearly all sectors of environmental concern, there is unfulfilled potential to conduct operations in a more sustainable manner. In addition, there are few projects that meet criteria as sustainable. Information sharing among agency practitioners with the work of professional societies in a range of resource areas is only beginning. LEED is well integrated into agency work due to the application of EO 13423.

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 LID approved permeable surfaces and bioswales reduces storm-water runoff and reduces contaminants of concern in stormwater runoff. Bioengineering techniques can promote favored wildlife while excluding undesirable species, such as rats. It is less expensive to design to prevent such impacts rather than to fix them after the fact.

Sustainability indicators for specific resources, such as water, energy, wildlife, etc., are undergoing research and scrutiny for criteria and selection of the best indicators of sustainability. Resource indicators are developed through the expert opinions of scientists, management agency personnel, non-governmental organization representatives, practitioners, and other stakeholders. A suite of variables, when complemented with other sustainability indicators, produce a viable system to monitor at the national level the biophysical, social, and economic characteristics indicating trends of sustainability. There is a need to develop local indicators that tier off these.

The following objective and strategies are designed to improve sustainability of both development projects and natural habitats. Many are adapted from EO 13423.

Objective: Sustain natural resources and the Navy institutional mission by enabling innovation in planning, design, project management, and implementation for development projects affecting the built environment.

Strategy:

I. Ensure Navy leadership has visibility with respect to the total cost of mission sustainment, day-to-day operations, infrastructure and building development, and redevelopment. This should incorporate climate change scenarios and the projected value of the loss of habitat associated with action decisions.

II. Apply sustainability principles to the management of habitats, species, and ecological functions on NAFEC by identifying resource-specific BMPs similar to what has been done for energy and water in the built environment using LEED, LID, and SSI approaches.

Actions:

A. Continue to comply with EO 13423.

B. Use construction siting, materials, and methods that promote biotic communities to the fullest extent possible.

4.3 Facility Infrastructure

The following section describes construction and facility and utilities maintenance as well as landscaping and grounds maintenance.

4.3.1 Construction, Facility, and Utilities Maintenance

Specific Issues

- Construction and facility maintenance projects may result in the incidental take of avifauna, such as bird nests, and direct mortality of less mobile species such as small mammals and herpetiles.

- Construction and facility maintenance projects may result in the introduction or spread of terrestrial invasive exotic plant species that may be transported in materials or on equipment.

Current Management

By EO, the President has directed that federal agencies shall design, use, or promote construction practices that minimize adverse effects on the natural habitat where cost-effective and to the extent practicable (EO 13112). Several other laws are pertinent: CWA, CAA, ESA, MBTA, NEPA, and Soil Conservation Act.

The NAFEC Activity Overview Plan is designed to help ensure that NAFEC's mission is executed effectively and efficiently through optimal use of existing facilities and well-planned development of future facilities.

Assessment of Current Management

The planning actions of demolition and consolidation stated in the NAFEC Activity Overview Plan, are adequate to avoid and minimize potential impacts to natural resources from construction and facility maintenance and upgrades. Potential exists however, for activities to disrupt nesting birds, or contribute to soil erosion. BMPs and processes by which to avoid bird disturbance and soil erosion are further addressed in Section 3.6.2.4, Birds; Section 3.3.4.1, Surface and Stormwater Management; and Section 3.3.3, Soil Resources.

Objective: Conduct construction and facility maintenance in a way that allows for protection of sensitive environmental resources while ensuring accomplishment of the military mission.

Strategy:

I. Consider developing use of a Site Approval and Project Review process to avoid and minimize potential impacts to native habitats and species.

II. Ensure impacts to migratory birds are avoided during project implementation.

Actions:

A. The MBTA requires that federal agencies coordinate with USFWS if a construction or site activity would result in the "take" of a migratory bird. In this case, coordination with USFWS and the NAFEC ED should occur, and applicable permits obtained prior to

construction or clearing activities. If construction or clearing activities are scheduled during nesting season (March 15 through September 15), NAFEC ED should be consulted to conduct surveys to identify potential active nests

B. If possible, schedule all building demolition to occur during the non-nesting season to avoid possible delays or accidental take of migratory birds.

III. Ensure water resources are protected.

4.3.2 Landscaping and Grounds Maintenance

The main urbanized area of NAFEC consists of residential, industrial, community service, administrative, and recreation uses. This area contains various landscaping improvements. Landscaped areas on base are "improved" areas that include family housing lawns, a community park, a baseball field, xericape areas around administrative buildings, and other small areas. Many introduced and native species have been used for landscaping in the improved areas, and include varieties of desert trees and shrubs in the xeriscape areas, palm trees, lawn grasses, and other evergreen shrubs.

In El Centro's harsh, arid environment, utilizing native and other drought-tolerant plants, coupled with improved irrigation design, will result in reduced water use as well as significant water cost savings. Landscaping can also reduce glare, buffer noise, improve visual aesthetics, create wind buffers, and provide for heat control in recreation areas and around buildings, reducing energy consumption and energy costs.

Dust control and air quality maintenance are particularly important functions of a sound landscaping plan. A "no dirt" policy would go far to reduce exposure of soil to wind erosion. Consideration should be given to covering large bare areas with drought/salt/wind tolerant ground cover or rocks/gravel.

Native landscaping installed around Building 504 adheres to current landscape guidelines. Source: RECON

General landscaping and planting guidelines and lists of recommended drought-tolerant and xeric (native) plants are contained in NAFEC's Smart Landscape Master Plan (SLMP) (2008). The approved landscaping plant list is in Appendix K. As indicated in the NAFEC Water Conservation Guide (Fauth and Smith 1996), replacing turf with native and drought tolerant plants in combination with rocks or gravel over bare areas will save large amounts of water, can be done in a very aesthetically pleasing manner, and can equal turf in terms of dust control.

NAFEC has some difficult soil problems to overcome for successful landscaping. Use of drought-tolerant natives will abate some of them, but the soil may need to be amended to enhance percolation or to overcome salinity, sodium, or other water quality problems.

Landscaping at NAFEC should allow for salt-tolerant and drought-tolerant plants, natives, special function selections for windbreaks, shade in parking and recreation areas, visual screens (near main runway), critical area planting, and phased implementation. Landscaping should also allow for no bird or bat attractants near the airfield. However, other pollinators, such as butterflies and moths, should be

encouraged in developed areas, both to provide habitat for pollinators and to provide a corridor link with the surrounding agriculture areas. While the landscaping plans for the installation include approved plant lists, many beneficial practices to attract pollinators are not included. A list of appropriate native plants that attract such pollinators can be found in Appendix K. In addition, the landscape plan should be amended to attract pollinators to the Installation.

Specific Issues

- NAFEC has some difficult soil problems to overcome for successful landscaping.
- Dust control and air quality maintenance are particularly important functions of a sound landscaping plan.
- Habitat for pollinators should be encouraged in developed areas.
- Drought-tolerant and xeric (native) plants are recommended in general landscaping and planting guidelines, however, some areas continue to utilize introduced plant species.

Current Management

Maintenance of semi-developed and developed grounds is accomplished at NAFEC by the BOS Contractor with technical assistance from staff in NAFEC ED. Landscaping and grounds keeping work occurs primarily in the Community Support, Housing, and Administrative land use areas at NAFEC.

Future landscaping at NAFEC should follow the guidance set forth in the NAFEC Smart Landscape Master Plan and Approved Plant List (2008). The purpose of the list is to provide a clear set of approved landscaping plants that are known to not be invasive in the El Centro region. The NAFEC Approved Landscaping Plant List is in Appendix K and also includes plants that are prohibited from use under any circumstances. All landscape designs and plant lists shall be reviewed and approved by NAFEC ED in the planning stages of project design.

The NAFEC Smart Landscape Master Plan focuses on resource conservation through creative and appropriate landscape design and management. The plan is designed to reduce the consumption of all resources including irrigation water, labor, materials (fuel, pesticides and fertilizers) and the transportation and disposal of green waste (clippings and prunings). The fundamentals of smart landscaping can be summarized in seven steps—planning and design, low water use plants, limited turf areas, efficient irrigation, soil improvement, mulches, and sound maintenance (SMLP 2008).

Assessment of Current Management

Use of the NAFEC Smart Landscape Master Plan and its Approved Plant List satisfies compliance with EOs and Navy policy. The guidelines provided in the NAFEC Smart Landscape Master Plan should be updated as needed when changes occur to the goals and strategies of the water conservation efforts under the Stormwater Pollution Prevention Plan.

The vegetative structure of landscaped areas is particularly important to wildlife and must be considered when maintaining these landscaped areas or when developing new landscaping for the base. Native plants require less irrigation and maintenance than ornamental species, and are the preferred food resource for native pollinators and birds. Exotic ornamentals have the potential to escape and spread into natural areas, which then require costs for removal.

Coordination must occur with NAFEC ED in the early phases of planning to determine site specific needs and constraints. Other species may be used for landscaping but must be approved by NAFEC ED prior to producing site plans or scopes of work. These species must be screened through regional invasive plant lists. The plant list may be updated periodically, due to additions or changes to regional invasive species lists. Prior to initiating a project, the most recent list should be obtained from NAFEC ED.

Objective: Sustainably improve the visual and aesthetic environment of NAFEC, while maintaining the integrity and character of natural resources.

Strategy:

I. Use landscaping to moderate environmental influences (e.g. solar heat gain, glare, dust, and wind), mitigate human activities (e.g. noise and construction), unify exterior spaces, and enhance formal/ceremonial activities.

Actions:

A. Use trees and shrubs to block undesirable views, noise, and lights and to provide privacy.

B. Plant deciduous trees for solar insulation/winter heat-gain screening at buildings.

II. Reduce energy consumption through creativity and planning.

A. Minimize water use, maintenance, and fertilizers wherever possible through efficient irrigation systems, drought-tolerant plants, appropriate plant use, and effective plant establishment techniques. Conduct an irrigation system evaluation to determine water use efficiency on landscaped, irrigated plantings.

B. Plant drought-tolerant plants from late fall to early spring. Revegetate all disturbed slopes in landscaped areas with effective erosion control plants wherever soils are exposed.

III. Incorporate water-conserving irrigation practices in landscapes, while controlling salt load in the soil profile. Adopt water-conserving operation and maintenance procedures, retrofits and sprinkler system replacements as suggested in the *Water Conservation Guide* (Fauth and Smith 1996).

A. Determine when sufficient irrigation has occurred on turf by estimating the water application rate per hour.

B. Designate lawn irrigation hours.

C. Discourage sprinkler runoff onto streets and sidewalks.

D. Reduce areas in turf and non-native plants with invasive potential and replace with drought-tolerant shrubs, trees and herbaceous perennials.

E. Amend the soil to improve water retention, drainage, and aeration.

F. Provide weed control by using mulches to reduce evapotranspiration and control weeds. Apply herbicides on an as-needed basis only.

G. Reduce the exposure of soil to erosion and resulting atmospheric dust, and reduce albedo (reflectance) around the NAFEC living environment.

H. Shade parking areas and bike racks.

I. Provide wind breaks to mitigate dust and wind.

J. Amend or reclaim excessively compacted, heavy, saline or sodic soils.

IV. Set BMP standards for landscape plant care and maintenance.

A. Use plants from small containers for landscaping and revegetation.

B. Consult with the local Farm Advisor, U.S. Department of Agriculture (USDA) County Agent, or local landscape contractors and nurseries about soil amendments needed for poor planting soils.

V. Utilize the Smart Landscape Master Plan for NAFEC (2008).

A. Incorporate into the landscaping plan practices and designs to attract pollinators.

B. Add pollinator-friendly plants to the approved plant list.

VI. Encourage employee and resident involvement in the program.

4.4 Environmental Awareness

Specific Issues

- Communication about the natural resources of NAFEC, environmental regulations, and protocols for situations where wildlife is trapped or injured, or birds are nesting or roosting in unwanted areas, may not be effectively conveyed.

Current Management

The Sikes Act (as amended) requires each military service to support environmental education for personnel and for the public where and when it is compatible with military safety and security needs.

The nature of military service entails a degree of transience in the resident population. Communicating the ways in which natural resources improve quality of life to residents can enhance pride and a feeling of ownership even for those residing at NAFEC temporarily. Appreciation of the links between human land use and the native environment leads to a caring and responsible attitude toward the ecosystem. The Navy has interesting and sensitive resources under its stewardship in the El Centro area, including the FTHL and exceptional populations of migratory birds. These may be highlighted for new and long-term personnel.

Conservation awareness on NAFEC is implemented by multiple basewide environmental programs. The conservation effort on site will continue to expand as this INRMP and subsequent natural resource management programs are undertaken to ensure efficient and thorough management of the natural resources on base. Conservation efforts at NAFEC address energy, water resources, recycling, pollution prevention, and public outreach and education.

Assessment of Current Management

The indoctrination program should continue to instruct personnel on NAFEC natural resources, and protocols for responding to issues such as trapped or injured wildlife, and nesting birds on facilities. Applicable goals and directives of this INRMP should be communicated to new staff in indoctrination materials, and through personnel training programs.

Objective: Increase natural resources outreach to military and civilian staff and contractors.

Strategy:

I. Identify the types of information and conservation practices for the indoctrination program to military personnel and new staff.

Actions:

A. Provide clear, concise instructions on environmental precautions and restrictions to be used by personnel.

II. Develop a multimedia educational program in support of the program objective.

A. Support a natural resource orientation program for new personnel. Create a video or digital versatile/video disc (DVD) for distribution for new personnel and use at meetings and conferences. The video/DVD should feature interesting interpretive features and instructions on proper ways to enjoy and protect natural and cultural resources.

B. Create a slide show (e.g. Powerpoint) containing similar information regarding interpretive features for gatherings where video capability is unavailable.

C. Educate personnel about resources to support land management goals by way of classes, workshops, displays in communal areas, literature, and signs. Write regular articles for the NAFEC newsletter.

III. Evaluate the effectiveness of the strategies adopted and adapt them as necessary.

4.5 Other Land Uses

This section describes other land uses on NAFEC.

4.5.1 Leases and Real Estate Outgrants

Specific Issues

- Stormwater runoff from paved surfaces in leased areas could be negatively impacted if appropriate SWPPP BMPs are not in place.

- Activities of lessees have potential to affect natural resources.

Current Management

Any project that may disturb the soil should go through the Site Approval and Project Review process in order to receive a site approval from local and regional Navy. As necessary, BMPs are required of the project to protect soil integrity and water quality. This project screening process will be a streamlined means for project sponsors to comply with NEPA, and the laws, regulations and guidelines described above. The agriculture outlease program is outlined in Sections 2.3.2 and 3.5.1.5.

Assessment of Current Management

The Site Approval and Project Review process would adequately ensure that base improvement projects and activities conducted by lessees satisfy all environmental regulations. Potential exists however, for lessees to be unaware of the various land use protocols outlined in this INRMP.

Objective: Ensure that all activities of lessees are in accordance with federal environmental regulations, EOs, and guidance outlined in this INRMP.

Strategy:

I. Begin to use the Site Approval and Project Review process to avoid and minimize potential impacts, and project timing is scheduled to avoid conflicts with sensitive natural resources.

Actions:

A. Ensure project plans are in accordance with the principles and guidance stated in this INRMP.

B. Support enforcement of implementation of BMPs as required by permits, regulatory authorities.

II. Ensure that protocols for responding to trapped or injured wildlife are communicated to lessees, as outlined in Section 4.4, Environmental Awareness.

III. Ensure landscaping activities of lessees is in line with the objectives and strategies stated in Section 4.3.2, Landscaping and Grounds Maintenance.

4.5.2 Outdoor Recreation and Public Access

The Sikes Act (as amended), DoDINST 4715.03, and OPNAVM-5090.1, Chapter 12 requires that a multiple-use resource management plan (an INRMP) be prepared for each naval installation having land or water areas suitable for conservation and management of natural resources. It is the responsibility of the Navy to provide outdoor recreation and interpretive programs on its lands to the maximum extent practicable. These programs are designed to be compatible with national defense and security requirements and must ensure multiple-use management of natural resources.

Navy policy permits ORV use in designated areas and on trails only (OPNAVM-5090.1). EO 11989—*Off-Road Vehicle on Public Lands* provides for closing off areas to use, where soil, wildlife, or other resources are adversely affected. At NAFEC, ORV use is commonly conducted by trespassing recreationists. Outdoor recreation, as defined for the purposes of the INRMP, is different than highly developed outdoor leisure facilities such as golf courses, tennis courts, athletic fields, or swimming pools (many of these resources are available at NAFEC). Outdoor recreation is the integration of recreational activities with natural resources, including indoor interpretive centers where the focus is on the understanding of the natural environment. Outdoor recreational opportunities include, but are not limited to, nature trails, guided tours, picnic and camping areas, fishing, and wildlife viewing.

Outdoor recreation associated with natural resources is limited on NAFEC and the target areas due to safety. The military mission and need for security is not compatible with public use of natural areas on

NAFEC. Morale, Welfare and Recreation manages baseball fields and indoor recreation at NAFEC for personnel.

Specific Issues

- ORV use is commonly conducted by trespassing recreationists.
- Activities associated with ORV use may disturb FTHL and other wildlife populations as well as cause habitat degradation.

Current Management

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 resources sensitivity (DoD 1996).

At NAFEC, ORV use is commonly conducted by trespassing recreationists. The ranges within West Mesa and East Mesa are off-limits to public use. R-2510 is adjacent to a frequently used ORV open area, and frequently trespassers use lands within the range despite warning signs. R-2512 also receives some ORV use, but not to the same extent (FTHL Interagency Coordinating Committee [ICC] 2003).

East Mesa targets lie near the Algodones Dunes, a heavily used ORV recreation area. However, the Coachella Irrigation Canal separates the locations, and the trespass by ORV users or metal scrappers has not been a significant problem. Both targets have danger signs posted at some distance out from the actual property perimeter to discourage trespass. Targets on West Mesa have had a historic problem with trespass from ORV users and from metal scrappers. The target areas are heavily scarred from off-road use. The PDZ has historically been used as a short cut for passage between allowable recreation areas north and south of the property.

The BLM–BUREC–U.S. Navy MOU that implements the 1996 withdrawal agreement addresses the ORV problem and requires steps to be taken by the BLM to reduce ORV trespass on R-2510 and R-2512. The MOU tasks BLM with identifying all Navy target areas as restricted access on all maps passed out to off-road recreationists. This has been accomplished on the most recent maps. The BLM has also voluntarily closed some adjacent property in order to further restrict access.

Range perimeters are currently well-posted with warning signs in English and Spanish to keep out ORV and other trespassers, per the BLM-BUREC-DON land withdrawal MOU. Posting those signs has been somewhat unsuccessful. People frequently remove the signs for the metal (J. Collins, NAFEC, *pers. comm*. 2006).

Assessment of Current Management

Off-road activity can cause habitat degradation. It damages root systems, as well as above-ground portions of plants, and causes soil displacement and soil compaction.

Bury *et al.* (1977) found that ORV use areas had significantly fewer species of vertebrates, greatly reduced abundance of individuals, and noticeably lower reptile and small mammal biomass. Breeding bird populations were also reduced. The impact to FTHL populations from ORV use is incomplete and inconclusive; however, indirect and direct impacts have been noted.

Habitat degradation indirectly affects the FTHL population. A reduction of plant cover will decrease the protection from predators and shelter from the heat and wind and may affect sand accumulation and retention (FTHL ICC 2003). Soil compaction may negatively affect FTHL burrowing activities and the population of harvester ants on which the FTHL preys. Direct mortality of FTHLs is caused by vehicular crushing, both on the ground surface and/or in collapsed burrows (FTHL ICC 2003).

Objective: Promote compatible, sustainable outdoor recreation opportunities which enhance quality of life for military personnel, while conserving natural resources, and without compromising military readiness.

Strategy:

I. Identify and evaluate suitable outdoor recreation opportunities in developed and undeveloped areas.

II. Seek strategies for compatible use, sustained yield, and overall protection of natural, cultural, and outdoor recreation resources.

III. Off-road vehicle use shall be located to protect natural resources, promote safety, and avoid conflicts with other property uses (EO 11644).

Actions:

A. Dirt roads which are identified as unnecessary by Security and Fire Departments will be officially closed, and use of these past roads would be considered off-road use.

B. Assess conditions of perimeter signage around ranges and replace as necessary to enforce ORV restricted areas.

C. Conduct outreach with BLM during publically-authorized ORV events to educate ORV users on authorized use and protected resources.

IV. Eliminate unauthorized ORV use.

A. The following areas shall not be used for off-road access except in emergencies as specified by the Watch Commander:

1. Areas restricted for reasons of safety or security.
2. Areas with fragile soils or geology, sensitive flora or fauna, or otherwise significant natural resources.
3. FTHL habitat areas.
4. Significant archaeological, paleontological, or historical resources.

B. Educate personnel about the policy restricting ORV use and the environmental damage it can cause.

C. Communicate clear criteria for when ORV use is permitted in the line of duty with maps of sensitive areas.

1. Pursuit of unauthorized persons is an activity for which ORV use by the Security Force may be permitted.

2. Establish a system to collect ORV event information with map of routes used. ORV use during emergencies will be documented by Security or the Fire Department in a formal report.

V. For areas where ORV use appears to be a repetitive occurrence by NAFEC personnel, consider constructing a road or other means to prevent environmental damage in that area.

4.5.3 Public Outreach

Specific Issues

Other than the public's use of ORV areas, there are no concerns as related to natural resources management at NAFEC.

Current Management

Public outreach occurs during special events hosted at NAFEC, such as Earth Day, where the natural resources of NAFEC are discussed.

Assessment of Current Management

The public outreach efforts that occur at special events are adequate at informing the public of the kinds of natural resources present at NAFEC, and how they are managed.

Objective: Support public outreach efforts as they relate to natural resources at NAFEC.

Strategy:

I. Identify and evaluate settings and forums which are suitable for enhancing community involvement, compatible with the military mission and security.

Actions:

A. Consider developing and hosting educational events that feature the Installation's natural resources and encourage community involvement including:

- Earth Day
- Arbor Day
- Migratory Bird Day
- Audubon Christmas Bird Count
- Pollinator Day

II. Consider developing educational materials to distribute and present at public venues, such as:

- A public brochure showcasing NAFEC's excellent stewardship of natural resources
- Materials and programs regarding the burrowing owl and flat-tailed horned lizard
- Articles in the installation newspaper (The Sand Paper)

- Conduct outreach with BLM during publically-authorized ORV events to educate ORV users on authorized use and protected resources.

III. Where appropriate, develop interpretive signs at natural resource areas.

Objective: Ensure that restricted public access is available for temporary uses, which are compatible with the military mission, natural resource responsibility, safety, and security.

IV. Establish clear, coherent policies and procedures for allowing temporary public access to NAFEC.

A. Provide access for agencies and others to conduct natural resources research to the extent it does not interfere with the military mission. Any studies or surveys must be approved by the CO.

V. Planning for public access shall consider, but not be limited to, the following topics:

A. Eligible users of installation resources and facilities, including NAFEC's method of determining user eligibility and priorities.

B. Procedures required for the public to gain access.

C. Accessible and off-limits resources, areas, and facilities.

D. Areas designated for special use, including accessible recreation opportunities for disabled veterans, disabled Americans and their families.

E. Points of access and egress.

F. Periods of access.

G. List of permitted and prohibited activities.

H. Schedule of applicable fees and charges.

I. Safety precautions and installation emergency situation responses.

J. Personal injury and property liability policy.

K. Native American access to traditional cultural sites.

L. Access agreements with agencies and organizations.

4.6 Regulatory Compliance

The INRMP is used as a tool to identify at an early stage, the potential impacts of planned Navy action on natural resources and provide a basis for altering the action to prevent or minimize those impacts.

NEPA

NEPA (Public Law 91-190, 42 U.S.C. 4321-4347 as amended) was enacted to prevent environmental damage by ensuring that federal agency decision makers give environmental factors appropriate weight before taking any discretionary actions. NEPA requires the preparation of a report that studies the effects of a proposed federal agency action and evaluates whether the action "significantly affects the quality of the human environment" (42 USC 4332). Elements of the report include an analysis of project alternatives

and analysis of cumulative effects on each resource topic. The analysis is used as a decision making tool on whether to proceed with the proposed action.

An EA was completed in October 2013 for the "El Centro Ranges" and involved analyzing the impacts of current range operations and potentially increasing operations by 10% and adding surveillance radar.

ENDANGERED SPECIES ACT

Under the ESA, federal agencies may not jeopardize the continued existence of any federally listed threatened and endangered species (TES) or cause the destruction or adverse modification of critical habitat. Currently the USFWS has not issued any biological opinions (BOs) nor has any critical habitat been designated on NAFEC. Section 7 of the ESA requires all federal agencies to enter into consultation with the USFWS or the National Marine Fisheries Service (NMFS) whenever proposed actions might affect listed TES plants and animals. Section 7 consultations will be initiated if warranted; otherwise, written documentation that there are no effects on TES will be generated by NAFEC ED and kept in project files.

CLEAN WATER ACT

Regulatory authority for Section 404 of the CWA has been delegated by the EPA to the USACE. Section 404 regulates the discharge of dredge or fill material into the Waters of the U.S. (WOUS) and adjacent wetlands. The USACE has set up the Nationwide Permit Program (NWP) to streamline the permit process for activities similar in nature and with minimal impacts. The NWP Program is re-evaluated every 5 years; NEPA is performed and each NWP is re-evaluated. If the thresholds determined for the NWP will be exceeded or conditions cannot be met, the NWP does not apply and the proposed action will require application for an Individual Permit (IP). An IP requires a public notice, an alternatives analysis (the 404(b)(1) analysis), and a NEPA document specific to the proposed project. USACE is currently implementing a National policy for "no net loss of values and functions" for wetlands and WOUS.

The USACE regulation provides that "all mitigation will be directly related to the impacts of the proposal, approximate to the scope and degree of those impacts, and reasonably enforceable." It also states "Consideration of mitigation will occur throughout the permit application review process and includes avoiding, minimizing, rectifying, reducing or compensating for resource losses. Losses will be avoided to the extent practicable. Compensation may occur on-site or at an off-site location" (33 CFR S 320.4[r]).

USACE has a three-step sequencing procedure for evaluating impacts to wetlands (Memorandum of Agreement between USACE and EPA dated February 7, 1990): (1) avoid, (2) minimize, and (3) compensate. First, the project proponent must first demonstrate avoidance and minimization of impacts to WOUS to the maximum extent possible. Avoidance includes demonstrating that there is no practicable alternative which would have less adverse impact. Minimization requires that consideration be given to redesigning or staging a project to reduce impacts. Compensatory mitigation is only authorized for unavoidable impacts and must replace the loss of values and functions of the WOUS proposed for impact. Compensatory mitigation includes creation, restoration, enhancement or preservation. All impacts must be avoided or minimized before compensating mitigation will be considered. In some cases, mitigation banking is the appropriate approach to compensating mitigation (33 CFR S 320.4[r]).

As of the date of this INRMP, NAFEC ED has not had to secure any Section 404 USACE permits in 2014.

Current Management

All proposed projects for NAFEC are presented to NAFEC ED. Currently; there is no formal process for site approval or a review by a project review board for proposed projects. The primary responsibility for NEPA implementation is NAFEC ED.

Assessment of Current Management

NAFEC ED uses NEPA to ensure its activities (as described in this INRMP) are properly planned, coordinated, and documented. It also uses NEPA to identify issues associated with other organizations' projects, which affect NAFEC's natural resources, when it has the opportunity to review such projects. Project and mitigation planning at NAFEC will continue to avoid, minimize, rectify, reduce, eliminate, or compensate for any identified environmental impact.

An important offshoot of proper NEPA implementation is that projects are often enhanced by the effort. When natural resources managers understand mission and project requirements in terms of land features and requirements, they often not only offer more potential site options to mission or project planners but also offer alternatives to avoid future environmental conflicts.

4.7 Integrating Other Plans and Programs

4.7.1 Installation Restoration Program

Per OPNAVM-5090.1, Navy policy relative to IR sites requires every effort must be made to ensure that Navy projects are not constructed on contaminated sites. If contamination is discovered during the planning stages of a project or during construction, careful project controls must be in place to ensure proper investigation and clean-up procedures are followed.

Potential contaminants within the various IR sites include substances such as benzene, dichloro-diphenyl-trichloroethane (DDT), dioxin, lead, polychlorinated biphenyls (PCBs), diesel fuel, and jet fuel. Contaminants have been found in the soil and soil vapors. Groundwater within four miles of NAFEC is not used for drinking, irrigation, industry, or recreation because of potential contamination. Past uses of the land that contributed to the contamination include engine testing and repair activities, firing ranges, fuel storage and refueling activities, and construction and use of a landfill (http://www.envirostor.dtsc.ca.gov as accessed on 03 June 2007).

Current Management

NAFEC has an award-winning Installation Restoration (IR) Program to proactively identify, clean up, and close environmentally contaminated sites. To date, eighteen IR sites have been located on NAFEC. Of those eighteen sites, thirteen have been completely cleaned up, and three sites are in the process of being cleaned up (B. Fischer, *pers. comm*.). Map 2-4 identifies IR sites on NAFEC.

The Navy's policy on cleanup of identified Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) sites where contamination has been identified is that the source must be controlled before cleanup, the cleanup must be risk-based and have site specific cleanup goals, and the monitoring criteria for any monitoring plan must be established before the first sample is collected.

NAFEC recognizes that adverse impacts to natural resources addressed in this INRMP may result from the release of hazardous substances, pollutants, and contaminants into the environment. The DoN IR Program is responsible for identifying CERCLA releases, RCRA releases, and releases under related provisions; considering risks and assessing impacts to human health and the environment, including impacts to endangered species, migratory birds, and biotic communities; as well as developing and selecting response actions when it is likely that a release could result in an unacceptable risk to human health and the environment.

NAFEC follows management strategy pursuant to the DoN INRMP Guidance (DoN 2006). When appropriate the CNRSW staff or the NAFEC natural resource management staff will assist the Installation Restoration Program Remedial Project Manager (RPM) with identification of potential impacts to natural resources caused by the release of these contaminants.

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

Assessment of Current Management

The CERCLA and RCRA programs are effective at remediation of contaminated media. Management of IR sites should continue to coordinate with NAFEC ED natural resource managers. During planning for site restoration, coordination with NAFEC ED should occur when restoration plans involve revegetation, to ensure NAFEC-approved native landscaping is used.

4.7.2 Integrated Cultural Resources Management Plan

Current Management

An Integrated Cultural Resource Management Plan (ICRMP) for NAFEC was just completed (2012). This ICRMP includes NAFEC and the target areas in its planning footprint and is intended to provide strategic guidance to NAFEC to support a conservation and stewardship program for historic and archaeological resources present on property owned or controlled by the Navy. The cultural resource conservation and stewardship program enables NAFEC to comply with DoD cultural resource instructions such as DoDINST 4715.16 Cultural Resources Management, EOs such as EO 11593 Protection and Enhancement of the Cultural Environment, and cultural resource laws including but not limited to the American Antiquities Act, Archaeological Resources Protection Act, Archaeological and Historic Preservation Act, NHPA, and the Historic Sites Act. Cultural resource management activities encompassed in the ICRMP include surveys of historic and archaeological resources.

Assessment of Current Management

NAFEC ED is able to review projects that may affect cultural resources at NAFEC and its target areas.

4.7.3 Wildlife Action Plan

Congress asked each state to develop a Wildlife Action Plan (WAP) to examine the health of wildlife and prescribe actions to conserve wildlife and vital habitat before they become rarer and more costly to

protect. In response, the CDFW developed the California WAP (Bunn et al. 2007). The California WAP is a comprehensive state wildlife conservation strategy. It addresses the area encompassing NAFEC in its subregional emphasis on the Colorado Desert Region. For this region, these stressors for wildlife were identified:

- Water management conflicts and water transfer impacts
- Inappropriate off-road use
- Loss and degradation of dune habitats through disruption of sand transport processes, invasive plant species, and inappropriate off-road use
- Growth and development
- Invasive species

The Wildlife Action Plan identifies a number of management focus species for the region, including Peninsular big-horn sheep (*Ovis canadensis nelson*), Coachella Valley fringe-toed lizard (*Uma inornata*), and desert pupfish (*Cyprinodon macularis*). The following recommendations made for public land managers in the region are relevant for NAFEC:

- Federal, state, and local agencies, along with nongovernmental conservation organizations, should work together to reach agreement upon and fund a restoration plan for the Salton Sea.
- Federal and state wildlife agencies should work to ensure that environmental impacts resulting from water transfers (both those permitted under the Quantification Settlement Agreement [QSA] and any future transfers) are mitigated and that the related habitat conservation plans are fully implemented.
- Federal and state wildlife agencies, water management agencies, and nongovernmental conservation organizations should develop and invest in restoration and protection efforts for the Salton Sea, the Colorado River delta, and other regional wildlife habitats.
- Permitting agencies, county and local planners, and land management agencies should work to ensure that infrastructure development projects are designed and sited to avoid harmful effects on sensitive species and habitats.
- Federal, state, and local agencies should work with nongovernmental organizations to provide greater resources to eradicate or control and to limit introductions of invasive species in the region.

Other Regional Planning Efforts

Section 1.11, Integrating Other Plans describes other planning documents from a variety of sources.

4.8 Natural Resources Law Enforcement

Specific Issues

- Unauthorized access and use by ORV's in target areas may disrupt and limit the viability of native populations or habitats.

Current Management

Protection of natural resources at NAFEC on the main installation is currently provided through NAFEC Force Protection. Protection of the natural resources in the withdrawn areas is provided by BLM. No Wildlife Law Enforcement Program is currently in place at NAFEC.

Assessment of Current Management

Natural resources are sufficiently protected under the current program. Improvements may be made in curtailing ORV use in the target areas. Natural resource management activities (restoration, area closures, etc.) should be continually communicated to NAFEC Force Protection, to ensure successful management and protection of resources.

4.9 Beneficial Partnerships and Collaborative Resources Planning

Ecosystems and the species that populate them (especially migratory species) usually transcend administrative boundaries, and their conservation can best be accomplished through cooperative ventures. 'Preserving all the parts' with an emphasis on habitats is central to the ecosystem management approach mandated by DoD. The ecosystem approach involves going beyond addressing short-term approaches one species at a time. Regional planning processes are a means to address natural resource management using an ecosystem approach. Partnerships among private, local, state, tribal, and federal interests are vital to help realize ecosystem management, the basis for management of Navy lands and waters.

Cooperative management of terrestrial NAFEC flora and fauna is required under the federal Sikes Act (as amended) and the Fish and Wildlife Coordination Act. Like NEPA, the Fish and Wildlife Coordination Act is essentially procedural as no specific outcome is mandated. The USFWS and CDFW have a statutory obligation to review and coordinate on INRMPs. Recognizing this core, three-way partnership in preparing, reviewing, and implementing INRMPs among the DoD, USDOI, USFWS, and state fish and wildlife agencies, a MOU was signed in July 2013. The CDFW and other state fish and wildlife agencies were represented by the IAFWA. The desire is for "synchronization of INRMPs with existing fish and wildlife service and state natural resource management plans" and "mutually agreed-upon fish and wildlife service conservation objectives to satisfy the goals of the Sikes Act."

Specific Issues

Since most of the target ranges are owned by the BLM with varying levels of control by the Navy (under the withdrawal agreement approved by Congress and the enacting MOU among the Navy, BLM and BUREC), there are joint planning issues. Development of projects in the vicinity of NAFEC and management of species by other agencies also result in joint planning. These include:

- Flat-tail horned lizard information sharing and management
- Urban growth/Encroachment Partnering
- Construction of new electrical generation and transmission infrastructure
- Location of proposed water developments and landfills in relation to their ability to attract birds which may prey upon the FTHL or become a BASH concern
- Placement of railroads bearing trash to a landfill
- Off-road vehicle access and controls
- Information sharing on cultural resources

Current Management

The Navy policy calls for its installations to expand involvement in regional ecosystem planning, management, and restoration initiatives. INRMP coordination and metric reviews are one of the beneficial partnerships in place for collaborative resource planning at NAFEC.

The Navy also sees partnerships as a means to manage encroachment pressure on the Navy mission. The instruction also defines encroachment to be any lack of action by the Navy to coordinate with local jurisdictions, monitor the development plans of adjacent communities, or adequately manage facilities and real property.

Assessment of Current Management

Continuing cooperative planning efforts with surrounding land agencies and individuals benefit NAFEC natural resources and those of the entire region. Cooperative planning can also reduce the costs of actions that require management across boundaries such as biological monitoring.

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

Strategy:

I. Participate in regional conservation and ecosystem planning efforts, based on the following criteria:

Actions:

A. Consider signing agreements that may encumber land or resources from development now or in the future. Emphasize the critical importance of ensuring continuation of the military mission and its unique attributes which cannot be replaced.

B. Promote regional understanding and appreciation of the INRMP's goals, objectives and policies and the ecosystem management and stewardship of NAFEC’s lands, which allows conservation of the FTHL and other species.

II. Meet annually and consult with USFWS and CDFW to fulfill Sikes Act (amended) provisions and related inter-agency cooperative agreements.

A. Ensure compatibility with INRMP goals, objectives, and policies as well as internal consistency in future inter-agency agreements and plans.

B. Involve state and federal resource agencies in the implementation of the INRMP objectives and policies as required by federal law and regulation.

C. Promote information sharing and scientifically based, coordinated data collection, and management planning.

III. Seek development of a California desert-wide DoD strategy for protecting the buffer areas of military installations from encroachment from population pressures, water security (quality and quantity), BASH, and dust control in the face of potential tightening of air quality laws.

A. Consider becoming members of the Desert Managers Group.

IV. Proactively monitor regional planning efforts that may result in attracting birds to the airfield vicinity, such as development of lakes by IID or landfills by the County.

V. Initiate at least semi-annual meetings with BLM to discuss mutual concerns such as FTHL information sharing and management, urban encroachment, pesticide drift into sensitive habitats, species surveys and studies, information sharing on cultural resources, location of proposed developments and landfills in relation to their ability to attract birds which may prey upon the FTHL or become a BASH concern, placement of railroads bearing trash to a landfill, and ORV access and controls.

5.0 Implementation Strategy

Effective implementation of the practices and projects described in Chapters 3 and 4 of this Integrated Natural Resources Management Plan (INRMP) will help to achieve sustainability of Naval Air Facility El Centro (NAFEC) ecosystems and associated species, while ensuring no net loss of the capability of NAFEC lands and waters to support the U.S. Department of the Navy (Navy) mission. The success of this INRMP requires diligence by leadership and natural resources staffs to comply with regulatory requirements, integrate complementary installation management plans, strengthen interagency partnerships, and implement adaptive management approaches for individual projects.

It also requires a review for "operation and effect." This is defined as "a comprehensive review by the Parties, at least once every five years, to evaluate the extent to which the goals and objectives of the INRMP continue to meet the purpose of the Sikes Act (as amended, 2012), which is to carry out a program that provides for the conservation and rehabilitation of natural resources on military installations."

A compliant INRMP is defined as "a complete plan that meets the purposes of the Sikes Act (as amended) [§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 five years [§101(2)(b)(2)]." If an INRMP is greater than five years old, then it must have undergone a review for operation and effect within the past five years. The responsibility for development, revision, and implementation of INRMPs is shared at every level in the U.S. Department of Defense (DoD) and among its command elements. Roles of various parties identified as stakeholders in implementing this INRMP are covered in Section 1.7 Roles, Responsibilities and Stakeholders.

5.1 Staffing and Personnel Training

The Sikes Act (as amended) specifically requires that there be "sufficient numbers of professionally trained natural resources management and natural resources enforcement personnel to be available and assigned responsibility" to implement an INRMP. In addition adequate training of natural resource personnel is important to the success of military sustainability and land management. The OPNAVM-5090.1 requires that Navy commands develop, implement, and enforce the management plan through personnel with professional training in natural resources.

"Natural resources programs shall support military readiness and sustainability and commands shall assign specific responsibility, provide centralized supervision and assign professionally trained personnel to the program. Natural resources personnel shall be provided an opportunity to participate in natural resource management job training activities and professional meetings."

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

The NAFEC Environmental Division is responsible for identifying personnel requirements to accomplish INRMP goals and objectives. The Environmental Division is also responsible for providing input into this process by allocating existing budgetary and personnel resources and then identifying staffing needs based on any additional current and future projects. Personnel assigned to natural resources management are the core staff responsible for implementing the INRMP. These personnel ensure that a consistent conservation program is carried out by using strategies outlined in this plan to support the Navy mission

and achieve INRMP goals and objectives. Staff coordination includes both planning teams for initiating projects and staffing teams to manage and run projects. In addition, contractual support, partnerships, and cooperative agreements are needed.

Properly trained personnel are required to achieve objectives and guidelines of this INRMP. Environmental staff members entrusted with this work must have a thorough knowledge and understanding of biology and natural resources, and administrative duties such as project management, reporting, and contracting. Periodically, additional training is needed to keep personnel updated on the current practices and advances in knowledge of these topics. These training opportunities may be offered in the forms of structured courses or conferences, workshops, and symposia. NAFEC will evaluate the following annual workshops or professional conferences for attendance depending on funding available for travel and training:

- National Military Fish and Wildlife Association annual workshop;
- North American Natural Resources Conference;
- Wildlife Society – Western Section;
- Partners-In-Flight national, regional, and state meetings (generally in conjunction with other listed meetings); and
- Partners in Amphibian and Reptile Conservation meetings.

Other conferences or workshops will be evaluated for their usefulness in improving the success of natural resources management activities through professional development and information exchange, and to present Navy natural resources achievements to the professional community.

5.2 INRMP Review, Metrics and Adaptive Management

According to OPNAVM-5090.1, annual reviews must verify that:

- Current information on all conservation metrics is available.
- All *must fund* projects and activities have been budgeted and implementation is on schedule.
- All required trained natural resources positions are filled or are in the process of being filled.
- Projects and activities for the upcoming year have been identified and included in the INRMP. An updated project list does not necessitate revising the INRMP.
- All required coordination has occurred.
- All significant changes to the installation's mission requirements or its natural resources have been identified.
- The INRMP objectives remain valid.

5.2.1 INRMP Metrics

DoD installations are instructed to report progress toward meeting natural resources conservation program measures of merit to the Deputy Under Secretary of Defense for Installations and Environment at each Environmental Management Review and to Congress in the Defense Environmental Programs Annual Report. The Office of the Secretary of Defense (OSD) reports on the status of its INRMPs to ensure they support and sustain the installation missions while complying with federal laws, regulations, DoD and Navy policies, Executive Orders (EOs), and other requirements.

Sikes Act (as amended) Implementation Guidance (Deputy Under Secretary of Defense for Installations and Environment Memorandum 10 October 2002) added new tracking procedures, entitled *metrics*, to

ensure proper INRMP coordination and project implementation. In 2004, Naval Facilities Engineering Command Southwest (NAVFAC) was tasked to develop a metric system for Navy natural resources programs to measure conservation impacts on installation missions and the success of partnerships with the U.S. Fish and Wildlife Service and state fish and wildlife agencies. DoD Instruction (DoDINST) 4715.03 (2011) continued to require the use of Natural Resources Conservation metrics to assess the overall health and trends of the natural resources program and to identify and correct potential funding and other resource shortfalls.

INRMP Annual Reviews are facilitated by the Navy Conservation website (Appendix L). The Navy Conservation website is designed to assist decision makers in assessing INRMP implementation and how well conservation efforts are applied across Navy sites in the 54 states and territories. Because each installation has an installation number, OSD will also be able to geo-reference the information collected and utilize Geographic Information System techniques to better map and manage its resources.

The metrics achieve the following:

- Assess INRMP implementation
- Measure conservation efforts
- Ensure no net loss to military testing and training lands
- Understand the conservation program's installation mission support
- Indicate the success of interagency natural resource partnerships

The Navy Conservation website provides the means to evaluate performance in seven focus areas:

- Ecosystem Integrity
- Listed Species and Critical Habitat
- Fish and Wildlife Management for Public Use
- Partnership Effectiveness
- Team Adequacy
- INRMP Project Implementation
- INRMP Impact on the Installation Mission

Each of the seven Focus Areas contains criteria that can be evaluated. The criteria responses have weighted values applied and a 0-100 rating is calculated for the entire focus area. The 1 to 100 scores corresponds with a Green (67-100), Yellow (66-34), and Red (33-0) report card.

5.2.2 Supporting the Natural Resources Data Call

Natural resources managers are often occupied with data requests as decision-makers pass down their reporting and analysis requirements. Data management guidelines and projects are discussed in Section 3.11 Data Integration, Access, and Reporting.

For example, upon request from Commander Naval Installations Command, NAVFAC maintains natural resources program information necessary to satisfy reporting requirements, legislative information requests, and support projects. This information is collected in the NAVFAC Natural Resources Data Call Station and applicable Geographic Information System programs. In addition, Regional Commanders/Area Coordinators shall report new conservation regulatory requirements (i.e., proposed listings of threatened and endangered species, proposed critical habitat restrictions, biological opinions, National Environmental Policy Act mitigation measures, etc.) via the chain of command, in coordination with NAVFAC Southwest, that impact Naval readiness and sustainability. This assessment may be

accomplished via the Natural Resources Data Call Station or by written report by 15 November for the preceding fiscal year. This assessment should be very detailed on the particular impacts on readiness, sustainability, and training including: days of training lost due to natural resources restrictions, endangered species impacts and costs for mitigation and protection, limitations on night operations, limitations on training capability, costs of mitigation related to endangered species, migratory birds, and any other issues or impacts that are important to Navy to support overall readiness and sustainability (OPNAVM-5090.1).

5.3 INRMP Project Programming and Budgeting

Installation COs or Officers-in-Charge endorse via signature their INRMPs. Their responsibility is to act as stewards of natural resources under their jurisdiction and integrate natural resources requirements into the day-to-day decision-making process. To accomplish this, they involve appropriate tenant, operational, training, or research and development commands in the INRMP review process to ensure no net loss of the military mission. At their discretion they may bring in Navy Judge Advocate General or Office of the General Counsel Legal Counsel to provide advice and counsel with respect to legal matters related to natural resources management and INRMPs (OPNAVM-5090.1). The Commanding Officers of shore activities holding Class 1 plant accounts (land) shall request funding sufficient to ensure support of an integrated program as prescribed by OPNAVM-5090.1 and the Real Estate Operations and Natural Resources Management Procedural Manual NAVFAC P-73, Vol. II, including personnel support and training.

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 specific time frames identified in the INRMP. The INRMP is considered implemented if the installation:

- Actively requests, receives, and uses funds for *must fund* projects and activities;
- Ensures that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP.
- Coordinates annually with all cooperating offices; and,
- Documents specific INRMP action accomplishments undertaken each year.

Since the Sikes Act (as amended) requires implementation of the INRMP there is a clear fiscal connection between INRMP preparation, revision, implementation and funding. Indeed, failure to prepare and implement the INRMP provides a potential cause of action under the Sikes Act (as amended). Accordingly, it is vital that budget personnel understand and participate in the INRMP process. Funding to implement natural resources management will largely come from program sources. See Appendix A for the Implementation Table.

5.3.1 Funding Classifications

Project prioritization systems are listed below, showing OSD, DoDINST 4715.03, and Navy Environmental Readiness Level (ERL) priority systems. All compliance projects (the *must fund* category) are ranked according to Navy ERLs and timeline urgency to facilitate capability versus cost trade-off decisions (Chief of Naval Operations 2004). The highest ERL (4) is considered the absolute minimum level of compliance. It supports all actions specifically required by law, regulation, or EO. Subject to the

availability of funding, all Navy ERL 4 projects and activities must be programmed in accordance with specific timeframes identified in this INRMP.

The budget programming hierarchy for this INRMP is based on Navy funding level classifications (see below for level classification descriptions).

Environmental Readiness Program Assessment Database

Environmental Program Requirements (EPRs) cover multiple subject matter or *business lines* aside from natural and cultural resources. 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, DoDINSTs and DoD Directives, and applicable international and overseas requirements (OPNAVM-5090.1).

All natural resources requirements are entered into the EPR-Web and they are available for review/approval by the chain of command by the dates specified in the Guidance letter that is provided annually by CNO (N45). This database is the source document for determining all programming and budgeting requirements of the Environmental Quality Program. EPR-Web is also the tool for providing the four ERL capabilities used in producing programming and budgeting requirements for the various processes within the budget planning system (see Section 1-10).

Four Navy ERLs (see below for descriptions) have been established to enable capability-based programming and budgeting of environmental funding, and to facilitate capability versus cost trade-off decisions.

Budget priorities for threatened and endangered species management, especially compliance with a BO, receive the highest possible budgeting priority, and supports NAFEC'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). Currently no threatened or endangered species occur at NAFEC.

Department of Defense Funding Level Classifications

Funds will be requested for planned actions within this INRMP. The previous classification used Class 0, I, II, and III projects. The guidance has been updated and Enclosure 4 of DoDI 4715.03 defines the four classes of conservation programs. The projects recommended in this INRMP have been prioritized based on compliance and stewardship criteria provided in the hierarchy below.

- **Recurring Natural Resources Conservation Management Requirements**

Formerly DoD Class 0. 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**

Formerly DoD Class I. 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**

Formerly DoD Class II. 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**

Formerly DoD Class III. 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.

Navy Funding Level Classification

- **Environmental Readiness Level 4**

- Supports all actions specifically required by law, regulation, or EO (DoD Non-Recurring Current Compliance and Non-Recurring Maintenance Requirements projects) just in time.
- Supports all DoD Recurring Natural Resources Conservation Management Requirements as they relate to a specific statute such as hazardous waste disposal, permits, fees, monitoring, sampling and analysis, reporting and record keeping.
- Supports recurring administrative, personnel and other costs associated with managing environmental programs that are necessary to meet applicable compliance requirements (DoD Recurring Natural Resources Conservation Management Requirements).
- Supports minimum feasible Navy executive agent responsibilities, participation in OSD sponsored inter-department and interagency efforts, and OSD mandated regional coordination efforts.

- **Environmental Readiness Level 3**

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

5.3.2 Implementation Schedule

This INRMP will become effective upon the acceptance and signatory release described in Section 1.7 Roles, Responsibilities and Stakeholders. 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 the Implementation Table will generally determine the order of implementation. The Environmental Division 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. Programming for INRMP implementation generally occurs in one- to three-year budget cycles through the Program Objectives Memorandum system; this is how the DoD allocates resources and links INRMP objectives to budgets and execution. See Appendix A for the Implementation Table.

5.3.3 Federal Anti-Deficiency Act

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

5.3.4 Funding Sources

In order to implement the various research, surveys, and programs necessary to fulfill the mission of NAFEC, funding must be identified and acquired. There are several avenues of funding available to the Environmental Division, beyond the typical Naval operational budget, that allow the inclusion of additional projects to assist the Environmental Division in their mission-related and stewardship endeavors. The Environmental Division must continually assess the priority and level of budgetary needs to fulfill Navy and regulatory requirements and to sustain overall program goals. There are restrictions on how different Navy funding sources for natural resources management may be used. It is important that

appropriate funding sources are used and that EPR exhibits clearly justify funding requests so that 1) natural resource funds are distributed widely, and 2) funding levels are not threatened by use of resource funds in ways that are inconsistent with funding program rules. Execution of this INRMP by the federal government is contingent on the availability of funds properly allocated in accordance with applicable law. All natural resources projects must be addressed in the INRMP.

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 planned actions 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 planned actions can be implemented virtually as soon as planning is performed.

5.3.4.1 Department of Defense Funding Sources

The costs of executing INRMP actions may be funded from a variety of DoD sources. The primary funding sources to Navy natural resources programs include:

Operations and Maintenance Funds
Funding sources for the natural resources program are derived from General and Administrative, Operations and Maintenance Navy (O&MN), and input into the Navy Environmental Program Requirements (EPR) system for funding. This primary budgetary source is the basis for maintaining the personnel and core programs inherent to the natural resources program. These appropriated funds are the primary source of resources to support must-fund, just-in-time environmental compliance (i.e. Navy Level ERL 4 projects). It is the responsibility of the Environmental Division to manage the natural resources program budget and funding. Once O&MN funds are appropriated for core personnel and the program, funding can be justified for other project requirements.

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 (as amended) and may be used only for fish and wildlife management on the installation where they are collected. NAFEC generates no fish and wildlife fees, and none are anticipated as hunting is prohibited and there are no fishing opportunities.

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.

Recycling Funds
Installations with a Qualified Recycling Program may use proceeds for some types of natural resource projects.

DoD Legacy Resource Management Program
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.

Strategic Environmental Research and Development Program and Environmental Security Technology Certification Program

The Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program are the DoD's environmental science and technology program, planned and executed in partnership with The U.S. Department of Energy and Environmental Protection Agency with participation by numerous other federal and non-federal organizations. SERDP invests across a broad spectrum of basic and applied research, as well as advanced development to improve DoD's environmental performance, reduce costs, and enhance and sustain mission capabilities. SERDP and Environmental Security Technology Certification Program promote partnerships and collaboration among academia, industry, the military services, and other federal agencies. They are independent programs managed from a joint office to coordinate efforts from basic and applied research to field demonstration and validation.

Special Initiatives

The DoD or Navy may establish special initiatives to fund natural resource projects. Funding is generally available only for a limited number of projects. There are currently two such DoD initiatives:

- Streamside Forests: Lifelines to Clean Water is a DoD streamside restoration small grants program. Funds are available to military installations working in partnership with a local school and/or civic organization to purchase locally native plant material for small streamside restoration projects. Funds are distributed as reimbursements. Up to $5,000 may be awarded per project. This is an ongoing program (no deadline), so proposals can be submitted at any time. Applications and additional information are available on the DENIX website.
- Sustaining Our Forests, Preserving Our Future is funding to ensure that the integrity of DoD forested lands remains intact.

5.3.4.2 External Assistance

Environmental program funding within the Navy is primarily based upon federally mandated requirements. Consequently, program managers are encouraged to seek outside funding, expertise, and support for projects consistent with the objectives of the INRMP. Scientific research that benefits installation natural resources can be accomplished through partnerships or external funding sources from various federal, state, local, and non-profit organizations with an interest in achieving the objectives consistent with those of the INRMP. Opportunities for external assistance with natural resource programs at NAFEC are identified below.

Contractor Support
Some projects, such as targeted surveys, may require contractor services or other federal agency services, either because of a need for expertise or for 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 NAFEC 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. These projects will require preparation of a request for proposal to acquire services, which should be considered to ensure appropriate funding can be obtained.

Cooperative Agreements and Partnerships
Cooperative agreements are legal relationships (not a contract) between the Navy and states, local governments, institutions of higher education, hospitals, non-profit organizations, and/or individuals. Cooperative Agreements are permitted to accomplish work identified in INRMPs pursuant to section 670c-1 of the Sikes Act (as amended). The principal purpose of the relationship is to work with 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 Ecosystem Studies Units
The Cooperative Ecosystem Studies Units (CESU) program is a working collaboration among federal agencies, universities, state agencies, non-governmental organizations, and other non-federal institutional partners. The CESU 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.

5.3.2 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. Past research is presented in Appendix M.

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 Environmental Division biologist provide the most likely and cost effective sources of assistance with implementation of this INRMP.

New funding sources should be sought from federal, state, local, and nonprofit organizations with an interest in achieving the goals and objectives of this INRMP in partnership with NAFEC. 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.

This page left intentionally blank.

6.0 References

6.1 Personal Communications

Collins, Jimmie. Environmental Division. Naval Air Facility El Centro, 1997, 2011.
Fischer, Bob. Environmental Division. Naval Air Facility El Centro, 2011.
Kagele, Bill. Water Resources. Naval Air Facility El Centro, 2011.
Powell, Robert. Natural Resources Specialist. Naval Air Facility El Centro. 2011.
Turner, Trent, Air Safety Officer, Naval Air Facility El Centro, 2011.
Hulse, David. Community Planner Liaison, Naval Air Facility El Centro, 2011.
Lippert, Stephen, Range Complex Sustainment Coordinator, Naval Air Facility El Centro, 2014.

6.2 Documents

Arizona Game and Fish Department
2005 Unpublished Abstract Compiled and Edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6pp.

Brooks, M. L.
1998 Ecology of a biological invasion: alien annual plants in the Mojave Desert. Riverside, CA: University of California. 186 p. Dissertation.

Brooks, M. L. and J. R. Matchett
2006 Spatial and temporal patters of wildfires in the Mojave Desert, 1980-2004. Journal of Arid Environments (67):148-164.

Bury, B. R., R. A. Luckenbach, and S. D. Busack
1977 Effects of Off-road Vehicles on Vertebrates in the California Desert. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C. Wildlife Research Report 8. 23p.

California Department of Fish and Game (CDFG)
1994 California Ecoregion GIS layers

2011 California Natural Diversity Database (CNDDB) State and Federally Listed Endangered and Threatened Animals of California). Natural Resources Agency of California Department of Fish and Game.

California Department of Water Resources (CDWR)
1970 Geothermal Wastes and the Water Resources of the Salton Sea Area. February 1970. California Department of Water Resources Bulletin 143–7.

Comrack, L.A. and R.J. Logsdon
2008 Status review of the American peregrine falcon (*Falco peregrines anatum*) in California. California Department of Fish and Game, Wildlife Branch, Nongame Wildlife Program Report 2008-06. 36 pp + appendices.

Conway, C. J., and C. A. Finley
2006 Migratory Linkages of Burrowing Owls on DoD Installations and Adjacent Lands. DoD Legacy Resource Management Program. December.

County of Imperial
2010 Draft Environmental Impact Report for the Desert Springs Resort specific plan. Prepared by BRG Consulting, Inc. May.

Craig, D. and P. L. Williams
1998 Willow Flycatcher (*Empidonax traillii*). *In* The Riparian Bird Conservation Plan: a strategy for reversing the decline of riparian-associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/riparian_v-2.html

Fauth, J. and M. Smith
1996 Naval Air Facility El Centro Water Conservation Guide. Public Works Department, Environmental, Natural Resources, and Planning Division, El Centro, CA.

Foreman, L. D. (ed.)
1997 Flat-tailed Horned Lizard Rangewide Management Strategy. Report of inter-agency working group. 56 pp. plus appendices.

Flat-tailed Horned Lizard Interagency Coordinating Committee (FTHL ICC).
2003 Flat-tailed horned lizard rangewide management strategy, 2003. Revision. 78 pp. plus appendices.

Gutterman, Y.
1994 Seed Germination in Desert Plants. Springer-Verlag, Heidelberg.

Haug, E. A., Millsap, B. A., and Martell, M. S.
1993 Burrowing Owl (*Speotyto cunicularia*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 61. Acad. Nat. Sci., Philadelphia.

Imperial Irrigation District
1986 Proposed Water Conservation Program and Initial Water Transfer. Draft Environmental Impact Report.

Intergovernmental Panel on Climate Change (IPCC)
2007 Deserts. *In* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, eds. M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden, and C. E. Hanson. Cambridge University Press, Cambridge, UK. Section 4.4.2.

Knopf, F. L.
1996 Mountain Plover (*Charadrius montanus*). *In* the Birds of North America, No. 211 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and the American Ornithologists' Union, Washington, D.C.

Knopf, F. L. and J. R. Rupert
1995 Habits and Habitats of Mountain Plovers in California. Condor 97:743-751.

Kuijt, J.
1966 Parasitism in Pholisma (Lennoaceae). I. External Morphology of Subterranean Organs. American Journal of Botany. Volume 53, No. 1. pp. 82-86.

Malcom-Pirnie, Inc.
2005 Munitions Response Program doc.

MODOC Associates
1982 Report of a Survey for Rare and Endangered or Threatened Plants on Navy Property in the Colorado Desert of California. Prepared for U. S. Navy Western Division. San Bruno, CA. Revised 15 September 1983.

Murphy, R. W
1974 A new genus and species of eublepharine gecko (Sauria: Gekkonidae) from Baja California, Mexico. Proc. Calif. Acad. Sci. 40:87-92.

Redmond, K. T.
2009 Historic Climate Variability in the Mojave Desert. *In* The Mojave Desert: Ecosystem Processes and Sustainability, eds. R. H. Webb, L. F. Fenstermaker, J. S. Heaton, D. L. Hughson, E. V. McDonald, and D. M. Miller. University of Nevada Press, Reno, Nevada.11-30p.

Rowlands, P. G.
1980 The Effects of Disturbance on Desert Soils, Vegetation and Community Processes with Emphasis on Off-road Vehicles: A critical review. USDI, Bureau of Land Management, Desert Plan Staff, Special Publication.190p.

Sawyer, J. O., Jr. and T. Keeler-Wolf
1995 A Manual of California Vegetation. First Edition. California Native Plant Society. http://davisherb.ucdavis.edu/cnpsActiveServer/index.html.

Schoenherr, A. A.
1992 A Natural History of California. University of California Press, Berkeley, CA. 772pp.

Shuford, W. D., and T. Gardali, (eds.)
2008 California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Small, A.
1994 California Birds: Their Status and Distribution. Ibis Publ. Co., Vista, CA.

Smith, S. D., T. N. Charlet, L. F. Fenstermaker, and B. A. Newingham
2009 Effects of Global Change on Mojave Desert Ecosystems. *In* The Mojave Desert: Ecosystem Processes and Sustainability, eds. R. H. Webb, L. F. Fenstermaker, J. S. Heaton, D. L. Hughson, E. V. McDonald, and D. M. Miller. University of Nevada Press, Reno, Nevada.31-56p.

Smith, T. P., Jr. and K. Berg
1988 Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society, Special Publication No. 1. Fourth edition. Sacramento, CA. 168p.

Stebbins, R. C.
1985 A Field Guide to Western Reptiles and Amphibians. Houghton Mifflin Co., Boston, MA. 336p.

Tierra Data Inc.
2013 Naval Air Facility El Centro General Herpetological Inventory Report. Final Report. Unpublished report submitted to Environmental Security, Naval Air Facility El Centro, California and Naval Facilities Engineering Command Southwest, San Diego, California. December 2013.

Unitt. P.
2004 San Diego County Bird Atlas. Proceedings No. 39. San Diego Society of Natural History. 645 p.

United States Army Corps of Engineers (USACE), Construction Engineering Research Laboratory (USACERL)
1997 Final Report, Surface Clearance and Subsurface Location and Identification of Ordnance Explosive and UXO, Carrizo Impact Area (CIA), El Centro, California. Prepared by David L. Holladay, Environmental Chemical Corporation under Contract #DACW05-95-D-001. 27p. + appendices.

United States Army Corps of Engineers and California Natural Resources Agency.
2011 Salton Sea Species Conservation Habitat Project. Draft Environmental Impact Statement/Environmental Impact Report. http://www.water.ca.gov/saltonsea/habitat/eir2011.cfm. Accessed 12 August 2014.

United States Bureau of Land Management (BLM)
1980 California Desert Conservation Area Plan (as amended). U.S. Department of the Interior, Bureau of Land Management California Desert District.

1996 Fire Management Activity Plan (FMAP) 1996 for the California Desert. U.S. Department of the Interior, Bureau of Land Management California Desert District, and National Park Service Death Valley National Park, Joshua Tree National Park, and Mojave National Preserve.

United States Census Bureau
2011 State and County Quick Facts. http://quickfacts.census.gov/qfd/states/06/06025.html. Accessed 24 June 2011.

United States Department of Defense (DoD)
1994 Memorandum from Sherri W. Goodman, Deputy Under Secretary of Defense for Assistant Secretary of the Navy, Office of the Under Secretary of Defense, Installations and Environment. Implementation of Ecosystem Management in the DoD. 3 August 1994. Washington, D.C.

1996 Navy Water Conservation Guide for Shore Activities. 21 August 1996.

2010 Department of Defense Office of the Under Secretary of Defense Memorandum: Draft Department of Defense Manual 4715.03, for Integrated Natural Resource Management Plan (INRMP) Implementation. 24 September 2010.

2011 Department of Defense Instruction Number (DoDINST) 4715.03, Natural Resources Conservation Program. 18 March 2011.

United States Department of the Navy (DoN)

1987 NAVFAC P-73 Real Estate Operations and Natural Resources Management Procedural Manual. Vol I. May 1987

1994 Memorandum from the Assistant Secretary of the Navy, Installations and Environment, for the Vice Chief of Naval Operations and the Assistant Commandant of the Marine Corps. Department of the Navy Natural Resources Conservation Strategic Plan. 13 June 1994.

2004 Department of the Navy Office of the Chief of Naval Operations (CNO) Navy Environmental Systems (EMS) Policy. December 6, 2004.

2006 Department of the Navy Office of the Chief of Naval Operations Integrated Natural Resources Management Plan Guidance for Navy Installations: How to Prepare, Implement, and Revise Integrated Natural Resource Management Plans (5090 N456K/6U838101 10 April 2006), April 2006.

2007 Memorandum from the Assistant Secretary of the Navy, Installations and Environment. Department of Navy Low Impact Development (LID) Policy for Storm Water Management. 16 November 2007.

2014 Naval Operations Manual 5090.1 (OPNAVM-5090.1) Environmental Readiness Program Manual. Department of the Navy, Office of the Chief of Naval Operations, 10 January 2014. Washington, D.C.

United States Department of the Navy. Naval Facilities Engineering Command Southwest (DoN, NAVFAC SW).

2006 Wildland Fire Management Plan Naval Air Facility El Centro and Target Areas. Contract No. N68711-00-D-4413/0020. October 2005. Prepared by Tierra Data Inc.

2011 Burrowing Owl (Athene cunicularia hypugaea) and General Avian Surveys at NAF El Centro in 2010. May 2011. Prepared by Arlene Arnold, NAVFAC SW Natural Resource Specialist. 24p.

United States Department of the Navy. Southwestern Division, Naval Facilities Engineering Command (DoN, SWDIV).

1994 Biological survey of Target Range R-2510 and R-2512 Naval Air Facility, El Centro, Imperial Valley, California. February 1994. Final report. Agreement No. N68711-92-LT-2009. Prepared by William S. LaHaye and David K. Garcelon, Institute for Wildlife Studies, Arcata, CA. 33p.

2000 Bird Aircraft Strike Hazard (BASH) Plan: Naval Air Facility El Centro and Target Ranges 2510 and 2512. Contract No. N68711-95-D-7605/0001. Prepared by Tierra Data Systems, Escondido, CA.

2001 Storm Water Discharge Management Plan (SWDMP): Naval Air Facility El Centro. Contract No. N68711-95-D-7605/0001. Prepared by Tierra Data Systems, Escondido, CA.

United States Department of the Navy, Western Division, Naval Facilities Engineering Command (DoN, WestDiv)

1987 Comprehensive Natural Resources Management Plan (NRMP) Naval Air Facility El Centro and Target Ranges R-2510, R-2512. Contract No. N62474-85-C-5521. Prepared by Innis-Tennebaum Architects, Inc., San Diego, CA. 172p.

2014 Range Air Installation Compatible Use Zone Study (RAICUZ) Aerial Weapons Target Ranges R-2510 and R-2512 Update, Naval Air Facility El Centro, California. Prepared by ?????, San Diego, CA.

United States Fish and Wildlife Service (USFWS)

2000 Recovery Plan for Bighorn Sheep in the Peninsular Ranges, California. U.S. Fish and Wildlife Service, Portland, OR. xv + 251 pp.

2001 Endangered and threatened wildlife and plants; Final Determination of Critical Habitat for Peninsular Bighorn Sheep; Final Rule. February 1, 2001, Federal Register 66(22):8650-8677.

2009 Endangered and threatened wildlife and plants; Designation of Critical Habitat for Peninsular Bighorn Sheep and Determination of a Distinct Population Segment of Desert Bighorn Sheep (*Ovid canadensis nelsoni*). Final Rule. April 14, 2009. Federal Register 74(70): 17288.

Zakrajsek, E. J. and J. A. Bissonette

2002 Development of a Bird-Avoidance Model for Naval Air Facility El Centro, California. Utah State University. Logan, UT.

Zedler, P. H.

1981 Vegetation Change in Chaparral and Desert Communities in San Diego County, California. Chapter 24 pp 406–430 in D.C. West, H.H. Shugart, and D.B. Botkin (eds.) Forest Succession. Springer Verlag. New York. 517 pp.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. E. Mayer, and M. White, eds.

1990 Birds. California's Wildlife, vol. 2. State of California, The Resources Agency, Department of Fish and Game, Sacramento.