ABSTRACT

This Integrated Natural and Cultural Resources Management Plan (IRMP) has been prepared to document natural and cultural resources found at the Construction Battalion Center (CBC) Port Hueneme, as well as to develop preliminary recommendations for the immediate and future management of natural resources at CBC Port Hueneme. CBC Port Hueneme is one site in the Naval Base Ventura County; the other site is Naval Air Station (NAS), Point Mugu. This IRMP is specific to the CBC site and fulfills a requirement set forth by the 1997 amendments to the Sikes Act, which requires the preparation and implementation of an IRMP for each military installation in the United States. On 18 November 1997, Congress passed the Sikes Act Improvement Amendments (SAIA) as part of the Fiscal Year 1998 DoD Authorization Act. As the principal legislation governing natural resources management on military lands, the SAIA requires significant changes to natural resources programs implemented on military lands. The SAIA also requires that IRMPs be reviewed annually by the natural resources staff and revised on a 5-year cycle.

Submitted to:
Engineering Field Activity West, Naval Facilities Engineering Command
900 Commodore Drive, San Bruno, CA 94066-5006
On behalf of: CBC Port Hueneme, California
Date: 5 November 1999
Prepared by: Tetra Tech, Inc.
Under Contract No.: N62474-94-D-7555

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EXECUTIVE SUMMARY

This Integrated Natural and Cultural Resources Management Plan (IRMP) has been prepared to document natural and cultural resources found at the Construction Battalion Center (CBC) Port Hueneme, as well as to develop preliminary recommendations for the immediate and future management of natural resources at CBC Port Hueneme. CBC Port Hueneme is one site in the Naval Base Ventura County; the other site is Naval Air Station (NAS), Point Mugu. This IRMP is specific to the CBC site and fulfills a requirement set forth by the 1997 amendments to the Sikes Act, which requires preparing and implementing an IRMP for each military installation in the United States. On 18 November 1997, Congress passed the Sikes Act Improvement Amendments (SAIA) as part of the Fiscal Year 1998 DoD Authorization Act. As the principal legislation governing natural resources management on military lands, the SAIA requires significant changes to natural resources programs implemented on military lands (Pohlman 1999). The SAIA also requires that IRMPs be reviewed annually by the natural resources staff and revised on a 5-year cycle.

Most Department of Defense (DoD) installations have prepared previously adopted, focused, natural resource-related plans (such as a Fish and Wildlife Management Plan) to address natural resource issues. However, due to the generally disturbed nature of most of the land and minimal extent of natural areas at CBC Port Hueneme, as well as the relatively small size of the site (approximately 1,650 acres), no previous natural resource plans specific to CBC Port Hueneme were available for the development of this plan. As a result, the findings of this plan are more general and introductory in nature. Several management goals proposed in this IRMP recommend further field work to augment baseline information on the natural resources.

Cultural resources at CBC Port Hueneme have been documented in the Historic and Archaeological Resources Protection Plan (HARP) (Uribe & Associates 1998). This IRMP builds upon the existing work completed in the HARP, and offers additional suggestions for managing and protecting cultural and historical resources. The executive summary from the HARP is contained in Appendix C.

Organization of the Plan

The text of the IRMP is organized in the following manner:

Chapter 1.0 provides a general introduction to CBC Port Hueneme, and discusses the military mission, purpose and goals of the IRMP, regulatory requirements and oversight of the IRMP, interagency coordination, regional biodiversity and conservation planning efforts, and the overall resource management program responsibilities of CBC Port Hueneme.

Chapter 2.0 discusses the general pre-history and history of CBC Port Hueneme, up to and including present day uses by the military, to provide the reader with an overall background of the site and its uses.

Chapter 3.0 describes the existing environment for both cultural and natural resources, including climate, soils, landforms and geology, water resources (surface and groundwater), vegetation, wildlife, outdoor recreation, cultural and historic resources, existing land use, and agricultural areas. It also describes any current management practices and issues associated with existing resources, where applicable.

Chapter 4.0 recommends management actions for CBC Port Hueneme based on knowledge gained from documenting the existing resources and management practices. A comprehensive list of recommended

projects is contained in this chapter, including criteria for prioritization, recommended implementation order, and funding sources.

PURPOSE, GOALS, MILITARY MISSION, HISTORY, AND LOCATION

Purpose and Goals

The purpose of this IRMP is to set the agenda for managing CBC Port Hueneme's natural and cultural resources for the next 5 to 10 years. This IRMP is also intended to document baseline resources, review current management practices related to natural and cultural resources at CBC Port Hueneme, and provide guidance on prioritizing appropriate methods for natural resource preservation and enhancement (in accordance with applicable regulations). Ultimately, the goals contained within this plan should provide a framework for daily land use and resource management decision making.

Military Mission

The mission of CBC Port Hueneme is to support the Naval Construction Force, fleet units, and units deployed from, or stationed at, the base. Support includes storage and ship advancement of mobilization construction materials, equipment, and provisions. CBC Port Hueneme also trains personnel for construction battalions and performs engineering and technical services. In addition, CBC Port Hueneme provides support to more than 40 tenant commands with missions ranging from Seabee support to shipboard missile systems testing.

The tenant commands on CBC Port Hueneme include:

- 1st Naval Construction Regiment;
- NR COMNAVFORKOREA DET;
- Naval Construction Training Center;
- Naval Facilities Engineering Service Center;
- Naval Civil Engineer Corps Officer School;
- Port Hueneme Division, Naval Surface Warfare Center (NSWC);
- Naval Construction Force Support Unit Two;
- Engineering Duty Officers School;
- Seabee Logistics Center;
- Naval Reserve Center, Port Hueneme; and
- Navy Cargo Handling Battalion 14.

History

Port Hueneme has a rich cultural history, likely dating back at least 7,000 years. Diverse terrain and abundant natural resources provided sustenance to early populations. The Chumash people were among the first encountered by European explorers in the late 1700s. The Ventureno, Barbareno, and Ynezeno, related linguistically and culturally, made up the Eastern Coastal Chumash. By the early 1800s the Chumash population had declined significantly following their recruitment into the Franciscan Missions and lack of natural resistance to European diseases. CBC Port Hueneme lands were once part of the Rancho Rio de Santa Clara o La Colonia; a land grant awarded to eight Anglo-European soldiers in 1837. The land was sold to Thomas A. Scott in the 1860s and resold to Thomas A. Bard in 1869. Following the establishment of the town of Hueneme in 1871, Bard constructed a wharf, which eventually became the largest shipping facility south of San Francisco. The fertile Oxnard Plain and availability of the Port contributed to the area becoming important in the regional agricultural economy. Following the attack on Pearl Harbor in 1941, the Navy's Construction Battalions (or Seabees) were organized to construct advance bases. Additional transshipment bases were needed by the Navy and Port Hueneme was selected primarily because it had a small commercial harbor that could be used immediately. The Advance Base Depot of Port Hueneme was established in 1942 to train Naval Construction Battalions and to amass and ship construction materials needed to support the war effort in the Pacific. Following World War II, action at the base declined with resurgence in activity in the 1950s during the Korean War and the 1970s during the Vietnam War.

Location

CBC Port Hueneme is located on the coast of Ventura County, California, adjacent to the cities of Port Hueneme and Oxnard (Figure ES-1). Port Hueneme is surrounded by the City of Oxnard to the east and north with Channel Islands Harbor bordering the west. Silver Strand Beach and the Pacific Ocean border the southern portion of the base.

IRMP Integration With Land Use Planning Efforts on CBC Port Hueneme

CBC Port Hueneme currently does not have a Master Land Use Plan. However, efforts are underway to complete a Master Plan that will be guided, in part, by the Land Use recommendations for green space and natural improvements contained in this IRMP. An integral part of this IRMP is the development of specific Geographic Information System (GIS) themes. These maps will be used as an analytical tool to determine the level of impact current and future missions and land use may have on natural resources, and will be updated as new information becomes available. The Master Plan will contain maps describing specific land uses on CBC Port Hueneme using the IRMP map information as a baseline. The Master Plan, in conjunction with this IRMP, will establish a systematic framework for decision making with regard to future development of CBC Port Hueneme.

Although NAS Point Mugu and CBC Port Hueneme have officially "merged," and the two bases are one, the planning documents for these bases (at the time of this writing) are not yet combined. However, the process has begun, and overall considerations with regard to land use and consolidation issues will be addressed in the Master Plan for the two bases. This IRMP is specific to Port Hueneme, and Point Mugu is expected to complete their IRMP in the near future. These plans will remain as separate documents due to the distinctively different geographic areas and resources of the two bases. Preparation of the Master Plan or Regional Shore Infrastructural Plan (RSIP) will integrate the planning of the two bases, and will establish a systematic framework for decision making with regard to future development and coordination between CBC Port Hueneme and NAS Point Mugu. The foundation of the RSIP will be the vision, mission, and facility requirements of the Base. In addition, it will incorporate operational, environmental,

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Figure ES-1 Location Map
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urban planning, and other Navy programs, with the IRMP being a key component of the plan development. The IRMP will be a cornerstone for the RSIP and will provide baseline natural resources data and management goals for the master planning process.

GENERAL ENVIRONMENT

Climate

CBC Port Hueneme area is influenced by its coastal setting and has a Mediterranean climate with moist, mild winters and warm, dry summers. Marked temperature discontinuities occur throughout the region and are related to the interplay of marine and continental controls. The average annual precipitation at CBC Port Hueneme is 15 inches with the maximum monthly precipitation occurring in January and the minimum in July and August. Low-level inversions that limit the height of the surface atmospheric mixing layer occur frequently over the Oxnard Plain.

Soils/Geology

The soils present at CBC Port Hueneme are represented, in part, by the soils of the Camarillo, Hueneme, and Pacheco Series. CBC Port Hueneme is located at the southwest margin of the Oxnard Plain in the western portion of the Ventura Basin, within the Transverse Ranges geomorphic province. The coastal area surrounding CBC Port Hueneme has undergone several man-made modifications, such as the creation of the Port of Hueneme Harbor and the deposition of dredge material. Several geologic faults are located in the vicinity of CBC Port Hueneme, including the McGrath fault and the Bailey fault. Major seismic activity has not occurred along either of these faults in recent history.

Water Resources

The major freshwater resources in the vicinity of CBC Port Hueneme include five groundwater aquifers, a stream, and artificial drainages. Impermeable building and pavement surfaces cover most of the base; the amount of surface runoff is, therefore, relatively high during storm events. Storm water runoff from the site discharges into the Port of Hueneme harbor. Groundwater from beneath the Oxnard Plain is the primary source of water for the population in the region. Drainage ditches adjacent to roadways on the site intercept overland flow. A shallow intermittent unnamed stream flows approximately 0.5 mile east of the site through the city of Port Hueneme. The surface water quality on CBC Port Hueneme contains a high concentration of minerals due to discharges from surrounding agricultural and urban areas, which use groundwater.

Vegetation

The main vegetation types on CBC Port Hueneme consist of coyote brush and California annual grassland. Coulter's goldfields (*Lasthenia glabrata* spp. *coulteri*) is a sensitive plant species known to be in the region of CBC Port Hueneme. The salt marsh bird's beak (*Cordylanthus maritimus* spp. *maritmus*) and the Ventura marsh milk-vetch (*Astragalus pycnostachyus lanosissimus*) may also occur at CBC Port Hueneme. Noxious weeds include hottentot fig (*Carpobrotus edulis*), pampas grass (*Cortaderia* spp.), and gum tree (*Eucalyptus* spp.); however no formal eradication or control programs have been implemented as of yet. The most significant landscaped area on the site is the Bard Estate, which includes a unique collection of exotic species and comprises the majority of the ornamental gardens located near the estate. Although no official programs for the use of native plants are currently implemented at CBC Port Hueneme, several California native plants have been identified at the Bard Estate. In addition, the DoD is currently in the process of establishing programs to utilize native plants

for landscaping. Executive Order 13112 (3 February 1999) requires federal agencies to prevent the introduction of invasive species, and creates an Invasive Species Council, who will be responsible for developing an Invasive Species Management Plan by August 2000.

Wetlands

Wetlands play a valuable role both ecologically and economically. Wetlands may be present at CBC Port Hueneme but have not been formally delineated according to the 1987 U.S. Army Corps Wetlands Delineation Manual (U.S. Army Corps of Engineers 1987). Management issues for wetland habitats include loss and degradation from development, contamination issues, and exotic plant species. The presence of exotic plant species on CBC Port Hueneme is due to either invasion or competition.

Habitat

Much of the remaining habitat at CBC Port Hueneme is highly disturbed and distributed in small patches (e.g., coyote brush, sand-verbena-bursage, and bulrush-cattail). However, these areas offer valuable habitat on base for many wildlife species, including sensitive species, documented in Chapter 3.0 of the IRMP.

Recreation

The Morale, Welfare, and Recreation (MWR) Department manages recreational activities on base. Recreational areas on CBC Port Hueneme include the golf course and driving range, a playing field, a park, track and field facilities, softball fields, and a recreational vehicle park. There are also limited bicycle trails on base. There are no allowed recreational uses of the harbor or shoreline on the base. Major recreational areas surrounding CBC Port Hueneme include city, county, and state beaches; McGrath and Mugu State Parks; and bicycle/hiking trails.

Cultural and Historical Resources

Approximately 100 acres (6%) of CBC Port Hueneme have been officially surveyed for archaeological resources. Archaeological research indicates that a prehistoric village (CA-Ven-663) once existed near the harbor entrance and other prehistoric sites may be deeply buried at CBC Port Hueneme. Recent efforts to locate CA-Ven-663 have been unsuccessful. Although extensive cutting, filling, construction, and heavy equipment training activities have probably destroyed or buried most archaeological sites, the possibility of encountering intact archaeological deposits during construction remains.

A survey and evaluation of buildings at CBC Port Hueneme that were more than 50 years old was conducted in 1995 (William Self Associates). Those listed, or eligible for listing, on the National Register of Historic Places include the shipwreck Bahama Star/La Janelle (CA-Ven-975H), an early farmstead (Quarters D), the estate of the Thomas R. Bard family and four World War II Quonset Huts (Buildings 383, 384, 385, and 386). The Bard estate, Berylwood, is listed on the National Register of Historic Places as a discontinuous historic district. It includes the Thomas Bard House (Officer's Club), the Richard Bard House (Quarters A), the Guest House (Building 39), the Swimming Pool (Building 5059), and the Tennis Courts (Building 5069). The memorial cemetery and the botanical gardens are associated with the Bard estate but are not included in the National Register District.

Other cultural resources of local interest that do not meet the criteria for listing on the National Register of Historic Places include the Freidrich home (Quarters B), the statuary at the Needham Theater, a mural

inside the Beehive Fitness Center, the Ventura County Railway Line, and the Ventura Road Eucalyptus Grove.

Land Use

CBC Port Hueneme encompasses approximately 1,650 acres; approximately 110 acres are covered with buildings (not including family housing area on the southern end of the base). CBC Port Hueneme outleases land to the Oxnard Harbor District and Mazda Corporation. The Port of Hueneme serves as a major industrial area on base. Administration areas are dispersed throughout the base; Building 1000 is the Port Hueneme Headquarters and serves as the main administration building.

REGIONAL BIODIVERSITY AND CONSERVATION PLANNING EFFORTS

There are several areas, most of them near CBC Port Hueneme, where some of Ventura County's most important planning efforts are underway to document and protect or enhance significant natural resources in the region. These efforts are detailed in Section 1.5 of this IRMP for informational purposes and to provide a regional frame of reference for natural resources at CBC. These areas include (see Figure ES-1):

- McGrath State Beach and Natural Preserve;
- Ormond Beach;
- Mugu Lagoon/Calleguas Creek Watershed; and
- Channel Islands National Marine Sanctuary.

KEY RESOURCES SELECTED FOR PROTECTION, ENHANCEMENT, AND MANAGEMENT

Several key resources are located in various areas throughout the site (e.g., sensitive species, aesthetic and recreational resources), and others are concentrated in particular areas. Habitats on base (e.g., bulrush-cattail habitat) and certain landscaped areas have been designated as Special Interest Natural Areas (DoD DIR 4700.4) at CBC Port Hueneme and contain natural resources that warrant protection and special conservation efforts. These Special Interest Natural Areas are shown in Figure ES-2, and are listed in Table ES-1 according to their habitat value and restoration potential; Special Interest Natural Area A has the highest habitat value and restoration potential. Key cultural resources at CBC Port Hueneme are shown in Figures ES-3 and ES-4 and are also listed in Table ES-1.

Table ES-1
Key Resources Selected for Protection, Enhancement, and Management at CBC Port Hueneme

Natural Resources
Sensitive Species
Plant/Wildlife Habitat
Bulrush-cattail habitat (Special Interest Natural Areas A and B)
Coyote brush habitat (Special Interest Natural Area C)
Sand-verbena-beach bursage and sandy beach habitat (Special Interest Natural Area D)
Marine and subtidal habitat (Special Interest Natural Area E)
Bard Estate grounds (Area F)
Shelterbelts/Windrows (Area G)
Seabee Golf Course (Area H)
Water, Soil, and Air Quality
Aesthetic and Recreational Resources
Disease Vectors and Pests[1]
Cultural Resources
Historical Resources
Berylwood NRHP District (Thomas R. Bard Estate)
Farrell House
Buildings 383, 384, 385, 386 (World War II Quonset huts)
Archaeological Resources
Site CA-Ven-663 (Prehistoric shell midden site on both sides of channel entrance)
Site CA-Ven-975H (*Bahama Star/La Janelle* shipwreck site)
Reported Ethnohistoric Burial Site (Possible Ethnohistoric Burial at Thomas R. Bard Estate)

Note: 1 - Disease vectors and pests are considered "key resources" because they are plant and wildlife populations at CBC Port Hueneme that require control in order to protect other natural resources on base.

Mission-Related Impacts

Impacts to natural resource management programs on CBC Port Hueneme may occur as a result of mission-related activities on base. These impacts may have long-term and/or short-term effects on natural resources. Long-term impacts, such as those that arise during the construction of new facilities, usually involve habitat loss and degradation. Short-term impacts may include hazardous materials releases and wastewater discharges; these impacts are less predictable and more transient than the long-term impacts on base. Key resources should be managed so mission requirements are met while these resources are protected.

Figure ES-2 Special Interest Natural Areas on CBC Port Hueneme
11x17

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Figure ES-3 Significant Historic Resources/Historic Properties on, or Eligible for, Listing in the NRHP

11x17

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Figure ES-4 Archaeologically Sensitive Resources and Areas Surveyed on CBC Port Hueneme

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Program Goals and Priorities

The priorities of the Resources Management Program at CBC Port Hueneme as recommended in this IRMP are set using criteria set by the DoD to prioritize funding for resources management program projects. DoD gives priority to resources management program projects according to the certain criteria; Class O receives the highest funding priority and Class III receives the lowest funding priority (DoD I 4715.3).

PROGRAM IMPLEMENTATION RECOMMENDATIONS

Several management goals of the Resources Management Program involve continued operation and maintenance of ongoing projects or programs at CBC Port Hueneme (e.g., maintenance of a Pollution Prevention Plan), while others require implementation of new or improved projects. Natural and cultural resources projects that are recommended for the Resources Management Program are presented in Tables ES-2 and ES-3, respectively.

Each project has been assigned a unique project title and project reference number to help facilitate future funding efforts for these projects, and projects are listed in potential implementation order according to program priorities established according to DoD I 4715.3. A brief description of each recommended project is provided below for more detail. Details for management actions necessary to implement these projects are located in Section 4.3.1 of the IRMP.

PROGRAM DATA MANAGEMENT

The main data management objectives of the Resources Management Program at CBC Port Hueneme are to:

- Organize and continually update existing data on natural and cultural resources at CBC Port Hueneme.

- Ensure that resource managers at CBC Port Hueneme, base planners, other base personnel, base contractors, and outside agencies have access to the latest information on natural and cultural resources at CBC Port Hueneme so these resources are properly protected according to the IRMP.

In addition to developing the IRMP, a literature database and reference binder and Geographic Information System (GIS) have been compiled. GIS themes available for CBC Port Hueneme are displayed in Table ES-4.

Table ES-2
Recommended Natural Resources Projects Listed in Potential Implementation Order

Implementation Order	Project Title (Project Reference)	Program Priority
1	Integrated Pest Management Plan (IRMP-NR-1)	Class I
2	Basewide Wetland Delineation (IRMP-NR-2)	Class II
3	Sensitive Species Surveys and Floristic Inventory (IRMP-NR-3)	Class II
4	Habitat Protection and Restoration Plan for Special Interest Natural Area A (Bulrush-cattail Habitat) (IRMP-NR-4)	Class II
5	Habitat Protection and Restoration Plan for Special Interest Natural Area B (Bulrush-Cattail Habitat) (IRMP-NR-5)	Class II
6	Habitat Protection and Restoration Plan for Special Interest Natural Area D (Sand Verbena-Beach Bursage and Sandy Beach Habitats) (IRMP-NR-6)	Class II
7	Revision of the Base Exterior Architecture Plan (BEAP) (IRMP-NR-7)	Class II
8	Footpath/Greenbelt Loop (IRMP-NR-8)	Class III
9	Landscape and Recreation Improvements (IRMP-NR-9)	Class III
10	Protection Measures for Potential Monarch Butterfly Roosting Sites at NCBC Port Hueneme (IRMP-NR-10)	Class II
11	Protection Measures for Kelp Beds at NCBC Port Hueneme (IRMP-NR-11)	Class II
12	Protection Measures for the California Brown Pelican and California Least Tern at NCBC Port Hueneme (IRMP-NR-12)	Class II
13	Protection Measures for Marine Mammals at NCBC Port Hueneme (IRMP-NR-13)	Class II
14	Protection Measures for Native Bird Species at NCBC Port Hueneme (IRMP-NR-14)	Class II
15	Conduct Field Studies to Develop a Natural Resources Monitoring Program and Database (IRMP-NR-15)	Class III
16	Habitat Protection and Restoration Plan Special Interest Natural Area C (Coyote Brush Habitat) (IRMP-NR-16)	Class II
17	Adaptive Management Plan for Burrowing Owls at NCBC Port Hueneme (IRMP-NR-17)	Class II
18	Construction of Agricultural Outlease Area at IRP Site 14 (IRMP-NR-18)	Class III
19	Improvements to the Storm Water Pollution Prevention Plan (SWPPP) (IRMP-NR-19)	Class III
20	Improvements to the Recycling Program (IRMP-NR-20)	Class III
21	Drip Irrigation System Installation (IRMP-NR-21)	Class III
22	Outdoor Recreation Assessment (IRMP-NR-22)	Class III

Table ES-3
Recommended Cultural Resources Projects Listed in Potential Implementation Order

Implementation Order	Project Title (Project Reference)	Program Priority
1	Inventory and Evaluation of World War II-Era and Cold War-Era Buildings and Structures at the Naval Surface Warfare Center (NSWC) (IRMP-CR-1)	Class I
2	Develop Maintenance Plan for Historic Buildings and Grounds (IRMP-CR-2)	Class I
3	Establish a Programmatic Agreement with the State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP) (IRMP-CR-3)	Class II
4	Update National Register Nomination (especially information on the botanical garden and the "Guest House") (IRMP-CR-4)	Class II
5	Establishment of Treatment Procedures for Archaeological Resources (IRMP-CR-5)	Class III
6	Location and Evaluation of Possible Ethnohistoric Burial Site at the Thomas R. Bard Estate (IRMP-CR- 6)	Class III

Table ES-4
Existing GIS Themes for CBC Port Hueneme

GIS Themes Provided by the Navy[1]	GIS Themes Developed by Tetra Tech
Boundaries	
Real estate boundaries	Regional location within California[2]
Harbor area	
Operational areas	
Aerial/satellite images of site and operational area	
Facilities	
Buildings	
Infrastructure	
Roads, sewer lines, water lines, gas lines, petroleum pipelines and storage, electrical lines, communications, and other above- and below-ground utilities	
Major stationary equipment (e.g., power stations, generators)	
Known or suspected locations of abandoned underground utilities	
Operations	
Planned development	
EMI surveys (I band and C band radiation)	
Water usage	
Pesticide usage	
Potential Contaminants	
Installation Restoration Sites (with top 5 characteristic chemicals)	
Location of surveys, studies, soil borings, etc.	
Topography/Geology/Hydrology/Hydrogeology	
Topography	Soils[2]
Geological hazards	Geology[2]
Wells/pumps	
Groundwater depth and flow direction	
Drainage ditches	
Overland flow	
Flood areas at various PPP levels	
Natural Resources	
Legacy trees[4]	Sensitive species locations[2]
	Habitats[2]
	Canals/Drainage channels/Surface Water[2]
	Landscaped areas[3]
	Golf Course (regionally native plants and native wildlife)[3]
Cultural Resources	
	Archaeologically sensitive resources and areas surveyed[2]
	Historic properties on, or eligible for listing on the National Register of Historic Places[2]
Management Options	
	Special Interest Natural Areas[2]
	Areas Designated for Land Use Improvements[3]

Notes: 1 - Data provided by the Navy in AutoCAD, Excel, or Microsoft Access.
2 - Themes included in this IRMP.
3 - Themes in progress.
4 - For purposes of this document, legacy trees are defined as those with 6 inch or greater circumference.

FUNDING SOURCES

Funding for resources management programs at DoD installations has traditionally been through the following programs:

- Fish and Wildlife and Outdoor Recreation Fees;
- Legacy Resource Management Program;
- National Environmental Compliance Account (NECA) Program;
- Coastal America Program;
- Strategic Environmental Research and Development Program (SERDP);
- Agricultural Outlease Program; and
- Operations and Maintenance (O&M) Funds.

However, because funding availability for federal projects is continually changing, these programs may no longer provide funding for installation resources management programs or may stop funding these programs in the future. Each program is described in more detail in Section 4.6 of the IRMP, along with potential funding sources for recommended management actions.

How to Use this Plan

This IRMP is written for the Public Works Office of CBC Port Hueneme and will be used to implement the resources management program for the site for the period from 1999 to 2004. This plan will be a primary consideration during the master planning process and for land use and development decisions at CBC Port Hueneme (DoDDIR 4700.4, DoDDIR 4710.1). This plan will also serve as a tool in prioritizing funding for the natural and cultural resources management programs at CBC Port Hueneme.

This plan should be considered a living document, and has been compiled in a modular format to facilitate replacement of data and maps as they change and are updated. This plan will be reviewed on an annual basis and revised at least every 5 years (DoDDIR 4700.4, DoD I 4715.3).

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1.0 INTRODUCTION

This Integrated Natural and Cultural Resources Management Plan (IRMP) has been prepared to document natural and cultural resources found at the Construction Battalion Center (CBC) Port Hueneme, as well as to develop preliminary recommendations for the immediate and future management of natural resources at CBC Port Hueneme. CBC Port Hueneme is one site in the Naval Base Ventura County; the other site is Naval Air Station (NAS), Point Mugu. The IRMP fulfills a requirement set forth by the 1997 amendments to the Sikes Act, which requires preparing and implementing an IRMP for each military installation in the United States. Most Department of Defense (DoD) installations have prepared previously adopted, focused, natural resource-related plans (such as a Fish and Wildlife Management Plan) to address natural resource issues. However, due to the generally disturbed nature of most of the land and minimal extent of natural areas at CBC Port Hueneme, as well as the relatively small size of the site (approximately 1,650 acres), no previous natural resource plans specific to CBC Port Hueneme were available for the development of this plan. As a result, the findings of this plan are more general and introductory in nature. Several management goals proposed in this IRMP recommend further field work to augment the baseline information on the natural resources.

Cultural resources at CBC Port Hueneme have been documented in the Historic and Archaeological Resources Protection Plan (HARP). This IRMP builds upon the existing work completed in the HARP, and offers additional suggestions for managing and protecting cultural and historical resources.

The plan is organized in the following manner:

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Chapter 2.0 discusses the general pre-history and history of CBC Port Hueneme, up to and including present day uses of the military, to provide the reader with an overall background of the site and its uses.

Chapter 3.0 describes the existing environment for both cultural and natural resources, including climate, soils, landforms and geology, water resources (surface and groundwater), vegetation, wildlife, outdoor recreation, cultural and historic resources, existing land use, and agricultural areas. This chapter documents observations for species in the field, and if not actually observed or previously documented, their likelihood for existence on CBC Port Hueneme. It also describes any current management practices and issues associated with existing resources, where applicable.

Chapter 4.0 recommends management actions for CBC Port Hueneme based on knowledge gained from documenting the existing resources and management practices. A comprehensive list of recommended projects is contained in this chapter, including criteria for prioritization, recommended implementation order, and funding sources.

1.1 LOCATION

CBC Port Hueneme is located on the coast of Ventura County, California, adjacent to the cities of Port Hueneme and Oxnard (Figure 1-1). Port Hueneme is surrounded by the City of Oxnard to the east and north with Channel Islands Harbor bordering the west. Port Hueneme is geographically located on the

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Figure 1-1 Location Map of CBC Port Hueneme
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Oxnard Plain, which is bordered by the Sulphur Mountains and Saouth Mountain on the north, the Santa Monica Mountains to the southeast**,** and the Pacific Ocean on the southwest. It is situated within the Venturan structural basin of the Western Transverse Ranges Geomorphic Province of California (Norris & Webb 1990). Groundwater aquifers in the region are part of the Oxnard Plain groundwater basin (Turner 1975). Silver Strand Beach and the Pacific Ocean border the southern portion of the base.

1.2 PURPOSE, GOALS, MILITARY MISSION, AND REQUIREMENT FOR THE IRMP

1.2.1 Military Mission

The mission of CBC Port Hueneme is to support the Naval Construction Force, fleet units, and units deployed from, or stationed at, the base. Support includes storage and ship advancement of mobilization construction materials, equipment, and provisions. CBC Port Hueneme also trains personnel for construction battalions and performs engineering and technical services. At present, CBC Port Hueneme is responsible for procurement, storage, maintenance, and disposal of the construction equipment and materials that make up the Propositioned War Reserve Material Stocks. Many of the Center's departments, such as the Supply Department, Comptroller, Civil Engineers Support Office, and Facilities System Office provide direct support to other Navy commands. In addition, CBC Port Hueneme provides support to more than 40 tenant commands with missions ranging from Seabee support to shipboard missile systems testing.

The tenant commands include:

- 1st Naval Construction Regiment;
- NR COMNAVFORKOREA DET;
- Naval Construction Training Center;
- Naval Facilities Engineering Service Center;
- Naval Civil Engineer Corps Officer School;
- Port Hueneme Division, Naval Surface Warfare Center (NSWC);
- Naval Construction Force Support Unit Two;
- Engineering Duty Officers School;
- Seabee Logistics Center;
- Naval Reserve Center, Port Hueneme; and
- Navy Cargo Handling Battalion 14.

CBC Port Hueneme was established early in the Second World War (1942) to train, stage, and supply the Seabees. Since then, the site has provided peacetime support to the Seabees, and served the Navy as a major port throughout the Second World War, the Korean War, the Vietnam War, and the 1990 conflict in the Middle East. The mission of CBC Port Hueneme is similar to its mission in 1942: to provide a home

port and to furnish training, administrative, and logistic support for Seabees serving in many parts of the world (U.S. Navy 1998a). As part of the Navy's streamlined shore structure management under the direction of Commander Naval Base San Diego and Commander in Chief U.S. Pacific Fleet, Port Hueneme provides site operation support services to the military defense complex in Ventura County encompassing all military activities at CBC Port Hueneme and NAS, Point Mugu (McConnell 1999). Through this effort, the site supports diverse DoD missions from mobilization and military training to test and evaluation of air and shipboard weapons systems for the strategic defense of the United States.

1.2.2 Requirement for the IRMP

On 18 November 1997, Congress passed the Sikes Act Improvement Amendments (SAIA) as part of the Fiscal Year 1998 DoD Authorization Act. As the principal legislation governing natural resources management on military lands, the SAIA requires significant changes to natural resources programs implemented on military lands (Pohlman 1999). The SAIA specifically states:

"The Secretary of each military department shall prepare and implement an integrated natural resources management plan (IRMP) for each military installation in the United States...The entire plan shall...provide for:

- Fish and wildlife management, land management, forest management (where applicable) and fish- and wildlife-oriented recreation;
- Fish and wildlife habitat enhancement or modifications;
- Wetland protection, enhancement, and restoration (where necessary for support of fish, wildlife, or plants);
- Integration of, and consistency among, the various activities conducted under the plan;
- Establishment of specific natural resource management goals and objectives and time frames;
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources;
- Public access to the military installation that is necessary or appropriate for the use described above, subject to the requirements necessary to ensure safety and military security;
- Enforcement of applicable natural resource laws (including regulations); and
- No net loss in the capability of military installation lands to support the military mission of the installation."

The SAIA also requires that IRMPs be reviewed annually by the natural resources staff and revised on a 5-year cycle.

1.2.3 Purpose and Goals of the IRMP

The purpose of this IRMP is to set the agenda for managing CBC Port Hueneme's natural and cultural resources for the next 5 to 10 years. This IRMP is also intended to document baseline resources, review current management practices related to natural and cultural resources at CBC Port Hueneme, and provide guidance on prioritizing appropriate methods for natural resource preservation and enhancement (in accordance with applicable regulations). Ultimately, the goals contained within this plan should provide a framework for daily land use and resource management decision making.

As described elsewhere in this plan, integrated natural resource management has specific goals that are shaped by the military mission, DoD guidelines and directives, pertinent laws and regulations, public needs, public values, ecological theory and practice, and management experience. Among the most important goals are the restoration, maintenance, and protection of biological diversity, biological integrity, and ecological health, while allowing for the military mission and appropriate human uses. In this IRMP, ecological health forms the umbrella under which appropriate management goals and actions are recommended.

The long time horizon for implementing recommended management goals is meant to assist CBC Port Hueneme with integrating its natural and cultural resources management with the installation's mission. Management strategies have been developed which, when combined, should provide optimum opportunity for CBC Port Hueneme natural resources to flourish. The IRMP provides integrated, ecosystem-based resource management strategies for a 5-year period. The plan is intended to be a living document integrating all aspects of natural resource management with CBC Port Hueneme's mission.

This IRMP uses adaptive management strategies to provide an alternative to traditional environmental planning by stressing inventiveness and flexibility in approaching environmental problems. Through interim monitoring, adaptive management provides the information required to assess the effect of management goals on habitat improvement, ecological restoration, and species preservation. Such an approach provides the proactive management strategy needed to successfully protect ecosystems in the face of change.

1.3 REGULATORY AGENCY OVERSIGHT/REQUIREMENTS

Table 1-1 lists the primary federal agencies that have jurisdiction over natural and cultural resources at CBC Port Hueneme. In certain circumstances, state agencies also have jurisdiction over natural and cultural resources at military installations. State agencies with jurisdiction at CBC Port Hueneme are also presented in Table 1-1. Each agency's role in overseeing natural and cultural resources at CBC Port Hueneme is discussed below. Although the California Department of Fish and Game does not have oversight or jurisdiction of natural resources at the Port Hueneme site, it is discussed below because it is a cooperative partner in the preparation of this plan. The California Coastal Commission has a similar role. All applicable regulations for natural and cultural resource management on CBC Port Hueneme are discussed in detail in Appendix A, and a summary of these regulations is provided in Table 1-2.

Table 1-1
Federal and State Agencies with Oversight over Natural and Cultural Resources at CBC Port Hueneme

Federal	State
Natural Resources	
United States Fish and Wildlife Service	
National Marine Fisheries Service	California Coastal Commission
United States Environmental Protection Agency	California Environmental Protection Agency
United States Army Corps of Engineers	
Cultural Resources	
Department of the Interior	California State Historic Preservation Officer

Table 1-2
Regulations, Guidance, and Policies Affecting CBC Port Hueneme

Regulation Name	Enforcement Agency or Agencies	Action
Navy Operations and Natural Resources Management Procedural Manual, Volume 2	DoD	Addresses all Chief of Naval Operations natural resource program requirements, guidelines, and standards.
Navy Historic and Archeological Resources Protection Planning (HARP) Guidelines	DoD	Provides guidelines for the development and implementation of HARP plans.
SECNAVINST 6240.6E	DoD/Department of the Navy Environmental Protection and Natural Resource Management Program	Requires the Navy to implement and maintain natural resources programs on all land and water areas under Navy jurisdiction.
DoD I 4715.3	DoD/Environmental Conservation Program	Implements policy, prescribes procedures, and assigns responsibilities to the Navy for the integrated management of natural and cultural resources on DoD property.
DoDDIR 4700.4	DoD/Natural Resources Management Program	Requires the Navy to implement and maintain a balanced and integrated program for natural resource management.
DoDDIR 4710.1	DoD/Archeological and Historic Resources Management program	Protects archeological and historic resources.

Table 1-2
Regulations, Guidance, and Policies Affecting CBC Port Hueneme

Regulation Name	Enforcement Agency or Agencies	Action
Sikes Act, as amended	DoD	Requires the preparation of an Integrated Resources Management Plan for DoD installations.
National Environmental Policy Act of 1969	Environmental Protection Agency	Protects natural resources by ensuring assessment of environmental impacts of proposed development.
Marine Mammal Protection Act of 1972	National Marine Fisheries Service (Department of Commerce) and U.S. Fish and Wildlife Service (Department of Interior)	Prohibits taking of marine mammals, except for incidental take under certain permitted activities.
Endangered Species Act of 1973 as amended	U.S. Fish and Wildlife Service, National Marine Fisheries Service	Protect proposed and listed threatened and endangered marine and terrestrial species and their critical habitat.
Memorandum from the White House for the Heads of Executive Departments and Agencies (26 April 1994)	White House Memorandum	Contains recommendations to increase environmentally and economically beneficial landscaping practices at Federal facilities and federally funded projects. "Environmentally beneficial" entails the use of regionally native plants and employing landscaping practices and technologies that conserve water and prevent pollution.
Memorandum from the Office of the Under Secretary of Defense to the Assistant Secretary of the Navy (23 September 1994)	DoD	Directs the Assistant Secretary of the Navy to implement recommendations in the "Memorandum from the White House on Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds" in Integrated Pest Management Plans.
Executive Order 11987 Exotic Organisms	Federal Regulation	Restricts the introduction of exotic species into natural ecosystems.

Table 1-2
Regulations, Guidance, and Policies Affecting CBC Port Hueneme

Regulation Name	Enforcement Agency or Agencies	Action
Executive Order 13112 Invasive Species (Replaces Executive Order 11987)	Federal Regulation	Prevent the introduction of invasive species and restore native species and habitats that have been invaded.
Migratory Bird Treaty Act of 1972	Federal Regulation	Protects most species of native birds, their nests, eggs, and young.
Rivers and Harbors Act of 1899	Federal Regulation / Army Corps of Engineers	Protects natural resources and habitats by regulating development in or over navigable waters.
Clean Water Act of 1977	Army Corps of Engineers	Protects natural resources by requiring permits for discharge and development in waters of the United States.
Executive Order 11990, Protection of Wetlands	All federal agencies responsible for permitting projects in wetlands.	Protects fish and wildlife species by requiring agencies to act to minimize destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
Executive Order 11988, Floodplain Management	Federal Regulation	Provides direction to reduce harm to and within floodplains.
Federal Coastal Zone Management Act of 1972	National Oceanic and Atmospheric Administration	Protects coastal species by authorizing National Oceanic and Atmospheric Administration to grant funds to states to develop coastal zone management programs to preserve, protect, develop, and restore or enhance coastal resources.
Fish and Wildlife Coordination Act of 1958	Army Corps of Engineers in coordination with U.S. Fish and Wildlife Service and state agencies.	Protects fish and wildlife species by requiring Army Corps of Engineers to consult with U.S. Fish and Wildlife Service and state agencies on permit applications for water resources development projects.

Table 1-2
Regulations, Guidance, and Policies Affecting CBC Port Hueneme

Regulation Name	Enforcement Agency or Agencies	Action
National Historic Preservation Act of 1966, as amended	Federal Regulation	Protects prehistoric and historic cultural resources.
Native American Graves and Repatriation Act of 1990	Federal Regulation	Addresses the rights of lineal descendants and members of Indian tribes and Native Hawaiian groups to ownership of Native American human remains and funerary or sacred objects.
Archaeological Resources Protection Act of 1979	Federal Regulation	Prevents disturbance of archaeological resources and sites on public and Indian lands.
California Coastal Act of 1976	Ventura County	Protects biological resources in the coastal zone.

1.3.1 Natural Resources

1.3.1.1 U.S. Fish and Wildlife Service

Pursuant to the federal Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (USFWS) recovers plant and animal species that are federally listed as threatened or endangered, or proposed for listing as threatened or endangered, as well as their critical habitats. The USFWS prohibits the taking of any of these species and any adverse modification of critical habitat (except under certain permitted activities). The USFWS is also responsible for determining candidates for listing. Among its many other tasks, USFWS is also responsible for protecting most species of native birds (e.g., all migratory birds), including their nests, eggs, and young pursuant to the Migratory Bird Treaty Act of 1972. Again, the USFWS prohibits the taking of any of these bird species, except under certain permitted activities.

1.3.1.2 National Marine Fisheries Service

Pursuant to the federal Endangered Species Act of 1973, as amended, the National Marine Fisheries Service (NMFS) protects marine species that are federally-listed as threatened or endangered, or proposed for listing as threatened or endangered, as well as their critical habitats. For marine species, they also are responsible for determining candidates for listing. Pursuant to the Marine Mammal Protection Act of 1972, NMFS prohibits the taking of any marine mammals, except for incidental take under certain permitted activities.

1.3.1.3 U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency's (U.S. EPA's) mission is to safeguard the nation's environment. Among its many roles, U.S. EPA is responsible for protecting the quality of the nation's

air, surface water, groundwater, wetlands and soil pursuant to the Clean Air Act, Clean Water Act (CWA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), Resource Conservation and Recovery Act (RCRA), and other regulations. Pursuant to the National Environmental Policy Act (NEPA), U.S. EPA also protects natural and cultural resources and other resources by ensuring that the potential environmental impacts of proposed federal development projects are assessed.

1.3.1.4 U.S. Army Corps of Engineers

Pursuant to Section 404 of the CWA of 1977, the U.S. Army Corps of Engineers (USACE) protects jurisdictional waters and wetlands of the United States by requiring a permit for fill-dredge projects that discharge into or develop these resources. Pursuant to the Rivers and Harbors Act of 1899, USACE also regulates development in or over navigable waters. The Los Angeles District of the USACE is responsible for dredging operations in harbors and implementing beach erosion control measures along the Southern California coast.

1.3.1.5 California Department of Fish and Game

Pursuant to the Sikes Act Amendments of 1997, this Plan is being prepared in cooperation with the California Department of Fish and Game (CDFG). Pursuant to the California Endangered Species Act of 1970, the CDFG is responsible for protecting plant and animal species that are state-listed as rare, threatened, and endangered. They also are responsible for determining candidates for listing and CDFG species of special concern.

1.3.1.6 California Coastal Commission

The California Coastal Commission (CCC) is designated as the State coastal zone management agency responsible for administering the federal Coastal Zone Management Act (CZMA) of 1972 in California. Policies of the CZMA deal with public access to the coast, coastal recreation, the marine environment, coastal land resources, and coastal development of various types, including energy facilities, ports, and other industrial development. Activities authorized, funded or carried out by the federal government that affect coastal zone resources must be reviewed by CCC for consistency with the federally approved California Coastal Management Program, including the California Coastal Act of 1976. Federal activities should be consistent to the maximum extent practical with CCC direction.

1.3.1.7 California Environmental Protection Agency

The mission of the California Environmental Protection Agency (CalEPA) is to improve environmental quality in order to protect public health, the welfare of our citizens, and California's natural resources. CalEPA is often delegated by U.S. EPA to protect the quality of California's air, surface water, groundwater, and soil. CalEPA comprises a number of constituent organizations including the Air Resources Board (ARB), Department of Pesticide Regulation (DPR), Department of Toxic Substances Control (DTSC), State Water Resources Control Board (SWRCB), and the Regional Water Quality Control Boards (RWQCB).

1.3.2 Cultural Resources

The California State Historic Preservation Officer (SHPO) is an appointed official responsible for administering the National Historic Preservation Act within California. Pursuant to the National Historic Preservation Act of 1966, the California SHPO and the Advisory Council on Historic Preservation

(ACHP) are responsible for reviewing any undertakings that may effect historic properties (i.e., those properties that are listed, or have been determined eligible for listing, in the National Register of Historic Places). Undertakings that occur on federal land, are funded with federal money, or require a federal permit are subject to review by the SHPO and ACHP. If a determination of no historic properties, no effect, or no adverse effect for an undertaking is made by the sponsoring agency, this finding is submitted to the SHPO for concurrence. The SHPO reviews the proposed undertaking and the work conducted to make the determination and either concurs with the finding, or makes recommendations for additional studies, if appropriate. If a determination of adverse effect is made, the finding is submitted to the ACHP, as well as the SHPO. Appropriate mitigation measures are developed in consultation between the agency, SHPO, and ACHP.

1.4 FISH AND WILDLIFE INTERAGENCY COORDINATION

As required in the Sikes Act, as amended (Section 2904[a][2]), this IRMP has been prepared in cooperation with the Secretary of the Interior, acting through the Director of the USFWS, and the head of CDFG. Because the Secretary of Commerce, acting through the NMFS, has jurisdiction over marine fishes and marine mammals, this IRMP has been prepared in cooperation with NMFS as well. This Plan reflects the mutual agreement of the Secretary of the Navy, Secretary of the Interior, Secretary of Commerce, and California Department of Fish and Game (CDFG) concerning conservation, protection, and management of fish and wildlife resources at CBC Port Hueneme. Nothing in this IRMP affects any provision of a federal law governing the conservation or protection of fish and wildlife species, or enlarges or diminishes California's responsibility and authority for the protection and management of fish and resident wildlife.

1.5 APPLICABLE REGIONAL BIODIVERSITY AND CONSERVATION PLANNING EFFORTS

There are several areas near CBC Port Hueneme, where some of Ventura County's most important planning efforts are underway to document and protect or enhance significant natural resources in the region. These regional efforts include (Figure 1-1):

- McGrath State Beach and Natural Preserve;
- Ormond Beach;
- Mugu Lagoon/Calleguas Creek Watershed; and
- Channel Islands National Marine Sanctuary.

Ongoing conservation and restoration efforts for each of these areas are discussed below for informational purposes and to provide a regional frame of reference for natural resources at CBC. Although CBC Port Hueneme is located within an urban environment, the site is juxtaposed between these natural areas, and therefore, conservation and restoration of natural resources at CBC Port Hueneme contributes to the regional conservation effort by providing an ecological "stepping stone" between these areas. Water, sediment, and soil resources management at CBC Port Hueneme (i.e., management of storm water quality, beach erosion, dredging of the harbor) also have potential impacts on areas south of CBC Port Hueneme (e.g., Ormond Beach).

1.5.1 McGrath State Beach and Natural Preserve

McGrath State Beach is located approximately 3 miles north of CBC Port Hueneme, at the mouth of the Santa Clara River in Ventura County, and was formed in 1962 by the California Department of Parks and Recreation (McIver 1990). The park encompasses 295 acres between Harbor Boulevard and the ocean, including McGrath Lake, 2 miles of sandy beach, and the mouth of the Santa Clara River. The Natural Preserve portion of the park was designated in 1977 and includes the lagoon at the mouth of the Santa Clara River and areas of adjacent sandy beach, coastal dune, riparian shrubland, and salt marsh to the south of the lagoon.

McGrath State Beach is designated as a Significant Biological Resource in Ventura County (Ventura County Planning Division 1997). The McGrath State Natural Preserve is a distinct area of outstanding natural and scientific significance within McGrath State Beach that has been set aside to preserve "rare or endangered plant and animal species and their supporting ecosystems, [and] representative examples of plant or animal communities existing in California prior to the impact of civilization." Several federal and state endangered plant and animal species occur at McGrath State Beach and Natural Preserve along with habitats considered sensitive by the California Department of Fish and Game, including southern coastal salt marsh, coastal freshwater marsh, and southern riparian scrub.

Currently, a steering committee of federal, state and local agencies is developing an Enhancement and Management Plan for the Santa Clara River that will benefit the McGrath State Beach and Natural Preserve.

1.5.2 Ormond Beach

Ormond Beach is less than 1 mile southeast of CBC Port Hueneme and is immediately adjacent to and northwest of NAS Point Mugu. South Ormond Beach is a 141-acre site, currently located on Southern California Edison-owned property, that supports a number of federal and state endangered plant and animal species and consists of sandy beach, coastal sand dune, southern coastal salt marsh, salt and mud flat, coastal brackish marsh, and coastal freshwater marsh habitats. Ormond Beach is designated as a Significant Biological Resource in the Ventura County General Plan (Ventura County Planning Division 1997).

South Ormond Beach (Arnold Road Wetlands), along with another coastal wetland area at Ormond Beach that is currently owned by the Metropolitan Water District (McWane Boulevard Wetlands), are being considered for restoration under the Southern California Wetlands Clearinghouse program. The Southern California Wetlands Clearinghouse is a partnership of public agencies (e.g., California Coastal Conservancy, USFWS, U.S. EPA) working cooperatively to acquire, restore, and enhance coastal wetlands and watersheds in southern California.

The *South Ormond Beach Wetland Restoration and Management Plan* (Jones & Stokes Associates, Inc. 1995), outlines three proposed phases to restoration at South Ormond Beach. Phase 1 includes debris removal, removing exotic invasive plants, revegetating damaged areas, controlling public access, installing signs, providing limited education activities, and monitoring water quality, water levels, vegetation, and wildlife. Phase 2 includes excavating excessive surface salt deposits and constructing a series of ponds and connecting channels to reduce hypersaline conditions and increase habitat diversity. Phase 3 involves establishing a hydrologic connection between South Ormond Beach and the Oxnard Drain, and establishing hydrologic and habitat connections between South Ormond Beach and the wetlands and waters of Mugu Lagoon at NAS Point Mugu.

1.5.3 Mugu Lagoon/Calleguas Creek Watershed

Mugu Lagoon is located at NAS Point Mugu, approximately 3 miles southeast of CBC Port Hueneme, and is part of the Calleguas Creek Watershed. This 1,474-acre lagoon is designated as a Significant Biological Resource in the Ventura County General Plan (Ventura County Planning Division 1997) and is the wetland area within Ventura County with the richest biodiversity. Boundaries of the Santa Monica Mountains Recreation Area extend into the main site of NAS Point Mugu encompassing a portion of Mugu Lagoon (Gillespie-DeLorenzo, ASLA & Associates, Inc. 1986). Mugu Lagoon shelters remnants of many plant and animal populations, including several federal and state endangered species, which once occurred along the coast from the Ventura River to the Santa Monica Mountains. Ocean waters offshore of Mugu Lagoon are also designated part of the "Mugu Lagoon to Latigo Point Area of Special Biological Significance" by the State Water Resources Control Board (SWRCB 1979). This designation recognizes that certain biological communities, because of their value or fragility, deserve special protection that consists of preservation and maintenance of natural water quality conditions to the extent practicable.

Impaired surface water and groundwater quality, and erosion and sedimentation of Calleguas Creek and its tributaries and inputs from agricultural return drainages, threaten to degrade Mugu Lagoon and the Mugu Lagoon to Latigo Point Area of Special Biological Significance. Sedimentation of Mugu Lagoon is a key threat to this ecosystem; it is anticipated that if sedimentation of Mugu Lagoon is not lessened, the lagoon will fill in within 50 years (California Coastal Conservancy 1997).

A Calleguas Creek Watershed Management Plan Committee consisting of federal, state, and local agencies; environmental advocacy groups; land owners; and elected officials was established to prepare a Calleguas Creek/Mugu Lagoon Watershed Management Plan that will present a strategy for the preservation, enhancement, and management of the watershed's resources. This management plan is being developed.

1.5.4 Channel Islands National Marine Sanctuary

An area with a 6 nautical mile radius around the northern Channel Islands and Santa Barbara Island was designated as a national marine sanctuary in 1980. Anacapa Island is the island closest to CBC Port Hueneme and is located within 14 nautical miles of the base. Anacapa Island and other islands of the sanctuary provide exceptional habitat for a number of protected marine mammal species, seabirds, fish, shellfish, kelp, and intertidal organisms. Harbor seals are known to breed on Anacapa Island. The only permanent rookery for the federal and state endangered California brown pelican also occurs on Anacapa Island.

The four main objectives of the Channel Islands National Marine Sanctuary Management Plan (James Dobbin Associates, Inc. 1983) include (1) enhance protection of the marine environment and resources of the sanctuary, (2) ensure that research activities within the sanctuary are directed to resolve management concerns and to increase the understanding of the sanctuary environment and resources, (3) ensure that interpretative programs enhance public awareness and understanding of the significance of the sanctuary, and (4) encourage commercial and recreational use of the sanctuary that is compatible with protection of its resources.

1.6 RESOURCE MANAGEMENT PROGRAM

The objective of the integrated natural and cultural resources management program (resources management program) at CBC Port Hueneme is to conserve and manage the soil, water, plant, fish, wildlife, and outdoor recreation resources on site to maximize multiple land use benefits; to fulfill land

stewardship responsibilities required by applicable laws, Executive Orders, and DoD Directives; and to identify, protect, and manage archeological, cultural, and historic resources on base while conducting ongoing mission-related activities. A brief introduction to the Resources Management Program at CBC Port Hueneme is provided in this section, including discussions of:

- The key resource values to be considered at CBC Port Hueneme;
- Program interaction with mission requirements;
- The responsibility for implementation of the program at CBC Port Hueneme; and
- The use of Geographic Information Systems (GIS) in resources management on base.

Section 4.0 provides more detail regarding the planning and implementation of the Resources Management Program at CBC Port Hueneme including a discussion of the program's priorities, management goals, and recommended management actions for key natural and cultural resources on base.

1.6.1 Key Resource Values to be Considered at CBC Port Hueneme

Key natural resources to be considered at CBC Port Hueneme include sensitive species; wetlands; native plants, fish, and wildlife; soil; surface water; groundwater; landscaping and site grounds; agricultural outlease areas; and areas for outdoor recreation. Maintaining the composition, structure, and function of habitats at CBC Port Hueneme, promoting biodiversity on base, and maintaining or restoring soil and water quality are key goals of the resources management program.

Cultural resources to be protected and managed at CBC Port Hueneme include archeological resources and archeological artifact collections and associated records, cultural items, and properties listed on the National Register of Historic Places or properties eligible for such listing.

1.6.2 Interaction with Mission Requirements of CBC Port Hueneme and Tenant Commands

The principal purpose of the lands and waters of CBC Port Hueneme is to support mission-related activities for CBC Port Hueneme and its tenant commands. According to the Sikes Act, as amended, the resources management program shall be consistent with CBC Port Hueneme mission and the missions of its tenant commands. Management of natural and cultural resources at CBC Port Hueneme, however, 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.

1.6.3 Mission-Related Impacts

Impacts to natural resources on CBC Port Hueneme may occur as a result of some mission-related activities. The military uses on CBC Port Hueneme cause mission-related impacts to natural resources on base. These impacts may be long or short term, ranging from widespread habitat degradation to hazardous materials releases. Understanding the potential basewide impacts on habitats and vegetation, wildlife, and pollution prevention management from base activities is critical in evaluating and developing resource management programs. Key resources should be managed so mission requirements are met while protecting these resources. In Section 4.0 of this IRMP is further discussion of potential mission-related impacts on vegetation and habitat, wildlife, and pollution prevention management.

1.6.4 CBC Port Hueneme Responsibility for Natural Resource and Environmental Programs

The Environmental Division of the Public Works Department, under the direction of the Commanding Officer, Naval Base Ventura County, is responsible for coordinating efforts and funding for natural resource and environmental programs. The Environmental Division receives program and policy support and guidance from the Navy Region Southwest (NRSW), San Diego. The Region is the Commander-in-Chief, Pacific Fleet's (CINCPACFLT) local agent for ensuring environmental programs are effectively managed. The Region is supported by Southwest Division, Naval Facilities Engineering Command (SWDIV) which provides assistance to many local installations.

1.6.5 Conservation Awareness

Conservation awareness on CBC Port Hueneme is implemented by multiple basewide environmental programs. The conservation effort on site will continue to expand as this IRMP and subsequent natural resource management programs are undertaken to ensure efficient and thorough management of the natural resources on base. Conservation programs currently in place on CBC Port Hueneme include the following:

- An Energy Showcase Program, comprising many different conservation projects on base. These efforts range from a steam plant decentralization program to the construction of an environmentally sustainable building. Section 3.5.3.1 further describes this program.

- Recycling program for materials used in basewide operations, including metals, oil, oil filters, cardboard, white paper, glass, and aluminum.

- Water conservation efforts, mostly under the Energy Showcase Program. These efforts include a gray water recovery system, low flow plumbing fixtures, and irrigation system planning to reduce water usage. These efforts are described in Section 3.5.3.1.

- Storm water pollution monitoring for toxic pollutants and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

1.6.6 Use of GIS

GIS maps and overlays guide the land use planning on CBC Port Hueneme. Specific overlays will also be produced as part of this IRMP. These maps identify land uses and natural resource constraints for future planning projects. The text and maps developed and used as a part of the IRMP will be used to assess impacts to natural resources. These maps will be updated as new information becomes available. The department on site responsible for planning is the Facilities Planning Branch, Public Works. Table 1-3 shows the GIS themes that CBC Port Hueneme provided, and themes currently included or in progress as part of this IRMP.

1.6.7 How to Use this Plan

This IRMP is written for the Public Works Office of CBC Port Hueneme and will be used to implement the resources management program for the site for the period from 1999 to 2004. This Plan will be a primary consideration during the master planning process and for land use and development decisions at CBC Port Hueneme (DODDIR 4700.4, DODDIR 4710.1). This Plan will also serve as a tool in prioritizing funding for the natural and cultural resources management programs at CBC Port Hueneme.

This Plan should be considered a living document, and has been compiled in a modular format to facilitate replacement of data and maps as they change and are updated. This Plan shall be reviewed on an annual basis and revised at least every 5 years (DODDIR 4700.4, DOD I 4715.3).

Table 1-3
GIS Themes for the IRMP

GIS Themes Provided by the Navy[1]	GIS Themes Developed by Tetra Tech
Boundaries	
Real estate boundaries	Regional location within California[2]
Harbor area	
Operational areas	
Aerial/satellite images of site and operational area	
Facilities	
Buildings	
Infrastructure	
Roads, sewer lines, water lines, gas lines, petroleum pipelines and storage, electrical lines, communications, and other above- and below-ground utilities	
Major stationary equipment (e.g., power stations, generators)	
Known or suspected locations of abandoned underground utilities	
Operations	
Planned development	
EMI surveys (I band and C band radiation)	
Water usage	
Pesticide usage	
Potential Contaminants	
Installation Restoration Sites (with top 5 characteristic chemicals)	
Location of surveys, studies, soil borings, etc.	
Topography/Geology/Hydrology/Hydrogeology	
Topography	Soils[2]
Geological hazards	Geology[2]
Wells/pumps	
Groundwater depth and flow direction	
Drainage ditches	
Overland flow	
Flood areas at various PPP levels	
Natural Resources	
Legacy trees[3]	Sensitive species locations[2] Habitats[2] Canals/Drainage channels/Surface Water[2] Landscaped areas[2] Golf Course (regionally native plants and native wildlife)[2]
Cultural Resources	
	Archaeologically sensitive resources and areas surveyed[2] Historic properties on, or eligible for listing on the National Register of Historic Places[2]
Management Options	
	Special Interest Natural Areas[2] Areas Designated for Land Use Improvements[2]

Notes: 1 - Data provided by the Navy in AutoCAD, Excel, or Microsoft Access.
2 - Themes included with this IRMP.
3 - For purposes of this document, legacy trees are defined as those with 6 inch or greater circumference.

2.0 CBC PORT HUENEME HISTORY, MILITARY MISSION, AND LAND USE

Port Hueneme has a rich, diverse cultural history, likely dating back at least 7,000 years. Many historical areas are located on CBC, including historic structures and one historic district, Berylwood (the Bard Estate), has been listed on the National Register of Historic Places. This chapter provides a comprehensive background of CBC Port Hueneme area, from prehistoric times, up through the present military uses of the base.

2.1 HISTORIC BACKGROUND

The history of land use of the Port Hueneme area can be divided into three phases: prehistory, ethnohistory, and history. Prehistory is defined here as the period of native occupation of the land before European contact (up to approximately 1770 AD). Most of the information about this period is available only through archaeological data and paleoenvironmental reconstructions. Ethnohistory covers a period of native occupation of the land after European contact but prior to settlement of the land by Euro-Americans. Information about this period is available through ethnographic data obtained by early explorers, missionaries, and researchers, and can be supplemented with archaeological data. History includes the period of Euro-American occupation of the land. Information on this period is available through written records and archaeological data.

2.1.1 Prehistory of the Port Hueneme Area

The Santa Barbara subregion of the Southern Coastal region of California extends from Santa Monica northward to Morro Bay, including the Port Hueneme area, and contains both coastal and mountain zones. Santa Rosa, Anacapa, San Miguel, and Santa Cruz islands, delineating the Santa Barbara Channel, are also included.

Archaeological evidence suggests that the region encompassing present-day Port Hueneme may have been inhabited by Native American hunter-gatherers for as long as 7,000 years before European intrusion (King 1981). The flora and fauna of the region provided a rich subsistence base to support a large prehistoric population (Moratto 1984). When the Spanish made contact with the natives of the Port Hueneme area in October 1542, the language spoken by the Indians was the Ventureño dialect of the Chumash language (Grant 1978b; Uribe & Associates 1998).

Five different chronological sequences have been suggested for prehistoric occupation of the Santa Barbara subregion. These chronologies are based on changes in artifact attributes and assemblages over time. The chronologies have undergone numerous revisions over the past 70 years since the earliest scientific studies that documented archaeological remains in the area. Prior to the 1920s, no systematic archaeological studies were conducted on Chumash sites in the Point Hueneme region. During the 1870s and 1880s, numerous sites throughout California were destroyed by antiquarians and pothunters searching for commercially valuable relics to sell to museums and wealthy collectors in the United States and abroad. Although their scientific value is compromised by the lack of scientific methodology of their collection, these artifacts have been used by archaeologists, along with data from properly conducted archaeological investigations, to reconstruct prehistoric cultural sequences (Grant 1978b; Uribe & Associates 1998).

Rogers (1929) was one of the first investigators to systematically test and record prehistoric archaeological sites in the Santa Barbara subregion. He believed the prehistory of the area to have consisted of three cultures (social groups with distinctive adaptations to their environment): Oak Grove,

Hunting People, and Canalino. The Oak Grove People, according to Rogers, built semisubterranean huts, used large elliptical metates (stone grinding slabs) and oval-shaped manos (hand-held grinding stones), made simple stone points and hand axes, and buried their dead lying face-down. Oak Grove sites have subsequently been radiocarbon dated to earlier than 7,000 years before present (B.P.) (Owen 1964). Hunting People did not leave archaeological remains of houses, but made more sophisticated projectile points, sandstone bowls, mortars and pestles, and basketry. They buried their dead head-down and flexed. Around 1,000 B.P. the Hunting People were supplanted by or intermixed with the Chumash, whom Rogers called the Canalino (Rogers 1929; Grant 1978b; Uribe & Associates 1998).

Five cultural periods for the prehistoric occupation of the Santa Barbara region were proposed by Olson (1930). Olson's earliest period, hypothetical but unsupported by archaeological evidence, was the Archaic. The next period, called Early Mainland, was characterized by the occurrence of numerous millingstones and a small number of mortars. From the Intermediate Mainland period, steatite ollas (rounded pots with small mouths), fishhooks, and bone beads have been found, but no millingstones have been recovered. The Late Mainland period includes the same assemblage as the Intermediate Mainland, with the addition of steatite comales (flat clay or stone pans for frying) and a greater number of ollas. The final, Historic period, according to Olson, dates from A.D. 1782 (Grant 1978b; Uribe & Associates 1998).

Four temporal horizons were identified by Wallace (1978) for cultural remains found in the Santa Barbara subregion. Wallace used the term "horizons" to indicate the spacial continuity in the Santa Barbara subregion of artifact assemblages representing different social groups at different times. First, the Early Man Horizon occupied a time period prior to approximately 8,000 years B.P. Early Man sites are characterized by stone projectile points, cutting tools, and faunal bones, but little evidence that plants were widely utilized as a food source. Sites dating to the Millingstone Horizon, from approximately 8,000 years to 5,000 years B.P., contain some projectile points and faunal bones, and have a large number of manos and metates. Assemblages from the Millingstone Horizon indicate that plants were probably the main source of food during this period, although hunting still took place. Many of the coastal sites contain little or no marine shell or marine mammal bone, suggesting that the sea had not yet been utilized as a major food source. The Intermediate Horizon, dating from approximately 5,000 years to 1,000 years B.P., was characterized by exploitation of a more diversified number of resources. Projectile points and faunal bones are plentiful in site assemblages, along with plant processing tools. Marine as well as terrestrial animal species were eaten. Artifact assemblages strongly resemble those of the Pinto Basin to the east in the California desert, suggesting that hunting people from that region came into the Santa Barbara subregion during this period. The diverse subsistence practices of the Intermediate Horizon formed the basis for the Chumash society that developed during the Late Prehistoric Horizon after approximately 1,000 years B.P. (Wallace 1978).

Warren proposed a modified version of Wallace's chronology, composed of four traditions. Warren's use of the word "tradition" refers to the way of life and technology of a social group in its adaptation to the environment that persists throughout a long time period. The Encinitas Tradition, Campbell Tradition, Chumash Tradition, and the Chumash correspond closely to Wallace's Early Man, Millingstone, Intermediate, and Late Prehistoric Horizons. Warren's Campbell tradition, however, ends at approximately 1,500 years B.P., whereas Wallace's comparable Intermediate Horizon extends to approximately 1,000 years B.P. (Uribe & Associates 1998, Warren 1968).

King (1981) developed a chronology for the Chumash area of the California coast composed of three periods: Early, Middle, and Late. This chronology is currently the most widely accepted cultural sequence for the Santa Barbara subregion. King, rather than implying cultural replacement, suggests that Chumash society has evolved in place in the Santa Barbara subregion for more than 7,000 years. Each of King's periods is divided into phases and subphases. The Early Period has three phases, dating from

before 7,000 years B.P. to approximately 3,000 years B.P. This period is characterized by an emphasis on plant foods, with hunting of terrestrial fauna and gathering of marine resources. Permanent settlements had cemeteries associated with them, and trade took place between the coastal region and the Channel Islands. During the Early Period, an egalitarian society gradually became one of ranking by achieved status, with no centralized leadership. Five phases comprise the Middle Period, which extended from approximately 3,000 years to 900 years B.P. Sites from the Middle Period contain many kinds of shell beads and ornaments, milling tools indicating an increasing subsistence on acorns, and a greater number of remains of marine species. By this time, leadership was inherited and status differentiation was well defined. The trade network had widened, and coastal villages, some of which were ports and centralized trade centers, emerged in response to this and the growing dependence on marine resources. By late in the Middle Period, plank canoes were in use. Late Period sites, dating from approximately 900 years B.P. to A.D. 1804, contain *Olivella* shell bead money, and lithic and ground stone tools that suggest a complex hunting and plant-gathering economy. During the three phases of the Late Period, special use sites including seasonal villages, rock shelters, food processing sites, and lithic quarries developed (King 1981; Uribe & Associates 1998).

2.1.2 Historic Era

2.1.2.1 Ethnography of the Port Hueneme Area

At the time of Spanish contact in the sixteenth century, the area now occupied by CBC Port Hueneme was the home of the Ventureño branch of the Chumash. The Chumash were an extensive tribe, occupying a territory that stretched from Malibu Canyon northward along the coast to San Luis Obispo, inland to the margin of the San Joaquin Valley, and westward to the islands of San Miguel, Anacapa, Santa Rosa, and Santa Cruz. The Chumash were composed of six linguistic groups: in addition to the Ventureño, there were the Barbareño, Ynezeño, Obispeño, Purisimeño, and Island groups. The Ventureño, Barbareño, and Ynezeño comprised the Eastern Coastal Chumash, who shared a common culture (Grant 1978a, 1978b).

The territory occupied by the Ventureño Chumash is predominantly mountainous, with peaks more than 8,000 feet high, but includes the Oxnard Plain on which CBC Port Hueneme is located, which stretches from Point Mugu to Ventura. This area is characterized by numerous streams, coastal sage scrub vegetation, and the presence of the California live oak (*Quercus agrifolia*). The acorn of this tree, collected in the fall and stored for use throughout the year, formed the main subsistence food of the Ventureño, who also gathered amole (soap plant), cattail seeds and roots, chia, berries, cherries, mushrooms, cress, and piñon nuts from the mountainous portion of their territory. The Chumash hunted rabbits, coyote, fox, mule deer, and game birds, particularly ducks and geese. Rabbits were taken with throwing sticks during communal drives. Dolphins, sea otters, and seals were hunted from canoes with harpoons, and whales were taken when they became stranded on the beach. Large middens of mollusk shells found at archaeological sites along the coast indicate the popularity of mussels, clams, and barnacles as a food source. Abalones were also eaten, but their shells are rare in middens because the shells were used for bead making. Numerous fish were also caught, including shark, yellowtail, rockfish, bonita, black sea bass, anchovy, halibut, and barracuda. Fish were harpooned, captured with nets, or hooked. Salmonids were harvested from streams by poisoning the water temporarily with liquid from crushed amole plants (Grant 1978b).

Ventureño houses were large, domed buildings with frames made of poles set in the ground and bent to the center, where they were bound together. The frames were covered with a thick thatch of interwoven grass. Reeds were used for mats, bedding, and interior partitions. A Ventureño house might shelter as many as 70 people. Villages were generally located on high ground near streams where they met with the ocean, or near slough areas. In addition to several houses, they typically included one or more

subterranean sweathouses covered with poles and earth, storehouses, an enclosed ceremonial area, and an area set aside for games (Grant 1978b).

Ventureño society was organized in patrilineal descent groups, with village chiefs inheriting their positions patrilineally upon approval of the people. Daughters or sisters of dead chiefs could also inherit the position, in the absence of a male heir. A chief was often the most wealthy member of a village, either from gifts received as chief or from goods owned prior to assuming that role. Village chiefs usually were given gifts for their services as leaders during warfare, and for presiding over ceremonies. Chiefs also granted permission for other villages to use their village's territory for hunting or gathering (Grant 1978b).

The Ventureño Chumash also had shamans, whose primary function was curing diseases. Chumash shamans used various methods, including singing, herbs, and sucking to remove objects believed to be causing sickness. In addition to healing, there were shamans who specialized in influencing weather, shamans who handled rattlesnakes, and shamans who magically became grizzly bears to kill enemies. Shamans derived their power from guardian spirits who appeared to them during trance states. One of the most interesting tools employed by Ventureño shamans was a cigar-shaped charm stone approximately 15 centimeters long. Charm stones would be arranged in circles of 20, then shoved together and sprinkled with water to produce a powerful supernatural effect (Grant 1978b).

Ventureño ritual life was simple, and consisted primarily of traditional birth, puberty, and death practices. When a woman was ready to give birth, she would excavate a small hollow in the ground wherever she happened to be at the time. She would then warm the hole with a fire, and line it with straw in preparation for the birth. After the child was born, the mother would flatten its nose, then wash herself with cold water. In the late 18th century, the Spanish reported that Chumash women often aborted first pregnancies or practiced infanticide on their first born in the belief that if a first infant survived the mother would never conceive again. Many women were severely injured or killed in abortion attempts (Grant 1978b).

At puberty, Chumash girls were forbidden to eat meat or grease, and could not look directly into a fire. Boys took part in a nocturnal ceremony during which they induced visions by means of a hallucinogenic drug made of *Datura* root mixed with water (Grant 1978b).

Death was observed among the Chumash by a ritual held at a ceremonial site near the village, where relatives of the deceased would gather around a fire throughout the night, with the body. In the morning, tobacco would be smoked in a stone pipe by one mourner after another, who would walk to the body, lift an animal skin covering the face, and blow smoke on it. Then, moving to the feet of the deceased, the mourners would stand and sing. Finally, all mourners participated in a loud outcry of lamenting. When the ceremony was over, the body would be carried to a cemetery and buried face-down in a flexed position, with the head toward the west. Offerings such as bowls, pestles, beads, weapons, and charmstones were often interred with the body (Grant 1978b). Where cemeteries were located in relation to villages is not clear. Grant (1978b) states that they were usually placed at some distance, while Kroeber (1925) says they were probably located within villages. For a year after the death of a man, his widow observed eating restrictions and wore a lock of her husband's hair on her head (Kroeber 1925).

Chiefs among the Ventureño were allowed more than one wife, but ordinarily marriages were monogamous. Prospective grooms would give gifts of beads, otter skins, or blankets to the parents of the young woman. Exogamy was often practiced, but men and women were also allowed to marry within their own villages. Adultery was considered a serious offense and was severely punished (Grant 1978b).

Material culture of the Ventureño included such items as fine steatite bowls, smoking pipes, ollas (jars), comales (flat cooking skillets), medicine tubes for shamans, hook-like objects called "pelican stones," and small statues of whales and other animals. Most steatite was obtained through trade with the Gabrielino Indians on Santa Catalina Island. Storage bowls as well as mortars and pestles were fashioned from sandstone. Sandstone was also used to make disk-like weights for digging sticks, called "doughnuts" by archaeologists. Local chert was used to make projectile points, along with obsidian traded from inland tribes. Wooden plates, bowls, and boxes were made, but the most notable woodworking skills of the Ventureño were exhibited in their planked canoes or *tomols*. These could be up to 10 meters (33 feet) in length, yet light enough for a few men to carry. *Tomols* were made of 20 or more hewn planks lashed together and caulked with asphaltum, then decorated with paint and shell ornaments. Not only could the fishing grounds be easily reached with these canoes, but voyages to the most distant Channel Islands were made. Basketry of the Ventureño was an advanced art form, with finely woven, intricately decorated baskets used for carrying burdens, water, fishing bait, trinkets, or food; storing seeds; and as infant cradles. Asphaltum, occurring in deposits all along the coast, was widely used for attaching shell decorations to stone or canoes, sealing baskets, and fastening points to arrow and spear shafts. Marine shell was used extensively for fashioning ornamental beads, fish hooks, and monetary beads. Whale bone was made into tools for woodworking, grave liners, and grave markers. Swordfish bills, deer bone, and bear bone were used to make numerous small tools, as well as decorations and musical instruments. Rope and twine for items such as bowstrings, anchor lines, and fish nets were fashioned from yucca, hemp, nettle, and milkweed (Grant 1978b).

The rock paintings of the Chumash are the most notable of those discovered in the United States. Rock paintings are usually found near water sources in the more mountainous portions of Chumash territory, and are sometimes associated with bedrock mortars. The multi-colored paintings are usually abstract, but sometimes zoomorphic and anthropomorphic figures are depicted. Rock painting sites are usually far from permanent village sites, and are sometimes associated with archaeological remains of seasonal hunting and gathering camps (Grant 1978b).

Spanish explorers arrived in the Point Hueneme area in October 1542. By the late 1700s, the Spanish were well-established in California, and a chain of Franciscan missions had been built between San Diego and San Francisco. By the early 19th century, the majority of the Chumash Indians in the Point Hueneme area had been absorbed by the Spanish mission system. The Franciscan missionaries imposed their religion on the Indians and pressed them into service, teaching them trades that were used in the construction and maintenance of the missions. While the missions of Santa Barbara, La Purísima Concepción, and Santa Ynez were all instrumental in subjugating the Chumash, mission San Buenaventura, being closest, had the greatest influence on the lives of those in the Point Hueneme area. Some Indians were able to escape to the interior regions of California; however, the majority stayed behind. Eventually, their population was decimated by diseases introduced by the Europeans for which they had no immunity, including smallpox, syphilis, and even the common cold (Grant 1978a; Uribe & Associates 1998).

At the time of contact with Europeans in the 16th century, the Chumash population is estimated to have been between approximately 8,000 and 17,250 (King 1969, Kroeber 1925). By the early 20th century, only around 74 Chumash were known to be living (Grant 1978a). The 1996 Native American Directory for Alaska, Canada, and the United States lists two tribal nations for the Chumash: The Santa Ynez Band of Mission Indians Nation, with a population of 340, and the Coastal Band and Santa Barbara Band of Chumash Indians, with an unlisted population (Snyder 1996).

2.1.2.2 History of the Port Hueneme Area

The first Europeans in the Point Hueneme area were Spanish explorers under the leadership of Captain Juan Rodríguez Cabrillo, who landed near Point Hueneme on October 15, 1542. In 1734, Cabrera Bueno gave the name Punta de Conversion to the promontory now known as Point Hueneme. English-speaking mariners and settlers continued to use the name Point Conversion until the late 19th century. The name Point Hueneme, derived from the name of a Ventureño Chumash village, first appeared on a coastal survey map sheet in 1885 (Garber 1965–1967).

Obtaining large plots of land in grants from the Spanish, and later the Mexican, government, Hispanic settlers at first relied largely on cattle and sheep ranching for their economy, hauling hides and tallow to the coast for loading onto ships bound for Spain, Central and South America, or the East Coast of North America. During the Mexican period (1821-1848) however, agriculture grew to become the dominant economic force. In 1837, Mexican governor Juan B. Alvarado granted the Rancho el Rio de Santa Clara o La Colonia, which encompassed present-day Port Hueneme, to eight Mexican soldiers. Twenty-seven years later, during the Anglo-American period, a syndicate led by Thomas A. Scott bought the rancho lands from the soldiers and their descendants, along with other property in the area totaling 227,000 acres.

Scott, who was Abraham Lincoln's Assistant Secretary of War and president of the Pennsylvania Railroad, intended to establish an agricultural settlement that would attract the Southern Pacific Railroad to make Hueneme the terminus of one of their lines. He also believed that his land purchase contained vast petroleum resources. Oil was struck by Thomas R. Bard, Scott's agent, in 1867, but by then there was little market for California oil. In 1869, when their oil and railroad plans remained unrealized, Scott's syndicate sold approximately 44,000 acres of the rancho lands to Bard, who focused his efforts on agriculture and sheep raising (NAVFAC Historian's Office 1987, n.d.a, n.d.h; Uribe & Associates 1998).

From the beginning, Bard was involved in conflicts with illegal tenants on his land, who incorrectly believed that portions of the rancho were still public lands to be taken by anyone willing to occupy and work them. This was the result of a misunderstanding regarding the rancho land Bard had purchased, the boundaries of which had never been properly defined (Miedema 1955–1958). Bard entered into several court battles with the squatters, and both sides put up monetary bonds until legal ownership could be resolved in civil court. In this way, violent conflict over the land was narrowly avoided (Garber 1965–1967; NAVFAC Historian's Office 1987; Robinson 1955; Thompson and West 1883; Uribe & Associates 1998).

By 1869 the population of the area had grown to the point that Bard had planned a town. By that time, several commercial buildings and houses stood on the streets of Hueneme. The small settlement included at least 17 families that had resided there for the past several years (Garber 1965–1967; NAVFAC Historian's Office 1987; Robinson 1955; Thompson and West 1883; Uribe & Associates 1998).

In 1870 W.E. Barnard, who represented the squatters' interests, also laid out a town and began lightering (using large boats to move cargo between ships and the shore in the absence of a wharf). Thomas Bard realized, that because of the presence of a deep submarine canyon, the coast at Hueneme was perfectly suited to be made into a commercial port for deep-draft vessels. While he was embroiled in the civil court case over land ownership with his competitor Barnard and the squatters, Bard worked to strengthen his influence by constructing a wharf that would give the town of Hueneme one of the largest shipping facilities in California, second only to San Francisco. With his construction crews laboring clandestinely at night, Bard built a 1,000-foot-long wharf in 1871. In 1872 Bard prevailed in his legal battle. His illegal tenants, however, were given the option of purchasing the portions of his land they had been living on. A plat map of the Town of Hueneme was recorded in September of 1872. (Garner 1991; NAVFAC

Historian's Office n.d.a, n.d.h; Robinson 1955; Thompson and West 1883; Triem 1985; Uribe & Associates 1998).

The plain encompassing the Port Hueneme area proved to be extremely fertile. This, the port, and Bard's wharf, which had been extended to a length of 1,800 feet by 1880, made it a prominent agricultural region. Numerous crops, including flax, wheat, corn, barley, and lima beans were grown successfully and shipped from the nearby port, which became the greatest grain-shipping facility south of San Francisco, and Hueneme prospered. For nearly 30 years, the busy port community was the largest town in the region. Thomas Bard became the richest man in Ventura County, was director of the State Board of Agriculture, was the first president of the Union Oil Company of California, and served from 1900 to 1905 in the U.S. Senate. He also served as president of several banks and an investment company, several small oil companies, and a hotel company (Miedema 1955-1958; NAVFAC Historian's Office 1987, n.d.a, n.d.b, n.d.c, n.d.h; Streets 1974).

Thomas Bard's mansion, which he named Berylwood, still stands at CBC Port Hueneme. The house was designed in the Italian Renaissance Revival style by prominent Los Angeles architect Myron Hunt and completed in 1912. It was occupied by Bard's wife Mollie until her death in 1937, and remained in the Bard family until 1944, when it was leased by the Navy. The U.S. government finally purchased the estate in 1951 for $149,500, and currently uses the house as the CBC Port Hueneme Officers' Club (NAVFAC Historian's Office 1987, n.d.a, n.d.b, n.d.c; Uribe & Associates 1998).

In addition to Berylwood, three other historic houses remain at CBC Port Hueneme. One is the Richard Bard residence, an American Colonial-style house originally constructed in 1910 for Thomas Bard's daughter Anna. Anna Bard only occupied the house for a year before moving from the area for health reasons. In 1911 and 1912, while Berylwood was under construction, Thomas and Mollie Bard stayed in the Bungalow, as they called the house, with other members of the Bard family. In 1914 Bard's other daughter, Elizabeth, and her husband, architect Reginald Shand, who had assisted Myron Hunt in the design of the Thomas Bard mansion, lived in the house for several months. Finally, in 1916 Thomas Bard's son, Richard moved into the house with his wife Joan. The couple and their children lived there until 1944, when the residence was leased by the Navy to house senior officers, a function it continues to fulfill today as "Quarters A" (Department of Parks and Recreation 1982a; NAVFAC Historian's Office 1991, n.d.d, n.d.e, n.d.f).

The other two historic houses still being used at CBC Port Hueneme were originally owned by farmers. The Friedrich house, now designated "Quarters B" and used as the home of the commanding officer of the Civil Engineer Corps Officers' School, was built in 1940 and 1941 for Vincent Friedrich and his wife Frances, who grew alfalfa and beans on their property. Within a year of their occupation of the modern, one-story house, the Navy took the property as part of the new Advance Base Depot, giving the Friedrichs $10,500 and 48 hours to vacate (NAVFAC Historian's Office 1990a, n.d.g).

The Farrell house, now known as "Quarters D" and occupied by the commanding officer of the Naval Ship Weapon Systems Engineering Station, is a Craftsman-style bungalow constructed in 1918 for Irish immigrants Edward and Mary Farrell, a married couple. The Farrells grew sugar beets and lima beans on their small farm, and raised five children there. After Edward's death in 1937, Mary Farrell continued to occupy the house until 1942, when the Navy acquired it for $5,000. The property includes a large wooden barn and a few small outbuildings (Department of Parks and Recreation 1982b; NAVFAC Historian's Office 1988, 1990b; Williams 1990).

In spite of the success and growth of Hueneme, Thomas A. Scott's dream in the early 1860s of making Hueneme a major point on the Southern Pacific Railroad never came to pass, due largely to the rise of the

sugar beet industry in the region. Thomas Bard had interested the Oxnard brothers of Louisiana, who owned sugar beet factories in several states, in the potential of the crop in Ventura County. He wanted their plant to be built in Hueneme, but the Oxnards located their American Sugar Beet Factory five miles northeast, near the region's best soil for beet production. The success of sugar beets in that area, which became known as Oxnard, and the industry's importance to the regional economy caused the Southern Pacific to build a spur there in 1898, bypassing Hueneme. The long wharf at Port Hueneme declined in importance along with the town as soon as the railroad terminus at Oxnard took over as the primary shipping center in Ventura County. Several Hueneme houses and commercial buildings were moved to Oxnard. With the economic decline of Hueneme, Thomas Bard sold his wharf in 1906 and, at the age of 64, retired to nearby Berylwood, where he died in 1915 at the age of 73 (NAVFAC Historian's Office 1987; Uribe & Associates 1998).

Experiments were carried out with lemon trees in the early 20th century because of the belief that the soil and mild climate would support citrus farming. The soil, however, was found to be too wet and saline due to a clay layer just below the ground surface and the high water table. In 1918, Oxnard Drainage District Number 1 was established to remove excess water by means of a complex surface and subsurface drainage network. By the early 1920s, lemons were beginning to replace sugar beets as the principal crop on the Oxnard Plain. In 1922, citrus production had grown to the point that two giant lemon packing plants were built in Hueneme by the Oxnard Citrus Association, eventually becoming the town's largest employer. As a result of competition from lemon production, the sugar beet industry declined and much of the local railroad track connecting beet growers was removed. The growth of the citrus industry in the area stimulated the need for an improved harbor.

On January 15, 1926, the first legal steps to build a new harbor at Port Hueneme took place when a bill for funding introduced to Congress by Representative Arthur M. Free was passed. In the summer of that year, Richard Bard purchased 336 acres of land adjacent to the harbor that had been the site of a race track. Bard had the harbor resurveyed and organized a harbor project that resulted in the passing of the County Harbor Act by Congress in 1928. Responding to legal action taken by Ventura commercial interests who wanted the new harbor built in their city, the Supreme Court ruled that the County Harbor Act was unconstitutional. In 1934 Richard Bard, representing the Harbor Dock Company, obtained a $1.6 million loan from the Public Works Administration (PWA) and began renovations to the existing harbor, but the loan was rescinded in 1935 because the Hueneme harbor was a private project. Finally, in 1937, the Oxnard Harbor District was created to establish a major seaport at Hueneme, and the citizens of Hueneme, Oxnard, Pleasant Valley, Newberry Park, and El Rio approved a bond issue of $1.75 million. With the necessary funding, ground was broken for the new Port Hueneme harbor on February 4th, 1938, by Richard Bard, who had worked to fulfill his father's dream since 1926. Dredging began during January 1939, and dumping of 1,400 tons of rock per day for the jetties began two months later. On July 4, 1940, the new harbor at Port Hueneme was completed, making the town once again the primary regional shipping center (NAVFAC Historian's Office 1948b, 1987; Port of Hueneme 1998).

2.1.3 Establishment of CBC Port Hueneme

The U.S. Navy began its involvement in the area by building the Point Hueneme Lighthouse, in 1874, on land donated by Thomas Bard. In 1920 the Navy returned to Port Hueneme to build and staff a radio compass station, its first project there since construction of the lighthouse 46 years earlier (NAVFAC Historian's Office n.d.h). However, it would be another 20 years before Port Hueneme once again became an important shipping center, with the dredging and construction of a deep-water port (Port Hueneme 1998; Triem 1985).

2.1.3.1 History of the Construction Battalion Center Port Hueneme

World War II. Prior to 1939, the U.S. Navy was building its forces in the Pacific by transferring a large portion of its fleet to Pearl Harbor in Hawaii and other Pacific ports. This action was in response to Japanese aggression in Asia and the Pacific islands and the possibility of war with the Imperial Japanese forces. In December 1941, the Japanese air force attacked the U.S. Naval site at Pearl Harbor with carrier-based aircraft, and the U.S. government immediately declared war on Japan and the other Axis powers.

Following the declaration of war on Japan and as part of the mobilization of military forces on the West Coast for deployment throughout the Pacific, the Navy was charged with gathering materials and personnel to build advance bases. In response to this command, the Naval Construction Battalion, known informally as the "Seabees," was formed. A large storage, training, and staging center was quickly needed on the West Coast, and the first location considered, at Oakland, did not meet the requirements (U.S. Bureau of Yards and Docks 1947). At the end of a long search for a suitable location, the Navy chose Port Hueneme. The small harbor there, along with the surrounding area, could be easily adapted to the needs of wartime stockpiling, training, and shipping, and was not overcrowded with shipping traffic like the ports of San Pedro and San Francisco (Combs 1942; Moreell 1942a, 1942b, 1942c; NAVFAC Historian's Office 1998; Uribe & Associates 1998).

Originally named the U.S. Navy Advance Base Depot Port Hueneme, the new site was established early in 1942. Construction was begun by the contracting firm of Atkinson and Pollock on March 9, and the site was officially opened on May 18. Wartime materials began to be stockpiled and shipped out to the Pacific theater of war, and the recently formed Naval Construction Battalions began training in wartime construction techniques. Like most communities surrounding wartime military centers, the town of Hueneme grew economically during World War II. During the 3 years prior to the end of the war, 33 miles of new roads and 30 miles of railroad were built to support military activities. A site with facilities for 21,000 military personnel was constructed, and the harbor at Port Hueneme was enlarged to simultaneously accommodate nine cargo ships, two tank-landing vessels, and several smaller ships. By 1945, 10,000 civilians were employed, or were in training, on the site (NAVFAC Historian's Office n.d.h; Uribe & Associates 1998).

At the beginning of the United States' involvement in the war, five separate military activities were established at Port Hueneme. The Advance Base Depot, for which the site was named, handled the acquisition, storage, assembly, testing, and shipment of construction materials and equipment to the Pacific theater of war. It was made up of approximately 1,050 fenced acres including the deep-water harbor and wharves. Camp Rousseau, also known as the Advance Base Receiving Barracks, was a training facility for the Naval Construction Battalions (Seabees) and consisted of approximately 385 acres next to the Advance Base Depot. The Acorn Training Detachment was a training unit for amphibious construction units. Acorn units were trained to land on beachheads immediately after they were secured by Marines and quickly construct advance air bases or repair captured enemy air fields, and maintain the air strips and associated facilities in operating condition (NAVFAC Historian's Office 1945). The Acorn Training Detachment occupied 125 acres adjacent to the Advance Base Depot. The training of radar units was carried out by the Argus Training Detachment on 10 acres adjoining the Advance Base Depot. The Advance Training Facilities, occupying 345 acres one-half mile north of the Advance Base Depot, trained the construction battalions in combat techniques. Each of these areas contained administration buildings, shops, warehouses, civilian and military personnel housing, and support facilities. As World War II continued, antiaircraft gunnery training, training of port directors for advance bases, hospital corpsmen's training, and the Naval Justice School were also established on the site (Marsh 1991; NAVFAC Historian's Office 1944, 1967a, n.d.).

Port Hueneme led all ports in the United States in the shipment of military construction supplies during World War II (U.S. Bureau of Yards and Docks 1947). Its importance to the Allied war effort in the Pacific was immense. More than 175,000 military personnel were trained and transported to Pacific military construction sites and nearly 4 million long tons of construction materials and machinery were shipped from the facility (Uribe & Associates 1998).

After Japan's surrender in 1945, CBC Port Hueneme, like all American supply bases, saw rapidly diminishing activity, although it remained in service as a processing facility for military personnel and materials being returned to the United States. In the months following the end of the war, at least 22,000 returning servicemen were processed back into the United States through Port Hueneme as part of the armed forces' "Operation Magic Carpet." Over 600,000 tons of materials and hundreds of tons of equipment were returned from advance bases in the Pacific and Asia by cargo ships that had been en route to the battle zones when the war ended. During one 18-hour period, 28 ships entered Port Hueneme to be unloaded. In addition to unloading, approximately 400,000 tons of materials had to be steam cleaned to eliminate tropical pests and diseases that could have contaminated crops in the surrounding Oxnard Plain. Operation Roll-Up, the recall of war materials to the United States, continued at CBC Port Hueneme until 1956 (NAVFAC Historian's Office 1967a).

Most importantly, the Advance Base Depot was retained as the only Seabee site in the country. In November 1945, all civilian employees of the site were dismissed, and 4,800 of them were rehired as U.S. Civil Service employees by the Navy. In January of 1946, the Construction Battalion Replacement Depot at Camp Shoemaker, California, and the Construction Battalion Training Center at Camp Endicott, Rhode Island were closed and CBC Port Hueneme, as the Advance Base Depot had been renamed in late 1945, took over their duties. In 1946, the first post-war Antarctic scientific expedition, Operation High Jump, was staged and supplied through CBC Port Hueneme. The Yards and Docks Supply Office was established at CBC Port Hueneme in 1947 as the Navy's supply control point for all operations west of the Mississippi (NAVFAC Historian's Office 1967a, 1967b, n.d.h; Uribe & Associates 1998).

The Korean War. Activity at CBC Port Hueneme remained at a relatively low level for 5 years, until the entry of the United States into the Korean conflict in 1950. At that time, with a resurgence of Seabee construction in Korea and other Pacific locations, six new construction battalions, numbers 2, 3, 5, 9, 10, and 11, used the Center as their home base. The numerous new Seabees and their officers were trained at expanded facilities for the Naval Construction Schools and the Civil Engineer Corps Officers School. By January of 1951, new recruitment into the Naval Construction Battalion had risen from 80 to 279 men per month. Because of the experience gained during the Second World War, the Navy was easily able to mobilize up again for the Korean conflict, and the Seabee crews sent overseas were better trained than their earlier counterparts. In May 1952, the Seabees reorganized into three units: the Operational Training Unit to oversee construction battalions of new and retrained Seabees, the U.S. Naval Construction Battalion Base Unit for Seabees awaiting assignment, and the Advanced Base Tactical Training Unit (NAVFAC Historian's Office 1967b). In addition to personnel, almost all of the construction supplies and equipment sent overseas by the Navy during the Korean War left the United States from Port Hueneme (NAVFAC Historian's Office 1967a).

As a result of the increasing amount of wartime construction materials and equipment once again being processed, stored, and shipped, and the large numbers of personnel again being trained, support facilities were also expanded. The Quonset huts and other temporary housing of the Second World War had been removed, so new huts and tents were set up. The Thomas Barracks, a complex of 10 three-story permanent concrete buildings, were begun in 1952, but were not completed until 1954. A large galley and a steam heating plant were also constructed during this period (NAVFAC Historian's Office 1967b).

After the Korean War ended in 1953, activity at CBC Port Hueneme decreased to a peacetime level for the second time, although Construction Battalions 3, 5, 9, 10, and 11 were maintained on active duty there to support the Navy's construction projects throughout Asia and the Pacific. By March 1954, the Advanced Base Tactical Training Center, the Advance Base Supply Depot, the Construction Equipment Depot, and the Construction Forces Operational Training Unit were disbanded as separate entities, and their functions were consolidated under the Construction Battalion Center. In 1956, the reconstruction of deteriorating wooden wharves and piers, and construction of new concrete piers was begun (NAVFAC Historian's Office 1967b, n.d.h).

The Vietnam War. More than 10 years after the Korean War, in 1964 and 1965, the need for American military bases, camps, airfields, harbors, and support facilities increased once again as the United States became deeply involved in the Vietnam War. With this need came a resurgence of wartime activity at CBC Port Hueneme. As a result of the growing demand for military construction in Southeast Asia, several new Seabee battalions were formed. By 1967, five Naval Construction Battalions were deployed in Vietnam and Thailand, and two more battalions of Seabees along with their maintenance units, were in training at the Construction Battalion Center (NAVFAC Historian's Office 1967a, 1967c, n.d.h). Seabee battalions spent 6 to 8 months in Southeast Asia, with the remainder of their time devoted to technical training at CBC Port Hueneme and combat training at Camp Pendleton at Oceanside, California. In addition to construction battalions, Seabee Technical Assistance Teams were deployed to Thailand and Vietnam to help people in remote villages with projects such as building roads, digging wells, and building schools (NAVFAC Historian's Office 1967c).

CBC Port Hueneme, as the main supply depot for the American forces in Vietnam, operated at a peak of activity not seen since World War II. Training facilities, as well as residences and support facilities for military personnel, were once again expanded. Civilian personnel working at the site increased from 2,700 in 1963 to more than 12,000 in 1967. Between 1963 and 1966, the amount of money spent for construction equipment nearly doubled, going from $42.5 million to $80 million. During the same period, the yearly shipment of materials from Port Hueneme to the war zone grew from 92,000 tons to 658,000 tons. Old wharves were rebuilt and new ones were constructed (NAVFAC Historian's Office 1967c, 1994). The activities of gearing up for the Vietnam War, including construction projects in Southeast Asia, were mostly completed by 1969. Seabee training and deployment, and materials and equipment shipping at CBC Port Hueneme once again began to slow. By 1973 only 55,533 tons of materials were shipped, and the seven construction battalions based there during the height of the war had been decreased to four (NAVFAC Historian's Office 1994).

The Gulf War. When the United States sent troops to the Persian Gulf to help end the Iraqi invasion of Kuwait in 1990, the Seabees once again went into action. Three of the four construction battalions from CBC Port Hueneme were sent to Saudi Arabia, and were followed by an underwater construction team, to build facilities needed by the Marine Corps. Members of the Naval Reserve Construction Battalion Center were called to active duty and joined regular CBC personnel in preparing and shipping war reserve materials to the Gulf. More than 7 million cubic feet of materials and equipment were shipped from Port Hueneme by the Seabees, the Marines, and the Air Force. After the Gulf War, the "roll-up" effort began again, and 50,000 tons of materials re-entered the United States through the site (NAVFAC Historian's Office 1994).

Peacetime Activities. After the Vietnam War, CBC Port Hueneme remained active, experiencing fewer reductions than many other military facilities in the United States. Following the deactivation of the Davisville, Rhode Island, Construction Battalion Center, CBC Port Hueneme took over logistical support of Operation Deepfreeze in the Antarctic. Deepfreeze, a mission providing support for National Science Foundation researchers since 1955, has had a large portion of its supplies shipped through Port Hueneme.

Although funding for Navy projects was at a minimum during the 1970s, the new U.S. Navy communications facility on the island of Diego Garcia in the Indian Ocean, operated jointly with Britain's Royal Navy, was built by Seabees from CBC Port Hueneme in 1974. This facility provides a vital communication link in an area of the globe that had previously been blacked out to Navy ships and aircraft. During the 1980s most of the World War II-era temporary construction at CBC Port Hueneme was demolished or demounted and replaced with modern permanent structures in an extensive construction program. Between 1984 and 1994, more building activity took place than during any time since World War II. Office buildings, classrooms, warehouses, a hospital, housing, and recreational facilities were built (NAVFAC Historian's Office 1994).

In addition to military and scientific support activities, CBC Port Hueneme has been involved in operations to serve the civilian community. In January 1961, unusually high tides threatened the community of Pierpoint Beach in Ventura. The commanding officer of the CBC, Admiral James R. Davis, ordered his Seabees to build sand dikes to protect houses and other structures on the beach, but the dikes began to fail. The Seabees then brought in 600 pontoons, which were filled with sand to form a breakwater that prevented any loss of property. On March 27, 1964, when Kodiak Island was devastated by the Alaskan earthquake and tidal wave, Seabees from Construction Battalions 5 and 9 were flown from CBC Port Hueneme to rebuild the damaged infrastructure and help victims of the disaster (NAVFAC Historian's Office 1967b).

CBC Port Hueneme currently remains in active readiness for possible wartime mobilization of the Naval Construction Force. Since 1974, CBC Port Hueneme's primary mission has been as the home port, training and administrative center, and logistical support center for the Seabees. In addition to Construction Battalions 3, 4, 5, and 40, CBC Port Hueneme is home to Reserve Naval Construction Battalion 17 and Underwater Construction Team 2. Along with the duties of wartime readiness, the CBC performs maintenance and construction tasks at all the U.S. Naval bases in the Pacific Ocean area (NAVFAC Historian's Office 1994, n.d.h).

2.1.4 Historic Districts

The only historic district listed on the National Register of Historic Places (NRHP) located within CBC Port Hueneme is Berylwood, the Bard estate. Berylwood was nominated to the NRHP on November 12, 1975, and listed on September 15, 1977 (Uribe & Associates 1998). The discontiguous district encompasses an area of approximately 2 acres, and includes the Thomas R. Bard mansion, completed in 1912; the Richard Bard house, built in 1910; a house known as "the Guest House" but whose actual function and origin is uknown; a swimming pool; tennis courts; and a garage. A milk house and a tool shed were originally included in the district, but were subsequently removed due to lack of integrity.

Thomas R. Bard originally came to the Port Hueneme area to act as Thomas Scott's agent, and purchased the land on which he built his estate from Scott in 1869. His first house was built in 1876 on the same site that is now occupied by the mansion. In 1890, extensive alterations and additions were made to the original house, creating, in effect, a different house. In 1911, Bard had this house completely dismantled to make room on the site for the Italian Renaissance Revival style dwelling designed by famed Los Angeles architect Myron Hunt. During the 1890 remodeling of the original house and the 1911–1912 construction of the final mansion, Bard reused as much lumber as could be salvaged. Wood dating to both the 1876 and 1890 houses can still be seen in parts of the current mansion (Uribe & Associates 1998).

The Richard Bard house is currently used as Quarters A for the Commanding Officer of CBC Port Hueneme (Department of Parks and Recreation 1982a; NAVFAC Historian's Office 1991, n.d.d, n.d.e,

n.d.f). The third dwelling located in the historic district was once thought to be the Bard's guest house and was called "the Doll House" because of its small size. The exact function and date of construction of this house is unknown but the house may have been moved to the estate from another Bard property in the 1930s for use by farm hands (Marsh, personal communication 1999). Used since the Second World War by the Navy, the Bard guest house was renovated in 1945 for use as married officer quarters. It is currently used as Bachelor Officer Quarters Alpha (Uribe & Associates 1998).

The Bard memorial cemetery, which was originally 400 feet north of the Bard mansion, is located in the southeastern corner of the estate, to which it was moved in 1951. The graves were reportedly relocated to a cemetery off CBC Port Hueneme at the same time. Due to its relocation and lack of special conditions necessary for listing of a cemetery, the Bard family memorial cemetery is not considered a contributing element of the National Register district. It is, however, listed as Ventura County Landmark Number 20.

Thomas R. Bard's botanical garden is located east of the Bard mansion and Richard Bard house, and is a prominent element of the estate, although it is not included in the National Register district due to diminished integrity. The garden contains 260 ornamental trees representing 48 genera and 78 species from around the world, planted between 1876, when Bard built his first home on the grounds, and his death in 1915 (Streets 1974).

Around 1903, Richard Bard discovered a site near the Bard mansion containing one or more human burials and small glass trade beads. The exact location of the site has not been determined, and no further information on it is available at this time (William Self Associates 1995). If re-discovered, however, the ethnohistoric burial may provide valuable information on contact between the Ventureño Chumash and early European visitors to the Point Hueneme area. Its possible existence illustrates the archaeological sensitivity of the Bard Estate National Register District.

2.1.5 Military Uses

CBC Port Hueneme property is currently designated for the following military uses:

- Storing and shipping construction materials, equipment, and provisions;
- Berthing surface craft and surface targets;
- Training personnel in various types of construction projects; and
- Engineering and technical services.

2.1.6 Natural History

Based on historic records, sand dunes have been present in the Port Hueneme area since the Holocene transgression approximately 15,000 years ago. The ancient dune system provided several salt- and freshwater lakes and ponds to support small wildlife, waterfowl, fish, and associated plant species (Horne 1980). The vegetation on CBC Port Hueneme has been altered significantly by various disturbances. The lakes and ponds within the region were drained by 1933 with the exception of McGrath Lake, located approximately 2 miles northwest of Port Hueneme.

2.1.7 IRMP Integration With Land Use Planning Efforts on CBC Port Hueneme and Point Mugu

CBC Port Hueneme currently does not have a Master Land Use Plan. However, efforts are underway to complete a Master Plan that will be guided, in part, by the Land Use recommendations for greenspace and natural improvements contained in this IRMP. An integral part of this IRMP is the development of specific GIS layers to supplement the management recommendations contained in the plan. These maps will be used to determine the level of impact current and future missions and land use may have on natural resources, and will be updated as new information becomes available. The Master Plan will contain maps describing specific land uses on CBC Port Hueneme using the IRMP map information as a baseline. The Master Plan, in conjunction with this IRMP, will establish a systematic framework for decision making with regard to future development of CBC Port Hueneme.

Although Point Mugu and CBC Port Hueneme have officially "merged," and the two bases are considered one, the planning documents for these bases (at the time of this writing) are not yet combined. However, the process has begun, and overall considerations with regard to land use and consolidation issues will be addressed in the Master Plan for the two bases. This IRMP is specific to Port Hueneme, and Point Mugu is expected to complete their IRMP in the near future. These plans will remain as separate documents to the distinctively different geographic areas and resources of the two bases. Preparation of the Regional Shore Infrastructure Plan (RSIP) (Master Plan) will integrate the planning of the two bases, and will establish a systematic framework for decision making with regard to future development and coordination between CBC Port Hueneme and Point Mugu. The foundation of the Regional Shore Infrastructure Plan will be the vision mission, and facility requirements of the complex. In addition it will incorporate operational, environmental, urban planning, and other navy programs, with the IRMP being a key component of plan development. The IRMP will be a cornerstone for the RSIP, and will provide baseline natural resources data and management goals for the master planning process.

Currently, all projects that have the potential to affect natural and cultural Resources at CBC Port Hueneme must be approved by the Environmental Division. Several of the environmental staff comprise the Project Review Board (PRB), which is responsible for the review of Work in Progress (WIP) forms submitted by project proponents needing approval for specific projects. These forms require the project proponent to describe the specific components of the proposed project so the PRB can accurately assess any expected impacts to natural and cultural resources. NEPA compliance determinations are based on the recommendations made by the PRB, on an individual project basis. All projects requiring ground disturbance are subject to PRB review.

In an effort to improve the PRB process, and ensure the consistent and comprehensive review of all projects that have the potential to impact the environment, the project review form will be updated. Additionally, a central information library will be developed for key natural and cultural resources documents for CBC Port Hueneme. The library will house this IRMP, biological and cultural survey reports, water quality monitoring reports, environmental impact analyses, planning documents, and key natural and cultural resources legislation.

3.0 NATURAL AND CULTURAL RESOURCES EXISTING CONDITIONS/SUMMARY

3.1 INTRODUCTION/OVERVIEW OF ENVIRONMENTAL SETTING OF CBC PORT HUENEME AND THE REGION

This section describes the existing condition of the natural and cultural resources on CBC Port Hueneme. It is divided into the following subsections:

- Climate;
- Soils;
- Landforms and geology;
- Water resources;
- Vegetation;
- Wildlife;
- Wetland resources and management;
- Cultural and historical resources;
- Archaeologically sensitive areas;
- Outdoor recreation;
- Land management; and
- Agricultural outlease program.

Physical environments comprising climate, soils, landforms and geology, and water resources are direct factors dictating the types of natural resources found on site and elsewhere in the region. These factors, combined with past and present land uses, contribute to the development of particular habitats. It is these habitats that make up and determine the biotic environment, including vegetation and wildlife species.

The CBC Port Hueneme area is influenced by its coastal setting and has a Mediterranean climate with moist, mild winters and warm, dry summers. Marked temperature discontinuities occur throughout the region and are related to the interplay of marine and continental controls. The average annual precipitation at CBC Port Hueneme is 15 inches with the maximum monthly precipitation occurring in January and the minimum in July and August. Low-level inversions that limit the height of the surface atmospheric mixing layer occur frequently over the Oxnard Plain.

The soils present at CBC Port Hueneme are represented, in part, by the soils of the Camarillo, Hueneme, and Pacheco Series (SCS and Landau Associates 1985). The soils consist of relatively deep, poorly drained, loamy sands to silty clay loams.

CBC Port Hueneme is located at the southwest margin of the Oxnard Plain in the western portion of the Ventura Basin, within the Transverse Ranges geomorphic province. Several geologic faults are located in the vicinity of CBC Port Hueneme, including the McGrath fault and the Bailey fault. Major seismic activity has not occurred along either of these faults in recent history.

The coastal area surrounding CBC Port Hueneme has undergone several man-made modifications in addition to the creation of the Port Hueneme Harbor. Dredge material from the construction of Channel Islands Harbor in the late 1950s was placed along the western side of the installation.

The major freshwater resources in the vicinity of CBC Port Hueneme include five groundwater aquifers, a stream, and artificial drainages. Impermeable building and pavement surfaces cover most of the base. The amount of surface runoff is, therefore, relatively high during storm events. Stormwater runoff from the site discharges into the Port Hueneme Harbor. Drainage ditches adjacent to roadways on the base intercept overland flow. A shallow intermittent unnamed stream flows approximately 0.5 mile east of the base through the City of Port Hueneme. Groundwater from beneath the Oxnard Plain is the primary source of water for the population in the region. Conservation efforts on CBC Port Hueneme address energy, water resources, recycling, pollution prevention, and public outreach and education.

Much of the remaining habitat at CBC Port Hueneme is highly disturbed and distributed in small patches (e.g., coyote brush, sand verbena-beach bursage, and bulrush-cattail). However, these areas offer valuable habitat on base for many plant and wildlife species, including sensitive species. Sensitive species that have been observed or that potentially occur on CBC Port Hueneme are detailed in Sections 3.6 (Vegetation) and 3.7 (Wildlife). Noxious weeds include hottentot fig (*Carpobrotus edulis*), pampas grass (*Cortaderia* spp.), and gum tree (*Eucalyptus* spp.); however no formal eradication or control programs have been implemented. The most significant landscaped area on the site is the Bard Estate, which includes a unique collection of introduced species. Disease vectors and pest animal populations also occur at CBC Port Hueneme. These include mosquitofish, pests associated with ballast water, ground squirrels, rodents, feral cats, and mosquitos.

Wetlands play a valuable role in their environment both ecologically and economically. Guidelines and regulations for protecting wetlands are discussed in Section 3.8. Wetlands may potentially occur at CBC Port Hueneme, but none have been formally delineated following the USACE Wetlands Delineation Manual (1987). Management issues for wetland habitats include loss and degradation from development, contamination issues, and exotic plant species.

Approximately 100 acres (6 percent) of CBC Port Hueneme have been officially surveyed for archaeological resources. Although prehistoric and ethnohistoric inhabitants of the area are known to have used the land now encompassing the installation, the only prehistoric archaeological site that has been found is a shell midden located on either side of the harbor entrance. Extensive cutting, filling, construction, and heavy equipment training activities have probably destroyed any intact archaeological sites; however, the possibility still exists that intact archaeological deposits could be encountered. Historic resources on site include the Thomas R. Bard Estate; the Bard estate memorial cemetery; Thomas R. Bard's botanical garden; the Bard Home Burial Site (possible ethnohistoric site); the Farrell home; the Freidrich home; Quonset Huts (Buildings 383, 384, 385, and 386); the statuary at the Needham Theater; a mural inside the Beehive Fitness Center; the Ventura County Railway Line; the Ventura Road Eucalyptus Grove; and Site CA-Ven-975H (*Bahama Star/La Janelle Shipwreck).*

There is no current recreation plan in place for CBC Port Hueneme. However, the Morale Welfare Recreation (MWR) Department manages recreational uses on base. Recreational areas on CBC Port Hueneme include the golf course and driving range, a playing field, a park, track and field facilities,

softball fields, limited bicycle trails, and a recreational vehicle (RV) park. There are no allowed recreational uses of the harbor or shoreline. Major recreational areas surrounding CBC Port Hueneme include city, county and state beaches; McGrath and Mugu State Parks; and bicycle/hiking trails.

CBC Port Hueneme encompasses approximately 1,650 acres; approximately 110 acres are covered with buildings (not including family housing area on the southern end of the base). CBC Port Hueneme outleases land to the Oxnard Harbor District and Mazda Corporation. The Port of Hueneme serves as a major industrial area on base. Administration is dispersed throughout the base; Building 1000 is the Port Hueneme Headquarters and serves as the main administration area.

There are currently no agricultural outlease areas on base. CBC Port Hueneme contains only one potential 33-acre site that may be leased in the future for agricultural purposes (Installation Restoration Program Site 14). After remediation is completed for this site, the area has great potential to be used for an ornamental plant nursery or related use.

3.2 CLIMATE

This section summarizes the climatological information for the CBC Port Hueneme area. A discussion of general weather features of the region is followed by a more specific discussion of particular meteorological parameters including temperature, precipitation, inversions, winds, and cloudiness.

3.2.1 General Weather Types

The CBC Port Hueneme area is influenced by its coastal setting and has a Mediterranean climate with moist, mild winters and warm, dry summers (WESTEC and Stollar 1988). This climate is controlled primarily by the semi-permanent Pacific High pressure system over the ocean to the west, thermal contrasts between the land and adjacent ocean, and geographic factors. The latter include the change in coastline orientation at Point Conception, gradual curvature of the coastline between Santa Barbara and Point Mugu, and the orientation of the coastal mountains.

3.2.2 Temperature

The annual daily temperature range is about 16 degrees Fahrenheit (F), with slightly greater ranges in winter than in summer. Mean monthly temperatures range from 54.5 degrees F in January to 66 degrees F in August. The warmest temperatures usually occur in late summer and early fall; daily maximum temperatures can be in the upper 80s and low 90s. The extreme maximum temperature of 104 degrees F occurred in October 1971; the extreme minimum temperature of 27 degrees F occurred in February 1971 and December 1972.

Marked temperature discontinuities occur throughout the region. These are related to the interplay of marine and continental controls. Mountains that border the Oxnard Plain act as a barrier to the influence of warm, dry air masses of the continental interior. In the local area, proximity to the Pacific Ocean is a moderating influence. Temperatures in the area of CBC Port Hueneme are summarized in Table 3-1.

Table 3-1
Monthly Mean Temperatures and Extremes
(in degrees Fahrenheit)

Data	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Extreme
Station: Point Mugu•													
Maximum	64	64	64	65	66	69	71	73	73	71	69	65	105
Minimum	45	45	46	48	52	54	57	59	58	53	49	45	27
Station: Oxnard♦													
Maximum	65.5	66.5	66.4	68.1	68.9	71.2	74.1	75.2	75.3	74.3	70.8	66.6	N/A
Minimum	44.2	46.2	46.4	48.7	51.8	54.9	57.9	58.8	57.3	53.3	48.3	44.6	N/A

Note: N/A - Not Available
Sources: •International Station Meteorological Climate Summary for Period 1946 to 1995.
♦Western Regional Climate Center for Period 1948 to 1998.

3.2.3 Precipitation

The average annual rainfall at CBC Port Hueneme is approximately 15 inches. Monthly mean precipitation annual totals are presented in Table 3-2. About 85 percent of this falls between November and March. Rainfall intensities for 2-, 50-, and 100-year return periods are listed for Ventura County Airport in Table 3-3. During this period, the base usually receives less than 3 inches of rainfall per month (U.S. Navy 1996). Summer precipitation is usually in the form of early morning drizzle and typically leaves only trace amounts. Thunderstorms are uncommon at CBC Port Hueneme.

Table 3-2
Monthly Mean Precipitation and Annual Totals
(in inches)

Data	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Station: Point Mugu•													
Mean	2.69	2.4	2.0	0.8	0.1	T	T	0.1	0.3	0.2	1.5	1.7	12.0
Station: Oxnard♦													
Mean	3.41	3.36	2.5	1.0	0.18	0.05	0.02	0.05	0.24	0.29	1.67	2.24	15.01

Note: T - Trace Amounts of < 0.05 inches.
Sources: Data from Brendler (1979).
•International Station Meteorological Climate Summary for Period 1946-1995.
♦Western Regional Climate Center for Period 1948 to 1998.

Table 3-3
Rainfall Intensity Frequencies at Ventura County Airport
(in inches)

Rainfall Duration	Return Period		
	2 Years	50 Years	100 Years
5 minutes	0.17	0.42	0.47
30 minutes	0.42	1.03	1.15
1 hour	0.64	1.58	1.75
6 hours	1.74	4.31	4.79
24 hours	2.60	6.45	7.16

Source: Data from Taylor (1979).

Surface visibility is often restricted by fog and haze in the early morning hours; however, in the afternoon, smoke or haze transported to the coast from the Los Angeles basin on southeasterly winds frequently restricts visibility regardless of the season (International Station Meteorological Climate Summary).

3.2.4 Inversions

Low level inversions that limit the height of the surface atmospheric mixing layer occur frequently over the Oxnard Plain. Subsiding air associated with the Pacific High helps to maintain a semi-permanent inversion over most of southern California. Over the Oxnard Plain, nocturnal cooling and the intrusion of drainage and marine air masses frequently cause inversions to form within 985 feet (300 meters [m]) of the surface.

3.2.5 Winds

Prevailing daytime surface winds in the vicinity of the installation are from the west at 8 to 12 knots, and become northerly in the evening hours at about 5 knots. Prevailing conditions are occasionally interrupted for a two to three day period of strong, gusty, and dry northeasterly winds known as the "Santa Anas." During the Santa Anas relative humidity drops to less than 20 percent and fire danger in nearby brush-covered hillsides rises to extreme levels.

The most potentially damaging winds in the CBC Port Hueneme area are prefrontal southeasters. These winds typically occur for 15 to 20 days between October and April. Wind speeds are usually less than 35 miles per hour (15 meters per second [m/sec]); however, on an average of once every two years, winds of 55 miles per hour (25 m/sec) may be expected in coastal areas. The duration of southeasters is typically six to nine hours; under certain conditions, when a low pressure center lies to the west, or a quasi-stationary front is present, a southeaster may persist for up to 3 days.

3.2.6 Cloudiness

The most distinctive feature of the climate at CBC Port Hueneme is the night and early morning low cloudiness and afternoon sunshine that prevails throughout the spring and summer months.

3.3 SOILS

The soils present at CBC Port Hueneme are represented, in part, by the soils of the Camarillo, Hueneme, and Pacheco Series. The soils consist of relatively level, deep, poorly drained, loamy sands to silty clay loams (SCS and Landau Associates 1985). Camarillo Series soils are typified by poorly drained sandy loams measuring approximately 5 feet or more in thickness. Hueneme Series soils are generally located in shoreline areas with slopes of 0 to 5 percent. Pacheco Series soils consist of poorly drained, silty clay loam, and are similar in thickness and topographic settings to that of Camarillo and Hueneme Series soils (SCS and Landau Associates 1985).

Two additional surface soil types appear in the vicinity of CBC Port Hueneme. Coastal Soils occur in narrow sand beaches and dunes adjacent to CBC Port Hueneme. Drainage from these soils ranges from very poor to good, and permeability is generally high. Fill material characterizes the surficial soils in the southwestern half of the installation. In some portions of this area, the fill material was mechanically compacted. Some of the imported material consists of dredge material, but may also contain boulders, concrete, asphalt, demolition debris, and soil from local borrow sources. Although permeability and

infiltration rates may vary, drainage of fill material is generally poor (The Earth Resources Corporation 1987).

3.4 LAND FORMS AND GEOLOGY

3.4.1 Landforms

CBC Port Hueneme is located at the southwest margin of the Oxnard Plain in the western portion of the Ventura Basin. The Ventura Basin is a relatively broad and level floodplain and river delta formed by the Santa Clara River. The Ventura Basin is bounded on the north and northwest by the Santa Ynez Mountains, to the south and east by the Santa Monica Mountains, and to the southwest by the Pacific Ocean and the Channel Islands.

The ground surface at CBC Port Hueneme is relatively flat and slopes gently from the northeast corner of the installation toward the western and southern portions of the installation. The ground surface elevation at the northeast corner of the installation lies at approximately 27 feet above mean sea level (msl), and the western and southern portions lie at approximately 5 and 10 feet above msl. The land surface along the shoreline consists primarily of sand dunes and beach sands that form the southern and southwestern boundaries of the installation.

The coastal area surrounding CBC Port Hueneme has undergone several man-made modifications in addition to the creation of the Port Hueneme Harbor. Dredge material from the construction of the Channel Islands Harbor in the late 1950s was deposited along the western side of the installation. As a result, surface soil is characterized by fill in the southwestern half of CBC Port Hueneme. The dredge material raised land levels, filled swampy areas, and separated the Port Hueneme Harbor from the Oxnard power plant canal. Excavated material generated during construction of the Channel Islands Harbor and a small off-site trash disposal area were placed at various locations along the western perimeter of the installation.

Based on dredging episodes completed over a 45-year period, the net sedimentation rate in the Port Hueneme Harbor is at least 3 to 4 inches per year and may be as high as 6 inches per year (SCS and Landau Associates 1985). Sedimentation occurs principally in the northern and western portions of the Port Hueneme Harbor, with the unlined surface drainage ditch along Pennsylvania Road representing the predominant source of sediment. Major sediment loading most likely occurs with increased runoff during heavy rainfall.

3.4.2 Geology

CBC Port Hueneme is located on the Oxnard Plain of the Ventura Basin in the western Transverse Ranges geomorphic province (PRC 1997). The western Transverse Ranges is a west-trending geomorphic province in southern California bounded on the north by the Santa Ynez fault, on the east by the San Gabriel Mountains, on the south by the Transverse Ranges Frontal Fault Zone, and on the west by the Pacific Ocean. The Ventura basin, including its offshore continuation in the Santa Barbara Channel, is filled with a thick sequence of Cenozoic sedimentary rocks estimated to be more than 20,000 feet in total thickness. Major east-trending folds and reverse faults reflect regional north-south compression and are characteristic of the basin (Norris and Webb 1990). Unconsolidated alluvial deposits occur in the uppermost 2,000 feet of sediment underlying the Oxnard Plain (The Earth Technology Corporation [Earth Tech] 1991).

CBC Port Hueneme is underlain by approximately 300 feet of Holocene and Pleistocene alluvium comprising unconsolidated clay, silt, sand, and gravel. The Holocene and Pleistocene alluvia are

underlain by the San Pedro and Santa Barbara Formations. The San Pedro Formation consists of largely unconsolidated gently folded, shallow marine and continental deposits that range from about 1,000 to 2,000 feet in thickness (WESTEC and Stollar 1988).

The Santa Barbara Formation, of early Pleistocene to late Pliocene age, underlies the San Pedro formation and consists of 1,000 to 1,500 feet of marine mudstone, shale, and minor sandstone (WESTEC and Stollar 1988). The sandstones, shales, and conglomerates of the Pliocene Pico and Saugus Formations underlie the Santa Barbara Formation (Earth Tech 1989; WESTEC and Stellar 1988).

3.4.3 Geohazards

3.4.3.1 Earthquake Ground Motion

Significant strong ground motion has been recorded in the western Transverse Ranges Region. Strong ground motion is the shaking of the ground near an earthquake source made of large amplitude seismic waves (Bolt 1978). Strong ground motion can originate from a large event on a distant fault, or a smaller event on a fault within the region. Strong ground motion during earthquakes is measured in units of acceleration due to gravity (g), where 1 g = 980 centimeters per second squared (s^2) (Bolt 1978). A peak acceleration value of 0.18g was recorded in Santa Barbara during the 30 June 1941 earthquake and a value of 0.13 g was recorded at Port Hueneme on 21 February 1973 during the Point Mugu earthquake. In addition, a maximum horizontal acceleration of 0.18 g was reported at Port Hueneme from the 18 March 1954 magnitude 4.7 earthquake recorded at an epicentral distance of approximately 5 miles (8 kilometers [km]). Based on these moderate earthquakes recorded at relatively short distances, it is apparent that significant ground motion can originate from nearby sources.

The Modified Mercalli Intensity Scale measures the intensity of an earthquake's effects in a given locality, and is based on observations of earthquake effects at specific places. While an earthquake has only one magnitude, it can have many intensities, which decrease with distance from the epicenter (California Department of Conservation 1997). The 1956 version of the scale ranges from I to XII. Intensity value I is described as "Not felt. Marginal and long-period effects of large earthquakes." Intensity value XII is described as "Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air" (Bolt 1978). It is difficult to compare magnitude and intensity because intensity is linked with the particular ground and structural conditions of a given area, as well as distance from the earthquake epicenter, while magnitude depends on the energy released by earthquake faulting. However, there is an approximate relation between magnitude and maximum expected intensity close to the epicenter. The areas shaken at or above a given intensity increase logarithmically with earthquake magnitude (California Department of Conservation 1997). The California Division of Mines and Geology [CDMG] (1973) has indicated that CBC Port Hueneme is located in a zone that is expected to experience maximum shaking intensities of about IX to X in the Modified-Mercalli Scale.

3.4.3.2 Surface Fault Rupture

Several faults are located in the vicinity of CBC Port Hueneme. The east-west trending McGrath Fault is approximately 5 miles north of the site and is related to the Montalvo Anticline that occurs along the Santa Clara River. The Bailey Fault, which trends northeast-southeast, is located approximately 7 miles south and east of the site along the Santa Monica Mountains. The Bailey Fault is believed to act as a barrier to groundwater movement as evidenced by differences in water levels and water quality on opposite sides of the fault (Mukae and Turner 1975). Major seismic activity is not known to have occurred along either of these faults in recent history. The Los Posas Syncline is approximately 4 miles

north of the site and trends northeastward from the coast to the Los Posas Valley (ERTEC 1989). Another unnamed syncline trends northward from the coast between CBC Port Hueneme and Point Mugu to an area south of Camarillo (Mukae and Turner 1975).

Geologic maps of the Port Hueneme area (Mukae and Turner 1975) and maps in the *Fault Rupture Hazard Zones in California* (CDMG 1972, Revised 1992) indicate that earthquake faults are not known to exist beneath CBC Port Hueneme. The potential for surface fault rupture at the CBC Port Hueneme is extremely low.

3.4.3.3 Liquefaction

Liquefaction is a process whereby granular sediments are altered from a solid state to a liquefied state as a result of increased pore-water pressure. Liquefaction may cause ground movement or ground failure and damage structures during earthquakes, thereby injuring human beings. Such failures do not occur at random but are limited to certain geologic settings and levels of seismic shaking.

In order for liquefaction to occur, susceptible geologic materials must be present near the ground surface (within approximately 50 feet [15m]); these materials must be saturated and they must undergo shaking of sufficient intensity to produce liquefaction. In the absence of any one of these conditions, liquefaction will not occur.

The potential for liquefaction in the Port Hueneme area was assessed by Sprotte and Johnson (1977). Results of their study indicate that major portions of the area have either a high-to-moderate or a moderate-to low potential for liquefaction. Based on the region's historic seismicity and the occurrence of liquefaction in 1872 and 1973, it is likely that liquefaction will occur in certain parts of the Port Hueneme area during a significant earthquake.

3.4.3.4 Differential Settlement

The potential for seismically induced differential settlement of Holocene sediments in the Port Hueneme area is high (Dames and Moore 1985). Seismicity induced differential settlement generally occurs in loose, granular soils. Cohesive or clay soils and sediments exhibit little or no settlement as a direct result of ground shaking. Theoretically, little damage to a structure will occur if it settles uniformly; the main problem would be to utility lines attached to the structure. Totally uniform settlement is rare and differential settlement can cause considerable damage to structures.

There are two types of settlement—compaction and consolidation. Compaction occurs in dry or moist, cohesionless sediments, whereas consolidation occurs in saturated sediments. In general, vibratory motion causes granular sediments to be rearranged into a denser packing. The net result is a reduction of void space, a corresponding reduction of the overall thickness of the cohesionless materials, and the possible settlement of the ground surface. If the soil is dry, the settlement is concurrent with the earthquake motion. Consolidation is a relatively slow process and is a function of the permeability of the soil (Dames and Moore 1985).

3.4.3.5 Subsidence

Human-induced subsidence has been occurring in parts of California for a number of years. The most common cause of subsidence is the withdrawal of fluids, including oil, gas, and water. Subsidence due to groundwater withdrawal is the most extensive type of subsidence in California and has been observed only in valley areas underlain by thick alluvial deposits.

A large area of the Oxnard Plain has experienced subsidence. The Oxnard Plain has been monitored by the U.S. Coast and Geodetic Survey since 1930 and has subsided by as much as 0.04 to 0.05 feet (0.0012 to 0.015 m) per year. A single point located at Hueneme Road and Highway 1 dropped 1.5 feet (0.5 m) in 21 years. Records from 1968 indicate that a dozen benchmarks have settled 1 foot (0.3 m) in a 15- to 20-year period. The current level of subsidence in the Port Hueneme area is relatively small and may be obscured by other effects such as beach erosion and deposition. However, subsidence will probably continue and the rate and amount could increase if extraction of fluids from the area is maintained at its current level, or increases.

3.4.3.6 Expansive Soils

Expansive soils greatly increase in volume when they absorb water and shrink when they dry. Expansion is most often caused by clay minerals, primarily montmorillonite and illite. Expansive soils only represent a hazard when they are unrecognized prior to building, as effective mitigation measures can be implemented. All soils occurring in the Port Hueneme are rated low to moderate with respect to shrink/swell potential.

3.4.3.7 Erosion and Deposition/Shoreline Wave and Wind Erosion

Erosion is the removal and transport of weathered material and it is followed by deposition of the material at another location or locations. The two major agents of erosion are water and wind. Beach erosion presents a major problem in many areas, including Ventura County.

The history of southern California indicates that as urbanization increases, incidents of beach erosion also increase. The area immediately north and south of Channel Islands Harbor has undergone severe beach erosion. Beach erosion is also occurring north of the harbor as far as the Santa Clara River. The current level of beach erosion in the Port Hueneme area is expected to accelerate if the natural flow of sand deposits along the Santa Clara and Ventura Rivers are further decreased.

In the future, erosion could constitute a problem for onshore facilities in the Port Hueneme area. Beach erosion could impact nearby recreational areas and subject onshore facilities to flooding.

Shoreline Wave and Wind Erosion

A small sand beach is located downcoast of the western jetty, within the mouth of the harbor at CBC Port Hueneme. The length of tidal shoreline at CBC Port Hueneme is approximately 727 feet (222 m). The beach is backed by concrete beams, riprap, and a pipeline used for moving sand past the harbor. Foredunes run perpendicular to the sandy beach, abut the west jetty, and extend east to the edge of the overflow parking lot of the Surface Warfare Engineering Facility (SWEF). The position of the high water mark was surveyed on 15 December 1998 using differential GPS.

The beach may be classified as a low energy beach. The beach face is steep with a slope of approximately 1 in 10. The beach has a southerly aspect and is protected from the dominant southwesterly swells by the jetty to the west. As a result, wave heights at the beach are low. At the time of the survey conducted on 15 December 1998, wave height was between 40 centimeters (cm) and 50 cm. Waves broke directly on the beach face and no surf zone was present. There was no evidence of sand bar formation. In contrast, the public beach located on the outside of the breakwater to the west was experiencing wave heights of approximately 6.6 feet (2 m), and exhibited a wide surf zone with a well developed sand bar system.

Beach sands in the mid- to upper-tidal levels consist of fine- to medium-sized grains (0.1 to 0.3 mm diameter); grain size was estimated by inspection. Below mid-tide level, the fine to medium sands are underlain by very coarse sands and fine gravel (1 to 3 mm diameter) at a depth of 1 to 2 cm.

The Ventura County coastline from the mouth of the Ventura River to Point Mugu can be characterized as a wide sandy alluvial plain (Noble Consultants 1989). The Ventura and Santa Clara Rivers empty into this region and deliver much of the sand to this shore segment. Longshore sand drift is from the northwest to the southeast. Construction of the Ventura Harbor, Channel Islands Harbor, and the Port Hueneme Harbor, along with private development along the beach, had a large influence on the historical shoreline evolution in this area; these harbors now play important roles in regulating littoral transport of sand in this region.

The beach is a dynamic sediment environment; sand grains are continually being moved by waves and currents. Littoral material of beaches moves in two basic directions: parallel to the shoreline (alongshore transport) and perpendicular to the shoreline (cross shore transport). Net sediment transport is usually alongshore. Along the Ventura coastline, sediment tends to travel downcoast.

In general, beaches undergo seasonal profile changes; the shoreline will retreat in winter as the more intense storm waves remove sand from the beach and deposit it in offshore bars. The intensity of these seasonal episodic beach changes varies with location. The beaches east and west of CBC Port Hueneme (e.g., Silver Strand Beach, Hueneme Beach, Ormond Beach) typically undergo mild seasonal beach variations.

Historically, the beaches between McGrath State Beach and Port Hueneme have been wide and abundant. However, the construction of the harbor at CBC Port Hueneme in 1940 at the head of the Hueneme submarine canyon created a complete littoral barrier. As a result, beaches east of the harbor at CBC Port Hueneme began to erode or recede. Hueneme Beach (Figure 1-1) began to erode rapidly and beaches from Ormond Beach to Laguna Point began to recede. NAS Point Mugu has had continual erosion problems over the years partially due to the construction of the harbor at CBC Port Hueneme, but also due to exposure to storms. The construction of the Channel Islands Harbor in 1960 improved the situation when the excavated material was deposited at Hueneme Beach east of the Port of Hueneme.

A regular program of sand bypassing (the Channel Islands Harbor Sand Bypassing Program) was later established by the USACE and improved areas downcoast of CBC Port Hueneme. Sand bypassing involves the mechanical transfer of sand around littoral barriers (e.g., the harbor at CBC Port Hueneme, jetties, and breakwaters). At CBC Port Hueneme, sand is pumped around the harbor from a permanent sand bypassing facility at the Channel Islands Harbor to Hueneme Beach located east of Port Hueneme Harbor (USACE 1997). The USACE conducts maintenance dredging of the harbor at CBC Port Hueneme on an as needed basis to prevent erosion to the area east of the harbor and to maintain navigation channels within the harbor (USACE 1997).

Management of shoreline erosion at and near CBC Port Hueneme remains a critical issue for the site and must be conducted from a regional perspective. Coordination with the USACE is critical in managing shoreline resources at CBC Port Hueneme. Key considerations for future management of shoreline erosion at CBC Port Hueneme include:

- Potential impacts on sensitive habitat down drift of the harbor such as Ormond Beach, and
- Potential impacts on the shoreline at NAS Point Mugu.

Water-Induced Erosion

CBC Port Hueneme has had surface erosion problems at several locations in the past. The primary location of erosion has been in the northwest portion of the site, just east of the Victoria Gate entrance. Erosion and flooding problems have existed throughout the canal system due to lack of vegetation. CBC Port Hueneme Public Works has attempted to reduce erosion by revegetating sections of the canals. Other plans include replacing the soil canal system with concrete-lined canal system to improve the effectiveness of the drainage. Wharf 4 also has had problems in recent years with erosion of the face of the wharf.

3.5 WATER RESOURCES

The major freshwater resources of CBC Port Hueneme and its surroundings include five aquifers, an unnamed stream (which flows along the eastern border of the base), and artificial drainages. Groundwater resources including aquifers, as well as water supply and water quality are described in the following section. Surface water resources and surface water hydrology, storm runoff, flood control, and protection from pollution, are also described. Figure 3-1 shows the surface water on CBC Port Hueneme.

3.5.1 Groundwater Resources

The groundwater aquifers beneath the Oxnard Plain are contained within Pleistocene and Recent sedimentary deposits associated with the development of the Santa Clara River, its floodplain, delta, and estuary. The aquifers are present to maximum depths of 3,000 feet or more and include five major units. In order of increasing depth, these aquifers are the Semi-Perched aquifer, Oxnard aquifer, Mugu aquifer, Hueneme aquifer, and Fox Canyon aquifer. A sixth aquifer, the Grimes Canyon aquifer, is present beneath the Fox Canyon aquifer in the southern and eastern portions of Oxnard Plain. It is absent beneath CBC Port Hueneme, due to a change in lithology (rock type) (PRC Environmental Management Inc. [PRC] 1997).

The aquifers underlying CBC Port Hueneme can be divided into three systems. The uppermost system consists of the Semi-Perched aquifer. The Oxnard and Mugu aquifers are referred to as the upper aquifer system. The Hueneme and Fox Canyon aquifers are referred to as the lower aquifer system. The aquifers are separated from one another by aquitards (barriers to water flow) consisting of continuous layers of silt or clay (City of Port Hueneme 1977). Water in the Semi-Perched aquifer is unconfined. The upper and lower aquifer systems are classified as confined to semi-confined.

Based on historic potentiometric levels, groundwater flow direction in the upper and lower aquifer systems ranges from southwest to southeast. Natural discharge is offshore through submerged outcrop areas (City of Port Hueneme 1977). Groundwater elevations and flow directions are influenced by tidal action.

Freshwater recharge to the aquifers beneath the Oxnard Plain and CBC Port Hueneme occurs naturally from: (1) precipitation during above-average rainfall periods, (2) infiltration through the Santa Clara Riverbed, and (3) artificial seepage areas in Saticoy and El Rio, northwest of the installation (Ventura County Public Works Agency 1981).

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Figure 3-1 Canals/Drainage Channels/Surface Water of CBC Port Hueneme
11 x 17, color

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Semi-Perched Aquifer. The Semi-Perched aquifer consists of recent deposits that occur from the site of surficial soils (five to 50 feet below ground surface [bgs]) to an average depth of 75 feet bgs. The aquifer consists primarily of stream-deposited sands and gravels, with minor silt and clay interbeds. The Semi-Perched aquifer is unconfined, and the water table occurs at approximately 5 to 10 feet bgs (PRC 1995b).

The dominant groundwater flow direction within the Semi-Perched aquifer at CBC Port Hueneme is toward the southwest, with a gradient of approximately 0.0005 to 0.004 feet/foot (PRC 1995b). Site-specific groundwater flow patterns are locally influenced by tidal effects or proximity to surface water ditches. Monitoring well pairs installed in the Semi-Perched aquifer indicate a slight downward vertical gradient in the aquifer (PRC 1995a).

Hydraulic parameters of the Semi-Perched aquifer are highly variable. Transmissivity values range from 19,000 to 45,000 gallons per day per foot (gpd/ft). Hydraulic conductivity ranges from 1,267 to 3,000 gallons per day per square foot (gpd/ft^2). Groundwater flow velocity in the Semi-Perched aquifer ranges from 694 to 1,643 feet per year (ft/yr) (WESTEC and Stollar 1988).

Current data indicate that the Semi-Perched aquifer discharges to the harbors, Pacific Ocean, and potentially the surface water drainage ditches in the area of CBC Port Hueneme (PRC 1997).

The Semi-Perched aquifer and Upper aquifer system are separated by a leaky aquitard (referred to as the "clay cap"), consisting of silt and clay with interbedded lenses of fine- to medium-grained sand. The aquitard ranges in thickness from approximately 20 to 50 feet in the vicinity of CBC Port Hueneme and up to 160 feet elsewhere (PRC 1997). The aquitard transports significant quantities of water between the Semi-Perched aquifer and the underlying Oxnard aquifer (ERTEC 1989; 1991). Groundwater flows upward from the Oxnard aquifer into the Semi-perched aquifer. However, in the vicinity of CBC Port Hueneme, the upward gradient is not large and is potentially reversible due to pumping within the Oxnard aquifer or recharge to the Semi-Perched aquifer (WESTEC and Stollar 1988). The aquitard is believed to be common throughout the site (Woodward-Clyde 1998).

There are currently no known drinking-water supply wells developed within the Semi-Perched aquifer in the vicinity of CBC Port Hueneme. Few water wells have been completed within this zone because of limited well yield and poor water quality (PRC 1995b). However, the Water Quality Control Plan for Los Angeles Region lists the Semi-Perched aquifer as designated for existing beneficial use for municipal and domestic supply (California Regional Water Quality Control Board [RWQCB] 1994).

Upper Aquifer System. The upper aquifer system consists of the Oxnard and Mugu aquifers. The Oxnard aquifer is approximately 150 feet thick, occurring from the site of the clay cap to approximately 300 feet bgs. The aquifer consists primarily of fine- to coarse-grained sand and gravel. Interbedded silt and clay layers separate the aquifer into several zones (PRC 1997).

The Oxnard and Mugu aquifers are separated by an aquitard consisting of silt and clay. The Mugu aquifer occurs within Upper Pleistocene deposits located approximately 300 to 500 feet bgs. The aquifer is approximately 120 to 240 feet thick and is characterized by fine- to coarse-grained sand and fine gravel with locally interbedded silt and clay. The aquifer has a high to moderate hydraulic conductivity (SCS and Landau Associates 1985). The upper aquifer system is characterized by artesian conditions, with potentiometric levels ranging from over 20 feet above msl in the northeastern portion of the installation to less than 10 feet above msl in the south and southeast (WESTEC and Stollar 1988).

An erosional unconformity and a discontinuous aquitard of silt and clay up to about 200 feet thick separates the Mugu aquifer from the underlying aquifers (SCS and Landau Associates 1985).

Lower Aquifer System. The lower aquifer system consists of the Hueneme and Fox Canyon aquifers. These aquifers occur between approximately 500 and 1,500 feet bgs and are found within the San Pedro and Santa Barbara Formations of late Pleistocene and early Pliocene age. The Hueneme aquifer consists of approximately 360 to 1,150 feet of irregularly bedded fine- to coarse-grained sands, silt, and clay. The Fox Canyon aquifer is separated from the overlying Hueneme aquifer by a silt and clay aquitard that is approximately 200 feet thick (SCS and Landau Associates 1985). The Fox Canyon aquifer consists of 500 to 600 feet of fine- to medium-grained sand and gravel with interbedded silt and clay. The aquifer is characterized by moderate to high permeability. Historical data indicate that the lower aquifer system is under artesian conditions, with potentiometric levels ranging from over 15 feet above msl in the northwestern part of CBC Port Hueneme to less than 5 feet above msl in the southeastern part of the installation (WESTEC and Stollar 1988).

3.5.1.1 Water Supply/Water Use

The CBC Port Hueneme obtains water from the Port Hueneme Water Agency (Water Agency). Currently, CBC Port Hueneme uses approximately 850 to 950 acre-feet of water each year. The Water Agency obtains water from the United Water Conservation District (UWCD) and Calleguas Municipal Water District (CMWD). The agency water is made by treating UWCD water in a desalinization plant and adding CMWD water to meet demand.

There is one potable water supply well on base, well 22 (State Well No. T1N/R21W-17C03), which pumps groundwater when operational. The Water Agency uses the well for landscape irrigation. The well is not presently used for drinking water but is kept on stand by as a drinking water source if needed (Pringle 1999). A pipeline, used to deliver untreated UWCD water, also exists to avoid using the more costly treated water from the agency for irrigation purposes.

Eleven active groundwater supply wells are present within approximately 0.5 mile of CBC Port Hueneme (ERTEC 1989). Three wells are screened in the Oxnard aquifer, two wells in the Hueneme aquifer, two wells in the Fox Canyon aquifer, and four wells in the lower aquifer system (ERTEC 1989).

Before 1983, 16 additional wells were screened in the Oxnard aquifer in the vicinity of CBC Port Hueneme. These wells were abandoned after seawater intrusion progressively rendered them unusable as potable water supply wells.

3.5.1.2 Groundwater Quality

The Los Angeles Regional Water Quality Control Board (RWQCB) defines water quality objectives as the allowable levels of constituents in groundwater that still maintain protection of the beneficial uses of the aquifer. Water quality objectives are used to identify trends of degradation or enhancement of regional waters, or can be used to support a variance to the aquifer degradation in the Water Quality Control Plan (PRC 1995c).

Groundwater in the Semi-Perched aquifer is nonpotable in the vicinity of CBC Port Hueneme. There are naturally occurring elevated concentrations of total dissolved solids (TDS), sulfate, and chloride in the semi-perched aquifer from seawater intrusion. TDS levels measured in monitoring wells during previous investigations range from 310 to 60,000 milligrams per liter (mg/L); sulfate levels range from 110 to 25,000 mg/L; and chloride ranges from 50 to 21,000 mg/L. Water quality objectives established by the RWQCB in the Water Quality Control Plan are TDS at 3,000 mg/L; sulfate at 1,000 mg/L; and chloride at 500 mg/L. Elevated nitrate concentrations, which exceed the standard limit for drinking water set by the

California Department of Health Services (1990), occur in a localized northwestern area of the installation. These high levels have generally been attributed to local agricultural activities.

The Oxnard aquifer is considered the principal water-bearing aquifer beneath the Oxnard Plain, but its water quality has been degraded by seawater intrusion (Woodward-Clyde 1998). TDS concentrations in the upper aquifer system range from approximately 410 to 60,469 milligrams per liter (mg/L) at CBC Port Hueneme. United States Geological Survey (USGS) studies have shown an almost continuous increase in TDS content in the Mugu aquifer since 1976. A USGS survey of the Oxnard aquifer performed in 1990 indicated 4,557 mg/L chloride and 9,188 mg/L TDS. These levels far exceed state drinking water standards and acceptable agricultural use standards (Ventura County Resource Management Agency, Ventura County Public Works Agency 1994).

The water quality of the lower aquifer system is higher than that of the upper aquifer system. However, in the Port Hueneme area, evaluation of samples from a monitoring well drilled by the USGS showed the presence of seawater in the Fox Canyon aquifer at a depth of about 700 feet. The aquifer is exposed to the ocean in the wall of the Hueneme submarine canyon a short distance from the coast. A stable isotope analysis performed by the USGS verified that lateral seawater intrusion is responsible for the 6,700 mg/L chloride concentration in the Fox Canyon aquifer (Ventura County Resource Management Agency, Ventura County Public Works Agency 1994).

Saltwater intrusion is a regional problem resulting from existing and historic land uses in the Oxnard Plain. When groundwater is over-pumped, seawater can infiltrate the aquifer and degrade water quality. Excessive groundwater withdrawal in the Oxnard Plain is the probable cause of coastal saltwater intrusion. Vertical leakage from shallow, brackish groundwater and improper well seals has also been suggested as a possible factor contributing to groundwater quality degradation. Since the late 1960s, seawater intrusion into coastal aquifers has been significantly reduced due to decreased irrigation pumping related to conversion of farmlands to urban uses (City of Port Hueneme 1993), and development and implementation of regional water quality strategies.

3.5.2 Surface Waters and Storm Runoff

3.5.2.1 Surface Water

Surface water at CBC Port Hueneme is transported primarily by low-gradient overland flow and by surface water drainage ditches that drain into Port Hueneme Harbor. Overland flow is intercepted by drainage ditches adjacent to widely spaced roadways. Surface water flow at the installation occurs in response to intermittent seasonal precipitation. Minor flooding associated with storm tides and wave action occasionally occurs in localized sections of the site near the harbor. A shallow intermittent stream flows approximately 0.5 mile east of the site through the city of Port Hueneme. Channel Islands Harbor, immediately west of the base, also receives intermittent runoff from small streams located north and northwest of CBC Port Hueneme (City of Port Hueneme 1977).

The chemical quality of surface waters draining into CBC Port Hueneme area is highly mineralized due to discharges from surrounding agricultural and urban areas, which use groundwater. During wet seasons, runoff into the drains dilutes the stream waters (City of Port Hueneme 1977).

3.5.2.2 Storm Runoff

The topography of CBC Port Hueneme is approximately level to gently sloping to the west and southwest. Impermeable building and pavement surfaces cover most of the site (not including the golf

course), so the percentage of rainfall that runs off is relatively high. Stormwater runoff from the site discharges into the Port Hueneme Harbor.

3.5.2.3 Flood Control

In CBC Port Hueneme, potential flooding may result from overflow of natural watercourses and man-made drainage systems due to excessive storm run-off or high ocean tides. The tide gate, at the intersection of the Pennsylvania Road Channel and Pleasant Valley Road Channel, currently prevents flooding of the south side of CBC Port Hueneme due to normal tidal influx. However, the south side of CBC Port Hueneme is still vulnerable to minor flooding from wave runup during storm surges. Seiches may occur on the western portion of the site (a seiche is a seismically or atmospherically induced "sloshing" of water in an enclosed basin such as the Port Hueneme Harbor). A seiche would potentially cause flooding in the immediate shoreline area. Because CBC Port Hueneme is located near the ocean, there is a very minor potential of a tsunami or seismically induced sea wave.

The storm drainage and flood control system in CBC Port Hueneme generally consists of surface drainage with limited storm drains. "Bubbling Springs" is the name of the main flood control channel in the city of Port Hueneme. This system ultimately drains to the ocean. The existing storm drain system and flood control facilities generally have the capacity to protect developed areas from flooding. However, the Federal Emergency Management Agency has identified a localized area that is subject to flooding during the 100-year flood. The 100-year flood is based on historical records, which suggest that a flood of this size would be expected to occur on the average of once within a 100-year period. The 100-year flood area within CBC Port Hueneme includes the harbor, flood control channels, and beach (Cotton Beland Associates, Inc. 1993).

CBC Port Hueneme is currently in the process of implementing a flood control project (P-513), intended to help protect water quality by reducing flooding potential on the base (Danza 1999).

3.5.2.4 Surface Water Quality

Stormwater Runoff

CBC Port Hueneme discharges storm water runoff from areas associated with industrial activities, and therefore must comply with the RWQCB California General Industrial Activities Storm Water Permit (Storm Water Permit) requirements. The three main objectives of the National Pollutant Discharge Elimination System (NPDES) permit program are (1) to identify and correct the sources of pollution that affect the quality of storm water discharges; (2) to identify and monitor the sources of potential pollution that may affect the quality of storm water discharges; and (3) to identify and implement best management practices (BMPs) to reduce potential pollution of storm water discharges associated with industrial activity. The Storm Water Permit requires development and implementation of an Storm Water Pollution Prevention Plan (SWPPP).

The purpose of the SWPPP is to describe potential sources of storm water pollutants that have been identified at CBC Port Hueneme and to prescribe BMPs or control measures for minimizing or eliminating the discharge of pollutants from industrial activities into storm water runoff. The SWPPP for CBC Port Hueneme does not address administration buildings, personnel housing facilities, retail facilities, food service facilities, and personnel parking lots.

CBC Port Hueneme uses source controls in lieu of using storm water management practices to remove or eliminate pollutants from contaminating storm water. Good housekeeping and source controls are pre-

emptive efforts to keep pollutants out of storm water. This requires the maintenance of clean, orderly facility areas that discharge storm water. Storm water management practices, other than source controls, include hydraulic controls and treatment-based controls. Hydraulic controls modify the storm water hydrograph by reducing the volume, rate, and/or velocity of runoff. Treatment-based controls remove pollutants from contaminated storm water.

In compliance with the requirements of the Storm Water Permit; a Monitoring and Reporting Program Plan (MRPP) has been created. Starting with the 1992/1993 wet season, storm water samples have been collected from storm events that produced significant discharge at CBC Port Hueneme. The storm water samples are analyzed for toxic pollutants. If toxic pollutant parameters are not detected in significant quantities after two consecutive sampling events, analysis for those particular pollutants may be discontinued in future sampling events. Significant quantities are defined in the Storm Water Permit as the volume, concentrations, or mass of a pollutant that can cause or threaten to cause pollution, contamination, or nuisance; adversely impact human health or the environment, and cause or contribute to a violation of any applicable water quality standards for the receiving water (U.S. Navy 1998b).

Nonpoint Source Pollution

Nonpoint source (NPS) pollution has been identified by the United States Congress and the U.S. EPA as a national environmental concern. Major sources of NPS pollution include runoff from construction, urban areas, silviculture, and agriculture. Agricultural activities create the greatest NPS problems associated with pesticides and fertilizers. Agriculture is the leading nonpoint source of water pollution (Miller 1994) containing pesticides and fertilizers, which can harm the natural balance in the environment. This harm occurs by introducing chemicals toxic to flora and fauna and through fertilizers encouraging extraordinary plant growth (i.e., eutrophication). Toxic chemicals can bioaccumulate in aquatic and terrestrial organisms causing long-term effects to the food web. Historical and present use of pesticides such as DDT, diazanon, lindane, methidathion, chlorpyrifos, and malathion have been documented to directly harm the reproductive cycles of birds, insects, and zooplankton (Kuivila *et al.* 1995; Siting 1981).

Eutrophication can contribute to an overabundance of vegetation in freshwater habitats and encourage algal blooms that reduce light penetration and photosynthesis in marine habitats (Miller 1994). The rapid encroachment of wetland plants in freshwater habitats can dramatically alter the ecosystem (e.g. reduce dissolved oxygen levels) and reduce the abundance of fish, birds, amphibians, and other species that utilize these habitats. The long-term effects of NPS pollution can be significant and adverse impacts of pesticides on organisms low on the food chain are amplified throughout the food web, causing a reduction of commercially, recreationally, and environmentally important species.

The drainage channels at CBC Port Hueneme have been designated part of Installation Restoration Program (IRP) Site 19 due to present contamination by nonpoint source pollution and past contamination from spills and leaks into storm sewers on base. A scoping-level ecological risk assessment was conducted during the preparation of a draft risk evaluation for IRP Site 19 that indicated the potential for negative impacts to ecological receptors due to exposure to contaminants within the drainage channels (PRC 1995a).

Methyl Tertiary Butyl Ether

Methyl tertiary-butyl ether (MTBE) is a potentially significant groundwater contaminant that has recently been detected at CBC Port Hueneme. MTBE is a gasoline oxygenate. Oxygenates such as MTBE are added to gasoline to enhance combustion and decrease vehicular carbon monoxide and ozone emissions (USGS 1999).

MTBE is a volatile organic compound (VOC) produced from methanol. Although MTBE may vaporize and condense from soils, it is also highly mobile in soil and can move into groundwater. MTBE is less biodegradable and moves more rapidly than other common gasoline compounds such as benzene, toluene, ethylbenzene, and total xylene (BTEX). It is approximately 40 times more soluble than BTEX compounds at room temperature. Currently, the U.S. EPA tentatively classifies MTBE as a possible human carcinogen (USGS 1999).

A study of MTBE contamination at CBC Port Hueneme is in progress, but the magnitude of the problem and specific management recommendations for this issue have yet to be determined. MTBE in groundwater at the site originated from a gas station that leaked 10,800 gallons of leaded gasoline between September 1984 and March 1985 (U.S. Navy 1999). The contaminated water plume is slowly travelling in the direction of Hueneme harbor.

Septic Tanks

No known contamination has occurred from leakage of septic tanks into groundwater (Pringle 1999).

3.5.2.5 Remediation/Beneficial Uses for Water Resources

In 1994, four bioremediation systems were installed to test the effectiveness of groundwater circulation wells designed to prevent MTBE-contaminated groundwater from reaching the harbor or contaminating other aquifers. One large system was placed at a source of contamination for source removal. Three smaller units were installed perpendicular to the flow, downgrade from the source, to remediate and contain the contaminated water (U.S. Navy 1999).

Management Issues and Concerns for Ground and Surface Water

Management issues associated with water resources at CBC Port Hueneme include:

- MTBE contamination of groundwater;
- Over-pumping of groundwater by offsite sources, resulting in seawater intrusion in the upper aquifer system;
- Proper characterization of “first flush” stormwater contamination;
- NPS including pesticides, herbicides, fertilizers, petroleum hydrocarbons, and metals; and
- Water quality (watershed protection).

3.5.3 Water, Energy-Related, and Recycling Conservation Efforts on CBC Port Hueneme

Conservation efforts on CBC Port Hueneme address energy, water resources, recycling, pollution prevention, and public outreach and education. These efforts are summarized in the following section.

3.5.3.1 Energy Showcase Program

CBC Port Hueneme has been chosen as a Navy Energy Showcase project. The purposes of the Energy Showcase Program at CBC Port Hueneme are to demonstrate efficient engineering practices and

conservation technologies for energy and water supply management; disseminate information throughout the DoD about the methods used at CBC Port Hueneme as an archetype for efficient energy management; and to demonstrate that the goal of a 30 percent reduction in energy usage in government buildings by the year 2005, Executive Order 12902, is achievable. In addition, the program is intended to demonstrate good resource sustainability planning by making use of reused, recycled, and recyclable materials. Energy Showcase projects are open to the public and are intended to serve as models for other government facilities (U.S. Navy 1999).

Water Conservation

The goals of the water conservation component of the Energy Showcase program are to develop projects to conserve potable water, reduce sewage treatment, reduce energy consumption from heating water, and to reduce facility maintenance costs (U.S. Navy 1999). Over the past 3 years, three water conservation projects have been implemented at CBC Port Hueneme, including:

- The replacement of standard toilets by low flow toilets in high occupancy buildings at a cost of $164,000, saving $22,000 and 11 million gallons of water per year;
- Improving the efficiency of irrigation systems on base at a cost of $50,000 to reduce water consumption saving $5,000 per year and 2.6 million gallons of water; and
- The construction of a net zero energy use building. Water conservation is a prominent component of the project.

The net zero energy use building design features architectural, landscaping, irrigation, and mechanical systems that have been integrated to promote efficient water use. Examples include:

- Lavatory waste water and rain run-off from the roof will be collected and used to flush toilets and urinals through a gray water recovery system.
- Excess roof water will be directed to a percolation basin for recharging the ground water. Other water retention and redistribution schemes will also be introduced.
- Plumbing fixtures will be low water usage devices.
- Future landscaping design, plant materials, and irrigation system will minimize evapo-transpiration and soil erosion.
- Microclimate modification techniques will be incorporated to reduce wind impact, provide shade areas, and alter surface temperatures (U.S. Navy 1999).

Future projects will include conducting a basewide water leak detection survey to correct deficiencies and developing water reclamation systems.

Energy Conservation Projects

There are several energy efficiency projects on CBC Port Hueneme under this showcase. The steam plant decentralization project is geared toward installing efficient satellite boilers while demolishing the central steam plant. The annual energy savings is approximately $340,000. Another energy conservation project is fuel cell installation. Fuel cells utilize natural gas in a non-combustion process to produce electricity

and thermal energy with low air emissions. An annual savings of $73,000 is expected from using fuel cells for energy (Carr and Spiessl 1998).

Renovations of old, inefficient office buildings and housing units are expected to have a large impact on the energy consumption on base. Old buildings have been demolished and personnel have been relocated into newer and more cost effective facilities. In the on site housing units, high efficiency appliances and water heaters have been installed, along with fluorescent lighting, high-grade installation, double-paned vinyl windows, photocell exterior lighting, and skylights (Carr and Spiessl 1998; U.S. Navy 1997).

Alternative fuel vehicles (AFVs) are being promoted and used on site, including compressed natural gas (CNG) electric automobiles. A CNG station has been constructed and 100 vehicles on site have been converted to use CNG. CNG vehicles produce up to 98 percent less nitrates of oxygen (NO_x), 30 percent less carbon dioxide (CO_2), and 86 percent less carbon monoxide (CO). 34 electric vehicles are used on base. Electric vehicles produce zero emissions and run on energy from utility power plants, which are closely regulated and monitored for proper emissions (Carr and Spiessl 1998).

In addition to the above facility and infrastructure improvements, a demonstration facility has been created to renovate an older facility that will serve as an example of an environmentally sustainable building (Building 850). Goals include zero net energy use from the power grid, use of renewable energy that is economically feasible, and use of recycled materials. Technologies utilized include natural daylighting and efficient lighting, photovoltaics, gray water recovery, solar hot water for domestic and space heating, zero VOC paints, sustainable landscaping, and tiles made from recycled materials. Partnerships in this endeavor include Southern California Edison, the U.S. Department of Energy, and the U.S. Army (Carr and Spiessl 1998).

3.5.3.2 Recycling on Base

In addition to the projects described in the Energy Showcase Program, recycling is also a major component of conservation awareness on base. Materials accumulated during the demolition and renovation of Building 850 will be reused or recycled to the extent possible (U.S. Navy 1999). Materials from basewide operations are also recycled. The MWR Department on site operates the recycling center. Materials recycled through this program include metals, oil, oil filters, cardboard, office paper, glass, aluminum, plastics, newspaper, mixed paper, steel cans, and waste wood (Partee 1999; U.S. Navy 1996). Although the recycling center does not regularly pick up recyclable materials from site housing, drop off areas are available for housing residents. Currently, there is no official basewide recycling program for demolition and construction projects, although offbase recycling of these materials does periodically occur. Metal scraps and waste wood are the only demolition and construction materials that are regularly recycled in the current recycling program.

The MWR Department currently operates a Qualified Recycling Program (QRP), as defined by DoD I 4715.4 *Pollution Prevention*. A QRP can sell recycled items, pay for the costs of the recycling program using these funds, and use the balance for projects that will benefit the installation. The recycling program on CBC Port Hueneme was designated a QRP in 1987, and has resulted in a significant diversion of waste since implementation (U.S. Navy 1996).

In 1992, CBC Port Hueneme began a greenwaste diversion project. Greenwaste from the ball fields and golf course on base (e.g., lawn clippings) are chipped and dispersed over disturbed soils on construction training to improve the soil and reduce water needed for dust control. In addition, this has resulted in a 20 percent waste reduction on base (U.S. Navy 1996).

3.5.3.3 Pollution Prevention Plan

The Pollution Prevention (P2) Plan for CBC Port Hueneme was finalized in 1996 and revised in June 1998 (U.S. Navy 1996). The main goal of this plan is to achieve the DoD goal in reducing waste by 50% of the 1994 baseline. The P2 Plan uses a comprehensive approach to reducing hazardous wastes, hazardous materials use, and off-site toxic chemical releases to minimal amounts. In addition, solid waste diversion is encouraged to reduce the amount of wastes that go into a landfill.

3.5.3.4 Public Outreach and Education

Many outreach and education efforts have been made to the community surrounding CBC Port Hueneme (U.S. Navy 1996). These efforts include the following:

- Special annual events such as Pollution Prevention Week, Earth Day, and Arbor Day include activities on base, such as educational talks, displays, and contests.
- Newspaper articles written by CBC Port Hueneme environmental staff bring environmental issues to the base and housing newspapers.
- CBC Port Hueneme has participated in the Navy's Partnership in Excellence program at a local elementary school, including demonstration of storm water sampling and best management practices (BMPs).
- CBC Port Hueneme developed and implemented the first Navy Household Hazardous Waste (HHW) Education Program for military and civilian employees of the base, residents, and local communities. Key elements of the HHW Program included a HHW pamphlet, a video, refuse container stickers, and newspaper articles.

3.6 VEGETATION

The following text presents a description of each habitat at the base and a corresponding preliminary plant list of observed species. Existing habitats are coyote brush, California annual grassland, bulrush-cattail, sand verbena-beach bursage, sandy beach, and marine subtidal. Coyote brush, a plant community dominated by soft woody shrubs, occurs at the intersection of Track Road and 23rd Avenue near the golf course. Ruderal plant communities are located on the northwest portion of the base and are dominated by introduced annual grasses. The sand verbena-beach bursage habitat is located along the coast approximately 1,000 feet west of the harbor along the southwestern boundary. Bulrush-cattail habitat is located within the drainage channels and in a ponded area north of 23rd Avenue. Marine subtidal habitat occurs in the harbor.

3.6.1 Existing Vegetation Types

The vegetation classification for this IRMP is based on *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). The following discussions reflect the major vegetation types on CBC Port Hueneme in order to provide an overview of habitat concerns. The major vegetation types that occur on CBC Port Hueneme are discussed below. Figures 3-2a and 3-2b present the vegetation types identified on the western half of CBC Port Hueneme. Since the eastern half is highly urbanized and landscaped, this portion of CBC Port Hueneme is not included. Sensitive plant species are discussed in Section 3.6.2, and presented in Table 3-8.

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Figure 3-2A Habitats and Sensitive Species Locations on CBC Port Hueneme

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Figure 3-2B Habitats and Sensitive Species Locations on CBC Port Hueneme

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The biological significance of some of these habitats is minimal when considering the regional scope of the habitat. However, these areas represent the last remaining fragments of habitat on the station and should be protected as sensitive resources.

Many plant species, particularly sensitive species and annuals, can be identified definitively or observed only during their blooming periods in spring and summer. Therefore, the results of the botanical survey conducted in December 1998 for this IRMP are supplemented with previous studies, and cannot be considered comprehensive. A preliminary list of plant species for each terrestrial and freshwater vegetation type is presented in Tables 3-4 through 3-7, at the conclusion of this section. Recommendations for additional vegetation surveys to fully characterize particular habitats are found in Chapter 4.0 of this IRMP.

Table 3-4
Plant List for CBC Port Hueneme, California
Vegetation Type: Coyote Brush

Family	Scientific Name	Common Name	Habit	N = Native I = Introduced	Occurrence
Aizoaceae	*Carpobrotus edulis*	Iceplant/Common hottentot fig	Shrub, subshrub	I	Scattered
Anacardiaceae	*Malosma laurina*	Laurel sumac	Shrub	N	Scattered
Asteraceae	*Ambrosia artemisifolia*	Common ragweed	Annual	I	Scattered
	*Baccharis pilularis**	Coyote brush	Shrub	N	Common
	Baccharis salicifolia	Mule fat	Shrub	N	Scattered
Fabaceae	*Melilotus alba*	White sweetclover	Annual/biennial	I	Scattered
	Melilotus indica	Sourclover	Annual herb	I	Common
	Lotus corniculatus	Birdfoot trefoil	Perennial	I	Scattered
Malvaceae	*Malva parviflora*	Cheeseweed	Annual	I	Scattered
Myoporaceae	*Myoporum laetum*	Myoporum	Shrub, small tree	I	Scattered
Plantaginaceae	*Plantago lanceolata*	English plantain	Perennial	I	Scattered
Poaceae	*Distichlis spicata*	Saltgrass	Grass	N	Scattered
	Avena spp.		Grass	I	Scattered
	Bromus spp.		Grass	I	Scattered
	Cortaderia spp.	Pampas grass	Grass	I	Scattered
	Hordeum		Grass	I	Scattered

Notes: * - Indicates dominance.
This is a preliminary list based on field observations on December 1998 and existing data.
Sources: Hickman 1996; Woodward-Clyde 1998.

Table 3-5
Plant List for CBC Port Hueneme, California
Vegetation Type: California Annual Grassland

Family	Scientific Name	Common Name	Habit	N = Native I = Introduced	Occurrence
Anacardiaceae	*Malosma laurina*	Laurel sumac	Shrub	N	Scattered
Asteraceae	*Baccharis pilularis*	Coyote brush	Shrub	N	Scattered
	Ambrosia artemisifolia	Common ragweed	Annual	I	Scattered
	Heterotheca grandiflora	Telegraphweed	Annual, biennial herb	N	Common
Brassicaceae	*Lepidium lasiocarpum* var. *lasiocarpum*	Peppergrass	Annual herb	N	Scattered
Fabaceae	*Lotus corniculatus*	Birdfoot trefoil	Perennial	I	Scattered
	Melilotus alba	White sweetclover	Annual/Biennial	I	Scattered
	Melilotus indica	Sourclover	Annual herb	I	Common
Malvaceae	*Malva parviflora*	Cheeseweed	Annual	I	Common
Plantaginaceae	*Plantago lanceolata*	English plantain	Perennial	I	Scattered
Poaceae	*Arundo donax*	Giant reed	Grass	I	Scattered
	Avena spp.		Grass	I	Common
	Bromus spp.		Grass	I	Common
	Cortaderia spp.	Pampas grass	Grass	I	Scattered
	Hordeum		Grass	I	Common

Note: This is a preliminary list based on field observations on December 1998 and existing data.
This area is highly disturbed with invasive exotic species. Refer to Section 3.6.1.2 for vegetation type description.
Sources: Hickman 1996; Woodward-Clyde 1998.

Table 3-6
Plant List for CBC Port Hueneme, California
Vegetation Type: Sand Verbena-Beach Bursage

Family	Scientific Name	Common Name	Habit	N = Native I = Introduced	Occurrence
Aizoaceae	*Carpobrotus edulis**	Iceplant	Perennial	I	Common
	Mesembryanthemum crystallinum	Crystalline iceplant	Annual, biennial	I	Scattered
Asteraceae	*Ambrosia chamissonis*	Silver beachbur	Perennial	N	Scattered
	Heterotheca grandiflora	Telegraph weed	Annual, biennial herb	N	Scattered
Brassicaceae	*Cakile maritima*	Sea rocket	Annual herb	I	Scattered
Convolvulaceae	*Calystegia soldanella*	Beach morning glory	Perennial	N	Rare
Frankeniaceae	*Frankenia salina*	Alkali heath	Subshrub	N	Scattered
Nyctaginaceae	*Abronia maritima*	Sand verbena	Perennial	N	Scattered

Notes: * - Dominant species.
This is a preliminary list based on field observations on December 1998 and existing data.
This area is highly disturbed with invasive exotic species. Please refer to Section 3.6.1.3 for vegetation type description.
Sources: Hickman 1996; Woodward-Clyde 1998.

Table 3-7
Plant List for CBC Port Hueneme, California
Vegetation Type: Bulrush-Cattail

Family	Scientific Name	Common Name	Habit	N = Native I = Introduced	Occurrence
Aizoaceae	*Mesembryanthemum* spp.	Iceplant	Annual/biennial	I	Scattered
Asteraceae	*Ambrosia artemisifolia*	Common ragweed	Annual	I	Scattered
Asteraceat	*Cotula cornopifolia*	Brass buttons	Perennial	I	Rare
	Verbesina enceliodes	Crownbeard	Annual	I	Common
Brassicaceae	*Brassica nigra*	Black mustard	Annual/ biennial, herb	I	Scattered
Convolvulaceae	*Cressa truxillensis*	Alkali weed	Perennial, subshrub	N	Scattered
Cyperaceae	*Cyperus esculentus*	Nutsedge	Perennial	I	Rare
	Scirpus americanus	American bulrush	Perennial	N	Scattered
	Scirpus acutus	Common tule	Perennial	N	Rare
	Scirpus californicus	Bulrush	Perennial	N	Scattered
	Scripus maritimus	Alkali bulrush	Perennial	N	Scattered
	Scirpus olnyei	Olney's bulrush	Perennial	I	Scattered
Fabaceae	*Lotus corniculatus*	Birdfoot trefoil	Perennial	I	Rare
	Melilotus alba	White sweetclover	Annual/biennial	I	Scattered
	Melilotus indica	Sourclover	Annual herb	I	Common
Frankeniaceae	*Frankenia salina*	Alkali heath	Subshrub	N	Scattered
Malvaceae	*Hibiscus* spp.	Hibiscus			Rare
	Malva parviflora	Cheeseweed	Annual	I	Rare
Myoporaceae	*Myoporum laetum*	Myoporum	Shrub, small tree	I	Scattered
Myrtaceae	*Eucalyptus* spp.	Eucalyptus	Tree	I	Scattered
Plantaginaceae	*Plantago lanceolata*	Narrowleaf plantain	Perennial	I	Scattered
	Plantago subnuda	Plantain	Perennial	N	Scattered
Poaceae	*Avena* spp.		Grass	I	Scattered
	Bromus spp.		Grass	I	Scattered
	Distichlis spicata	Saltgrass	Grass	N	Common
	Hordeum		Grass	I	Scattered
	Phragmites australis	Common reed	Grass	N	Scattered
Potamogetonaceae	*Ruppia maritima*	Ditch grass	Perennial	N	Rare
Salicaceae	*Salix lasiolepis*	Arroyo willow	Shrub, small tree	N	Common
Typhaceae	*Typha latifolia*	Broad-leaved cattail	Perennial	N	Scattered

Note: This is a preliminary list based on field observations on December 1998 and existing data.
Sources: Hickman 1996; Woodward-Clyde 1998.

Table 3-8
Sensitive Plant Species Potentially Occurring at the
Naval Base Ventura County, Port Hueneme Site, California

Family	Scientific Name	Common Name	Status				Habitat	Comments	Blooming Period
			Federal	State	CNPS	Navy			
Scrophulariaceae	*Cordylanthus maritimus* spp. *maritimus*	Salt marsh bird's beak	FE	SE	1B		Coastal salt marsh, coastal dunes	Ormond Beach & Mugu Lagoon. Could be present with *Frankenia* spp., *Typha* spp., *Distichlis spicata*.[1,2]	May-Oct
Fabaceae	*Astragalus pynostachyus* var. *lanosissimus*	Ventura marsh milk-vetch		*	1A	NSC	Coastal salt marsh	Recently re-discovered population near McGrath State beach in a degraded dune system; habitat requirements not well known.[1,2]	Jul-Oct
Asteraceae	*Lasthenia glabrata* spp. *coulteri*	Coulter's goldfields			1B	NSC	Coastal salt marsh, playas, grassland	Collected at Hueneme in 1901, presumed extant.[2]	Feb-Jun

Notes: FE = Federally listed Endangered.
FT = Federally listed Threatened.
NSC = Navy Species of Concern.
SE = State listed Endangered
1A = California Native Plant Society listed plants are presumed extinct in California, but rediscovery remains a distinct possibility.
1B = California Native Plant Society listed plants are rare, threatened, or endangered in California and elsewhere.
* - Currently noticed as a Candidate Species (CDFG 1999).
1 = (USFWS 1999).
2 = Surveys are needed to confirm the presence or absence of this species at CBC Port Hueneme.

Sources: California Department of Fish and Game, Natural Diversity Data Base. April 1998. Special Plants List. Biannual publication, Mimeo., 119pp.
California Department of Fish and Game, Natural Diversity Data Base. August 1998. State and Federally listed Endangered, Threatened, and Rare Plants of California.
Cal Flora Database. 1997. Kings River Ecosystem Project and Institute of Forest Genetics. USDA Forest Service, Pacific Southwest Research Station. http://galaxy.cs.berkeley.edu:8080/calflora.

3.6.1.1 Coyote Brush

Coyote brush habitat is a diverse vegetation type dominated by coyote brush (*Baccharis pilularis*). Within the constraints of an urban environment, associated shrub species that typically occur in this vegetation type may include black sage, California blackberry (*Rubus ursinus*), California buckwheat (*Eriogonum fasciculatum*), California coffeeberry (*Rhamnus californic*a), California sagebrush (*Artemesia californica*), wax myrtle (*Myrica californica*), poison oak (*Toxicodendron diversilobum*), salal (*Gaultheria shallon*), white sage (*Salvia apiana*) and/or yellow bush lupine (*Lupinus arboreus*) at an elevation from sea level to 1000 meters (Sawyer Keeler-Wolfe 1995). Typical upland settings include stabilized dunes, coastal bluffs, open slopes or terraces. However, this habitat is highly disturbed and isolated on CBC Port Hueneme. The most extensive coyote brush habitat on base occurs at the intersection of Track Road and 23rd Avenue adjacent to the golf course; the dominant species is coyote brush. Other species observed include mulefat (*Baccharis salicifolia*), iceplant (*Carpobrotus edulis*), myoporum (*Myoporum laetum*), laurel sumac (*Malosma laurina*), white sweetclover (*Melilotus alba*), and english plantain (*Plantago lanceolata*). Table 3-4 provides a preliminary list of species observed in this habitat.

3.6.1.2 California Annual Grassland

California annual grasslands are typically composed of bromes (*Bromus* spp.), California poppy (*Eschscholzia californica*), filarees (*Erodium* spp.), goldfields (*Lasthenia* spp.), lupines (*Lupinis* spp.), mustards (*Brassica* spp.), oats (*Avena* spp.), owl's-covers (*Castilleja* spp.), ryegrasses (*Lolium* spp.), and/or star thistles (Sawyer Keeler-Wolfe 1995). Some widespread and invasive exotics include wild oats (*Avena* spp.), mustards (*Brassica* spp.), brome grasses (*Bromus* spp.), sweet-clovers (*Melilotus* spp.) and plantains (*Plantago* spp.). These exotic species occur at CBC Port Hueneme throughout the highly disturbed grassland and in graded areas that may have historically been occupied by coyote brush. The largest area occupied by disturbed California annual grassland is located on the northwest portion of the base and is dominated by introduced annual grasses. Table 3-5 provides a preliminary list of species observed in this habitat at CBC Port Hueneme.

3.6.1.3 Sand Verbena-Beach Bursage

Sand verbena-beach bursage habitat occurs along the coast at localized stretches of and isolated by headlands and rocky tidepools (Sawyer Keeler-Wolfe 1995). Sand verbena-beach bursage is presently reduced by urban and other development. This habitat is typically characterized by sand verbenas (*Abronia maritima* and *Abronia* species), beach-bur (*Ambrosia chamissonis*), dune buckwheat (*Eriogonum latifolium*) and sea rocket (*Cakile maritima*). At CBC Port Hueneme, this habitat is found along the coast approximately 1,000 feet west of the Port Hueneme Harbor along the southwest boundary of the base (see Figures 3-2a and 3-2b). Native plant species occurring within this area include telegraph weed (*Heterotheca grandiflora*), beach morning glory (*Calystegia soldanella*), and sand verbena (*Abronia maritima*). The dominant plant species, however, is a nonnative plant, hottentot fig (*Carpobrotus edulis*) and most of the area is disturbed by ORV tracks. Table 3-6 provides a preliminary list of species observed in this habitat at CBC Port Hueneme.

3.6.1.4 Bulrush-Cattail

Bulrush-cattail habitat varies considerably in salinity with water chemistry ranging from fresh to hypersaline. This habitat typically includes rushes (*Juncus* spp.), bulrush (*Scirpus* spp.), saltgrass (*Distichlis spicata* var. *spicata*), and broad-leaved cattail (*Typha latifolia*) (Sawyer Keeler-Wolfe 1995). A more alkaline bulrush-cattail habitat is found within the drainage channel at CBC Port Hueneme. For purposes of this IRMP these drainages will be referred to as Special Interest Natural Area B (Figure 4-1). Vegetation in this area is routinely maintained through the application of an herbicide. Native plant species occuring within this area under unmaintained conditions include common thule (*Scirpus acutus*), american bulrush (*Scirpus americanus*), plantain (*Plantago subnuda*), saltgrass, and common reed (*Phragmites australis*). Nonnative plant species that provide the dominant cover under maintained conditions include crownbeard (*Verbesina enceliodes*) and sourclover (*Melilotus indica*). A freshwater bulrush-cattail habitat occurs at CBC Port Hueneme in a ponded area north of 23rd Avenue. For purposes of this IRMP this freshwater pond will be referred to as Special Interest Natural Area A (Figure 4-1). Dominant species observed include bulrush (*Scirpus californicus*) and American bulrush (*Scirpus americanus*). Table 3-7 provides a preliminary list of species observed in this habitat at CBC Port Hueneme.

3.6.2 Sensitive Species

A plant species is considered sensitive if it is listed as endangered, threatened, or proposed for listing as endangered or threatened pursuant to the federal Endangered Species Act of 1973, as amended. Navy plant species of concern and species considered sensitive by the California Native Plant Society (CNPS)

are also considered sensitive for the purposes of this IRMP. Navy species of concern are species whose conservation status may be of concern to the Navy.

Plant species are listed as sensitive by the CNPS (Skinner and Pavlik 1994) according to five categories. List 1A species are presumed extinct in California; List 1B species are rare or endangered in California and elsewhere. List 2 species are rare or endangered in California but are more common elsewhere. List 3 species include those for which more information is needed. List 4 plants are those with limited distribution.

A list of sensitive plant species potentially occurring at CBC Port Hueneme is presented in Table 3-8. Sensitive plant species that may occur at the Port Hueneme site include salt marsh bird's beak, Ventura marsh milk-vetch, and Coulter's goldfields, and are described in more detail below.

3.6.2.1 Salt Marsh Bird's Beak (*Cordylanthus maritimus* var. *maritimus*)

This species, in the family Scrophulariaceae, is an annual herb with white to cream-colored petals having pale to brownish or purplish-red tips. Salt marsh bird's beak occur on coastal dunes and in coastal salt marshes. This plant is listed as a federally endangered (FE) species, California state endangered (SE), species, and is included on the California Native Plant Society (CNPS) List 1B. Within the region, salt marsh bird's beak is known to occur at Silver Strand Beach, McGrath Beach, Ormond Beach, and the lagoon at NAS Point Mugu. This species has not been observed at CBC Port Hueneme. Key threats to this species include off-road vehicle use, road construction, foot traffic, and loss of salt marsh habitat.

3.6.2.2 Ventura Marsh Milk-Vetch (*Astragalus pynostachyus* var. *lanosissimus*)

Ventura marsh milk-vetch, in the family Fabaceae, is a perennial herb with greenish white or cream-colored petals. This species is associated with coastal salt marshes. Ventura marsh milk-vetch is a Navy species of concern and is included on the CNPS List 1A. Plants on List 1A are considered by CNPS to be extinct, however, one site was discovered in 1997 in degraded coastal dunes with imported fill approximately three miles northwest of CBC Port Hueneme. Ventura marsh milk-vetch is currently listed as a candidate species by the California Department of Fish and Game (CDFG 1999). This species has not been observed at CBC Port Hueneme. Key threats to this species include nonnative species such as iceplant and pampas grass.

3.6.2.3 Coulter's Goldfields (*Lasthenia glabrata* spp. *coulteri*)

This species, in the family *Asteraceae*, is an annual herb that stands up to 60 cm with yellow disks and rays. Coulter's goldfields are known to occur in coastal salt marsh, playas, valley and foothill grassland, and vernal pools. This plant is a Navy species of concern and is included on the CNPS List 1B. This plant was reported in Port Hueneme in 1901 and is presumed extant (CNDDB 1998). Coulter's goldfields has also been identified at the Ventura River mouth and at Mugu Lagoon. Key threats to this species include urbanization and agricultural development.

3.6.3 Exotic Plant Species Control and Eradication

Exotic plant species or noxious weeds are problematic throughout the nation. In response to commercial, agricultural, and public health concerns, the Federal Noxious Weed Act (1975, Title 7, Chapter 61) was implemented to provide regulatory control for exotic species. The term "noxious weed" is defined as "any living stage (including but not limited to, seeds and reproductive parts) of parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United

States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture including irrigation, or navigation or the fish and wildlife resources of the United States or the public health" (USFWS 1998a). The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) is the federal legal authority for the Noxious Weed Act. In California, the Exotic Pest Plants Committee (CalEPPC) provides regional and widespread lists for exotic pest plants of greatest ecological concern including those designated as Federal Noxious Weeds. Plants on CalEPPCs List A-1 are considered most invasive wildland pest plants that are widespread in California (CalEPPC 1996).

Exotic plant species are major threats to the continued survival of California's native flora and fauna. The effects of exotic plants are varied; in come cases, the impact is relatively small and in other cases, when an exotic such as pampas grass (*Cortaderia* spp.) takes over entire coastal hillsides displacing almost all native vegetation, the impact is very significant (Holland and Keil 1995). The most problematic and widespread species currently identified at CBC Port Hueneme are hottentot fig *(Carpobrotus edulis*), pampas grass (*Cortaderia* spp.*)* and Tasmanian blue gum (*Eucalyptus globulus*); these plant species are discussed below. Other species of concern include narrow-leaved iceplant (*Conicosia pugioniformis*) and crystalline iceplant (*Mesembryanthemum crystallinum*). The habitat most threatened by these species is sand verbena-beach bursage habitat that occurs in the southwest portion of CBC Port Hueneme. Bulrush-cattail habitat is also vulnerable to invasion by German ivy (*Senecio mikanioides*), tamarisk (*Tamarix chinensis*), and giant reed (*Arundo donax*). Giant reed, reported on CalEPPCs List A-1, occurs near the bulrush-cattail habitat north of 23rd Avenue. Management goals for exotic vegetation are summarized in Section 4.0 of this IRMP.

Hottentot fig (Carpobrotus edulis)

This species is native to South Africa, and has been planted widely in California since the early 1900s. Hottentot fig was introduced by various private and government agencies to control dune movement and in the process have sometimes crowded out the native species (Holland and Keil 1995). Hottentot fig, also referred to as iceplant, is remarkable in its ability to colonize habitats and spread rapidly, excluding native plants. Its fleshy fruits are consumed by a variety of mammals, resulting in widespread seed dispersal. Seedlings establish tap roots and then proliferate radially by stolons, forming a thick, dense mat. Single clones can cover large areas. At CBC Port Hueneme, hottentot fig is the dominant species occupying the sand verbena-beach bursage habitat. Hottentot fig is also used in landscaped areas throughout the base. This plant is on CalEPPCs List A-1 (highly invasive) (CalEPPC 1996).

Pampas Grass (Cortaderia spp.)

Most species of pampas grass are native to South America. It is an erect perennial grass forming large tussocks with plume-like inflorescences. Two species were introduced as ornamentals to California in the late 19th century, *Cortaderia jubata* and *C. selloana*. Populations of *C. jubata* and *C. selloana* favor disturbed sites (Hickman 1996). *C. selloana* is used for landscaping on the base. Activities involving the removal of native vegetation create an opportunity for invasion by pampas grass. *C. jubata* and *C. selloana* are both on CalEPPCs List A-1 (highly invasive) (CalEPPC 1996). At CBC Port Hueneme, pampas grass is scattered throughout the base. The largest population of pampas grass is at the former solid waste disposal area located on Lehman Road.

Gum Tree (Eucalyptus spp.)

All eucalyptus species are native to Australia. There are several tree species throughout California which may grow as tall as 50 m. Lemon scented gum (*Eucalyptus citriodora*), sugar gum (*Eucalyptus*

cladocalyx) and red iron gum (*Eucalyptus sideroxylon*) are the most common species known in Ventura County (CalFlora Datasite 1997). Eucalyptus have become naturalized occupying native habitat and preventing native flora from reestablishing. Tasmanian blue gum (*Eucalyptus globulus*) and other eucalyptus identified on CBC Port Hueneme are used for landscaping and windbreaks between Track and West Roads, Channel Islands Boulevard, and Ventura Road. *E. globulus* is on CalEPPCs List A-1 (CalEPPC 1996).

Giant Reed (Arundo donax)

Giant Reed is a grass species native to Europe. It is an erect perennial herb with dense, panicle-like silvery to purplish inflorescences. Giant reed establishes itself easily from broken root fragments. This grass favors moist places such as seeps and ditchbanks. Riparian areas are most threatened with invasions by giant reed. Giant reed is on CalEPPCs List A-1 (highly invasive). At Port Hueneme, giant reed was observed near the bulrush-cattail habitat north of 23rd Avenue.

3.6.4 Use of Native Plants

The President's memorandum on *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds*, dated 26 April 1994 provides recommendations to increase environmentally and economically beneficial landscaping practices at federal facilities and federally funded projects. The memorandum states that environmentally beneficial landscaping must utilize techniques that complement and enhance the local environment and seek to minimize the adverse effects that the landscaping will have on it. The memorandum directs the following:

- The use of regionally native plants for landscaping;
- The design, use, or promotion of construction practices that minimize adverse effects on the natural habitat;
- Landscaping practices, to help reduce energy consumption; and
- The creation of outdoor demonstrations incorporating native plants.

The Department of the Navy provided guidance affecting use and selection of native plants on native lands. This includes clearing exotic plants during site selection of new facilities, minimizing destruction of existing native plants, revegetating with native plants, considering native landscapes and drainages adjacent to playing fields and golf greens, and staff training (U.S. Navy 1994). This guidance is provided in Appendix B.

No official programs for use of California native plants are implemented basewide at CBC Port Hueneme. Several plants native to California, however, have been planted at the Bard Estate. These include Monterey pine (*Pinus radiata*), Monterey cypress (*Cupressus macrocarpa*), redwood (*Sequoia sempervirens*), Torrey pine (*Pinus torreyana*) coast live oak (*Quercus agrifolia*), California laurel (*Umbellularia californica*), toyon (*Heteromeles arbutifolia*), and Western sycamore (*Platanus racemosa*) (CBC Port Hueneme 1972). Recommendations for future use of native plants in landscaping efforts may be found in Chapter 4.0 of this IRMP.

3.6.5 Revegetation/Erosion Control

The President's *Memorandum on Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds* (26 April 1994), provides recommendations for revegetation and erosion control. This includes selection and siting of plants in a manner that conserves water and controls soil erosion. The U.S. Navy's *Guidance Affecting Use and Selection of Native Plants on Navy Lands*, which responds to the presidential memorandum, states the following:

- During construction, minimal disturbance of existing native vegetation will significantly reduce erosion;
- Native plants act as major pollution filters and buffers and provide effective soil stabilization (U.S. Navy 1994).

No official programs for revegetation and erosion control are currently implemented at Port Hueneme.

3.6.6 Landscaping

The main urbanized area of CBC Port Hueneme consists of residential, industrial, community service, administrative, and recreation uses. This area contains various turf and landscaping improvements. The most significantly landscaped area on the site is the Bard Estate which includes a unique collection of exotic species planted by Thomas R. Bard from 1871 to 1915. Plants from many parts of the world including India, New Caledonia, Japan, China, Brazil, and Australia cover the 15-to-20 acre estate area. A list of plant species documented at the Bard Estate is provided in Appendix B. Other landscaped areas on the site are "improved" areas, which include family housing lawns, golf course fairways and greens, and other small areas. The Base Exterior Architecture Plan (BEAP) 1983 currently provides landscaping guidelines for CBC Port Hueneme. Many introduced species are used for landscaping in the improved areas, including varieties of coniferous and broadleaf trees, lawn grasses, shrubs, vines, and colorful flowers used to decorate building surroundings.

3.6.7 Fungal Disease

Fungal disease (pitch canker) was introduced to California in the 1980s, and has established itself in the native Monterey pine populations in Monterey County. It also has caused significant problems in pines planted near Los Osos and Morro Bay. During a 1995 survey, U.S. Forest Service researchers discovered pines with pitch canker in Ryon Park in Lompoc. At present, there is no treatment for this disease other than the removal of the diseased trees (USAF 1997). Pitch canker is known to be a problem affecting the pine trees at CBC Port Hueneme's Seabee Golf Course (Garcia 1998). Other pine trees planted in the landscaped areas may also be diseased.

If removal of a diseased tree at CBC Port Hueneme is necessary, the tree should be replaced by a native tree or plant that is less likely to be affected by fungal disease. The replacement tree or plant selected will be from the *Native Plant Species List for CBC Port Hueneme* recommended as a management action (in Chapter 4.0 of this IRMP). If the native plant species list has not been developed, a qualified biologist should be consulted. In addition, the *Naval Air Weapons Station Point Mugu, Landscape Plant List: California Native Plants* in Appendix B may be referenced for recommendations replacement.

3.7 WILDLIFE

3.7.1 Existing Habitat and Wildlife-Habitat Associations

Much of the habitat at CBC Port Hueneme is highly disturbed and distributed in small patches. However, these habitats on site offer valuable habitat to many wildlife species, including sensitive species. Landscaped areas at CBC Port Hueneme include shelterbelts/windrows that consist of a variety of introduced trees including eucalyptus, the Bard Mansion grounds, shade trees in the residential areas, and the Seabee Golf Course. Landscaped areas also provide suitable habitat for a number of wildlife species. Artificial habitat for wildlife may also exist at CBC Port Hueneme, including buildings, bridges, debris piles, and dirt mounds.

A description of the wildlife species that are typically associated with each of the habitats, landscaped areas, and artificial habitat found at CBC Port Hueneme follows. Sources for this information include CDFG's California Statewide Wildlife Habitat Relationships System (Mayer and Laudenslayer 1988; Zeiner *et al.* 1988, 1990a, 1990b), *A Natural History of California* (Schoenherr 1992), various field guides (Eschmeyer and Herald 1991; Page and Burr 1991; Robbins *et al.* 1983; Stebbins 1985; and Whitaker 1997) and results from a brief biological survey conducted at CBC Port Hueneme for this Plan (15 December 1998). In addition, Table 3-9 lists those fish and wildlife species that have been observed at CBC Port Hueneme. This list is a synthesis of results from the brief biological survey conducted at CBC Port Hueneme and from results of biological surveys conducted for the *Draft Environmental Assessment, Drainage Channel Improvement Program* (Woodward Clyde 1998) and the *Supplemental Site Inspection, Sites 1, 2, and 3* (PRC 1995c) for CBC Port Hueneme.

The species listed in Table 3-9 may be found in the following habitats on CBC Port Hueneme: coyote brush, California annual grassland, bulrush-cattail, sand verbena-sandy beach, marine subtidal, and landscaped areas/artificial habitat. The following discussion lists the species found in each of these habitat types. A detailed description of these habitats is found in Section 3.6 (Vegetation).

3.7.1.1 Coyote Brush

The mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), Costa's hummingbird (*Calypte costae*), blue-grey gnatcatcher (*Polioptila caerulea*), song sparrow (*Melospiza melodia*), and white-crowned sparrow (*Zonotrichia leucophrys*) are among the bird species observed in coyote brush habitat at CBC Port Hueneme. Sign was observed for coyote. Desert cottontail (*Sylvilagus audubonii*) and deer mouse (*Peromyscus maniculatus*) are typically common in this habitat but were not observed at CBC Port Hueneme. Reptiles such as the western fence lizard (*Sceloporus occidentalis*), side-blotched lizard (*Uta stansburiana*), and gopher snake (*Pituophis melanoleucus*) are the typical reptile species that occur in coyote brush habitat.

3.7.1.2 California Annual Grassland

Bird species that were observed in California annual grassland habitat at CBC Port Hueneme include the killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), rock dove (*Columba livia*), and American crow (*Corvus brachyrhynchus*). Other bird species that were observed include the red-tailed hawk (*Buteo jamaicensis*), house finch (*Carpodacus mexicanus*), and the burrowing owl (*Athene cunicularia*), a Navy species of concern (see Section 3.7.2 for more details). Other species that are typical of this habitat include the opossum (*Didelphis virginiana*), black-tailed jackrabbit, desert cottontail, California ground squirrel, deer mouse, California pocket mouse, and the western harvest

Table 3-9
List of Fish and Wildlife Species Observed
at CBC Port Hueneme, California

Scientific Name	Common Name	Source of Observation
Aquatic Invertebrates		
Gammarus sp.	Amphipod	3
Hyallela azteca	Amphipod	3
Notonecta sp.	Backswimmer	3
Enallagma sp.	Bluet (damselfly)	3
Pacifasicus sp.	Crayfish	3
Aeschna sp.	Darner	3
Cirolanidae	Isopods	3
Callibaetis sp.	Mayfly	3
Chironomidae	Midges	3
Emerita talpoida	Mole crab	3
Mytilus sp.	Mussel	3
Libelulla sp.	Skimmer	3
Terrestrial Invertebrates		
Danaus plexippus	Monarch butterfly	2
Fish		
Fundulus parvipinnis	California killifish	3
Gambusia affinis	Mosquito fish	3
Poecilia latipinna	Sailfin molly	3
Amphibians		
Hyla regilla	Pacific treefrog	3
Reptiles		
Pituophis melanoleucus	Gopher snake	4
Birds		
Grebes (Podicipedidae)		
Podiceps nigricollis	Eared grebe	3
Podilymbus podiceps	Pied-billed grebe	3
Aechmophorus occidentalis	Western grebe	2
Pelicans (Pelecanidae)		
Pelecanus occidentalis	California brown pelican	2
Cormorants (Phalacrocoracidae)		
Phalacrocorax penicillatus	Brandt's cormorant	3
Phalacrocorax auritus	Double-crested cormorant	2
Phalacrocorax pelagicus	Pelagic cormorant	3
Herons, Egrets, and Bitterns (Ardeidae)		
Nycticorax nycticorax	Black-crowned night heron	2
Ardea herodias	Great blue heron	2,3
Casmerodius albus	Great egret	2
Butorides striatus	Green-backed heron	3
Egretta thula	Snowy egret	3
Waterfowl (Anatidae)		
Anas platyrhynchos	Mallard	2,3

Table 3-9
List of Fish and Wildlife Species Observed
at CBC Port Hueneme, California

Scientific Name	Common Name	Source of Observation
Hawks, Kites, Harriers, and Eagles (Accipitridae)		
Accipiter cooperii	Cooper's hawk	3
Buteo jamaicensis	Red-tailed hawk	2,3
Accipiter striatus	Sharp-shinned hawk	3
Falcons (Falconidae)		
Falco sparverius	American kestrel	2,3
Rails, Coots, and Gallinules (Rallidae)		
Fulica americana	American coot	2
Plovers and Relatives (Charadriidae)		
Charadrius vociferus	Killdeer	2
Avocets and Stilts (Recurvirostridae)		
Himantopus mexicanus	Black-necked stilt	2
Sandpipers and Relatives (Scolopacidae)		
Gallinago gallinago	Common snipe	3
Tringa melanoleuca	Greater yellowlegs	2
Actitis macularia	Spotted sandpiper	3
Aphriza virgata	Surfbird	2
Calidris mauri	Western sandpiper	2
Catoptrophorus semipalmatus	Willet	2
Gulls and Terns (Laridae)		
Larus californicus	California gull	3
Larus heermanni	Heerman's gull	2
Larus delawarensis	Ring-billed gull	3
Larus occidentalis	Western gull	2
Doves and Pigeons (Columbidae)		
Zenaida macroura	Mourning dove	2
Columba livia	Rock dove	2,3
Owls (Strigidae)		
Athene cunicularia	Burrowing owl	2
Swifts (Apodidae)		
Chaetura pelagica	Chimney swift	3
Hummingbirds (Trochilidae)		
Calypte anna	Anna's hummingbird	2
Calypte costae	Costa's hummingbird	2
Kingfishers (Alcedinidae)		
Ceryle alcyon	Belted kingfisher	2
Woodpeckers (Picidae)		
Colaptes auratus	Northern flicker	3
Tyrant Flycatchers (Tyrannidae)		
Sayornis nigricans	Black phoebe	2
Sayornis saya	Say's phoebe	2
Swallows (Hirundinidae)		
Hirundo rustica	Barn swallow	3
Jays, Crows, and Magpies (Corvidae)		
Corvus brachyrhynchos	American crow	2,3
Wrens (Troglodytidae)		
Cistothorus palustris	Marsh wren	3

Table 3-9
List of Fish and Wildlife Species Observed
at CBC Port Hueneme, California

Scientific Name	Common Name	Source of Observation
Old World Warblers, Thrushes, Gnatcatchers, and Kinglets (Muscicapidae)		
Polioptila caerulea	Blue-grey gnatcatcher	2
Mockingbirds and Thrashers (Mimidae)		
Mimus polyglottos	Northern mockingbird	2
Shrikes (Laniidae)		
Lanius ludovicianus	Loggerhead shrike	2
Starlings (Sturnidae)		
Sturnus vulgaris	European starling	2
Sparrows, Buntings, Warblers, and Relatives (Emberizidae)		
Euphagus cyanocephalus	Brewer's blackbird	3
Spizella passerina	Chipping sparrow	3
Geothlypis trichas	Common yellowthroat	2,3
Quiscalus mexicanus	Great-tailed grackle	3
Agelaius phoeniceus	Red-winged blackbird	2,3
Melospiza melodia	Song sparrow	3
Zonotrichia leucophrys	White-crowned sparrow	2,3
Sturnella neglecta	Western meadowlark	2
Dendroica coronata	Yellow-rumped warbler	2,3
Finches and Relatives (Fringillidae)		
Carpodacus mexicanus	House finch	2
Carduelis psaltria	Lesser goldfinch	3
Mammals		
Lagomorpha		
Lepus californicus	Black-tailed jackrabbit	2
Rodentia		
Thomomys bottae	Botta's pocket gopher	4
Spermophilus beecheyi	California ground squirrel	2,3
Carnivora		
Zalophus californianus	California sea lion	2
Canis latrans[1]	Coyote	2,3
Felis catus[1]	Feral cat	2
Urocyon cinereoargenteus[1]	Gray fox	3
Procyon lotor[1]	Raccoon	3
Marsupialia		
Didelphis virginiana[1]	Opossum	3

Notes: 1 - Indirectly observed (i.e. tracks, scat, other remains).
2 - Field visit conducted by Tetra Tech, Inc. on 15 December 1998.
3 - Field visits conducted on 13 November 1996, 18 December 1996, and 29 January 1997 by Ms. Anne Knowlton and Mr. John Storrer in support of an Environmental Assessment for the base (Woodward-Clyde 1998).
4 - PRC 1995c.

mouse (*Reithrodontomys megalotis*). Reptile species that typically occur in grasslands are the western fence lizard and gopher snake.

3.7.1.3 Sand Verbena-Beach Bursage

A dune field is a food-poor ecosystem, therefore, insects are typically the most common species in this habitat. The coyote, red-tailed hawk, and American kestrel are among the vertebrate species that forage in dune habitat and have been observed at CBC Port Hueneme.

3.7.1.4 Bulrush-Cattail

A variety of immature and adult aquatic invertebrates occur in bulrush-cattail habitat at CBC Port Hueneme including amphipods (*Gammarus* sp., *Hyalella azteca*), isopods (Cirolanidae), midges (Chironomidae), damselflies (*Enallagma* sp.), mayflies (*Callibaetis* sp.), skimmers (*Libelulla* sp.), and backswimmers (*Notonecta* sp.). Crayfish (*Pacifasicus* sp.) and mussels (*Mytilus* ssp.) also occur in this habitat. Copepods may also be present in the zooplankton in this habitat. The California killifish (*Fundulus parvipinnis*) is a common fish species in bulrush-cattail habitat and was observed at CBC Port Hueneme. The nonnative sailfin molly (*Poecilia latipinna*) and mosquitofish (*Gambusia affinis*) are fish species that also occur in bulrush-cattail habitat at CBC Port Hueneme.

Several bird species utilize bulrush-cattail habitat at CBC Port Hueneme primarily for feeding including the great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), black-crowned night heron (*Nycticorax nycticorax*), greater yellowlegs (*Tringa melanoleuca*), black-necked stilt (*Himantopus mexicanus*), and belted kingfisher (*Ceryle alcyon*). The red-winged blackbird (*Agelaius phoeniceus*), American coot (*Fulica americana*), and mallard (*Anas platyrhynchos*) have been observed in the freshwater bulrush-cattail habitat at CBC Port Hueneme. Large- to medium-sized mammals that occur in bulrush-cattail marsh habitat at CBC Port Hueneme include the coyote and raccoon. Small mammals that are typically found in bulrush-cattail habitat include the deer mouse and western harvest mouse. The Pacific treefrog (*Hyla regilla*) is ubiquitous in the region and utilizes freshwater bulrush-cattail habitat on base.

3.7.1.5 Sandy Beach

Low-energy beaches such as the one at CBC Port Hueneme are typically species-poor. In addition, the presence of coarse sands and gravel below the mid-tide level may reduce the habitat quality of the beach at CBC Port Hueneme for those invertebrate species typically found in the lower intertidal zones of beaches. One of the most common animals of sandy beaches is the mole crab. During a qualitative sampling of the beach at NCBC Port Hueneme for infaunal organisms, the mole crab, *Emerita talpoida*, occupied a narrow band at the mid-tide level. Cirolanid isopods were present throughout the mid- to upper-intertidal zone. No benthic infauna were detected below the mid-tide level. Kelp flies (*Fucellia* spp., *Coelopa* spp., etc.) also occur in decaying piles of seaweed on sandy beaches.

Among the vertebrates that occur on the sandy beach at CBC Port Hueneme are various birds, including the California gull (*Larus californicus*), Heerman's gull (*Larus heermanni*), ring-billed gull (*Larus delawarensis*), Western gull (*Larus occidentalis*), willet (*Catoptrophorus semipalmatus*), spotted sandpiper (*Actitis macularia*), and Western sandpiper (*Calidris mauri*). California brown pelicans (*Pelecanus occidentalis*), a federal and state endangered species, often roost on the sandy beach at CBC Port Hueneme.

3.7.1.6 Marine Subtidal

Marine subtidal habitat consists of communities associated with sand, mud, and rock substrates; kelp beds are among the most diverse communities in this habitat. The kelp beds located within the harbor at

NCBC Port Hueneme may provide habitat for many species of fish and invertebrates. There are 150 species of fishes along the California coast, and nearly all of them can be found at one time or another in kelp beds. Topsmelt *(Atherinops affinis*), kelp bass (*Paralabrax clathratus*), garabaldi (*Hypsypops rubicundus*), and California sheephead (*Semicossyphus pulcher*) are among the most common fish species that occur in kelp beds. California spiny lobster (*Panulirus interruptus*), sheep crab (*Loxorhynchus grandis*), and the common sea cucumber (*Parastichopus californicus*) are among the invertebrate species that occur in kelp beds. Bottom-feeding fish that occur in the subtidal zone include the California scorpionfish (*Scorpaena guttata*) and cabezon (*Scorpaenichthys marmoratus*). Numerous marine mammals occupy or migrate through the waters off the coast of CBC Port Hueneme, including dolphins, porpoises, whales, and pinnipeds. Although haul-out areas have not been observed at CBC Port Hueneme, California sea lions (*Zalophus californianus*) regularly visit the harbor and Pacific harbor seals (*Phoca vitulina*) may visit the harbor as well.

3.7.1.7 Landscaped Areas and Artificial Habitat

Trees used for landscaping, especially those near water, may provide potential nesting sites for birds. Eucalyptus and cypress trees at CBC Port Hueneme also provide potential roosting sites for monarch butterflies, although no roost sites have been observed at CBC Port Hueneme.

Wood and debris piles at CBC Port Hueneme provide potential habitat for many species of reptiles. Although none were observed during the brief biological survey at CBC Port Hueneme, eaves of buildings and bridges provide potential roosting and nesting habitat for several bat species, many of which are considered sensitive species. Dirt mounds at NCBC Port Hueneme have been observed to provide preferred habitat for the burrowing owl (*Athene cunicularia*) (see Section 3.7.2 for more details).

3.7.2 Sensitive Species

A fish or wildlife species is considered sensitive if it is listed as endangered or threatened, or proposed for listing as endangered or threatened pursuant to the federal Endangered Species Act of 1973, as amended or designated as a candidate for listing. In addition, marine mammals are considered sensitive if they are protected under the Marine Mammal Protection Act. Navy species of concern are also considered sensitive species. A Navy species of special concern represents a species whose conservation status is of concern to the Navy but does not have official status.

Table 3-10 and Figures 3-2a and b list all sensitive species either observed or potentially occurring at CBC Port Hueneme. Species accounts are provided below for only those sensitive species that have been observed at CBC Port Hueneme, as well as any additional federally listed, proposed listed, or candidate species that potentially occur on base.

Invertebrates

Monarch butterfly *(Danaus plexippus)*. Winter roost sites for the Monarch butterfly range along the coast from northern Mendocino to Baja California. Eggs are laid singly under host leaves, stems, and flowers; the larvae eat the leaves and flowers as they hatch. Adults hibernate by roosting in tree groves, especially eucalyptus, Monterey pine, and cypress. They must have nectar and water sources nearby. Trees provide important resting sites for overwintering (Scott 1986). This species has been observed at CBC Port Hueneme. Although roost trees have not been observed on base, eucalyptus and cypress trees at CBC Port Hueneme provide potential roost sites for this species.

Table 3-10
Sensitive Fish and Wildlife Species Potentially Occurring at the Naval Base Ventura County, Port Hueneme Site, California

Scientific Name	Common Name	Federal[1]	State[2]	Navy[3]	O = Observed[4] E = Expected
TERRESTRIAL INVERTEBRATES					
Danaus plexippus	Monarch butterfly			NSC	O
Cicindela hirticollis gravida	Sandy beach tiger beetle			NSC	E
FISH					
Eucyclogobius newberryi [5]	Tidewater goby	FE			E
AMPHIBIANS					
Rana aurora draytonii	California red-legged frog	FT			E
REPTILES					
Phrynosoma coronatum frontale	California horned lizard			NSC	E
Salvadora hexalepis virgultea	Coast patch-nosed snake			NSC	E
Cnemidophorus tigris multiscutatus	Coastal western whiptail			NSC	E
Diadiphis punctatus modestus	San Bernardino ringneck snake			NSC	E
Phrynosoma coronatum blainvillei	San Diego horned lizard			NSC	E
Anniella pulchra pulchra	Silvery legless lizard			NSC	E
Thamnophis sirtalis ssp.	South Coast garter snake			NSC	E
Clemmys marmorata pallida	Southwestern pond turtle			NSC	E
Thamnophis hammondii	Two-striped garter snake			NSC	E
BIRDS					
Pelicans (Pelecanidae)					
Pelecanus occidentalis californicus	California brown pelican	FE	SE		O
Plovers and Relatives (Charadriidae)					
Charadrius alexandrinus nivosus	Western snowy plover	FT			E
Gulls and Terns (Laridae)					
Sterna antillarum browni	California least tern	FE	SE		E
Sterna elegans	Elegant tern			NSC	E
Owls (Strigidae)					
Athene cunicularia	Burrowing owl			NSC	O
MAMMALS					
Bats (Vespertilionidae and Molossidae)					
Myotis evotis	Long-eared myotis			NSC	E
Myotis volans	Long-legged myotis			NSC	E
Corynorhinus townsendii pallescens	Pale big-eared bat			NSC	E
Myotis occultus	Occult little brown bat			NSC	E
Myotis ciliolabrum	Small-footed myotis			NSC	E
Corynorhinus townsendii townsendii	Townsend's western big-eared bat			NSC	E
Eumops perotis	Western mastiff bat			NSC	E
Myotis yumanensis	Yuma myotis			NSC	E
Mice, Rats, and Voles (Cricetidae)					
Neotoma lepida intermedia	San Diego desert woodrat			NSC	E

Notes:

[1]Federal Status:

FE = Federally listed as Endangered; FT = Federally listed as Threatened; FPE = Federally proposed for listing as Endangered; FPT = Federally proposed for listing as Threatened; FC = Federal candidate species

[2]State Status:

SE = State-listed as Endangered; ST = State-listed as Threatened; SCE = State candidate for listing as Endangered; SCT = State candidate for listing as Threatened

[3]Navy Status:

NSC = Navy species of concern

[4]Actually observed at Naval Base Ventura County, Port Hueneme Site.

[5]Proposed for delisting north of Orange County by the U.S. Fish and Wildlife Service on 24 June 1999 (64 Federal Register 33816).

Fish

Tidewater goby (*Eucyclogobius newberryi*). The tidewater goby, a federally endangered species, is found up to 10 kilometers inland in brackish waters, existing in shallow lagoons and lower stream reaches. The USFWS has recently proposed to delist tidewater goby populations located north of Orange County (24 June 1999) (64 *Federal Register* 33816) They are most commonly found in slow moving and relatively still brackish waters where they can avoid winter flood flows. They prefer areas with low

salinity but can be found in areas with salinity equivalent to that of seawater. The tidewater goby reproduces by laying eggs in small vertical burrows in sandy substrate (Swift 1991). It has a short life span of about one year, although individuals in the northern part of its range may live up to 3 years. The key threat to this species is habitat loss (U.S. Air Force 1997a). Two populations have been recently observed in the vicinity of CBC Port Hueneme: one in the Santa Clara River at McGrath State Beach and one in a canal in the Ormond Beach area (CDFG 1998b). A survey for the tidewater goby was conducted in the drainage channels at CBC Port Hueneme for the proposed Drainage Channel Improvement Program (Woodward-Clyde 1998). Although no tidewater goby were observed during this survey, potential habitat for this species occurs in the bulrush-cattail habitat in the drainage channels at CBC Port Hueneme. Tidegates at the intersection of the

Pennsylvania Road Channel and the Pleasant Valley Road Channel at CBC Port Hueneme, however, may restrict access to much of the drainage channels.

Amphibians

California red-legged frog (*Rana aurora draytonii*). The California red-legged frog is a federally threatened species, a CDFG species of special concern, and a CDFG protected species. California red-legged frogs are found primarily at sites with still or slow-moving water (Hayes and Jennings 1988). Throughout Santa Barbara County, red-legged frogs occur in streams, ponds, lakes, and reservoirs (McKeown 1974; Stebbins 1985; Storer 1925). Adults prefer semi-permanent or permanent water bordered by willows and aquatic vegetation (Christopher 1996; Hayes and Jennings 1988; Jennings and Hayes 1990; Jennings 1988; Rathbun *et al.* 1993; Storer 1925). When not breeding, the red-legged frog may be found far from water (Rathbun *et al.* 1993; Stebbins 1985; Storer 1925) and may also reside in crevasses or burrows (Jennings *et al.* 1992). Although the breeding period is short, typically lasting only 1 to 2 weeks, breeding can occur from November through April (Christopher 1996; Hayes and Jennings 1986; Stebbins 1985, Storer 1925). Eggs are usually laid among emergent vegetation or willows at or up to 3 feet below the water's surface along the pond margins (Jennings *et al.* 1992; Stebbins 1985; Storer 1925). Three and one-half to seven months are required for larvae to reach metamorphosis (Jennings and Hayes 1990; Storer 1925). Red-legged frogs become reproductively mature at 2 to 3 years of age (Jennings and Hayes 1985), and may live from 8 to 10 years (Jennings *et al.* 1992). Over the past 100

years, habitat for the California red-legged frog has been drastically altered or eliminated due to human activities and the introduction of predatory species such as bullfrogs, fish, and crayfish. Although this species has not been observed at CBC Port Hueneme, potential habitat exists for the California red-legged frog in bulrush-cattail habitat on base with salinity less than 4.5 parts per thousand.

Birds

California brown pelican (*Pelecanus occidentalis californicus*). The California brown pelican is federally and state-listed as endangered. The brown pelican roosts on rocky cliffs and coastal bluffs; offshore kelp beds provide excellent feeding areas. Pelican numbers peak in southern California from

June through January as they migrate north from Mexico. They have been sighted at numerous locations along the coast at CBC Port Hueneme. Their nearest known nesting site is on Anacapa Island in the Santa Barbara Channel. Mugu Lagoon at NAS Point Mugu is one of the most important southern California mainland sites for daytime roosts for this species (Jacques *et al.* 1996) (Appendix D). The key threat to this species is disturbance to rocky cliffs and roosting areas (U.S. Air Force 1997a). Historical threats are DDT and other contamination of their food supply, causing eggshell thinning and altered parental behavior (Zeiner *et al.* 1990a).

Western snowy plover (*Charadrius alexandrinus nivosus*). This federally threatened migratory bird species nests and winters on the foredunes along the coast and along beaches. The breeding season for this species is from March through September. The decline in western snowy plover populations has been attributed to lower reproduction due to human disturbance, predation, and habitat loss through invasion by nonnative plants. The USFWS has mapped occurrences of European beachgrass that threaten snowy plover nesting sites and has recommended eradicating the grass at specifically targeted locations (Laye and Mangione 1995). Nesting populations have been observed on Ormond Beach and McGrath State Beach at the mouth of the Santa Clara River. In 1997 there was a nesting population observed on Oxnard Beach (Hollywood-by-the Sea). The key threats to this local population are human use and domestic or feral animals such as dogs or cats (CDFG 1998b). Although this species has not been observed at CBC Port Hueneme, potential nesting and foraging areas for the western snowy plover exist in sandy beach habitats on base.

California least tern (*Sterna antillarum browni*). The California least tern is federally and state endangered species. This migrating bird species breeds mostly in coastal foredunes and in other sparsely vegetated sites with sandy or gravelly soils. One brood of 1-4 is raised yearly. Least terns arrive at colonial nesting locations in late April and nest from mid-May through August. After breeding, family groups regularly occur at lacustrine waters near the coast of southern California. Because this species tends to abandon nesting areas readily if disturbed, it requires nests in areas relatively free of human or predatory disturbance (Zeiner *et al*. 1990a). Its habitat has been subject to significant human disturbance and alteration in the past before the species was listed. Another key threat includes predation by other wildlife species (such as burrowing owls and American kestrels) or domestic or feral animals (such as cats) (U.S. Air Force 1997a). The most recent observation of this species in the Port Hueneme vicinity is a nesting location near an inlet to the Channel Islands Harbor on Oxnard Beach (Hollywood-By-the-Sea) on 27 June 1997 (CDFG 1998b). This species also nests at McGrath Beach and at Ormond Beach north of the Southern California Edison Company plant and 1 kilometer southeast of the Port Hueneme sewage disposal plant, and forages in the harbor at CBC Port Hueneme.

Burrowing owl (*Athene cunicularia*). The burrowing owl is a Navy species of concern. This owl species has been declining in numbers across much of its range in western North America, and is found primarily in open grassland and coastal scrub habitats, as well as in agricultural and rangelands. The burrowing owl is a winter visitor in the region. It is one of the few diurnal owls, and depends on ground squirrels and other small mammals for creating burrows that it uses for refuge and roosting. They may also dig their own burrows or use artificial burrows (California State University, Stanislaus Foundation 1996).

The owls, tending to be opportunistic feeders, mostly prey on small mammals and insects. They also are known to prey on the federally endangered California least tern. Predators include prairie falcons, red-tailed hawks, Swainson's hawks, ferruginous hawks, northern harriers, golden eagles, foxes, coyotes, and domestic dogs and cats (Zeiner *et al.* 1990a). Burrowing owls tend to avoid areas near trees, perhaps where other raptors may roost and prey upon them. The main threats to this species are habitat loss, poisoning of ground squirrels, and predation by feral cats and dogs (Rosenberg *et al.* 1998; U.S. Air Force

1998; Zeiner *et al*. 1990a). The burrowing owl has been observed at CBC Port Hueneme. A single known burrow location is in a dirt mound near Buildings 1421 and 1423. More burrowing owls may be located in other dirt mounds and in California annual grassland habitat on base.

3.7.3 Disease Vectors and Pest Animal Populations

The DoD Pest Management Program of 1996 (DOD I 4150.7) 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. Disease vectors are animals 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. Pest animal populations and disease vectors that are known or expected to occur at CBC Port Hueneme are described below. Pest plant populations, or noxious weeds, known or expected at CBC Port Hueneme described in Section 3.6.4.

Pest Animals

Mosquitofish. Mosquitofish (*Gambusia affinis*) are native to the Atlantic and Gulf Coast drainages and tend to outcompete native fish where they are introduced if not managed appropriately. Mosquitofish are often reared by mosquito abatement districts and released to control mosquitos. Mosquitofish have been found in the drainage channels at CBC Port Hueneme (Woodward-Clyde 1998). They were placed in the drainage channels sometime prior to 1993 for mosquito control and are presently not monitored by the base.

Pests Associated with Ballast Water. To maintain stability during transit along coasts and on the open ocean, ships fill their ballast tanks with water from coastal ports from which they originate. Associated sediments also are taken up into the ballast along with a load of living organisms. Species that end up in ballast water range in size from tiny microorganisms to larger species, including schools of fish. After arriving at their destination, ships typically release their ballast water and the associated organisms into the new port. Certain invading species (also known as aquatic nuisance species) (e.g., zebra mussel) can cause complex changes within the structure and function of their new ecosystem, including restructuring established food webs, importing new diseases to the region, and outcompeting indigenous species. Ballast water pests are currently treated buy CBC Port Hueneme before any water is released into the harbor. However, testing for ballast water pests has not been conducted to determine whether or not any introductions of invasive species has inadvertently occurred.

Ground Squirrels. California ground squirrels (*Spermophilus beecheyi*) exist at CBC Port Hueneme and are considered pests that require control. The California ground squirrel may cause habitat degradation by digging up vegetation in landscaped areas. Studies have shown that ground squirrel populations decline in fields where vegetative cover is allowed to increase; decreasing field cover allows ground squirrels to detect predators more easily. Ground squirrel populations are currently not managed at CBC Port Hueneme. Possible actions for control include rodenticides, live trappings, construction of raptor perches, and increasing grass heights. However, ground squirrels also provide habitat for burrowing owls, by providing burrows for this sensitive species.

Feral Cats. A feral cat population has been observed at CBC Port Hueneme (Fischer 1999). Feral cats are problematic because they are detrimental to native bird populations on base, including sensitive species such as the burrowing owl; birds constitute approximately 20 to 30 percent of the diet of a feral cat. Feral cats are also thought to depend upon food from people, garbage, and carrion; as these sources

of food increase, so do the populations of feral cats (National Audubon Society 1998). There is currently no management program on site for these animals. A management program may consist of a capture and spay/neuter program, or if the problem is severe enough, an extermination program.

Disease Vectors

Mosquitoes. Two mosquito species are presently known at CBC Port Hueneme: *Aedes taeniorhynchus* and *Culex tarsalis* (Casuga, S. 1999). In Southern California, *Aedes taeniorhynchus* larvae are found in salt marshes that are occasionally flooded by high tides. Hosts for this mosquito include large mammals and humans. *Culex tarsalis* larvae occur in all freshwater areas (i.e. pools, riparian habitat, freshwater marshes) and salt marshes with up to 1 percent salinity (Alameda County 1999). Hosts for this species include birds and mammals. Mosquito species such as *Aedes* sp., *Culex* sp., and *Anopheles* sp., are carriers of diseases such as yellow or dengue fever (*Aedes* sp.), malaria, virus encephalitis, filariasis (*Anopheles* sp.), meningitis, and filaria (threadworm) diseases (*Culex* sp.), but the carriers of these diseases have not been reported for Ventura County.

Mosquito population trends at CBC Port Hueneme have not been documented, but mosquitoes are periodically counted on site using a light trap. Methods that have been used to control mosquitoes at CBC Port Hueneme are described below. Please see Section 4.3.1.1 for future recommendations.

- VectoBac (*Bacillus thuringiensis* ssp. *israelensis*). *Bacillus thuringiensis* ssp. *israelensis* (*B.t.i.)* is available as granules, slow release briquettes, or wettable powder for treating bodies of water. This bacteria kills mosquito and blackfly larvae. It is nonhazardous to humans, other animals, fish, and predacious insects and can be applied by hand, with a backpack blower or granule spreader, or by aircraft (National Park Service [NPS] 1998). At CBC Port Hueneme, VectoBac is applied aerially from May through October during every high tide (Casuga 1999).

- Melathion Ultra Low Volume (ULV). Prokil Melathion ULV is a liquid solution containing a minimum of 98 percent malathion. The solution is diluted with water and applied with a sprayer. Historical and present use of pesticides such as DDT, diazinon, lindane, methidathion, chlorpyrifos, and malathion have been documented to directly harm the reproductive cycles of birds, insects, and zooplankton (Kuivila *et al.* 1995; Siting 1981). Toxic chemicals can bioaccumulate in aquatic and terrestrial organisms causing long-term effects to the food web. At CBC Port Hueneme, Melathion ULV is applied in response to mosquito complaints which occur approximately 28 times during the high mosquito population period (summer through fall) (Casuga 1999).

- Mosquitofish (*Gambusia affinis*). The use of mosquitofish for mosquito abatement at CBC Port Hueneme is described above.

Rodents. The deer mouse (*Peromyscus maniculatus*) is a host of hantavirus, a virus that is often fatal to human beings. This species is primarily responsible for an outbreak of the virus in 1993 in the southwestern United States. Rodents that are chronically infected with hantavirus can shed the virus in their saliva, urine, and feces for long periods of time. Human infection may occur by inhalation of tiny airborne droplets of fresh or dried rodent excretions, through direct contact with the rodents, or ingestion of contaminated food or water. There is no evidence that hantavirus is transmitted from insects, livestock, or pets. Hantavirus is not normally associated with urban areas, rather, it is normally associated with rural and semi-rural activities such as cleaning barns and sheds, occupying previously vacant cabins, planting or harvesting field crops, and camping and hiking. Deer mouse populations are widespread in the United

States and CBC Port Hueneme is likely to have an abundant population on base. There is currently no management program on site for these animals.

Management Issues

Native habitat and landscaped areas at CBC Port Hueneme provide important habitat for fish and wildlife species within the urban environment on base. Three sensitive wildlife species have been observed at CBC Port Hueneme and include the federally and state endangered California brown pelican, the burrowing owl, and monarch butterflies. Potential habitat exists on site for several more sensitive species including listed species such as the California red-legged frog and California least tern. Marine mammals, such as the California sea lion, occur in the harbor at CBC Port Hueneme and are protected by the Marine Mammal Protection Act of 1972, as amended. Numerous native bird species are present on site and are also protected by the Migratory Bird Treaty Act of 1918, as amended.

Key threats to fish and wildlife species at CBC Port Hueneme include harassment from human activities on base, habitat destruction, and potential contaminant impacts. The spread (and, occasionally, abatement) of disease vectors and pest populations on site also threaten native fish and wildlife populations at CBC Port Hueneme and can impact humans as well. Protection and enhancement of fish and wildlife species and their habitat, and control of disease vectors and pest populations on site is a primary goal of this IRMP. Recommended management goals and management actions for these resources are provided in Section 4.0.

3.8 WETLAND RESOURCES AND MANAGEMENT

Wetlands play a valuable functional role in their environment both ecologically and economically. Wetlands are ecologically important since they provide food, spawning and nursing grounds, and habitat for many species. Economically, wetlands not only help absorb floodwater runoff, but also act as natural water treatment centers, filtering out large amounts of nutrients and waterborne pollutants and protecting the quality of the water in the area (Miller 1994).

There are two federal legislative acts that drive wetlands regulation at the national level. The most important of these is the Clean Water Act (CWA) (33 U.S.C. Part 1344). The other, the Rivers and Harbors Act of 1899 (33 U.S.C. Part 403), does not typically entail wetland protection provisions at the federal level but can provide for regulations at the state level. The Rivers and Harbors Act protects natural resources and habitats by regulating development in or over navigable waters.

The regulatory program established under the CWA is developed after extensive interplay between several federal agencies responsible for implementing the Act. The responsible agencies are the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (USACE), the Natural Resources Conservation Service (NRCS), and the National Marine Fisheries Commission (NMFC).

The CWA has several sections that pertain to wetlands. Section 404 regulates development that would impact waters of the United States and wetlands. The USACE and U.S. EPA have been given jurisdiction to implement Section 404, and all projects that would impact waters or wetlands require a permit from the USACE. In the absence of wetlands, the upstream limit of Section 404 jurisdiction is the point at which the ordinary high watermark is no longer perceptible. Where wetlands are present, either adjacent to jurisdictional waters or not, the jurisdictional limit is the boundary of the wetland as defined by the USACE 1987 Wetlands Delineation Manual.

Executive Order (EO) 11990, the Protection of Wetlands was implemented in 1977 to avoid adverse impacts associated with the destruction or modification of wetlands. This EO attempts to protect fish and wildlife species by requiring enforcement agencies to act to minimize destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. The enforcement agencies include all those responsible for permitting projects in wetlands, such as the USACE and the EPA.

Historically, wetlands have been more extensive on CBC Port Hueneme than they are today; these resources included saltwater and freshwater ponds. Beginning in the 1930s, these wetlands were filled and graded to provide a surface to build upon. The definition of wetlands according to the USACE, wetland systems on base, jurisdictional waters of the United States, and wetlands management issues are described below.

3.8.1 Wetlands Definitions

The USACE is, responsible for determining jurisdictional boundaries of wetlands for regulatory and permitting purposes under Section 404 of the Clean Water Act. Under the USACE definition, an area is considered a wetland only if all three parameters are present; wetlands are:

> Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (USACE 1987)

For delineating wetlands, the USACE has developed a field method using a "three parameter test" that considers hydrophytic vegetation, wetland hydrology, and hydric soils. Under the USACE definition, an area is considered a wetland only if indicators of all three parameters are present, except for wetland types designated as "problem areas" or conditions considered to be significantly disturbed or "atypical."

3.8.2 Wetlands on Base

Wetlands may be present at CBC Port Hueneme but have not been formally delineated according to the USACE Wetlands Delineation Manual 1987. The bulrush-cattail habitat located north of the 23rd Avenue Channel is a potential wetland providing abundant wildlife use. Although the drainage channels are not defined "waters of the United States" based on the mean high tide water line and presence of the tidegate (see discussion below), the channels may be potential wetlands based on the "three parameter test." Management issues for wetlands are discussed in Section 3.8.4.2 and Chapter 4.0 of this IRMP.

3.8.3 Jurisdictional Waters of the United States

In Section 404 of the Clean Water Act, the USACE regulates dredged material and fill discharged into "waters of the United States." Waters of the United States are generally defined in 33 CFR 328.3(a) to include navigable waters (eg., rivers, streams, lakes) and vegetated wetlands. Jurisdictional determination for the drainage channels at Port Hueneme was issued by the Corps in March 1994 (Appendix B). The following was determined:

- Any construction (work and/or structures) that occurs below the mean high tide water line would require a permit from the Corps in accordance with Section 10 of the Rivers and Harbors Act only. The drainage canals became a navigable water of the United

States (33 CFR 329.4) once the connection to the Port of Hueneme, a recognized navigable water of the United States was made.

- The Corps does not consider the drainage canals to be "waters of the United States." However, if the tidegate were to be removed and tidal action were to return, the canals would be considered "waters of the United States" and rules and regulations of Section 404 would be applicable.

The drainage canals include the 23rd Avenue Channel, Pennsylvania Road Channel to the harbor, Lehman Road Channel, and the Pleasant Valley Road and Eastern Pleasant Valley Road Channels.

The Port Hueneme harbor area and beach lie immediately adjacent to the Pacific Ocean. Under definitions of Section 404, the ocean is considered to be a jurisdictional resource shoreward to the high tide line. The high tide line is the intersection of the land with the water surface at its maximum height reached by a rising tide. This line includes the water level reached during spring or other periodic high tides, but does not include storm surges that are departures from normal or predicted circumstances. The Port Hueneme Harbor also qualifies as a bay with regulatory jurisdiction extending to the entire surface and bed of all water bodies subject to the tidal action.

3.8.4 Management Issues/Wetland Habitat Disturbance, Degradation, and Loss

A general concern for regional wetland habitats is habitat loss due to agricultural, urban, military, and other development. Disturbances, both natural and artificial, also can adversely affect wetlands. Both of these factors are important because they affect the productivity and value of wetlands.

Potential wetlands exist within the 23rd Avenue Channel, Pennsylvania Road Channel, Lehman Road Channel, Pleasant Valley Road Channel and East Valley Road Channel and bulrush-cattail habitat located north of 23rd Avenue. Major threats to these potential areas include the presence of contaminants and potential construction activities in these areas. The drainage channels are periodically cleared for flooding purposes.

The exotic plant species, pampas grass (*Cortaderia* spp.) and Arundo (*Arundo donax*) potentially pose a threat to wetlands on CBC Port Hueneme. These plants outcompete native plants and contribute to the degradation of wetland habitats.

Since potential wetland locations and systems may be present at CBC Port Hueneme, a basewide wetlands delineation is necessary. A detailed discussion of the legal protection of wetlands and management recommendations is presented in Chapter 4.0.

3.9 CULTURAL AND HISTORICAL RESOURCES

3.9.1 Prehistoric Resources

Archaeologically sensitive resources and areas surveyed on CBC Port Hueneme are shown in Figure 3-3, and discussed in the following text.

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Figure 3-3 Historic Resources on CBC Port Hueneme
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Approximately 100 acres (6%) within CBC Port Hueneme have been surveyed for archaeological resources. Although prehistoric and ethnohistoric inhabitants of the area are known to have used the land now encompassing the installation, the only prehistoric archaeological site that has been found is a shell midden located on either side of the harbor entrance. Extensive cutting, filling, construction, and heavy equipment training activities have probably destroyed or buried any archaeological sites; however, the possibility still exists that intact archaeological deposits could be encountered (Uribe & Associates 1998).

Site CA-Ven-663. This prehistoric Late-Period (A.D. 1100-1804) shell midden site was reported in 1933 on both sides of the channel entrance of Port Hueneme. Shell, blackened sand, mammal bone, fire-affected rocks, and a battered cobble were observed. During enlargement of the port in 1942, most of the site was destroyed. Subsequently, numerous buildings have been constructed and rock and concrete jetty materials have been piled along the north side of the channel entrance. Material dredged from the harbor has been dumped on both sides of the channel entrance for several decades, and the site is believed to be lost (Uribe & Associates 1998).

3.9.2 Historic Resources

Historic resources at CBC Port Hueneme are shown in Figure 3-4. The following discusses those historic resources that are on, or eligible for, listing in the NRHP, as well as other historic resources identified at CBC Port Hueneme.

Thomas R. Bard Estate (Berylwood). The Thomas R. Bard estate is a National Register of Historic Places (NRHP)-listed district including the Bard mansion, designed by Los Angeles architect Myron Hunt in the Italian Renaissance Revival style and completed in 1912; the Richard Bard house, built in 1910; a house known as the "Guest House", but whose age and original function are unknown; a swimming pool; tennis courts; and a garage. The Navy currently uses the Bard mansion for an Officers' Club, the Richard Bard house as Quarters A for the Commanding Officer of CBC Port Hueneme, and the Bard guest house as Bachelor Officers' Quarters Alpha (Uribe & Associates 1998). A house which was used as quarters for Chinese servants of the Bards in the 19th Century has been torn down and is not part of the current estate (Marsh, personal communication 1999).

Bard family memorial cemetery. Originally located 400 feet north of the Thomas R. Bard mansion, the Bard family memorial was relocated permanently to the southeast corner of the Bard estate in 1951. At that time, all graves within the cemetery were moved to a location off CBC Port Hueneme. The cemetery is not NRHP-eligible because of special conditions required for listing cemeteries; however, it is listed as Ventura County Landmark Number 20 (Uribe & Associates 1998).

Thomas R. Bard's botanical garden. The botanical garden is located east of the Bard mansion and the Richard Bard house. The grounds contain 260 ornamental trees representing 48 genera and 78 species, planted between 1876 and 1915. The botanical garden is not considered eligible for the National Register and is not part of the Thomas R. Bard Estate NRHP district due to diminished integrity (Streets 1974; Uribe & Associates 1998).

Edward and Mary Farrell house. This two-story Craftsman-style bungalow was built in 1918 by the Farrells, who immigrated from Ireland and grew sugar beets and lima beans on their small farm. The Farrell house is eligible for NRHP listing under Criterion C, because it is a distinct representative of the California bungalow style of its era, and possibly the only one remaining in the region. The property includes a wooden barn (Building 581) and a milk house (Building 346). Currently the Farrell house is designated Quarters D, and is used for officer housing (Uribe & Associates 1998).

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Figure 3-4 Archaeologically Sensitive Resources and Areas on CBC Port Hueneme
11 x 17, color

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Vincent and Frances Friedrich house. The Friedrichs, who grew alfalfa and beans on their farm, were prosperous enough to build this modern, single-story, ranch-style house in 1940–41. The house, which is located southwest of the intersection of Channel Islands Boulevard and Ventura Road, is architecturally undistinguished and is therefore not eligible for listing on the National Register. It is currently used as Quarters B, officers' housing (Uribe & Associates 1998).

Buildings 383, 384, 385, and 386. These four buildings are Quonset huts installed at the Advance Base Depot Port Hueneme (now CBC Port Hueneme) during the Second World War. The buildings are unmodified, retain all seven NRHP elements of integrity, and are particularly representative of the Seabees because of their mission as a construction battalion and the role of the Quonset hut in advance site construction (Uribe & Associates 1998). The Quonset hut was developed during 1941 at the Quonset Point Naval Air Station in Rhode Island, mass produced, and assembled at every United States. military facility in the world throughout the Second World War. This grouping of four Quonset huts is National Register-eligible under Criterion C because the buildings embody a distinctive type, period, and method of construction.

Statuary at the Needham Theater. A statue depicting a Seabee in battle gear bidding goodbye to a loved one was placed in front of the theater building during World War II. By the early 1990s, the statue, constructed of steel rebar covered with concrete, had seriously deteriorated and was removed. Using Legacy Resource Management Program funds, a duplicate was made from a mold of the original, and replaced it in front of the theater. The original statue is now stored inside the CBC Port Hueneme museum (Transano 1999). As an element of the building with which it was associated, the statue would have been included if the building had been eligible for listing on the National Register. Having been removed from its original location, however, it is an object of art, rather than an element of a building, and does not qualify for listing on the National Register (Uribe & Associates 1998).

Mural inside the Beehive Fitness Center (Building 233). At the end of World War II, a mural depicting Seabees engaged in various wartime activities, including a beach landing and construction operations, was painted on tiles inside the Advance Base Depot Port Hueneme skating rink. Around 1950, the building became the original CBC Port Hueneme museum. In 1957, the museum moved to its present location, and the old skating rink building was turned into a gymnasium. After having basketballs bounced against them for more than three decades, the tiles upon which the mural was painted were disintegrating, and were restored using Legacy Resource Management Program funds in the early 1990s (Transano 1999). The building has recently been extensively remodeled for use as a fitness center, and as a result has lost its historical and architectural integrity. It is therefore not eligible for listing on the NRHP, and the mural, as an object of art, is not separately eligible (Uribe & Associates 1998).

Ventura County Railway Line. The railway is entirely within Ventura County, and connects the Southern Pacific line in Oxnard and the City of Port Hueneme with the U.S. Naval Base. It was originally intended to extend from Los Angeles to San Francisco, but only the existing section was built. The line started in 1903 as the Bakersfield and Ventura Railway Company, and was bought by the Ventura County Railway Company in 1911. Before World War II, its primary function was transporting sugar beets. During the war, it was used by the military, and the portion within the Advance Base Depot Port Hueneme was bought by the Navy. The railway was designated Ventura County Historical Landmark Number 141 in September of 1991 (Uribe & Associates 1998).

Ventura Road Eucalyptus Grove. This grove consists of a one-mile-long row of blue gum eucalyptus trees over 80 years old, located on the west side of Ventura Road between Teakwood Drive and Pleasant Valley Road. It is an example of the windbreaks planted by early settlers to shelter their crops and

homes. Most of the trees are on city-owned property, but many are within CBC Port Hueneme (Uribe & Associates 1998).

Site CA-Ven-975H. This submerged archaeological site consists of the shipwrecked remains of the *Bahama Star/La Janelle*. The *Bahama Star* was launched in 1929, and cruised between Miami, Florida and the Bahama Islands throughout the 1930s. During World War II the ship was used to transport troops to the Pacific, the Mediterranean, and the Baltic. After 1945 the *Bahama Star* resumed service as a commercial cruise liner, and was eventually bought by the Western Steamship Company, who changed its name to *La Janelle* in 1968. Two years later Western put the ship up for sale, and had it anchored off the west breakwater at Point Hueneme awaiting potential buyers. On 17 April 1970 a severe storm passed through the area, swamping and sinking *La Janelle*. The shipwreck soon filled with sand, making recovery impossible, and it was incorporated into the breakwater. It is located at the west entrance to the CBC Port Hueneme harbor (Uribe & Associates 1998).

3.10 ARCHAEOLOGICALLY SENSITIVE AREAS

The grading, cutting, filling with dredge spoils and other materials, construction of hundreds of buildings, and intensive heavy equipment training that have taken place at CBC Port Hueneme since the United States' entry into World War II nearly six decades ago have greatly reduced the area of undisturbed, unaltered land within the base. Wetlands, including salt water and fresh water ponds, are known to have existed in the area until the early 20th century. These contained an abundance of floral and faunal resources that would have attracted prehistoric and ethnographic peoples. Starting in the early 1930s, the wetlands were filled and graded to form much of the level surface on which CBC Port Hueneme is built. Ancient stabilized sand dunes, as well as stream channels in the vicinity, also have the potential to contain archaeological sites (Uribe & Associates 1998). Although the extensive ground disturbances have probably destroyed prehistoric sites, the potential still exists for the discovery of archaeological materials below the ground surface. The majority (approximately 94%) of the installation has not been surveyed or tested for archaeological materials. The need for further work can be divided into three categories: areas of low, medium, and high archaeological sensitivity, as identified by Uribe & Associates (1998).

Low Archaeological Sensitivity. In areas of low sensitivity, there is little potential for the occurrence of significant prehistoric or historic archaeological resources on or below the ground surface. The locations of prehistoric sites in the vicinity of CBC Port Hueneme can be used to a certain extent to predict site locations within the facility. Several historic properties with the potential for archaeological materials at the site are already known. However, extensive disturbances have resulted in low archaeological sensitivity for the majority of the installation.

Medium Archaeological Sensitivity. In areas of medium sensitivity, archaeological materials may have existed on or below the ground surface, but disturbances have reduced the probability that such materials still exist. Areas of medium sensitivity at CBC Port Hueneme include late Pleistocene and Holocene deposits that were once the boundaries of ponds or other wetlands. Impacts to CBC Port Hueneme have reduced such areas to only of a portion of both sides of the harbor entrance, where site CA-Ven-663 was observed prior to widening of the harbor and other activities. It is likely that the site was completely destroyed, but remnants may still exist in those areas.

High Archaeological Sensitivity. In areas of high sensitivity, there is a high likelihood that archaeological materials may be encountered. Portions of CBC Port Hueneme known to be of high sensitivity consist of only three locations at the installation: the National Register-listed Berylwood Historic District (Thomas R. Bard estate/Officers' Club), the Farrell house (Quarters D), and the wreck of the *Bahama Star/La Janelle*. These three areas comprise historic sites, with the possibility, somewhere

on the grounds of the Berylwood Historic District, of an ethnohistoric burial or cemetery, observed by Richard Bard in 1903 (William Self Associates 1995).

3.10.1 Sensitivity for Native American Remains/Burials

Around 1903, Richard Bard discovered a site near the Bard mansion containing one or more human burials and small glass trade beads. The exact location has not been determined, and no further information on it is available at this time. This site may be an ethnohistoric Chumash burial or cemetery (William Self Associates 1995). Additional Native American burials may be present in the area. The Historic and Archeological Resources Protection (HARP) Plan for CBC Port Hueneme describes the procedures to be followed in the event that human remains are inadvertently discovered on the installation (Uribe and Associates 1998). In accordance with NAGPRA and other federal regulations, mandated procedures include immediate notification of the cultural resources program coordinator at Southwest Division, who in turn initiates consultation with the appropriate Native American group(s) and government officials, and the preparation and implementation of a treatment plan.

3.10.2 Mitigation Strategies

Mitigation strategies are detailed in Appendix C of this IRMP.

3.11 OUTDOOR RECREATION

Recreational areas on CBC Port Hueneme include the golf course and driving range, a play field, a park, track and field facilities, softball fields, and a recreational vehicle (RV) park. There are also bicycle trails on base. Shoreline recreation on site includes fishing; there are no allowed recreational uses of the harbor. Surrounding the site are public beaches, state parks, and bicycle/hiking trails.

3.11.1 Recreation Areas and Uses

The MWR Department manages recreational uses on base. The main MWR office is located in Building 103. Table 3-11 shows the acreage for various types of recreation areas, which total about 147.59 acres.

Table 3-11
Acreage for Recreation Uses

Golf Course	118.51 acres
Driving Range	8.03 acres
Bolles Field Recreation Site	1.62 acres
Bolles Park	2.33 acres
Track and Field	3.65 acres
Softball Fields:	
Fields 1 and 2	4.17 acres total
Fields 3 and 4 (both currently under construction)	4.18 acres total
RV Park (currently under construction)	5.1 acres
Total	147.59 acres

Note: Does not include recreational areas for housing on base.
Source: Sitar 1999.

An alternate bicycle/hiking route goes transects the site along the shoreline. It was recommended that the Scenic Alternate Bicycle/Hiking Route be extended along Port Hueneme City Beach and Ormond Beach to provide continued access along the coastline (CDPR 1976).

Other recreational facilities on site include CBC Port Hueneme Lanes Bowling Center, an olympic-sized outdoor swimming pool, the Auto Hobby Shop, the Bee-Fit Wellness Center, an outdoor recreation gear issue, the Warfield Fitness Center, the Youth Activity Center, picnic areas (including the Bolles Field Recreation Site), tennis courts, the Needham Theater, and the CEC/Seabee Museum (U.S. Navy 1998a).

CBC Port Hueneme swimming pool is located near the intersection of Coats Street and 29th Avenue. Red Cross swimming lessons, water safety instruction, and scuba certification make up the site Aquatics Program (U.S. Navy 1998a).

3.11.1.1 Special Interest Activities

The Golf Course

CBC Port Hueneme Golf Course is located on the eastern side of the base, adjacent to Channel Islands Boulevard. Encompassing 118.51 acres, the golfing green is separated into two parts by Patterson Avenue (Sitar 1999). The golf course is an 18-hole course with a driving range (approximately 8 acres, which is not included in the acreage given above), chipping green, putting green, 5 lakes, and night lighting (Quizada 1999).

The golf course is open to military and civilian personnel. About 30 to 40 percent of the users are civilians that must be guests to have access. There was about 45,000 rounds of golf played in 1998; this number is low due to the heavy rainy season. Usually there are about 45,000-50,000 rounds per year played (Quizada 1999).

There are several tournaments held at CBC Port Hueneme Golf Course. Military clubs that hold regular events include the Men's Golf Association and the Women's Golf Association. About 2 civilian tournaments are held per month; the groups that hold these must have a military sponsor (Quizada 1999).

3.11.1.2 Surrounding Recreational Areas

Recreational areas surrounding CBC include city, county and state beaches, McGrath and Mugu State Parks, and bicycle/hiking trails. Public beaches are discussed below in Section 3.11.2, Shoreline and Ocean Recreation.

McGrath State Beach is approximately 26,400 feet (5 miles) northwestward down the coastline from the Port of Hueneme. McGrath State Beach is a 295-acre park, which includes 10,445 linear feet (LF) of shoreline, 2,900 Santa Clara River frontage, McGrath Lake, campsites, restroom and shower facilities, a trailer sanitation station, and a campfire center. Recreational activities include camping, picnicking, fishing, surfing, and other shore-related activities (CDPR 1979). Mugu State Park is located approximately 48,000 feet (9 miles) southeast of CBC Port Hueneme boundary and comprises 6,554 acres. This state park contains various natural scenes, such as beach and coastline, a mountain rimmed valley, and coastal canyons. Recreational activities within this area include swimming, fishing, surfing, camping, picnicking, bicycling, hiking, and horseback riding (CDPR 1972).

3.11.2 Shoreline and Ocean Recreation

3.11.2.1 CBC Port Hueneme

A portion of the Port of Hueneme is owned and operated by the Oxnard Harbor District and the remaining by the U.S. Navy. There are no allowed recreational uses in the harbor; commercial uses are discussed in Section 7.3.12.1, Improved Grounds.

A fishing area is located along the 700-foot pier located on the base, approximately 800 feet east of Arnold Road (CDPR 1976). Although this area has been closed off to the public, illegal fishing from the pier occurs on a regular basis.

3.11.2.2 Surrounding Shoreline and Ocean Recreation Areas

Directly to the west of the Port Hueneme Harbor is Silver Strand Beach, which is bounded on the far west side by the Channel Islands Harbor and comprises 41 acres (4,900 LF of shoreline). Parking for this beach is provided through off-street as well as on-street parking space. Hollywood Beach, a 50-acre park containing 6,029 LF of shoreline, borders the Channel Islands Harbor to the west.

To the southeast of CBC Port Hueneme is Port Hueneme City Beach, which includes 68 acres (4,600 LF of shoreline) with picnic sites, parking, and a snack bar/bait and tackle shop. A fishing pier owned by the City of Port Hueneme is located along this coastal area. It serves as a diving point between the public beach and the CBC Port Hueneme boundary.

Ormond Beach is located to the southeast of the Port Hueneme City Beach, bounded by the Oxnard Sewer Plant on the west and the Southern California Edison (SCE) Ormond Generating Plant on the east. Ormond Beach is held by the City of Oxnard and comprises 85 acres and 4,950 LF of shoreline (CDPR 1976). Legal and illegal off-road vehicle (ORV) use on and around Ormond Beach has historically been extensive. This recreational use has contributed to the degradation of the habitat and a management program has been implemented by SCE and the USFWS to restore the wetlands in and around the public beach. Recreational use in the area around Ormond Beach is somewhat limited due to industrial land holdings (mostly Southern California Edison SCE) (City of Oxnard 1995).

The Pacific Coast Bicycle/Hiking Route provides access along the beach areas adjacent to the naval base. A study of Ventura County beaches done by the CDPR concluded that military, industrial, and residential encroachment on these and other resources caused a major impact on scenic and recreational resources along the coast (CDPR 1976).

Located off the coast of Ventura County is the Channel Islands National Marine Sanctuary. Recreational uses in this protected ocean area include boating, fishing, diving, and scenic and wildlife viewing. The Channel Islands are a popular destination for hikers and campers, and the sanctuary provides a thoroughfare for island visitors (U.S. Department of Commerce).

3.12 LAND USE

3.12.1 Developed Grounds

CBC Port Hueneme encompasses approximately 1,650 acres (71,874,000 square feet [ft^2]) of flat, mostly developed or paved lands with residential, industrial, and commercial land uses. There are 36 miles of

road and 16 miles of railroad on the site (U.S. Navy 1997). 408 buildings totalling approximately 110 acres (4,627,000 ft^2) are located on the base, not including family housing.

3.12.1.1 Housing

Military family housing on CBC Port Hueneme is mostly concentrated on the southern end of the site. Approximately 10,000 civilian and military personnel, along with their dependants, live on site in 817 family housing units. These housing units include 77 officer units, 723 enlisted units, and 17 mobile home spaces (U.S. Navy 1997). To qualify for housing, one family member must be in active duty in the military (Reuning 1999). The Navy Family Housing Welcome Center serves the site by providing information on rentals and real estate and processing applications for government quarters on site, and is located in Building 101 (U.S. Navy 1999b).

The oldest family housing units on site were built in the early 1960s. A renovation program is currently underway, and all units will soon be either new or newly renovated. There are no definite plans for new units to be built in the near future (Reuning 1999).

3.12.1.2 Operations/Industrial

Outleasing

CBC Port Hueneme outleases land to the Oxnard Harbor District and the Mazda Corporation. The Oxnard Harbor District holds a license that allows for up to 25 acres of land to be used. This acreage varies from day to day, depending upon operations of the harbor. The outleased land is used for storage of goods that come through the portion of the harbor that is owned by the Oxnard Harbor District (Thompson 1999). Mazda Corporation uses a portion of the land on site for storage of rolling stock.

The Port of Hueneme

The Port of Hueneme is owned in part by the Oxnard Harbor District; the U.S. Navy owns the remaining dock space. The Oxnard Harbor District also owns and operates approximately 69 acres of land in the harbor area and adjacent channel (Ortiz 1999). The Port of Hueneme is the only deep-water harbor port between Los Angeles and San Francisco. Importing primarily occurs through the commercial portion of the harbor. In 1986, 627,700 revenue metric tons came through the port. The volume is expected to increase 140 percent by 2010, to 1,497,853 tons (SCAG 1988).

Commodities shipped through the port include bananas, automobiles, oil products, lumber, fish, livestock, wood pulp, liquid fertilizer, and other agricultural products. The Port of Hueneme is the import center for Mazda automobiles in Southern California. Mercedes Benz, BMW, Jaguar, Range Rover, and Mitsubishi Corporations also import stock through the port. Bananas and other fruits and wood pulp are also large-scale commodities that go through the harbor. Oil products, which are available for ships operating from the port, come in through barges at least quarterly (Ortiz 1999). The Port of Hueneme serves as the principle staging area for supplies, equipment, and crews for the oil platforms located in the Santa Barbara Channel. The port also handles a small amount of fuel oil for Southern California Edison Company, stationed near CBC Port Hueneme (SCAG 1988). The newest commodity to be imported through the port is liquid fertilizer, which comes in bulk tankers (Ortiz 1999).

The Port of Hueneme is also vitally important to operations at CBC Port Hueneme. A port facility with a total of 10 berths exists in the harbor. The figures for amount of cargo brought into CBC Port Hueneme half of the port are not released to the public (SCAG 1988). Imports and exports through the Navy

include bulk items and wheeled cargo, which serve military operations for bases throughout the pacific range (Ortiz 1999).

3.12.1.3 Administration Area

Building 1000 is CBC Port Hueneme Headquarters and serves as the main administration area. Located near the intersection of Patterson Road and 23rd Avenue, it is 68,400 ft^2 and consists of solely administration offices (Contreras 1999). In addition to this main building, most departments on site have their own office for administrative operations, in their respective buildings.

Offices housed in Building 1000 include: Command Office; Command Counsel; Public Affairs Office; Staff Judge Advocate (Legal); Comptroller Department; Human Resources Office; Military Affairs Department; Military Operations Division; Environmental, Fire, and Safety Department; Supply Department; and the Naval Reserve Construction Battalion Center (NRCBC Port Hueneme), Port Hueneme Office (U.S. Navy 1998a).

3.13 AGRICULTURAL OUTLEASE PROGRAM

There are currently no agricultural outlease areas on base. CBC Port Hueneme contains only one potential 33-acre site that may be leased in the future for agricultural purposes (Installation Restoration Program Site 14). After remediation is completed for this site, the area has great potential to be used for an ornamental plant nursery or related use.

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4.0 INITIAL IMPLEMENTATION RECOMMENDATIONS FOR THE RESOURCES MANAGEMENT PROGRAM

The purpose of this chapter is to provide specific management direction for and facilitate the protection of natural and cultural resources on CBC Port Hueneme.

Section 4.1 (Key Resources Selected for Protection, Enhancement, and Management) provides an overview of individual key resources that need special management plans and programs. These resources are listed in Table 4-1. Special Interest Natural Areas designated in this IRMP are also identified in this section.

Table 4-1
Key Resources Selected for Protection, Enhancement, and Management at CBC Port Hueneme

Natural Resources
Sensitive Species
Plant/Wildlife Habitat
Bulrush-cattail habitat (Special Interest Natural Areas A and B)
Coyote brush habitat (Special Interest Natural Area C)
Sand verbena-beach bursage and sandy beach habitats (Special Interest Natural Area D)
Marine subtidal habitat (Special Interest Natural Area E)
Bard Estate grounds (Area F)
Shelterbelts/Windrows (Area G)
Seabee Golf Course (Area H)
Water, Soil, and Air Quality
Aesthetic and Recreational Resources
Disease Vectors and Pests[1]
Cultural Resources
Historical Resources
Berylwood NRHP District (Thomas R. Bard Estate)
Farrell House
Buildings 383, 384, 385, 386 (World War II Quonset huts)
Archaeological Resources
Site CA-Ven-663 (Prehistoric shell midden site on both sides of channel entrance)
Site CA-Ven-975H (*Bahama Star/La Janelle* shipwreck site)
Reported Ethnohistoric Burial Site (Possible Ethnohistoric Burial at Thomas R. Bard Estate)

Note: 1 - Disease vectors and pests are considered "key resources" because they are plant and wildlife populations at CBC Port Hueneme that require control in order to protect other natural resources on base.

Section 4.2 (Program Goals and Priorities) lists management goals for key resources on CBC Port Hueneme (Table 4-2). Criteria used to develop and prioritize management project implementation in this IRMP are described. The criteria currently used by the DOD range from Class O (compliance requirements) to Class III (enhancement actions beyond compliance) and are defined in this section.

Table 4-2
Management Goals for Key Resources at CBC Port Hueneme

Key Resource	Management Goal
Natural Resources	
All Resources	Implement the Resource Management Program according to Volume II of the *Navy Operations and Natural Resources Management Procedural Manual* and the Department of the Navy *Historic and Archeological Resources Protection Planning Guidelines* pursuant to DoDDIR 4700.4, DoDDIR 4710.1, and DoD I 4715.3.
	Review the IRMP every year and revise the IRMP at 5-year increments, at a minimum.
	Perform required environmental impact analyses and special studies or mitigation for all current and proposed projects subject to NEPA. Coordinate NEPA compliance activities with NAS Point Mugu when proposed projects affect both bases.
	Maintain a Cultural Resource Coordinator at CBC Port Hueneme to oversee compliance with NEPA, NHPA, ARPA, and NAGPRA.
Sensitive Species	Protect and enhance populations of federally endangered or threatened species, species proposed for listing as endangered or threatened, and federal candidates for listing that occur at CBC Port Hueneme in accordance with the federal Endangered Species Act of 1973, as amended.
	Prevent the taking of any native wild bird species, including their nests, eggs, and young, except by special permit, pursuant to the Migratory Bird Treaty Act of 1918, as amended. "Take" means to kill, pursue, harass, wound, trap/capture, or attempt any such conduct.
	Protect and enhance state-listed and proposed listed species, state candidate species for listing, and Navy species of concern.
Plant/Wildlife Habitats	Protect and enhance wetlands at CBC Port Hueneme in compliance with the Wetlands Protection Act (Executive Order 11990) and Section 404 of the Clean Water Act.
	Restore areas on base with potential for enhancement.
Water, Soil, and Air Quality	Maintain the Installation Restoration Program (IRP) at CBC Port Hueneme pursuant to CERCLA. Continue cleanup efforts at IRP sites as required by the Department of Toxic Substances Control.
	Maintain the Surface Water and Storm Water Program element of the Compliance Program at CBC Port Hueneme in compliance with the Clean Water Act. Maintain, improve, and implement the SWPPP as required under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities.
	Maintain the Underground Storage Tank (UST) Program at CBC Port Hueneme pursuant to California's UST regulations (Title 23, Division 3, Chapter 16, Articles 1-10 of the California Code of Regulations [CCR]). Continue cleanup efforts as required by the Department of Toxic Substances Control and the Los Angeles Regional Water Quality Control Board.
	Maintain and improve the Pollution Prevention Program at CBC Port Hueneme, including the Recycling Program and Energy Showcase Program.
	Protect navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act.

Table 4-2 (continued)
Management Goals for Key Resources at CBC Port Hueneme

Key Resource	Management Goal
Aesthetic and Recreational Resources	Optimize current and future recreational opportunities at CBC Port Hueneme.
	Improve landscaping and recreational opportunities in close proximity to housing and main administration.
	Address aesthetic concerns of the public with the base.
Disease Vectors and Pests	Prevent and control disease vectors and pest populations associated with the facilities and ships at CBC Port Hueneme in compliance with the DoD Pest Management Program (DoD I 4150.7 and OPNAVINST 6250.4B).
Cultural Resources	
Historic Resources	Determine the extent of World War II-Era and Cold War-Era historic resources at the Naval Surface Warfare Center at CBC Port Hueneme.
	Ensure compliance with Section 106 of the NHPA for any action that might adversely affect NRHP-listed or eligible properties. (See Appendix C for suggested mitigation measures to reduce potential impacts.
	Preserve and maintain NRHP-listed properties.
Archaeological Resources	Develop and use specific treatment procedures for archaeological resources found at CBC Port Hueneme.
	Conduct archival research and locate potential ethnohistoric burials. If intentional excavation is to occur, consult with Native Americans pursuant to Section 3 of the Native American Graves Protection and Repatriation Act.

Table 4-2, page 2 of 2

Section 4.3 (Program Implementation Recommendations) outlines specific projects developed from evaluating the key resources on CBC Port Hueneme, management goals, and priority criteria. In developing management projects, an ecosystem and habitat-scale approach was taken. This encompasses management of natural resources beyond immediate impacts and political boundaries, and taking a "big picture" view of human actions and how they may affect resources. These projects have been designated with a project title and reference. A recommended implementation order is described, according to the priority criteria and/or special conditions of the resource and impacts. The recommended projects for natural and cultural resources are listed, according to implementation order, in Tables 4-3 and 4-4, respectively. The descriptions for each project include:

- A background on the key resource that the project has been designed to manage;
- The key threats to the resource (i.e., why management is required);
- The management goals the project addresses; and
- The management actions recommended for the project.

Table 4-3
Recommended Natural Resources Projects Listed in Potential Implementation Order

Implementation Order	Project Title (Project Reference)	Program Priority
1	Integrated Pest Management Plan (IRMP-NR-1)	Class I
2	Basewide Wetland Delineation (IRMP-NR-2)	Class II
3	Sensitive Species Surveys and Floristic Inventory (IRMP-NR-3)	Class II
4	Habitat Protection and Restoration Plan for Special Interest Natural Area A (Bulrush-Cattail Habitat) (IRMP-NR-4)	Class II
5	Habitat Protection and Restoration Plan for Special Interest Natural Area B (Bulrush-Cattail Habitat) (IRMP-NR-5)	Class II
6	Habitat Protection and Restoration Plan for Special Interest Natural Area D (Sand Verbena-Beach Bursage and Sandy Beach Habitats) (IRMP-NR-6)	Class II
7	Revision of the Base Exterior Architecture Plan (BEAP) (IRMP-NR-7)	Class II
8	Footpath/Greenbelt Loop (IRMP-NR-8)	Class III
9	Landscape and Recreation Improvements (IRMP-NR-9)	Class III
10	Protection Measures for Potential Monarch Butterfly Roosting Sites at NCBC Port Hueneme (IRMP-NR-10)	Class II
11	Protection Measures for Kelp Beds at NCBC Port Hueneme (IRMP-NR-11)	Class II
12	Protection Measures for the California Brown Pelican and California Least Tern at NCBC Port Hueneme (IRMP-NR-12)	Class II
13	Protection Measures for Marine Mammals at NCBC Port Hueneme (IRMP-NR-13)	Class II
14	Protection Measures for Native Bird Species at NCBC Port Hueneme (IRMP-NR-14)	Class II
15	Development of a Natural Resources Monitoring Program and Database (IRMP-NR-15)	Class III
16	Habitat Protection and Restoration Plan Special Interest Natural Area C (Coyote Brush Habitat) (IRMP-NR-16)	Class II
17	Adaptive Management Plan for Burrowing Owls at NCBC Port Hueneme (IRMP-NR-17)	Class II
18	Construction of Agricultural Outlease Area at IRP Site 14 (IRMP-NR-18)	Class III
19	Improvements to the Storm Water Pollution Prevention Plan (SWPPP) (IRMP-NR-19)	Class III
20	Improvements to the Recycling Program (IRMP-NR-20)	Class III
21	Drip Irrigation System Installation (IRMP-NR-21)	Class III
22	Outdoor Recreation Assessment (IRMP-NR-22)	Class III

Table 4-4
Recommended Cultural Resources Projects Listed in Potential Implementation Order

Implementation Order	Project Title (Project Reference)	Program Priority
1	Inventory and Evaluation of World War II-Era and Cold War-Era Buildings and Structures at the Naval Surface Warfare Center (NSWC) (IRMP-CR-1)	Class I
2	Develop Maintenance Plan for Historic Buildings and Grounds (IRMP-CR-2)	Class I
3	Establish a Programmatic Agreement with the State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP) (IRMP-CR-3)	Class II
4	Update National Register Nomination (especially information on the botanical garden and the "Guest House") (IRMP-CR-4)	Class II
5	Establishment of Treatment Procedures for Archaeological Resources (IRMP-CR-5)	Class III
6	Location and Evaluation of Possible Ethnohistoric Burial Site at the Thomas R. Bard Estate (IRMP-CR- 6)	Class III

Section 4.4 (Cooperative Resource Planning) describes the process of arranging cooperative agreements for resource management with various federal, state, and local governmental agencies, as well as nongovernmental organizations and individuals.

Section 4.5 (Applicable Regulations and Permits) lists the regulatory driver, and regulatory and oversight requirements, for the projects described in Section 4.3. Each regulation is described in more detail in Appendix A.

Section 4.6 (Potential Program Funding Sources) discusses the funding programs traditionally used for resources management programs at DoD installations. Table 4-8 in Section 4.6 lists each project developed in Section 4.3, and the potential funding source(s) for which the project may qualify.

Section 4.7 (Program Data Management) describes the following:

- The data management goals of the Resources Management Program at CBC Port Hueneme;
- Information sources used for the IRMP including the Literature Database and Reference Binder, GIS, and Global Positioning System (GPS); and
- Recommendations for the further development and future use of GIS for land use planning of CBC Port Hueneme.

4.1 KEY RESOURCES SELECTED FOR PROTECTION, ENHANCEMENT AND MANAGEMENT

Several key resources (e.g., sensitive species, aesthetic, and recreational resources) are located throughout the base, and others are concentrated in particular areas. Habitats on base (e.g., bulrush-cattail habitat) have been designated as Special Interest Natural Areas (DoD DIR 4700.4) and contain natural resources that warrant protection and special conservation efforts. These Special Interest Natural Areas are shown in Figure 4-1 and listed in Table 4-1 according to their habitat value and restoration potential; bulrush-cattail habitat (Special Interest Natural Area A) has the highest habitat value and restoration potential. Certain landscaped areas that provide potential wildlife habitat have also been designated as resource management areas, (i.e. Areas F, G, and H), but are not considered Special Interest Natural Areas pursuant to DOD DIR 4700.4. Key cultural resources at CBC Port Hueneme are shown in Figures 3-3 and 3-4.

Impacts to natural resource management programs on CBC Port Hueneme may occur as a result of mission-related activities on base. These impacts may have both long-term and/or short-term effects on natural resources. Long-term impacts, such as those that arise during the construction of new facilities, typically involve habitat loss and degradation. Short-term impacts may include hazardous materials releases and wastewater discharges; these impacts are less predictable and more transient than the long-term impacts on base. Key resources should be managed so mission requirements are met while these resources are protected. A general overview of potential mission-related impacts is provided below; they are discussed in more detail in Section 4.3.1, Recommended Natural Resources Projects.

4.1.1 Impacts to Vegetation and Habitats

Many native habitats on base have been greatly reduced on a regional scale and are sensitive to human impacts. Such habitats include bulrush-cattail habitat, coyote brush habitat, sand verbena-beach bursage habitat, sandy beach habitat, and marine subtidal habitat. Key mission-related impacts to these resources may include sedimentation due to construction and training activities, destruction or fragmentation due to flood-control measures and vehicle traffic, and operations and construction in the harbor.

4.1.2 Impacts to Wildlife

The main mission-related impacts on wildlife at CBC Port Hueneme include habitat loss due to construction activities and grounds maintenance activities, harassment by human activities such as construction training, and harbor traffic. Potential contaminant impacts (related to mission activities) also adversely affect wildlife. Sensitive or special-status species, such as the burrowing owl, brown pelican, other native bird species, marine mammals, and monarch butterflies, are particularly at risk of being impacted by mission-related activities.

4.1.3 Impacts to Soil, Water, and Air Quality

Activities such as construction and demolition projects on CBC Port Hueneme may impact pollution prevention goals by contributing to nonpoint source pollution and solid waste generation on base. Programs have been put in place to ameliorate these impacts, and these should be reviewed and updated regularly as mission activities and program goals.

Figure 4-1 Special Interest Natural Areas on CBC Port Hueneme
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4.2 PROGRAM GOALS AND PRIORITIES

4.2.1 Program Management Goals

General management goals were developed for each key natural and cultural resource at CBC Port Hueneme (Table 4-2). These management goals are designed to protect key resource values at CBC Port Hueneme and were developed in accordance with various regulatory requirements and DoD policies. Project-specific program implementation goals and management actions are contained in Tables 4-2 through 4-4.

4.2.2 Criteria for Establishing Program Priorities

The priorities for implementation of specific actions of the Resources Management Program at CBC Port Hueneme as recommended in this IRMP will be set using criteria used by the DoD to prioritize funding for installation resources management program projects. DoD gives priority to resources management program projects according to the following criteria; Class O receives the highest funding priority and Class III receives the lowest funding priority (DoD I 4715.3):

Class O: Recurring Natural and Cultural Resources Conservation Management Requirements

> Includes activities needed to cover the recurring administrative, personnel, and other costs associated with managing DoD's conservation program that are necessary to meet applicable compliance requirements (federal and state laws, regulations, Executive Orders, and DoD policies) or that are in direct support of the military mission. Also included are environmental management activities associated with the operation of facilities, installations, and deployed weapons systems. Recurring costs consist of manpower, training, supplies, hazardous waste disposal, operating recycling activities, permits, fees, testing and monitoring and/or sampling and analysis, reporting and recordkeeping, maintaining environmental conservation equipment, and compliance self assessments.

Class I: Current Compliance

> Includes projects and activities needed because an installation is currently out of compliance (has received an enforcement action from a duly authorized federal or state agency, or local authority); has a signed compliance agreement or has received a consent order; has not met requirements based on applicable federal or state laws, regulations, standards, Executive Orders, or DoD policies; and/or are immediate and essential to maintain operational integrity or sustain readiness of the military mission. "Class I" also includes projects and activities needed that are not currently out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, DoD policies, or Executive Orders, but deadlines have not passed or requirements are not in force) but shall be if projects or activities are not implemented in the current program year. Those activities include:
>
> - Environmental analyses (including planning) for natural and cultural resource conservation projects, and monitoring and studies required to assess and mitigate potential impacts of the military mission on conservation resources;
>
> - Baseline inventories of natural and cultural resources;

- Biological assessments, surveys, or habitat protection for specific listed species, critical for the protection of the species so that proposed or continuing actions can be modified in consultation with the USFWS or NMFS to prevent "taking" of the species;

- Inventories and surveys of historical and archaeological sites critical for the protection of cultural resources so that continuing actions can be modified in consultation with the State Historic Preservation Office and the Advisory Council for Historic Preservation;

- Mitigation to meet existing regulatory permit conditions or written agreements;

- Nonpoint source pollution or watershed management studies or actions needed to meet compliance dates cited in approved state coastal nonpoint source pollution control plans, as required to meet consistency determinations;

- Wetlands delineation, following existing statutory requirements, critical for the prevention of adverse impacts to wetlands without a permit so that continuing actions can be modified to ensure mission continuity;

- Efforts to achieve compliance with requirements whose deadlines have already passed;

- Initial curation of archaeological materials; and

- Consultations with Native American groups, if reinterment of Native American remains is part of their wishes.

Class II: Maintenance Requirements

Includes those projects and activities needed that are not currently out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, Executive Orders, or DoD policies, but deadlines have not passed or requirements are not in force), but will be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples include the following:

- Compliance with future requirements that have deadlines;

- Conservation and GIS mapping to comply with federal, state, and local regulations, Executive Orders, and DoD policy;

- Efforts that are part of non-deadline specific compliance requirements of leadership initiatives;

- Wetlands enhancement to achieve the President's order for "no net loss" or to achieve enhancement of existing degraded wetlands; and

- Programs that educate the public on the importance of protecting archaeological resources.

Class III: Enhancement Actions. Beyond Compliance

Includes those projects and activities that 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 under regulation or Executive Order and are not of an immediate nature. Examples include:

- Community outreach activities, such as "Earth Day" and "Historic Preservation Week;"
- Educational and public awareness projects, such as interpretive displays, oral histories, "watchable wildlife" areas, nature trails, wildlife checklists, and conservation teaching materials;
- Biological assessments, surveys, or habitat protection for a candidate species for listing as endangered or threatened;
- Restoration or enhancement of cultural or natural resources when no specific compliance requirement dictates a course or timing of action; and
- Management and execution of volunteer and partnership programs.

4.3 PROGRAM IMPLEMENTATION RECOMMENDATIONS

An ecosystem approach was utilized in developing projects to manage key resources on CBC Port Hueneme. The U.S. Fish and Wildlife Service (USFWS) uses this approach in implementing the Endangered Species Act; the guidelines set by the USFWS provide an example in establishing natural resource management programs. The ecosystem approach encompasses management of natural resources beyond immediate impacts and political boundaries, while taking a "big picture" view of human actions and how they may affect resources (USFWS 1998c). The main objective of the ecosystem approach, as described in an interagency memorandum in 1995, is to "restore and sustain the health, productivity, and biological diversity of ecosystems . . . through a natural resource management approach that is fully integrated with social and economic goals (USFWS 1998c)." An important concept in achieving such a management goal is to have the cooperation of federal, state, and private groups to ensure an integrated resource management program that transcends geographical and jurisdictional boundaries.

Several management goals of the Resources Management Program involve continued implementation of ongoing projects or programs at CBC Port Hueneme (e.g., maintenance of a Pollution Prevention Plan), while others require implementation of new or improved projects. New or improved natural and cultural resources projects that are recommended for the Resources Management Program are presented in Tables 4-3 and 4-4, respectively.

Each project has been assigned a unique project title and project reference number to help facilitate future funding efforts for these projects, and projects are listed in potential implementation order according to program priorities established according to DoD I 4715.3. A brief description of each recommended project is provided in Section 4.3.1 (Natural Resources) and Section 4.3.2 (Cultural Resources).

4.3.1 Recommended Natural Resources Projects

The following discussion describes each of the recommended projects listed in Table 4-3. The project descriptions include the following:

- A background on the key resource the project has been designed to manage;
- The key threats to the resource;
- The management goals the project addresses; and
- The management actions recommended for the project.

4.3.1.1 Integrated Pest Management Plan (IRMP-NR-1)

Disease vectors that require management at CBC Port Hueneme include mosquitoes and deer mice (*Peromyscus maniculatus*). Hottentot fig (iceplant) (*Carpobrotus edulis*), pampas grass (*Cortaderia* spp.), giant reed (*Arundo donax*), and Tasmanian gum tree (*Eucalyptus* spp.) are the most problematic and widespread pest plant species that require management on base; pitch canker is a plant disease that has destroyed many trees at the Seabee Golf Course. Mosquitofish (*Gambusia affinis*), pests associated with ship ballast water, ground squirrels (*Spermophilus beecheyi*), and feral cats are pest animal populations that must be managed at CBC Port Hueneme.

Key Issues

Pest species tend to flourish in disturbed habitats such as those at CBC Port Hueneme. They can have devastating impacts on native plant and wildlife populations or can prevent colonization by native plants and wildlife. Conversely, the use of pesticides to control disease vectors and pest populations can also have negative impacts on native plants and animals on base, especially the burrowing owl, monarch butterfly, and native bird species.

Management Goal

Prevent and control disease vectors, and pest populations associated with the facilities and ships at CBC Port Hueneme in compliance with the DoD Pest Management Program (DoD I 4150.7 and OPNAVINST 6250.4B).

Management Action

Preparation of an Integrated Pest Management Plan for CBC Port Hueneme is recommended and required by DoD I 4150.7, *DoD Pest Management Program* and OPNAVINST 6250.4B, *Pest Management Programs*, to establish and maintain a safe, effective, and environmentally sound integrated pest management program on base. The main objective of the Integrated Pest Management Plan at CBC Port Hueneme should be to prevent and control disease vectors and pests that may adversely affect readiness or military operations and that may adversely impact the natural environment on base.

Integrated pest management (IPM) is the preferred method for disease vector and pest management at DoD installations (DoD I 4150.7). Integrated pest management uses regular or scheduled monitoring to determine if and when treatments are needed to control disease vectors or pests, and employs physical, mechanical, cultural, biological, genetic, regulatory, chemical, and educational tactics to keep disease vector and pest populations low enough to prevent unacceptable damage or impacts. Treatments are chosen and timed to provide natural controls of pests with minimal disruption to the surrounding environment. If required, the least environmentally harmful pesticides are used as a last resort. Malathion (ULV) should not be used in areas or during conditions when the chemical may enter waterways or natural habitat areas. It is recommended that the IPM Plan include designations of areas

unsuitable for spraying and for weather conditions when the ULV spray is least likely to enter natural areas (e.g. onshore wind days) (USFWS 1999).

Table 4-5 presents the required contents of an Integrated Pest Management Plan for CBC Port Hueneme, according to DoD I 4150.7.

The treatment of ballast water to eradicate invasive aquatic species is a current area of research (USFWS 1998b). One method of preventing exotic species invasions is to exchange ballast water on the high seas. The introduction of peracetic acid into ballast water and treatment of ballast water in dockside facilities are treatment methods that are currently being explored. The Integrated Pest Management Plan should evaluate potential options for the treatment of ballast water in CBC Port Hueneme ships, including the feasibility of treating the ballast water using the existing Bilge and Oily Wastewater Treatment System (BOWTS) at CBC Port Hueneme. The most feasible treatment option should be implemented as soon as possible.

Table 4-5
Required Contents of an Integrated Pest Management Plan

Description of the disease vector and pest management requirements and minimum disease vector and pest management staffing requirements at CBC Port Hueneme.
Description of all integrated pest management (IPM) procedures required to monitor and control pests at CBC Port Hueneme.
Identification of all resources (e.g., work years, facilities, equipment) required to support the Pest Management Program.
Identification of all pesticides, including EPA registration numbers, approved for use in the Pest Management Program (e.g., pesticides used for the golf course).
Description of all health and safety measures that will be taken to protect pest management personnel and the general public from pesticide exposure and risk.
Identification of any planned measures to comply with DoD Memoranda of Agreement with State pesticide regulatory offices relating to the use or application of pesticides.
Description of any pest management operation with special environmental considerations, such as (1) the use of a restricted-use or experimental-use pesticide; (2) use of a pesticide application that may contaminate groundwater or surface water; (3) application of a pesticide over 640 or more contiguous acres in one operation; (4) an operation that may adversely affect sensitive species; (5) aerial application of pesticides; and (6) management or control of designated noxious weeds.
Identification of animal control efforts required for feral cats or wildlife.
Identification of active or potential vector-borne diseases at CBC Port Hueneme and a description of any collaboration with local and state agencies for vector surveillance and control.
Identification of golf course pest management operations.

4.3.1.2 Basewide Wetland Delineation (IRMP-NR-2)

As scientific study and the legal protection of wetlands have increased in recent decades, the number of definitions of wetlands has proliferated. Only wetlands that meet specific criteria are legally protected. Wetlands that are "jurisdictional waters of the United States," as defined by the USACE, are protected under Section 404 of the Clean Water Act. The USACE definition of wetlands is very specific and includes "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation

typically adapted for life in saturated soil conditions." The Wetlands Protection Act (Executive Order 11990) protects wetlands that are defined in a manner almost identical to that under the USACE definition. Wetlands that are legally protected under the Clean Water Act must be delineated using a specific USACE protocol.

The USACE (1994) determined that the drainage channels north of the tide gate are not considered jurisdictional waters of the United States as long as the tide gate is closed. However, wetlands have not been delineated at CBC Port Hueneme using the USACE protocol within the drainage channels. Other areas at CBC Port Hueneme may be classified as jurisdictional waters of the United States, including the forebay south of the tide gate, bulrush-cattail habitat located north of 23rd Avenue (Special Interest Natural Area A), and other areas classified as wetlands in the National Wetlands Inventory. The USFWS classification system for wetlands (Cowardin *et al.* 1979) used in the National Wetlands Inventory is less stringent than the USACE system for defining wetlands and has no federal legal basis. Therefore, the occurrence of legally protected wetlands at CBC Port Hueneme has not fully been determined.

Key Threats

Discharge of sediment into wetlands or potential destruction of wetlands due to construction training and other construction activities are the main threats to potential wetlands at CBC Port Hueneme.

Management Goal

Protect and enhance any wetlands at CBC Port Hueneme in compliance with the Wetlands Protection Act (Executive Order 11990) and Section 404 of the Clean Water Act.

Management Action

- Delineation of the boundaries of all jurisdictional waters of the United States at CBC Port Hueneme using the USACE protocol is recommended to determine where legally protected wetlands occur on base.

- Bulrush-cattail habitat (Special Interest Natural Areas A and B) and other wetlands identified in the National Wetlands Inventory on base should be delineated using USACE protocols.

- Use of GPS to conduct wetlands delineation is recommended to accurately map jurisdictional wetlands boundaries at CBC Port Hueneme in GIS.

4.3.1.3 Sensitive Species Surveys and Floristic Inventory (IRMP-NR-3)

Natural habitats and landscaped areas at CBC Port Hueneme offer valuable habitat to many plant and wildlife species, including sensitive species. Each natural habitat at CBC Port Hueneme has been designated as a Special Interest Natural Area due to its habitat value for plants and wildlife. Artificial habitat for wildlife may also exist at CBC Port Hueneme, including buildings, bridges, debris piles, and dirt mounds. Eaves of buildings and bridges provide potential roosting and nesting habitat for several bat species, many of which are considered sensitive species.

Potential habitat exists on base for several more sensitive species including listed species such as the tidewater goby and California red-legged frog; however, the presence or absence of these species at CBC Port Hueneme has not been confirmed.

Key Threats

Key threats to fish and wildlife species at CBC Port Hueneme include harassment (e.g., disturbance) from human activities on base such as construction training, habitat destruction by development, and potential contaminant impacts. The spread and, sometimes the abatement, of disease vectors and pest populations on base also threaten native fish and wildlife populations at CBC Port Hueneme.

Management Goal

Protect and enhance federally endangered or threatened species, species proposed for listing as endangered or threatened, and federal candidate species for listing that occur at CBC Port Hueneme in accordance with the federal Endangered Species Act of 1973, as amended. Protect and enhance state-listed and proposed listed species, state candidate species for listing, and Navy species of concern.

Management Action

To identify the potential impacts of base activities on listed species and other sensitive species at CBC Port Hueneme, basewide surveys for several sensitive species, listed in Table 4-6, are recommended. Intensive species-specific surveys should be conducted in suitable habitat on base, using USFWS and/or CDFG protocols, to confirm whether or not these species occur at CBC Port Hueneme. Survey reports should expand upon information provided in this IRMP by discussing the habitat requirements of each species and providing recommendations for enhancement of these species.

Table 4-6
Special-Status Species Surveys Recommended
for the Naval Base Ventura County, Port Hueneme Site

California red-legged frog (*Rana aurora draytonii*) (FT)[1]
Silvery legless lizard (*Anniella pulchra*) (NSC)
Tidewater goby (south of the tide gate only) (*Eucyclogobius newberryi*) (FE)[2]
Light-footed clapper rail (*Rallus longirostris levipes*) (FE, SE)[3]
Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) (NSC, SE)[3]
Bats (several species) (NSC)

Notes: Species are listed in order of priority based upon their potential to exist at the Naval Base Ventura County, Port Hueneme Site.

1 - A survey for this species is recommended in bulrush-cattail habitat (Special Interest Natural Area A) located north of 23rd Avenue).

2 - A habitat suitability analysis is recommended for this species south of the tide gate to determine the need to proceed with a presence/absence survey. The USFWS has recently proposed to delist tidewater goby populations north of Orange County (24 June 1999) (64 *Federal Register* 33816). If delisted, surveys for this species would not be necessary.

3 - A survey for this species is recommended only if the presence of suitable nesting habitat (*Salicornia* sp., *Juncus* sp., *Spartina* sp.) is found for the species during a floristic inventory of the base.

FE - Federally listed as Endangered.

FC - Federal candidate species.

NSC - Navy species of concern.

In addition, a complete floristic inventory of CBC Port Hueneme is recommended during the spring and summer to detect annual plants that may have been missed during past surveys (USFWS 1999).

4.3.1.4 Habitat Protection and Restoration Plan for Bulrush-Cattail Habitat (Special Interest Natural Area A) (IRMP-NR-4)

Special Interest Natural Area A is located in the northwest corner of CBC Port Hueneme in the Seabee Earthmoving Training Area near 23rd Avenue. This area consists of fairly pristine bulrush-cattail habitat and has the highest potential for restoration on base. This habitat is dominated by bulrushes (*Scirpus californicus* and *Scirpus americanus*), which form a thick stand that surrounds and protects the marsh. This area supports and provides habitat for other wildlife species, including potential habitat for a federally listed species, the California red-legged frog (although this species has not been observed in the field at CBC Port Hueneme).

Key Threats

Key threats to this area include potential destruction or fragmentation by human activities in the adjacent crane storage area and Seabee Earthmoving Training Area, sedimentation and potential contamination due to runoff from the Seabee Earthmoving Training Area and other nearby areas, potential invasion by exotic plant species (especially by pampas grass and giant reed [*Arundo donax*]), and littering in and around the area. Specifically, the marsh is bisected by a dirt road which results in fragmentation of the habitat into two areas. Two wooden decks, occurring on either side of the marsh, and an old wooden bridge that spans the marsh, are currently utilized in an unregulated manner. Sparsely vegetated California annual grassland abuts the marsh, leaving little buffer against sedimentation of the area. A small artificial wetland located adjacent to the marsh (apparently formed by drainage from Building 1516), is dominated by pampas grass and threatens the introduction of this species into the marsh. The banks of the marsh are littered with trash in several areas.

Management Goal

Protect and enhance ecological integrity of bulrush-cattail habitat on base, including, but not limited to, the structure and function of this natural habitat.

Management Action

Development of a habitat protection and restoration plan for Special Interest Natural Area A is recommended to protect and enhance the bulrush-cattail habitat at CBC Port Hueneme and to improve passive recreational use of the area. Species-specific surveys for the California red-legged frog should be completed prior to habitat modification.

The recommended objectives of the habitat protection and restoration plan are:

- Restore the continuity of the bulrush-cattail habitat by permanently restricting vehicle and foot traffic along the dirt road that currently bisects the habitat;
- Create a wildlife viewing area near the marsh by constructing interpretive signs and benches on both wooden decks, constructing footpaths between the decks and the wooden bridge, and by making the wooden bridge safe for foot traffic;
- Develop a vegetative buffer (e.g., willow trees) around the marsh that provides more protection from runoff;

- Prevent the invasion of exotic plant species into this habitat, especially pampas grass and giant reed (*Arundo donax*), by eradicating nearby stands of these species and any exotic plant species that already exist within the marsh to the extent practicable;

- Remove litter from the banks of the marsh on a regular basis;

- Install signs near the area indicating the presence of sensitive habitat. Signs should be constructed at a low height and should be fitted with materials to discourage perching, especially by predatory birds. Materials such as Nixalite™ and CatClaw™ are appropriate, non-lethal means of preventing potential predators from gaining additional advantage over other birds (USFWS 1999). Signs should also indicate seasonal prohibitions on access to the area where vulnerable species nest or roost (USFWS 1999); and

- Evaluate the possibility of obtaining mitigation credit for restoration of the area.

The Planning Branch should be consulted before implementation of the recommended actions for this area.

4.3.1.5 Habitat Protection and Restoration Plan for Bulrush-Cattail Habitat (Special Interest Area B) (IRMP-NR-5)

Special Interest Natural Area B is located in the drainage channels of CBC Port Hueneme. This area consists of disturbed bulrush-cattail habitat and has the second highest potential for restoration on base due to its habitat value. This bulrush-cattail habitat is dominated by the California bulrush (*Scirpus californicus*), broad-leaved cattail (*Typha latifolia*), and common reed (*Phragmites australis*). The drainage channels have historically been maintained by regularly clearing vegetation from the bottoms and banks using Rodeo™ to kill unwanted vegetation (Woodward Clyde 1998). Saltgrass (*Distichlis spicata*), sourclover (*Melilotus indica*), and crownbeard (*Verbesina enceliodes*) are the dominant plant species in this habitat under maintained conditions. This area supports an abundant bird population and provides excellent habitat for other wildlife species. Habitat may exist for the federal and state endangered tidewater goby in the drainage channels south of the tidegate.

Key Threats

Currently, CBC Port Hueneme is proposing to implement a Drainage Channel Improvement Project due to flooding problems on base (Woodward Clyde 1998). The proposed project involves continued maintenance of the channels via regular clearing of vegetation. A draft environmental assessment has been prepared for the proposed project pursuant to NEPA and is currently undergoing review.

The drainage channels have also been designated part of IRP Site 19 due to past contamination from spills and leaks into storm sewers on base and present contamination by nonpoint source pollution. A scoping-level ecological risk assessment was conducted during the preparation of a draft risk evaluation for IRP Site 19 that indicated the potential for negative impacts to ecological receptors due to exposure to contaminants within the drainage channels (PRC 1995a).

Additional threats to this habitat within the drainage channels are potential invasion by exotic plant species (especially iceplant), and littering in and around the area. In addition, to prevent flooding of the base, a tide gate (located near the intersection of the Pennsylvania Road Channel and the Pleasant Valley Road Channel) currently impedes tidal influx into the channels.

Management Goal

Protect and enhance ecological integrity of bulrush-cattail habitat on base, including, but not limited to, the structure and function of this natural habitat.

Management Action

Development of a habitat protection and restoration plan for Special Interest Natural Area B is recommended to protect and enhance the bulrush-cattail habitat at CBC Port Hueneme. A habitat suitability analysis for the tidewater goby should be conducted within the forebay south of the tidegate prior to development of a plan.

The recommended objectives of the habitat protection and restoration plan are as follows:

- Complete a predictive ecological risk assessment for the drainage channels to determine the need for remediation and, if necessary, determine cleanup goals pursuant to CERCLA.

- Continue to prevent future contamination of the drainage channels to the extent practicable through implementation of the SWPPP for the base.

- Implement mitigation measures for the proposed Drainage Channel Improvement Project pursuant to NEPA to reduce potential impacts to biological resources to less than significant levels.

- Determine the feasibility of planting pickleweed (*Salicornia* spp.), alkali heath (*Frankenia salina*), or salt grass (*Distichlis spicata*) within the drainage channels and/or within the forebay south of the tide gate to develop potential habitat for the Belding's savannah sparrow and light-footed clapper rail. If feasible, this should be done after all construction and remediation within the channels is complete.

- Prevent the invasion of exotic plant species, especially pampas grass, iceplant (*Carpobrotus edulis*) and giant reed (*Arundo donax*), by eradicating nearby stands of exotic plant species and any exotic plant species that exist within the bulrush-cattail to the extent practicable.

- Remove litter from the drainage channels at CBC Port Hueneme, especially from the trash rack, on a regular basis (e.g., annually or after major storms).

- Install signs near the drainage channels indicating the presence of sensitive habitat. Signs should be constructed at a low height and should be fitted with materials to discourage perching, especially by predatory birds. Materials such as Nixalite™ and CatClaw™ are appropriate, non-lethal means of preventing potential predators from gaining additional advantage over other birds (USFWS 1999). Signs should also indicate seasonal prohibitions on access to the area where vulnerable species nest or roost (USFWS 1999).

The Planning Branch should be consulted before implementation of the recommended actions for this area.

4.3.1.6 Habitat Protection and Restoration Plan for Sand Verbena-Beach Bursage and Sandy Beach Habitat (Special Interest Natural Area D) (IRMP-NR-6)

Special Interest Natural Area D is located in the southwest corner of CBC Port Hueneme near the Surface Warfare Engineering Facility (SWEF) and the west jetty of the harbor. This area consists of a small sandy beach and an area of sand verbena-beach bursage habitat. The sand verbena-beach bursage habitat is currently dominated by iceplant (*Carpobrotus edulis*), but contains scattered populations of beach morning glory (*Calystegia soldanella*), alkali heath (*Frankenia salina*), sand verbena (*Abronia maritima*), silver beachbur (*Ambrosia chamissonis*), and telegraph weed (*Heterotheca grandiflora*). This area provides excellent habitat for shorebirds and the California brown pelican and is a potential haulout area for pinnipeds. It also provides potential foraging habitat for the federally threatened western snowy plover.

Key Threats

Key threats to this area include potential destruction by human activities, past and illegal disposal of dredge spoils and other debris in the area, wind and wave erosion, potential invasion by exotic plant species (especially by pampas grass and iceplant), and littering in and around the area. Specifically, vehicle traffic has been allowed on the upper reaches of the sandy beach and has resulted in compaction of the area. The pipeline from the Channel Islands Harbor sand bypassing program also extends across the upper reaches of the sandy beach, creating a sand barrier, and dirt and other debris from past construction projects has been disposed of on the beach. The sand verbena-beach bursage habitat is littered with trash including layers of visqueen that were used in the dunes in the past to create an artificial pond, and iceplant is beginning to invade the area.

Management Goal

Protect and enhance ecological integrity of sand verbena-beach bursage habitat and sandy beach habitat on base, including, but not limited to, the structure and function of these natural habitats.

Management Action

Development of a habitat protection and restoration plan for Special Interest Natural Area D is recommended to protect and enhance the sandy beach and sand verbena-beach bursage habitat at CBC Port Hueneme.

The recommended objectives of the habitat protection and restoration plan are:

- Permanently restrict vehicle traffic on the beach and restrict foot traffic on the beach except for mission-critical activities.
- Restrict vehicle and foot traffic in the sand verbena-beach bursage habitat.
- Prevent disposal of debris (e.g., construction fill, dredge spoils) on the sandy beach or sand verbena-beach bursage habitat.
- Encourage growth and repair of the sand verbena-beach bursage habitat by protecting the native vegetation in these areas. Native vegetation helps to trap and hold sand on dunes.

- Prevent the invasion of exotic plant species into the sand verbena-beach bursage habitat, especially pampas grass and iceplant, by eradicating nearby stands of exotic plant species and any exotic plant species that already exist within this area to the extent practicable.

- Remove litter from these areas on a regular basis.

- Prevent the public from littering in the sand verbena-beach bursage habitat on CBC Port Hueneme property by installing trash cans outside of the base boundary at Silver Strand Beach and installing signs indicating the presence of sensitive habitat.

- Install signs within the base boundary near the sand verbena-beach bursage habitat and sandy beach indicating the presence of sensitive habitat. Signs should be constructed at a low height and should be fitted with materials to discourage perching, especially by predatory birds. Materials such as Nixalite™ and CatClaw™ are appropriate, non-lethal means of preventing potential predators from gaining additional advantage over other birds (USFWS 1999). Signs should also indicate seasonal prohibitions on access to the area where vulnerable species nest or roost (USFWS 1999).

The Planning Branch should be consulted before implementation of the recommended actions for these areas.

4.3.1.7 Revision of the Base Exterior Architecture Plan (BEAP) (IRMP-NR-7)

Landscaped areas at CBC Port Hueneme, especially the Bard Mansion grounds (Area F), shelterbelts/windrows (Area G), and the Seabee Golf Course (Area H), provide important habitat for native bird species and other wildlife species because these areas serve as ecological islands within an urban environment (Siena College–Audubon International Institute 1997). The vegetative structure of these areas is particularly important to wildlife and must be considered when maintaining these landscaped areas or when developing new landscaping for the base. The selection of plant species for future landscaping and for replacing dead and dying vegetation is also a critical consideration. The use of native plant species for future landscaping is beneficial because it supports greater biodiversity, requires less maintenance, and prevents the spread of invasive exotic plant species.

Proper irrigation and fertilization of landscaped areas is required to maintain healthy vegetation. However certain irrigation and fertilization practices can be detrimental to other natural resources on base and must be managed carefully.

The Base Exterior Architecture Plan (BEAP) for CBC Port Hueneme provides landscape planting and landscape maintenance guidelines, including a recommended plant species list for landscaping, irrigation procedures, and fertilization procedures. Many of these guidelines should be updated to: (1) provide wildlife management in landscaped areas at CBC Port Hueneme, (2) contribute to water conservation efforts under the Energy Showcase Program, (3) comply with the Storm Water Pollution Prevention Plan, and (4) comply with an Integrated Pest Management Plan (see Section 4.3.1.1).

Key Issues

Proper selection of plant species for landscaping (e.g., nonnative species) and replacement of existing landscaped areas (e.g., eucalyptus) are critical for the overall ecological integrity of landscaped areas. If grounds are not maintained properly, invasive species will flourish (e.g., iceplant and pampas grass) to the detriment of native species. The current plant list for landscaping in the BEAP recommends the use of

nonnative invasive plant species for landscaping (e.g., iceplant). This plant list is inadequate because it does not address the requirement of Executive Order 13112 to prevent the introduction of invasive species on federal lands.

Other grounds maintenance activities impact natural resources on base. The use of fertilizers can cause eutrophication of water bodies at CBC Port Hueneme and negatively impact aquatic species. The use of certain pesticides can also have negative impacts on non-target species. Irrigation practices in landscaped areas, especially at the golf course, can also impact water conservation efforts on base.

Management Goal

Protect and enhance ecological integrity of wildlife corridors and buffer areas around development on base.

Management Action

The following improvements to the landscape planting guidelines and landscape maintenance guidelines established in the existing BEAP for CBC Port Hueneme are recommended to ensure that future landscaping and grounds maintenance practices are conducted in a manner with maximum benefit to native plant and wildlife species:

- Enhance plant species richness in Area G (shelterbelts/windrows) to promote wildlife biodiversity by removing eucalyptus trees in these areas using a phased approach.

- Determine the proper landscape mosaic that promotes wildlife diversity at the Seabee Golf Course;

- Preserve and enhance the existing landscaping in the Bard Mansion grounds;

- Remove or replace landscaping on base only when the vegetation is dead, diseased, or dying and poses a risk to human safety, or when it is beneficial to native plant and wildlife species to do so (i.e., removal of exotics);

- Develop a native plant species list for CBC Port Hueneme to replace the existing plant list in BEAP, using a qualified biologist, that includes recommendations from the *NAS Point Mugu Landscape Plant List: California Native Plants* (Keeney and Kameon, 1997) and other California botanical resources;

- Conduct all future landscaping using native plant species selected from the native plant species list developed specifically for CBC Port Hueneme. Use drought-tolerant species as much as possible.

- When replacing dead or dying vegetation, a native species of similar size and structure should be used for replacement.

- Develop procedures for protecting native bird species (including their nests, eggs, and young) according to the Migratory Bird Treaty Act, and potential monarch butterfly roost trees, from destruction during grounds maintenance activities. All potential roost trees for monarch butterflies at CBC Port Hueneme should be surveyed annually to determine if roosting sites have been established (see Section 4.3.1.10). Any existing roost trees for

monarch butterflies at CBC Port Hueneme should not be disturbed (see Section 4.3.1.10). Removal of shrubs and trees should be avoided during the nesting period for native bird species to the extent practicable (e.g., spring and summer). All shrubs and trees should be checked for nests if scheduled for removal or replacement. If a nest for a native species is found, removal of the shrub or tree should be avoided or postponed until the nest is no longer being used.

- Conserve water as much as possible when irrigating landscaped areas by installing drip irrigation systems wherever possible (see Section 4.3.1.21).

- Apply fertilizers to landscaped areas in compliance with the Storm Water Pollution Prevention Plan for CBC Port Hueneme.

- Control plant diseases and pests according to an Integrated Pest Management Plan (see Section 4.3.1.1).

4.3.1.8 Footpath/Greenbelt Loop (IRMP-NR-8)

Construction of a new footpath connecting housing, administration, and recreational areas at CBC Port Hueneme is recommended to improve recreational opportunities for base personnel (Figure 4-2).

Management Goal

Improve landscaping and recreational opportunities in close proximity to housing and main administration areas.

Management Action

A new footpath/greenbelt would be developed using an aggregate gravel base; the footpath would begin at the soccer field at the corner of Pleasant Valley Road and Pacific Road, extend down Pacific Road, wind through the administration areas, and eventually loop around the Seabee Golf Course. The footpath would be designated for walking, jogging, and bicycle use. Native trees would be planted along the footpath for shade and to provide wildlife habitat. Landscaping procedures should follow guidelines established in the BEAP for CBC Port Hueneme (see Section 4.3.1.7). Vegetation should be selected from a native plant species list for CBC Port Hueneme.

The Planning Branch should be consulted before implementation of these recommended improvements.

4.3.1.9 Landscape and Recreation Improvements (IRMP-NR-9)

Various landscape and recreation improvements are recommended for CBC Port Hueneme as indicated in Figure 4-2.

Buildings 1296, 1297, 1249, and 1379 are proposed for demolition. Construction of a RV Park is currently planned in these areas. Implementation of landscape and recreation improvements are recommended in areas adjacent to the proposed RV Park to improve aesthetic and recreational resources near the RV Park.

Figure 4-2 Areas Designated for Land Use Improvements and Enhancement, CBC Port Hueneme

11x17, color

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Building 77 is proposed for demolition; landscaping of this area after demolition and improvements to the landscaping near Buildings 1166 and 1167 are recommended to create additional greenspace near Buildings 1166 and 1167.

Landscape improvements are proposed near Buildings 69, 72, 73, and 5058 to improve aesthetic and recreational resources in this area.

Currently, landscaping along the southwest boundary of CBC Port Hueneme is degraded and in need of maintenance. Residents of the Silver Strand community have an unobstructed view of the entire southwest portion of the base. Improving landscaping along Silver Strand Road and other areas along the southwest boundary of the base is recommended to provide the public with a more aesthetically pleasing view of the base and to provide wildlife habitat.

Currently, there is no landscaping along West Road near the Victoria Gate at CBC Port Hueneme. The Seabee Earthmoving Training Area is clearly visible to the public travelling along Victoria Road near the base. Improving landscaping along West Road in the northwest corner of the base is recommended to provide the public with a more aesthetically pleasing view of the base and to provide wildlife habitat.

Management Goal

Improve landscaping and recreational opportunities in close proximity to housing and main administration areas and to address aesthetic concerns of the public with the base.

Management Action

The following management actions are recommended:

- Install lawns and native shade trees to the west and south of the proposed RV Park;
- Construct a swimming pool, a small convenience store, a maintenance building, and an office/clubhouse containing showers, laundry facilities, and a game room at the proposed RV Park site;
- Install a lawn and native shade trees near Buildings 1166 and 1167, especially where Building 77 is proposed for demolition;
- Install native vegetation near Buildings 69, 72, 73, and 5058.
- Install multiple canopy levels along Silver Strand Road and other areas along the southwest boundary of the base;
- Landscape along West Road using native shrub species, where possible;
- Landscaping procedures should follow guidelines established in the BEAP for CBC Port Hueneme (see Section 4.3.1.7); and
- Vegetation should be selected from a native plant species list for CBC Port Hueneme.

4.3.1.10 Protection Measures for Potential Monarch Butterfly Roosting Sites at CBC Port Hueneme (IRMP-NR-10)

Monarch butterflies (*Danaus plexippus*) migrate south along the coast of California and Baja California during the fall/winter and hibernate during the winter by roosting in large aggregations in tree groves, especially eucalyptus, Monterey pine, and cypress. Several monarch butterfly roost sites exist in Ventura County. Monarch butterflies are considered Navy species of concern, and although no roost sites for monarch butterflies have been observed at CBC Port Hueneme, landscaped areas, especially the Bard Mansion grounds and shelterbelts/windrows on base, provide potential roost sites for this species.

Key Threats

The main threat to monarch butterflies at CBC Port Hueneme is destruction of potential roost sites. Grounds maintenance activities have the greatest potential to impact this species on base. If roost sites for this species are found in the future, key threats would be destruction of roost sites, disturbance near roost sites (e.g., construction), and the use of pesticides near roost sites.

Management Goal

Protect and enhance state-listed and proposed listed species, federal and state candidate species for listing, and Navy species of concern.

Management Action

Implementation of the following protection measures for monarch butterflies and their roost sites is recommended at CBC Port Hueneme:

- Survey the base annually for monarch butterfly roost sites.
- Protect all potential roost sites for the monarch butterfly at CBC Port Hueneme including all eucalyptus, cypress, and pine trees to the extent practicable.
- Avoid clearing and thinning of vegetation in known roost sites and have clearance for removal of trees at CBC Port Hueneme reviewed by the Project Review Board (PRB).
- If butterflies are present from September through February, avoid construction activity in the vicinity of known roost sites. The appropriate setback distance should be determined on a case-by-case basis.
- Protect water and nectar sources for butterflies near known roosts.
- Avoid using insecticides, herbicides, or other toxic chemicals in the vicinity of known roost sites.
- Enhance landscaped areas to attract monarch butterflies through the planting of winter-blooming flowers, providing/conserving freshwater sources on base, and making additional tree plantings to provide shelter from cold and wind. Native plant species should be used for additional plantings (USFWS 1999).

- Create a pamphlet on monarch butterflies and distribute to all base personnel. The pamphlet should describe the biology of monarch butterflies, and potential threats to this species on base, and provide rules for dealing with this species on base including methods for reporting important observations (e.g., roost site locations) to base natural resource managers (see Section 4.3.1.15).

4.3.1.11 Protection Measures for Kelp Beds at CBC Port Hueneme (IRMP-NR-11)

Kelp beds are among the most biodiverse regions in the marine environment and provide cover and food for many species within the outer harbor at CBC Port Hueneme. Kelp beds have been observed along both the west and east jetties and at the west side of the mouth of the harbor at CBC Port Hueneme. Because most of the marine subtidal habitat at CBC Port Hueneme is disturbed, protection of these kelp beds is critical to preserving the integrity of this habitat on base.

Key Threats

Key threats to the kelp beds at CBC Port Hueneme include dredging operations within the harbor, harbor traffic, rip-rap construction along the harbor mouth and jetties, and potential contaminant impacts.

Management Goal

Protect and enhance ecological integrity of marine subtidal habitat on base, including, but not limited to, the structure and function of these natural habitats.

Management Action

Implementation of the following protection measures for kelp beds at CBC Port Hueneme is recommended:

- Survey and map the extent of kelp beds within the base boundaries.
- Protect the kelp beds from destruction or damage during dredging operations or harbor construction through coordination with the U.S. Army Corps of Engineers.
- Prevent destruction or damage of kelp beds by harbor traffic, to the extent practicable, especially by large vessels.
- Discourage further construction of rip-rap or disposal of any debris along the mouth of the harbor and along the existing sections of the west and east jetties.
- Create and distribute a pamphlet on kelp beds to all base personnel. The pamphlet should describe the ecology of kelp beds, potential threats to these areas on base, and provide rules for dealing with these areas on base including methods for reporting important observations (e.g., presence of new kelp beds) to base resource managers.

4.3.1.12 Protection Measures for the California Brown Pelican and California Least Tern at CBC Port Hueneme (IRMP-NR-12)

The California brown pelican (*Pelecanus occidentalis californicus*), a federally listed and state listed endangered species, often roosts on the sandy beach near the Surface Warfare Engineering Facility

(SWEF) at CBC Port Hueneme and also feeds within the harbor. Populations of the brown pelican experienced dramatic declines in the 1960s and 1970s due to widespread reproductive failure caused by exposure to high concentrations of DDE.

California least terns (*Sterna antillarum browni*) are also federally listed and state listed as endangered and may feed in the harbor.

Key Threats

Key threats to the brown pelican at CBC Port Hueneme include potential harassment by human activity on the sandy beach, potential contaminant impacts, entrapment by broken fishing line located in the harbor, and potential destruction of roosting habitat. Key threats to the California least tern include potential contaminant impacts, entrapment by broken fishing line located in the harbor, and harbor construction during feeding.

Management Goal

Protect and enhance federally endangered or threatened species, species proposed for listing as endangered or threatened, and federal candidate species that occur at CBC Port Hueneme in accordance with the federal Endangered Species Act of 1973, as amended.

Management Action

Implementation of the following protection measures for this species is recommended to prevent potential take of the species during routine operations at CBC Port Hueneme:

- Restrict access to the sandy beach at CBC Port Hueneme except for mission-critical activities.

- Install signs at the sandy beach at CBC Port Hueneme indicating the presence of a sensitive species. Signs should be constructed at a low height and should be fitted with materials to discourage perching, especially by predatory birds. Materials such as Nixalite™ and CatClaw™ are appropriate, non-lethal means of preventing potential predators from gaining additional advantage over other birds (USFWS 1999). Signs should also indicate seasonal prohibitions on access to the area where vulnerable species nest or roost (USFWS 1999).

- Install and maintain a barbed wire fence along the west jetty of the harbor and install signs to prevent the public from fishing within the base boundaries.

- Avoid construction in the harbor to the extent practicable between the months of April through August to protect foraging least terns.

- Create a pamphlet on the California brown pelican and California least tern and distribute to all base personnel. The pamphlet should describe the requirements of the federal Endangered Species Act, the biology of the California brown pelican, potential threats to this species on base, and provide rules for dealing with this species on base including methods for reporting important observations (e.g., presence of injured individuals) to base natural resource managers (see Section 4.3.1.15).

4.3.1.13 Protection Measures for Marine Mammals at CBC Port Hueneme (IRMP-NR-13)

California sea lions (*Zalophus californianus*) and possibly harbor seals (*Phoca vitulina*) frequent the harbor and may occasionally haul out on the sandy beach near the SWEF at CBC Port Hueneme.

Key Threats

Key threats to marine mammals at CBC Port Hueneme include potential harassment by harbor traffic and by human activities on the sandy beach, potential contaminant impacts, and entrapment by broken fishing line located in the harbor.

Management Goal

Prevent taking any marine mammal that occurs at CBC Port Hueneme pursuant to the Marine Mammal Protection Act of 1972, as amended. "Take" means to "harass, hunt, capture, or kill, or to attempt to harass, hunt, capture, or kill."

Management Action

Implementation of the following protection measures for marine mammals is recommended to prevent potential take of these species during routine operations at CBC Port Hueneme:

- Prohibit harbor traffic and base personnel from purposefully approaching any marine mammal within CBC Port Hueneme boundaries.

- Restrict access to the sandy beach at CBC Port Hueneme except for mission-critical activities.

- Install signs at the sandy beach at CBC Port Hueneme indicating the presence of a sensitive species. Signs should be constructed at a low height and should be fitted with materials to discourage perching, especially by predatory birds. Materials such as Nixalite™ and CatClaw™ are appropriate, non-lethal means of preventing potential predators from gaining additional advantage over other birds (USFWS 1999). Signs should also indicate seasonal prohibitions on access to the area where vulnerable species nest or roost (USFWS 1999).

- Install and maintain a barbed wire fence along the west jetty of the harbor and install signs to prevent the public from fishing within the base boundaries.

- Create a pamphlet on marine mammals and distribute to all base personnel. The pamphlet should describe the requirements of the Marine Mammal Protection Act, the biology of the marine mammals that potentially occur at CBC Port Hueneme, potential threats to these species on base, and provide rules for dealing with these species on base including methods for reporting important observations (e.g., presence of injured individuals) to base natural resource managers (see Section 4.3.1.15).

4.3.1.14 Protection Measures for Native Bird Species at CBC Port Hueneme (IRMP-NR-14)

Many native bird species (e.g., songbirds, herons, egrets, shorebirds, raptors) utilize natural habitats and landscaped areas at CBC Port Hueneme for feeding, roosting, and nesting.

Key Threats

Key threats to these species at CBC Port Hueneme include habitat destruction and potential exposure to contaminants. Grounds maintenance activities have the greatest potential to impact native bird species on base.

Management Goal

Prevent taking any native wild bird species, including their nests, eggs, and young, except by special permit, pursuant to the Migratory Bird Treaty Act of 1918, as amended. "Take" means to kill, pursue, harass, wound, trap/capture, or attempt any such conduct.

Management Action

Implementation of the following protection measures for native bird species is recommended to prevent potential take of these species during routine operations at CBC Port Hueneme:

- Create a pamphlet on native birds and distribute to all base personnel. The pamphlet should describe the requirements of the Migratory Bird Treaty Act, the biology of the dominant native bird species that occur at CBC Port Hueneme, potential threats to these species on base, and provide rules for dealing with these species on base including methods for reporting important observations (e.g., nest locations) to base natural resource managers (see Section 4.3.1.15).

4.3.1.15 Development of a Natural Resources Monitoring Program and Database (IRMP-NR-15)

The comprehensive and successful management of natural resources necessarily includes up-to-date monitoring of populations. The USFWS typically recommends long-term monitoring as a method to track listed, candidate, and sensitive species. A well-designed and executed monitoring program helps natural resource managers determine the causes of population fluctuations and distribution changes for targeted species. The Navy could use monitoring results to evaluate the effects of its various activities on sensitive resources, implement timely management actions to address any adverse effects that may result from a particular activity, and to evaluate the effectiveness of management recommendations presented in this IRMP. As sensitive species at CBC Port Hueneme are more thoroughly surveyed and documented, individual monitoring plans for these species will likely be developed. However, in addition to formal monitoring requirements, an informal process can also be undertaken. This process would include the development and management of a database used for observations in the field, and would be updated by observations from all personnel located at CBC Port Hueneme.

Key Issues

Currently, CBC Port Hueneme has neither a formal nor an informal method for monitoring natural resources on site. Since natural resources for the site have been documented (on a preliminary basis) in this IRMP, development of a database for purposes of monitoring existing populations is an essential step in the proper management of natural resources at CBC Port Hueneme.

Management Goal

Development of an informal or formal monitoring program for natural resource observations on CBC Port Hueneme.

Management Action

- Development of a template database with a comprehensive inventory of both plant and animal populations.

- Designation of a point of contact on either CBC Port Hueneme or NAS Point Mugu who will be responsible for receiving information and updating the database accordingly (at a minimum, on a quarterly basis).

- Creating educational materials for all personnel at CBC Port Hueneme explaining how they can contribute to natural resources management by relaying their natural resource observations. These materials should provide procedures for dealing with stranded, injured, or dead wildlife found on base (e.g. marine mammals, sea turtles, birds).

- Coordination of the database with NAS Point Mugu natural resources staff.

4.3.1.16 Habitat Protection and Restoration Plan for Coyote Brush Habitat (Special Interest Natural Area C) (IRMP-NR-16)

Special Interest Natural Area C is located north of 23rd Avenue between Track 14 Road and the Seabee Golf Course. This area consists of disturbed coyote brush habitat and has the third highest potential for restoration on base based upon habitat value and acreage. This habitat is dominated by coyote brush (*Baccharis pilularis*), supports an abundant bird population, and provides habitat for other wildlife species.

Key Threats

Key threats to this area include potential destruction or fragmentation by human activities, potential invasion by exotic plant species, and littering in and around the area. Specifically, a dirt road runs through the middle of this habitat and the area is littered with trash. Human activity at the golf course may occasionally disturb wildlife.

Management Goal

Protect and enhance ecological integrity of coyote brush habitat on base, including, but not limited to, the structure and function of this natural habitat.

Management Action

Development of a habitat protection and restoration plan for Special Interest Natural Area C is recommended to protect and enhance the coyote brush habitat at CBC Port Hueneme. Species-specific surveys are recommended for this project.

The recommended objectives of the habitat protection and restoration plan are:

- Restore the continuity of the coyote brush habitat by permanently restricting vehicle and foot traffic along the dirt road that currently runs through the habitat.

- Prevent the invasion of exotic plant species by eradicating nearby stands of exotic plant species and any exotic plant species that already exist within the coyote brush habitat to the extent practicable.

- Remove litter from the area on a regular basis.

- Install signs near the area indicating the presence of sensitive habitat. Signs should be constructed at a low height and should be fitted with materials to discourage perching, especially by predatory birds. Materials such as Nixalite™ and CatClaw™ are appropriate, non-lethal means of preventing potential predators from gaining additional advantage over other birds (USFWS 1999). Signs should also indicate seasonal prohibitions on access to the area where vulnerable species nest or roost (USFWS 1999).

The Planning Branch should be consulted before implementing the recommended actions for this area.

4.3.1.17 Adaptive Management Plan for Burrowing Owls at CBC Port Hueneme (IRMP-NR-17)

The burrowing owl (*Athene cunicularia*), a Navy species of concern, has been observed at CBC Port Hueneme. The burrowing owl has been declining in numbers across much of its range in western North America. One known burrow location has been observed at CBC Port Hueneme in a dirt mound near Buildings 1421 and 1423 in the Seabee Earthmoving Training Area, and potential wintering habitat exists for this species in California annual grassland habitat throughout the base (especially where ground squirrel burrows occur).

The protection of burrowing owls (*Athene cunicularia*) at CBC Port Hueneme is of great importance (USFWS 1999). Very few colonies of this species remain in Ventura County, or in the rest of the state outside of refuges.

Key Threats

The main threats to the burrowing owl at CBC Port Hueneme include harassment by human activities, habitat loss, ground squirrel control, predation by feral cats, disturbance by dogs, and potential contaminant impacts. Training activities within the Seabee Earthmoving Training Area are likely to disturb the burrowing owl that reside in this area and may destroy active burrows. Additional burrowing owls are likely to occur on base where other construction or training activities occur, in open storage areas, and possibly at Installation Restoration Program (IRP) Sites that contain open ground or California annual grassland habitat.

Management Goal

Protect and enhance state-listed and proposed listed species, state candidate species for listing, and Navy species of concern.

Management Action

- Preparation of an adaptive management plan for burrowing owls at CBC Port Hueneme is recommended to develop land use practices that are conducive to protection of the species on base. The USFWS (1999) recommends that areas where burrowing owls are found should be managed as preserves for the species. Because the burrowing owl is a known predator of a listed species (California least tern), preparation of a plan is

recommended to balance the protection of both species. A similar plan has been prepared for Naval Air Station (NAS) Lemoore. A survey of burrowing owls at CBC Port Hueneme to complete a census of the population on base and to map the population on base, would be required as the first task to complete this project.

- Limit control of California ground squirrels on base because this species creates new habitat for the burrowing owl and control measures used (e.g. rodenticides) may harm burrowing owls (USFWS 1999).

- Develop new opportunities for burrowing owls to nest in protected, unused portions of CBC Port Hueneme through the construction of berms with burrows and nesting dens (USFWS 1999).

- Develop interim protection measures for the known burrowing owl location at CBC Port Hueneme (e.g., avoid training in the burrow location to the extent practicable).

- Develop educational materials for base personnel, especially personnel that train in or around areas with known burrows, to minimize disturbance to this species.

4.3.1.18 Construction of Agricultural Outlease Area at IRP Site 14 (IRMP-NR-18)

CBC Port Hueneme is capping contaminants at IRP Site 14 as required by CERCLA. IRP Site 14 is a 33-acre site located in the northwest quadrant of CBC Port Hueneme and is bounded by 23rd Avenue to the north, Toledo Road (also called Track 18 Road) to the east, several buildings of the Construction Equipment Department complex to the south, and West Road to the west. IRP Site 14 was formerly used for disposal of various wastes, and later used for heavy equipment training. Cleanup of IRP Site 14 is warranted due to unacceptable human health risks associated with soils contaminated with certain polycyclic aromatic hydrocarbons (PAHs), toxaphene (pesticide), Aroclor-1260, and antimony (Tetra Tech EMI 1998).

IRP Site 14 is officially considered a municipal solid waste landfill, therefore, remediation of contaminated soils at CBC Port Hueneme consists of the construction of a final cover for the landfill. The final cover to the landfill will be constructed on top of solid waste and consists of the following elements from bottom to top:

- A foundation layer consisting of contaminated soils;

- A geosynthetic clay liner (GCL);

- A drainage layer; and

- A protective cover consisting of a 1- to 2-foot layer of clean imported soil and 6 inches of top soil.

A detention basin will also be constructed on top of the GCL along the southern edge of the site. Wetland plant species will be planted within the detention basin (Mortensen, 1999). Development of a post-closure operation and maintenance plan is currently in progress and will be completed when construction of the final cover is complete. The post-closure maintenance plan will discuss procedures for post-closure monitoring of IRP Site 14.

The final cover to the landfill was designed for a variety of future land uses including open space, open storage, covered storage, and an RV park. Construction associated with such uses would require project-specific design to preserve the integrity of the final cover. IRP Site 14 is currently designated for future use as an agricultural outlease area. Specifically, CBC Port Hueneme would like to use the area for open storage of potted plants after the final landfill cover is installed.

Key Issues

Future land use and the final design of the landfill cover can have the following impacts on natural resources at CBC Port Hueneme:

- The burrowing owl has been identified just north of IRP Site 14 and would likely colonize the covered landfill if open space were left on the site. The burrowing owl often utilizes burrows developed by ground squirrels and other small mammals (Zeiner *et al.* 1990a). Colonization by burrowing owls could impact the integrity of the landfill cover and potentially put this sensitive species at risk due to potential exposure to contaminants below the landfill cover. (However, exposure to contaminants would only occur if they breach the GCL.)

- Development of wetland habitat within the detention basin will provide habitat for invertebrates, amphibians, birds, and mammals, including potential habitat for listed species such as the federally threatened California red-legged frog (*Rana aurora draytonii*). Any contamination associated with storm water runoff from future land use at IRP Site 14 could put fish and wildlife species within the basin at risk.

Management Goal

Protect and enhance federally endangered or threatened species, species proposed for listing as endangered or threatened, and federal candidates for listing that occur at CBC Port Hueneme in accordance with the federal Endangered Species Act of 1973, as amended. Protect and enhance state-listed and proposed listed species, state candidate species for listing, and Navy species of concern.

Management Action

Implementation of the following management actions is recommended to protect natural resources at IRP Site 14:

- Construct an aggregate gravel base over IRP Site 14 immediately after construction of the final landfill cover to prevent colonization by burrowing owls and invasion of nonnative grasses.

- In the post-closure maintenance plan for IRP Site 14, develop storm water monitoring procedures for the detention basin that protect plant and wildlife species within the basin (as planned) and corresponding success criteria.

- Ensure that no environmentally harmful pesticides will be used by the future lessors of the site (e.g., for maintenance of the potted plant nursery).

4.3.1.19 Improvements to the Storm Water Pollution Prevention Plan (IRMP-NR-19)

A Storm Water Pollution Prevention Plan (SWPPP) was prepared for CBC Port Hueneme in compliance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities. The purpose of the SWPPP is to describe potential sources of storm water pollutants that are associated with industrial activities at CBC Port Hueneme and to prescribe best management practices (BMPs) or control measures for minimizing or eliminating the discharge of these pollutants into storm water runoff.

Key Issues

Three key issues have been identified regarding storm water pollution prevention at CBC Port Hueneme follow:

1. The SWPPP for CBC Port Hueneme does not cover administration buildings, personnel housing facilities, retail facilities, food service facilities, and personnel parking lots (U.S. Navy 1998b). Each of these facilities is a potential source of storm water pollution. Potential point and nonpoint storm water pollutants associated with these facilities include: excess nutrients, antifreeze and coolants, detergents and surfactants, fuels (diesel, gasoline), lubricants, metals, oil and grease, paint/varnish, sediment (soil, glass grit, used absorbent), trash and debris, used oil, and waste wash water. Therefore, expanding the SWPPP to include non-industrial facilities is recommended.

2. CBC Port Hueneme primarily uses source controls in lieu of using storm water management practices to remove or eliminate pollutants from contaminating storm water. While source reductions are vital to minimizing storm water pollution, implementing non-source storm water management practices can further improve storm water quality. Storm water management practices, other than source controls, include hydraulic controls and treatment-based controls. Hydraulic controls are structural controls that reduce the volume of runoff or divert flows away from source areas. Examples of hydraulic controls are infiltration systems. Treatment-based controls are controls that remove pollutants from storm water, usually through some structural means such as a detention basin or grassy swale. Therefore, implementation of non-source storm water BMPs is recommended.

3. In accordance with the NPDES General Permit, CBC Port Hueneme is required to collect samples and perform visual observations only if there are significant storm water discharges during scheduled facility operating hours, or within 2 hours following scheduled facility operating hours. Unfortunately, rain events frequently occur outside of business hours, and failure to sample all storm water runoff can result in mischaracterization of storm water runoff quantity and quality. Therefore, storm water sampling during non-operating hours at CBC Port Hueneme is recommended.

Management Goal

Maintain the Surface Water and Storm Water Program element of the Compliance Program at CBC Port Hueneme in compliance with the Clean Water Act of 1976. Maintain, improve, and implement the SWPPP as required under NPDES General Permit for Storm Water Discharges Associated with Industrial Activities.

Management Action

Implementation of the following measures to improve the SWPPP for CBC Port Hueneme is recommended:

- Expand the SWPPP and MRPP to cover all facilities at CBC Port Hueneme, including non-industrial facilities.

- Expand the use of oil/water and sediment separators throughout the facility. A variety of sediment catch basin, oil/water separator, and curbside filter designs are available. Since many metals and organic pollutants are adsorbed onto sediment particles or are found as Light Non-Aqueous Phase Liquids (LNAPLs), sediment, oil, and grease should be removed from storm water as thoroughly as practicable.

- Install structural BMPs. Structural BMPs can achieve multiple storm water management goals including: contaminant filtration, settling of sediments, storm water detention, and flood control. Appropriate measures may include, among others, vegetative swales, collection and reuse of storm water, constructed wetlands, infiltration devices, and wet detention/retention basins.

- Storm water sampling should be performed in accordance with the SWPPP, during operating and non-operating hours. The General Permit requires that storm water samples be collected during the first 30 minutes of storm water discharge to capture the "first flush" of pollutants.

4.3.1.20 Improvements to the Recycling Program (IRMP-NR-20)

Currently, paper, aluminum, and other material generated in the administration buildings at CBC Port Hueneme are recycled in a Qualified Recycling Program run by the MWR Department. A Qualified Recycling Program can sell recycled items, pay for the costs of the recycling program using these funds, and use the balance for projects that will benefit the installation. In addition, construction materials and demolition debris are recycled through contractor salvage operations, and green waste is used as mulch to improve disturbed soils on training areas.

Key Issues

Additional materials may be reused or recycled at CBC Port Hueneme including: construction materials, demolition debris, household waste generated in the housing units, and green waste generated on base (e.g., yard waste and waste generated from grounds maintenance).

Management Goal

Maintain and improve the Pollution Prevention Program at CBC Port Hueneme, including the Recycling Program.

Management Action

Implementation of the following improvements to the Recycling Program at CBC Port Hueneme is recommended:

- Manage the Qualified Recycling Program under the Pollution Prevention Program rather than the MWR Department.

- Expand the reuse and recycling of construction materials and demolition debris and improve documentation of these recycling efforts (e.g., amount recycled per year).

- Establish a separate composting program at CBC Port Hueneme to expand recycling of green waste (e.g., yard waste and waste generated from grounds maintenance) and reduce the use of fertilizers on base.

- Enlarge the materials recovery facility at CBC Port Hueneme to accommodate composting and storage of reusable construction materials. Consider using an IRP Site that would be suitable for this land use after remediation (e.g., IRP Site 9 – Burn Pit).

4.3.1.21 Drip Irrigation System Installation (IRMP-NR-21)

Water conservation is a basewide effort under the Energy Showcase Program at CBC Port Hueneme. Use of drip irrigation systems is an effective method for conserving water on base.

Management Goal

Maintain and improve the Energy Showcase Program, including water conservation efforts.

Management Action

Installation of drip irrigation systems in landscaped areas with exotic, ornamental species at CBC Port Hueneme is recommended, to the extent practicable. Installation of these systems should follow guidelines established in the BEAP for CBC Port Hueneme.

A drip irrigation system is much more efficient than other irrigation methods (Whitney 1999). For example, an average drip emitter (used for drip irrigation) uses about 1 gallon of water per hour, a microspray (another application of drip irrigation) uses 10 to 15 gallons per hour, and an overhead sprinkler uses 2 to 5 gallons per minute. Drip emitters also put water right to the root zone, thereby reducing runoff and evaporation. Drip emitters work best with established trees and shrubs, while subsurface and microspray systems work well with grass, turf, or other ground cover.

4.3.1.22 Outdoor Recreation Assessment (IRMP-NR-22)

Many areas on and around CBC Port Hueneme provide residents and visitors with recreational opportunities. The BEAP describes the existing bikeways at CBC Port Hueneme. An Outdoor Recreation Assessment is recommended to optimize and expand recreational opportunities on base while prioritizing land uses and allowing for efficient planning of future recreational sites.

The Outdoor Recreation Assessment should:

- Provide maximum recreational and leisure time opportunities;

- Plan a variety of outdoor and indoor, and passive and active activities;

- Minimize adverse impacts to natural resources while supporting the leisure activities of the base and local community;

- Provide numerous recreational opportunities in locations accessible to potential users; and

- Update recommendations made in the BEAP.

Management Goal

Optimize current and future recreational opportunities at CBC Port Hueneme.

Management Action

Completion of the Outdoor Recreation Assessment for CBC Port Hueneme would include:

- A survey of current recreation areas and uses on base;
- Assessment of recreational needs on base;
- Integration with the surrounding recreation areas (e.g., connecting base bicycle path with surrounding paths);
- Maintenance of fencing and signage to reduce or eliminate illegal public access for recreational purposes;
- Maintenance of the base picnic grounds, play fields, and associated recreation facilities;
- Maintenance of current and planned outdoor recreation opportunities;
- Promotion of passive recreational uses in natural habitat areas (e.g., Special Interest Natural Areas) except for seasonal prohibitions on access to areas where vulnerable species may nest or roost (e.g. the beach) (USFWS 1999); and
- Update the BEAP with recommendations from the Outdoor Recreation Assessment.

4.3.2 Recommended Cultural Resources Projects

The following discussion describes each of the recommended projects listed in Table 4-4. The project descriptions include the following:

- A background on the key resource the project has been designed to manage;
- The key threats to the resource;
- The management goals the project addresses; and
- The management actions recommended for the project.

4.3.2.1 Inventory and Evaluation of World War II-Era and Cold War-Era Buildings and Structures at the Naval Surface Warfare Center (IRMP-CR-1)

Fourteen World War II buildings, and several Cold War-era buildings within the Naval Surface Warfare Center (NSWC) have not yet been inventoried and evaluated for eligibility to the National Register of Historic Places (NRHP) (Uribe & Associates 1998; William Self Associates 1995).

Key Threats

Potential development or degradation of these buildings are key threats to these historic resources.

Management Goal

Determine the extent of World War II-Era and Cold War-Era historic resources at the Naval Surface Warfare Center at CBC Port Hueneme.

Management Action

- It is recommended that fourteen World War II buildings, and several Cold War-era buildings within the NSWC, be inventoried and evaluated for eligibility to the NRHP (William Self Associates 1995; Uribe & Associates 1998).

- This work should be conducted by a qualified historian to assess the historic value of these resources within the World War II and Cold War contexts.

4.3.2.2 Develop Maintenance Plan for Historic Buildings and Grounds (IRMP-CR-2)

Often, NRHP listed and eligible sites, buildings, and structures must be maintained, repaired, or otherwise altered. The following historic areas exist at CBC Port Hueneme:

- Thomas R. Bard Estate (Berylwood);
- Bard family private cemetery;
- Thomas R. Bard's botanical garden;
- Edward and Mary Farrell house;
- Vincent and Frances Friedrich house;
- Buildings 383, 384, 385, and 386;
- Statuary at the Needham Theater;
- Mural inside the Beehive Fitness Center (Building 233);
- Ventura County railway line;
- Ventura Road eucalyptus grove; and
- Site CA-Ven-975H.

Key Issues

Routine and repetitive actions, such as repair and maintenance of NRHP listed or eligible properties within CBC Port Hueneme must comply with Section 106 of the NHPA. Standards and techniques must be established to conduct routine repair and maintenance of these properties.

Management Goal

Ensure compliance with Section 106 of the NHPA for any action that might adversely affect NRHP-listed or eligible properties, and to avoid impacts to properties from detection and neglect.

Management Action

To ensure compliance with Section 106 of the NHPA during routine and repetitive actions, such as repair and maintenance of NRHP listed or eligible properties within CBC Port Hueneme, a Maintenance Plan should be prepared. The Maintenance Plan should state the standards and techniques to be used when NRHP listed and eligible sites, buildings, and structures are maintained, repaired, or otherwise altered.

4.3.2.3 Establish a Programmatic Agreement with the SHPO and the Advisory Council on Historic Preservation (IRMP-CR-3)

Several NRHP listed and eligible properties are located on CBC Port Hueneme, which can be affected by mission operations.

Key Threats

Routine and non-routine operations at CBC Port Hueneme, such as new construction and the maintenance or repair of buildings or structures, have the potential to affect NRHP listed or eligible properties on the installation. Standards must be established to guide these operations to avoid adverse impacts to NRHP listed or eligible properties.

Management Goal

Ensure compliance with Section 106 of the NHPA for any action that might adversely affect NRHP listed or eligible properties.

Management Action

To expedite compliance with Section 106 of the NHPA during routine and repetitive actions, such as repair and maintenance of NRHP listed or eligible properties within CBC Port Hueneme, a Programmatic Agreement (PA) should be negotiated with the SHPO and the ACHP. Such a document would state the standards and techniques to be used when NRHP listed and eligible sites, buildings, and structures are maintained, repaired, or otherwise altered consistent with the Maintenance Plan described above. In addition, the PA can stipulate the need for archaeological monitoring in the event of undertakings in areas of medium or high archaeological sensitivity. The PA can further provide guidelines to be followed in the event that archaeological deposits are encountered. As long as the terms of the PA are followed as a guide for routine and repetitive undertakings, additional consultation with the SHPO or ACHP would not be necessary. The ACHP has published a guide to aid agencies in drafting PA documents titled *Preparing Agreement Documents* (ACHP 1989). CBC Port Hueneme should also consult the cultural resources coordinator at the Naval Facilities Engineering Command (Southwest Division) when developing the PA (Uribe & Associates 1998).

4.3.2.4 Update National Register Nomination (especially information on the botanical gardens and the "Guest House") (IRMP-CR-4)

The Bard Estate, known as Berylwood, was listed on the NRHP in 1977. At that time, the associated botanical gardens were not included in the National Register nomination due to lack of integrity. In addition, one house within the estate was called the "Guest House" on the nomination form. The exact age and function of the house is unknown. Recent research and oral history interviews with descendants of the Bards have indicated that the house was never used as a guesthouse by the Bards. Also, once called the "Doll House," it was thought to have been used by the Bard children for play with their dolls. This also has been contradicted but interviews with Bard descendants (Kaughman, personal communication, 1999; Marsh, personal communication, 1999). Another theory is that the house may have served as quarters for the Bard's Chinese servants in the nineteenth century. A Bard descendant, however, has claimed this is untrue, and that the house used for the Chinese servants was torn down long ago. It now appears likely that the "Guest House" may have been moved to the estate in the 1930s from another Bard property for use by farm hands (Marsh 1999).

Key Threats

The current National Register nomination of the Bard Estate contains inaccurate information on the "Guest House," which leads to misinterpretations and a lack of understanding of the estate. In addition, because the botanical gardens are not included in the nomination, they are not protected by Section 106 of the NHPA. These gardens, therefore, may be affected by activities on the installation, which could in turn have an effect on the setting of the NRHP-listed estate.

Management Goal

Ensure compliance with Section 106 of the NHPA for any action that might adversely affect NRHP listed or eligible properties.

Management Action

To avoid any adverse impacts to the setting of the NRHP-listed Bard estate, the National Register nomination for the estate should be updated. As part of this effort, the botanical gardens should be re-evaluated and possibly included in the nomination as a contributing element of the district. In addition, archival research should focus on the origin and function of the house known as the "Guest House" to clarify its history and role within the estate.

4.3.2.5 Establishment of Treatment Procedures for Archaeological Resources (IRMP-CR-5)

Three well-documented historic sites (the National Register-listed Berylwood Historic District, the Farrell house, and the *Bahama Star/La Janelle* shipwreck) are considered to be areas of high archaeological sensitivity, and one poorly documented prehistoric site, CA-Ven-663, is regarded as an area of medium archaeological sensitivity (Uribe & Associates 1998).

Key Threats

Harbor widening, construction, and dredge spoil dumping have most likely destroyed site CA-Ven-663. Any ground-disturbing activities in the three areas of high archaeological sensitivity may also impact these archaeological resources. Base activities within all of these areas may encounter new archaeological resources that must be dealt with properly.

Management Goal

Utilize specific treatment procedures for archaeological resources found at CBC Port Hueneme.

Management Action

- A professional archaeologist should be present to monitor all ground-disturbing activities in areas of high or medium archaeological sensitivity at CBC Port Hueneme.

- Development of provisions and procedures are recommended for the treatment of archaeological resources that may be encountered at CBC Port Hueneme in the event that ground-disturbing activities occur in areas of high or medium archaeological sensitivity.

4.3.2.6 Location and Evaluation of Possible Ethnohistoric Burial Site at the Thomas R. Bard Estate (IRMP-CR-6)

Human remains and associated glass trade beads reportedly discovered by Richard Bard on the grounds of the Thomas R. Bard mansion in 1903 may represent an ethnohistoric Chumash burial or cemetery (Uribe & Associates 1998). The exact location of the site has not been determined and no known formal efforts have been made to confirm the presence of this site.

Key Threats

Any ground-disturbing activities or development in this area may impact this ethnohistoric resource.

Management Goal

Identify potential ethnohistoric burial and repatriate remains, as appropriate.

Management Action

- To comply with the Native American Graves Protection and Repatriation Act (NAGPRA), an effort should be made by a professional historian and/or archaeologist to locate and evaluate the potential Chumash burial or cemetery on the grounds of the Bard Estate.

- Methods to identify the location of the burial should begin with the detailed archival research to determine if the location of the Richard Bard's discovery was ever documented.

- Additional methods to confirm the presence of the site could begin with non-intrusive subsurface testing such as ground-penetrating radar (GPR).

- Because small individual burials may remain undetectable by GPR, limited intrusive methods such as shovel test pits also may be considered, but should be conducted in a manner to avoid adverse effects to the NRHP listed Bard estate.

- In addition to confirming the presence of the burial, both non-intrusive and intrusive subsurface testing may result in the discovery of other archaeological materials. Procedures for identifying and consulting with Native American groups are described in

the *Historic and Archeological Protection (HARP) Plan for CBC Port Hueneme* and should be followed if Native American remains are encountered as a result of this effort, or if Native American remains are inadvertently discovered in other portions of CBC Port Hueneme (Uribe & Associates 1998).

4.4 COOPERATIVE RESOURCE PLANNING

Cooperative agreements (e.g., for inventories, monitoring, research, minor construction and maintenance, public awareness) may be entered into with other federal agencies, states, local governments, nongovernmental organizations, and individuals to provide for the maintenance and improvement of natural and cultural resources or conservation research on DoD installations (DoD I 4715.3). Cooperative agreements have resulted in the formation of at least two programs that provide funding for resources management program projects at DoD installations: the Coastal America Program and the Strategic Environmental Research and Development Program (described below). Cooperative agreements may provide future funding opportunities for the Resources Management Program at CBC Port Hueneme and should be pursued. Currently, CBC Port Hueneme does not have any cooperative agreements.

4.5 APPLICABLE REGULATIONS AND PERMITS

The regulatory requirements for implementing the program projects recommended in Section 4.3 are listed in Table 4-7. Each regulation is described in more detail in Appendix A.

4.6 POTENTIAL PROGRAM FUNDING SOURCES

Funding for resource management programs at DoD installations has traditionally been through the following programs:

- Fish and Wildlife and Outdoor Recreation Fees;
- Legacy Resource Management Program;
- National Environmental Compliance Account (NECA) Program;
- Coastal America Program;
- Strategic Environmental Research and Development Program (SERDP);
- Agricultural Outlease Program; and
- Operations and Maintenance (O&M) Funds.

However, because funding availability for Federal projects is continually changing, these programs may no longer provide funding for installation resources management programs or may stop funding these programs in the future. Each program is described in more detail below. Table 4-8 indicates which funding sources may potentially be used to fund recommended management actions for the Resources Management Program at CBC Port Hueneme. Implementation of future program projects may be coordinated with other naval bases (e.g., NAS Lemoore, NAS Point Mugu) which may result in cost savings.

Table 4-7
Regulatory Oversight and Requirements for Implementation of Recommended Program Projects

Project Title (Project Reference)	Regulatory Oversight and Requirements
Natural Resources	
Integrated Pest Management Plan (IRMP-NR-1)	NEPA Documentation (uncertain)
Basewide Wetland Delineation (IRMP-NR-2)	USACE and USFWS Oversight
Sensitive Species Surveys and Floristic Inventory (IRMP-NR-3)	CDFG Permits Required
Habitat Protection and Restoration Plan for Bulrush-Cattail Habitat (Special Interest Natural Area A) (IRMP-NR-4)	NEPA Documentation; Possible Section 7 Consultation with the USFWS pursuant to the Endangered Species Act (ESA)
Habitat Protection and Restoration Plan for Bulrush-Cattail Habitat (Special Interest Natural Area B) (IRMP-NR-5)	NEPA Documentation
Habitat Protection and Restoration Plan for Sand Verbena-Beach Bursage and Sandy Beach Habitats (Special Interest Natural Area D) (IRMP-NR-6)	NEPA Documentation
Revision of the Base Exterior Architecture Plan (BEAP) (IRMP-NR-7)	None
Footpath/Greenbelt Loop (IRMP-NR-8)	NEPA Documentation (uncertain)
Landscape and Recreation Improvements (IRMP-NR-9)	NEPA Documentation (uncertain)
Protection Measures for Potential Monarch Butterfly Roosting Sites at NCBC Port Hueneme (IRMP-NR-10)	Coordination with CDFG
Protection Measures for Kelp Beds at NCBC Port Hueneme (IRMP-NR-11)	Coordination with the CCC
Protection Measures for the California Brown Pelican and California Least Tern at NCBC Port Hueneme (IRMP-NR-12)	USFWS Oversight and Coordination with CDFG
Protection Measures for Marine Mammals at NCBC Port Hueneme (IRMP-NR-13)	NMFS Oversight
Protection Measures for Native Bird Species at NCBC Port Hueneme (IRMP-NR-14)	USFWS Oversight
Development of Natural Resources Monitoring Program and Database (IRMP-NR-15)	USFWS Oversight and Coordination with CDFG
Habitat Protection and Restoration Plan for Coyote Brush Habitat (Special Interest Natural Area C) (IRMP-NR-16)	NEPA Documentation
Adaptive Management Plan for Burrowing Owls at NCBC Port Hueneme (IRMP-NR-17)	Coordination with CDFG
Construction of Agricultural Outlease Area at IRP Site 14 (IRMP-NR-18)	NEPA Documentation (uncertain)
Improvements to the SWPPP (IRMP-NR-19)	RWQCB Approval
Improvements to the Recycling Program (IRMP-NR-20)	NEPA Documentation (uncertain)
Drip Irrigation System Installation (IRMP-NR-21)	None
Outdoor Recreation Assessment (IRMP-NR-22)	None
Cultural Resources	
Inventory and Evaluation of World War II-Era and Cold War-Era Buildings and Structures at the NSWC (IRMP-CR-1)	SHPO Oversight
Develop Maintenance Plan for Historic Buildings and Grounds (IRMP-CR-2)	NEPA Documentation (uncertain); SHPO Oversight
Establish a Programmatic Agreement with the State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP) (IRMP-CR-3)	SHPO and ACHP Oversight
Update National Register Nomination (especially information on the botanical garden and the “Guest House”) (IRMP-CR-4)	SHPO Oversight
Establishment of Treatment Procedures for Archaeological Resources (IRMP-CR-5)	SHPO Oversight
Location and Evaluation of Possible Ethnohistoric Burial Site at the Thomas R. Bard Estate (IRMP-CR-6)	NEPA Documentation; SHPO Oversight

Table 4-8
Potential Funding Sources for Recommended Program Projects

Project Title (Project Reference)	Potential Funding Source(s)
Natural Resources	
Integrated Pest Management Plan (IRMP-NR-1)	• NECA • SERDP
Basewide Wetland Delineation (IRMP-NR-2)	NECA
Sensitive Species Surveys and Floristic Inventory (IRMP-NR-3)	NECA
Habitat Protection and Restoration Plan for Bulrush-Cattail Habitat (Special Interest Natural Area A) (IRMP-NR-4)	• NECA • Agricultural Outlease Program • O&M Funds
Habitat Protection and Restoration Plan for Bulrush-Cattail Habitat (Special Interest Natural Area B) (IRMP-NR-5)	• NECA • Agricultural Outlease Program • O&M Funds
Habitat Protection and Restoration Plan for Sand Verbena-Beach Bursage and Sandy Beach Habitats (Special Interest Natural Area D) (IRMP-NR-6)	• NECA • Coastal America Program • O&M Funds
Revision of the Base Exterior Architecture Plan (BEAP) (IRMP-NR-7)	O&M Funds
Footpath/Greenbelt Loop (IRMP-NR-8)	O&M Funds
Landscape and Recreation Improvements (IRMP-NR-9)	O&M Funds
Protection Measures for Potential Monarch Butterfly Roosting Sites at NCBC Port Hueneme (IRMP-NR-10)	• NECA • Agricultural Outlease Program • O&M Funds
Protection Measures for Kelp Beds at NCBC Port Hueneme (IRMP-NR-11)	• NECA • Coastal America Program • O&M Funds
Protection Measures for the California Brown Pelican and California Least Tern at NCBC Port Hueneme (IRMP-NR-12)	• NECA • Coastal America Program • O&M Funds
Protection Measures for Marine Mammals at NCBC Port Hueneme (IRMP-NR-13)	• NECA • Coastal America Program • O&M Funds
Protection Measures for Native Bird Species at NCBC Port Hueneme (IRMP-NR-14)	• NECA • Agricultural Outlease Program • O&M Funds
Development of Natural Resources Monitoring Program and Database (IRMP-NR-15)	• NECA • Coastal America • Agricultural Outlease Program • O&M Funds
Habitat Protection and Restoration Plan for Coyote Brush Habitat (Special Interest Natural Area C) (IRMP-NR-16)	• NECA • Agricultural Outlease Program • O&M Funds
Adaptive Management Plan for Burrowing Owls at NCBC Port Hueneme (IRMP-NR-17)	• NECA • Agricultural Outlease Program • O&M Funds
Construction of Agricultural Outlease Area at IRP Site 14 (IRMP-NR-18)	• Agricultural Outlease Program • O&M Funds
Improvements to the Storm Water Pollution Prevention Plan (SWPPP) (IRMP-NR-19)	• NECA • SERDP • O&M Funds
Improvements to the Recycling Program (IRMP-NR-20)	• NECA • SERDP • O&M Funds
Drip Irrigation System Installation (IRMP-NR-21)	O&M Funds
Outdoor Recreation Assessment (IRMP-NR-22)	O&M Funds
Cultural Resources	
Inventory and Evaluation of World War II-Era and Cold War-Era Buildings and Structures at the Naval Surface Warfare Center (NSWC) (IRMP-CR-1)	NECA
Develop Maintenance Plan for Historic Buildings and Grounds (IRMP-CR-2)	NECA
Establish a Programmatic Agreement with the State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP) (IRMP-CR-3)	NECA
Update National Register Nomination (especially information on the botanical garden and the "Guest House") (IRMP-CR-4)	NECA
Establishment of Treatment Procedures for Archaeological Resources (IRMP-CR-5)	NECA
Location and Evaluation of Possible Ethnohistoric Burial Site at the Thomas R. Bard Estate (IRMP-CR-6)	NECA

4.6.1 Fish and Wildlife and Outdoor Recreation Fees

Collection of fees for hunting and fishing at DoD installations is a source of funding for the administration and maintenance of installation resources management programs. However, hunting and fishing at CBC Port Hueneme are both prohibited. Therefore, fish and wildlife and outdoor recreation fees are not an anticipated source of funding for the Resources Management Program at CBC Port Hueneme.

4.6.2 Legacy Resource Management Program

The Legacy Resource Management Program was established by Congress in November of 1990 under Public Law 101-511 § 8120 to assist the DoD in balancing the intensive use of its 25 million acres of land for military training and testing in compliance with cultural and natural resource legislation and development of management programs. Limited funding for resource management is available. Currently, there is the opportunity to request matching funds for invasive weed control by requesting a grant through the National Fish and Wildlife Foundation (NFWF).

4.6.3 Naval Environmental Compliance Account Program

The Naval Environmental Compliance Account (NECA) Program funds projects at Naval installations that are required to remain in compliance with federal regulations (e.g., Clean Water Act, Clean Air Act, NEPA, NHPA).

4.6.4 Coastal America Program

The Coastal America Program joins the efforts of federal agencies with those of state, local, and private alliances to collaboratively address environmental problems along the nation's coasts. Federal partners include those agencies with principle responsibilities for the stewardship of coastal resources, those with responsibilities for infrastructure development and maintenance, and those agencies whose activities impact coastal environments. The challenge has been to integrate the capabilities of existing resources with state, local, and nongovernmental efforts to address specific local problems by sharing information, pooling resources, and combining management skills and technical expertise. This is being accomplished by bringing partners to the table using a broad, problem solving approach. The Coastal America collaborative interagency structure enables national policy issues to be identified and resolved, regional plans and strategies to be developed, and local projects to be implemented. Federal partner agencies include Department of Agriculture, Department of the Air Force, Department of the Army, Department of Commerce, Department of Defense, Department of Energy, Department of Housing and Urban Development, Department of the Interior, Department of the Navy, Department of Transportation, Environmental Protection Agency, and the Executive Office of the President.

4.6.5 Strategic Environmental Research and Development Program

The Strategic Environmental Research and Development Program (SERDP) addresses environmental matters of concern to the DoD and the Department of Energy (DOE) as mandated in 10 U.S.C. 2901-2904. The purposes of the Program are to:

- Address environmental matters of concern to DoD and the DOE through support for basic and applied research and development of technologies that can enhance the capabilities of the departments to meet their environmental obligations.

- Identify research, technologies, and other information developed by the DoD and the DOE for national defense purposes that would be useful to governmental and private organizations involved in the development of energy technologies and technologies to address environmental restoration, waste minimization, hazardous waste substitution, and other environmental concerns, and to share such research, technologies, and other information with such governmental and private organizations.

- Furnish other governmental organizations and private organizations with data, enhanced data collection capabilities, and enhanced analytical capabilities for use by such organizations in the conduct of environmental research, including research concerning global environmental change.

- Identify technologies developed by the private sector that are useful for DoD and DOE defense activities concerning environmental restoration, hazardous and solid waste minimization and prevention, and hazardous material substitution, and provide for the use of such technologies in the conduct of such activities.

SERDP identifies and develops technology to enhance capabilities to meet environmental commitments and to foster the exchange of scientific information and technologies among its participants, other governmental agencies, and the private sector. The SERDP is designed to link to other environmental programs to identify and solve defense specific needs, extend applications of defense information to others, and build on existing science and technology to derive more useable and cost-effective approaches for achieving reductions in environmental risks.

4.6.6 Agricultural Outlease Program

The Agricultural Outlease Program is a DoD-wide program that leases DoD property for agricultural use. Proceeds from the program fund natural resource management programs for all branches of DoD. The Agricultural Outlease Program currently generates over $2 million per year for Department of the Navy natural resource management programs; $1.6 to $1.8 million of this total is generated from NAS Lemoore.

4.6.7 O&M Funds

O&M funds for CBC Port Hueneme are available for implementing Resources Management Program projects.

4.7 PROGRAM DATA MANAGEMENT

The main data management objectives of the Resources Management Program at CBC Port Hueneme are to:

- Organize and continually update existing data on natural and cultural resources at CBC Port Hueneme.

- Ensure that resource managers at CBC Port Hueneme, base planners, other base personnel, base contractors, and outside agencies have access to the latest information on natural and cultural resources at CBC Port Hueneme so these resources are properly protected according to the IRMP.

In addition to the development of the IRMP, the following information sources have been compiled to help accomplish these objectives:

- Literature Database and Reference Binder.
- Geographic Information System maps and overlays.

4.7.1 Literature Database and Reference Binder/Library

An extensive literature search for natural and cultural resources information on CBC Port Hueneme was conducted in support of IRMP preparation. Results of the literature search are summarized in a Literature Database that was created in Microsoft Excel. The database contains the full reference for each document and article collected during the literature search and is searchable by author, year, title, and key words. Hard copies of the most relevant documents and articles are also provided in a Reference Binder.

The Literature Database and Reference Binder provide a centralized location for specific details of the natural and cultural resources information summarized in the IRMP. Eventually, development of a central library for the Resources Management Program is recommended as new information becomes available on the natural and cultural resources at CBC Port Hueneme. Hardcopies of biological and cultural survey reports, water quality monitoring reports, environmental impact analyses, planning documents, and key legislation are among the items that could be collected in the library. The Literature Database could be expanded for use as a tracking system for library documents. Development of a central location for key documents and articles enables easy access to natural and cultural resource information on CBC Port Hueneme and is critical for effective protection and management of these resources (see Section 4.3.1.15).

4.7.2 Geographic Information System

Geographic Information System (GIS) maps and overlays currently guide land use planning at CBC Port Hueneme. Spatial data on natural and cultural resources at CBC Port Hueneme (e.g., sensitive species locations, habitat locations) have been integrated into the base GIS in support of preparation of the IRMP using numerous data sources.

Compiling planning and natural and cultural resources data into a single, accessible system will provide a critical natural and cultural resources management tool. Access to GIS overlays will facilitate natural and cultural resources management at CBC Port Hueneme by allowing resource managers to specifically assess an area by viewing applicable GIS overlays.

In addition, the GIS system can and should be continuously updated as new natural and cultural resources information or planning information is generated for CBC Port Hueneme. The modular format of this Plan facilitates easy replacement of updated GIS maps.

The development of the natural and cultural resources GIS overlays for CBC Port Hueneme is discussed below. Recommended natural and cultural resources overlays and recommended quality assurance/quality control procedures for the base GIS are also provided below.

4.7.2.1 Use of Global Positioning System

- Sensitive species locations and habitat locations at CBC Port Hueneme were documented using a Trimble Pathfinder Pro XR GPS unit. Data collected in the field using this GPS

unit were subsequently downloaded into the base GIS. Due to the accuracy of GPS technology, the use of a GPS unit to georeference natural and cultural resource locations and planned land uses at CBC Port Hueneme is highly recommended in the future.

4.7.2.2 Existing GIS Overlays for CBC Port Hueneme

Table 4-9 lists the GIS overlays that currently exist for CBC Port Hueneme. Overlays showing natural and cultural resources and land use management recommendations were added to the GIS for CBC Port Hueneme to support preparation of the IRMP. These overlays were developed using data collected in the field using a GPS unit, by downloading digital data from the Internet (e.g., the National Wetlands Inventory map), and by hand-digitizing data from existing hard copy maps (e.g., the soil survey for Ventura County).

4.7.2.3 Recommended GIS Overlays for Natural and Cultural Resources

Development of the following GIS overlays for natural and cultural resources is recommended to enhance management of these resources at CBC Port Hueneme:

- Storm water monitoring stations designated by the SWPPP and results or "hits" at these stations (e.g., contaminant concentrations detected);
- Regional drinking water distribution system;
- Results from future biological and cultural resources surveys and studies (e.g., results of a basewide wetlands delineation, results of sensitive species surveys); and
- Planned land uses for CBC Port Hueneme (to be completed during development of the Master Plan for CBC Port Hueneme).

4.7.2.4 Recommended Quality Assurance/Quality Control of the GIS

The GIS database for CBC Port Hueneme was developed using ArcView GIS Version 3.0a software developed by ESRI. The NAD 83 State Plane Coordinate System is used for X and Y coordinates, and the NAVD 88 State Plane Coordinate System is used for Z coordinates. Data collected for future additions to the GIS database for CBC Port Hueneme should be compatible with this software and coordinate systems, and compatible for use on Windows 95/NT based computers.

Metadata for the GIS overlays at CBC Port Hueneme currently do not exist. Annotation of all GIS overlays with Federal Geographic Data Committee (FGDC) metadata using a predefined metadata template (*Content Standards for Digital Geospatial Metadata*, FGDC, 1994) 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 CBC Port Hueneme is also recommended.

Table 4-9
Existing GIS Themes for CBC Port Hueneme

GIS Themes Provided by the Navy[1]	GIS Themes Developed by Tetra Tech
Boundaries	
Real estate boundaries	Regional location within California[2]
Harbor area	
Operational areas	
Aerial/satellite images of site and operational area	
Facilities	
Buildings	
Infrastructure	
Infrastructure, roads, sewer, water, gas, petroleum pipelines and storage, electrical, communications, and other above- and below-ground utilities	
Major stationary equipment (e.g., power stations, noise generators)	
Known or suspected locations of abandoned underground utilities	
Operations	
Planned development	
EMI surveys (I band and C band radiation)	
Water usage	
Pesticide usage	
Potential Contaminants	
Installation Restoration Sites (with top 5 characteristic chemicals)	
Location of surveys, studies, soil borings etc.	
Topography/Geology/Hydrology/Hydrogeology	
Topography	Soils[2]
Geological hazards	Geology[2]
Wells/pumps	
Ground water depth and flow direction	
Drainage ditches	
Overland flow	
Flood areas at various PPP Levels	
Natural Resources	
Legacy trees[3]	Sensitive species locations[2]
	Habitats[2]
	Canals/Drainage channels/Surface Water[2]
	Landscaped areas[2]
	Golf Course (regionally native plants and native wildlife)[2]
Cultural Resources	
	Archaeologically sensitive resources and areas surveyed[2]
	Historic properties on, or eligible for listing on the National Register of Historic Places[2]
Management Options	
	Special Interest Natural Areas[2]
	Areas Designated for Land Use Improvements[2]

Notes: 1 - Data provided by the Navy in AutoCAD, Excel, or Microsoft Access.
2 - Themes included with this IRMP.
3 - For purposes of this document, legacy trees are defined as those with 6-inch or greater circumference.

5.0 LIST OF PREPARERS

Caballero, Val, Word Processor, Tetra Tech, Inc.

B.S., 1995, Mathematics, California Polytechnic State University, San Luis Obispo, California
Technical Writing Concentration
Years of Experience: 1

Ms. Caballero has 1 year of experience in word processing business and technical documents. Her experience includes formatting and producing deliverables for federal government and private contract agencies. She has worked on environmental assessments, cultural resources documents, monthly reports, proposals, and technical information reports. She also has experience in writing business and technical documents, creating databases, and developing and maintaining web sites. Relevant coursework completed by Ms. Caballero includes professional writing, corporate communication, technical communication theory, and interactive document writing.

Project Responsibilities: Ms. Caballero provided word processing services for the IRMP.

Chandler, Evelyn, Cultural Resources Specialist/Archaeologist, Tetra Tech, Inc.

B.A., 1989, Anthropology/Sociology, University of Redlands, Redlands, California
B.A., 1989, Political Science, University of Redlands, Redlands, California
Years of Experience: 9

Ms. Evelyn Chandler has 9 years of experience in cultural resources management. She has supervised field surveys and test excavations for the evaluation of archaeological sites for eligibility to the National Register of Historic Places (NRHP). She has extensive familiarity with issues related to compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA). Her primary responsibilities include supervision of field crews and managing project budgets and contractual obligations. She has participated in and supervised all aspects of field work including field surveys, test excavations, site documentation, mapping, sidewalk profiling, interpreting U.S. Geological Survey (USGS) topographic maps and U.S. Air Force 1:2000 base maps, and report preparation. She has recorded both prehistoric and historic sites, and identified and analyzed prehistoric and historic artifacts. She has contributed to and authored cultural resources technical reports, research designs, and work plans and has contributed to and reviewed a variety of environmental compliance documents including environmental assessments (EAs), environmental impact statements (EISs), environmental impact reports (EIRs), and environmental document surveys.

Project Responsibilities: Ms. Chandler contributed to the Regulatory Requirements for the IRMP, Historic Background, Land Use, Cultural and Historic Resources, and Historical and Cultural Mitigation Suggestions Sections.

Cottermanm, Cary, Cultural Resources Specialist/Archaeologist, Tetra Tech, Inc.

B.A., 1994, Anthropology/Archaeology, California State University, San Bernardino
Years of Experience: 7

Mr. Cotterman has 7 years of professional experience in cultural resources management. He is an experienced field archaeologist with an area of specialization in historical archaeology. He has taken part in various surveys and excavations of archaeological sites for determination of eligibility to the NRHP as well as projects involving Section 106 and 110 compliance. He is experienced in all aspects of prehistoric and historic archaeological fieldwork including pedestrian surveys, excavations, detailed site survey and mapping, and the monitoring of construction sites. In addition, Mr. Cotterman is experienced in the

laboratory analysis and technical illustration of artifacts. He has conducted archival research and architectural analysis of historic buildings, recorded and analyzed historical grave markers, and processed data from archaeological research projects in Africa.

Project Responsibilities: Mr. Cotterman contributed to the Regulatory Requirements for the IRMP, Historic Background, Land Use, Cultural and Historic Resources, and Historical and Cultural Mitigation Suggestions Sections.

Cushing, Kenneth, Word Processor III, Tetra Tech, Inc.

Chemistry, Georgia Institute of Technology, Atlanta, Georgia
Years of Experience: 2

Mr. Cushing has 3 years of experience in word processing documents for federal government and private contracting agencies. He has experience in providing formatting, proposal support, and production of deliverables. He is responsible for compiling and formatting a variety of environmental documents, including management plans, environmental assessments, cultural resources documents, health and safety plans, work plans, informal technical information reports, and monthly reports. He has also converted and organized documents for online and offline browsing. These projects included spreadsheet, presentation, and database creation.

Project Responsibilities: Mr. Cushing provided word processing services for the IRMP.

Donn, Ted, Senior Ecologist, Tetra Tech, Inc.

Ph.D., 1983, Zoology, University of New Hampshire
B.A., 1977, Biology, Clark University (Departmental Honors)
Years of Experience: 22

Dr. Ted Donn is an ecologist and risk assessor at Tetra Tech with over 22 years of experience and is certified as a senior ecologist by the Ecological Society of America. He has a broad knowledge of theoretical and applied population, community, and ecosystem ecology, sand beach ecology, coastal processes, and ecological risk assessment. Dr. Donn has managed numerous baseline biological characterizations and special status species surveys. Key projects include ecological inventories of two major Naval facilities (NAS Fallon, NV; NAS Lemoore, CA) which mapped soils, and potential and existing vegetation; surveyed birds, small and large mammals, and herpetofauna; and developed a GIS and database.

Project Responsibilities: Dr. Donn reviewed and provided guidance on the entire document. He also conducted a marine biological survey and assessment.

Eldridge, Jacqueline C., Publications Manager, Tetra Tech, Inc.

B.S., 1971, Biology, Fairleigh Dickinson University, Teaneck, New Jersey
M.S., 1978, Marine Science, Long Island University, Greenvale, New York
M.B.A., 1983, Business Administration, National University, Vista, California
Years of Experience: 22

Ms. Eldridge has 22 years of experience in technical and business writing, and management and project planning for the federal government and private contracting agencies. She has assisted in preparing and reviewing technical reports, management plans, statements of work, and proposals for various Air Force and Navy programs. She also has worked on numerous environmental monitoring, compliance, and impact analysis projects for government agencies and private industry. Her work experience also

includes assignments as project manager, project environmental professional, laboratory supervisor, and senior technical editor. On Air Force Center for Environmental Excellence (AFCEE) contracts, she has been responsible for preparation and production of Air Force decision documents, EISs, EAs, Base Realignment and Closure (BRAC) Cleanup Plans (BCPs), and Environmental Baseline Surveys (EBSs).

Project Responsibilities: Ms. Eldridge reviewed and provided guidance on the entire document.

Emery, Angela D., Associate Environmental Scientist, Tetra Tech, Inc.

B.S., 1998, Environmental Studies (Concentration Biological Sciences), University of California, Santa Barbara
Years of Experience: 1

Ms. Emery is an environmental scientist with a strong background in the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) impact analysis processes. She has performed impact analyses for a broad range of issue areas, including hazardous materials and hazardous waste management, solid waste management, land use, infrastructure, visual resources, noise, and socioeconomics. In completing these studies, she has applied various state, federal, and local planning laws, codes, and regulations to determine project significance and impact levels. She has experience and course work in biological field surveys, focusing on terrestrial vertebrates. Other relevant course work completed by Ms. Emery includes environmental law, coastal zone management, endangered species management, ecology and evolution of terrestrial vertebrates, introduction to marine biology, and economics.

Project Responsibilities: Ms. Emery contributed to the ESA/Sikes Act Discussion, Conservation Efforts, Wildlife, Outdoor Recreation, Land Management, and Program Implementation Recommendations Sections. She also contributed to the biological field survey conducted for this document.

Fowler, Sarah, Intern Environmental Scientist, Tetra Tech

B.S.c., 1999, Geology, University of Canterbury, New Zealand
Years of Experience: 1

Ms. Fowler is an environmental intern with a background in geology. She has experience in water resource management. Relevant coursework completed by Ms. Fowler includes geology field studies, environmental geology, engineering geology, and Antarctic studies.

Project Responsibilities: Ms Fowler contributed to Water Resources, Climate, Groundwater Management, and Regulatory Requirements sections.

Gard, Scott W., Senior Environmental Program Manager, Tetra Tech, Inc.

B.A., 1965, Economics, University of Missouri, Kansas City
M.A., 1970, Economics, University of Missouri, Kansas City
Years of Experience: 28

Mr. Scott Gard has 28 years of compliance and environmental impact analysis experience. For the past three years, Mr. Gard has been a program manager for natural and cultural resource studies for Vandenberg Air Force Base (AFB), which has required coordination with federal, state, and local environmental regulatory agencies on a regular basis. The Integrated Natural Resources Management Plan (INRMP) and Integrated Cultural Resources Management Plan (ICRMP) for Vandenberg AFB were prepared under his general direction as program manager for these resource areas.

Project Responsibilities: Mr. Gard provided management on this IRMP.

Groves, William, Environmental Science Intern, Tetra Tech, Inc.

B.S., 1996, Anthropology (University and Departmental Honors), University of Houston
M.E.S.M., (pending), Environmental Science and Management, University of California, Santa Barbara
Years of Experience: 3

Mr. Groves is an environmental scientist with a background in hydrology; water resources management; policy analysis; modeling and simulation; environmental planning; and GIS. At Tetra Tech, he has contributed to environmental assessments and environmental impact statements under NEPA. He has performed impact analyses for a broad range of issue areas, including water resources management, land use, infrastructure, visual resources, noise, and socioeconomics. In completing these tasks, he has applied various state, federal, and local planning laws, codes, and regulations to determine project significance and impact levels. Mr. Groves is currently researching the effectiveness of urban stormwater pollution best management practices. Prior to joining Tetra Tech, he conducted research on the conservation biology and ecology of declining amphibian populations in the Sierra Nevada Mountains.

Project Responsibilities: Mr. Groves contributed to the Climate, Soils, Water Resources, Program Implementation Recommendations, Groundwater Management, Surface Waters and Storm Runoff, and Funding Sources sections.

Ige, Geri K., Senior Graphic Designer, Tetra Tech, Inc.

Fine Arts, University of California, Irvine
Years of Experience: 19

Project Responsibilities: Ms. Ige created maps and figures for the IRMP.

Lum, Luanne, Environmental Scientist, Tetra Tech, Inc.

B.A., 1985, Environmental Design and Planning, University of Colorado
Years of Experience: 12

Ms. Luanne Lum has over 12 years experience in conducting biological characterizations, assessments for restoration projects, and in the preparation of EIRs and EISs. Tasks performed include soil and plant surveys, oak woodland restoration, and sensitive species monitoring. Methods used for research and analysis include plant species identification and mapping, global positioning system (GPS) data collection and management, soil classification, water and soil sampling, impact analysis, and computer programming.

Project Responsibilities: Ms. Lum contributed to the Introduction, Geology, Climate, Vegetation, Wildlife, Wetland Resources and Management, Wetland Habitat Disturbance, Degradation, and Loss, Jurisdictional Waters of the United States, and Management Goals sections. She also contributed to the biological field survey conducted for this document and coordinated the GPS data collection and management.

McGinnis, Christina E., Senior Environmental Planner, Tetra Tech, Inc.

B.A., 1991, History, University of California, Los Angeles
M.A., 1994, Urban Planning, University of Oregon, Eugene
Years of Experience: 8

Ms. McGinnis is an Environmental Planner with experience in every aspect of environmental review. She has managed all stages of private and public projects while ensuring applicable regulatory requirements are met. She has performed impact analysis for all environmental issues required under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). She has served as Project Manager for numerous environmental documents and presented these documents before local regulatory bodies. Ms. McGinnis has applied various state, federal and local planning laws, codes and regulations to determine project significance and impact levels. She also served as Project Manager for Integrated Ecosystem and Cultural Resource Management Plans for two military bases.

Project Responsibilities: Overall project management and coordination.

Oneal, Amber S., Associate Environmental Scientist, Tetra Tech, Inc.

B.S., 1998, Environmental Studies, University of California, Santa Barbara
B.S., 1998, Ecology, University of California, Santa Barbara
Years of Experience: 2

Ms. Oneal is an environmental technician with experience NEPA and the CEQA environmental analysis process. She has performed impact analysis for all environmental resource issue areas under NEPA and certain resource issue areas, including biology, geology, socioeconomics, land use, infrastructure and visual resources, under CEQA. Ms. Oneal has applied various federal, state, and local planning laws, codes, and regulations to determine proposed project significance and impact levels. She has completed coursework in the areas of environmental law, environmental impact analysis and endangered species management. In addition, Ms. Oneal has field experience in the areas of vertebrate identification as well as experimental design and techniques.

Project Responsibilities: Ms. Oneal contributed to the biological field survey conducted for this document.

Randall, Diane, GIS Specialist, Tetra Tech, Inc.

Technical Certificate, Computer Programming, Sawyers College, Ventura, California
Technical Certificate, Program Management, Moorpark College, California
Years of Experience: 12

Ms. Diane Randall has 12 years of experience with computer software and hardware and their applications. She has been responsible for coordinating and maintaining the GIS system for the Vandenberg AFB environmental program and for other Tetra Tech environmental projects in Santa Barbara, Ventura, and San Luis Obispo counties. Ms. Randall also has the capability to create three-dimensional simulations of sites, automated groundwater and bedrock contouring, and geologic cross-section diagrams for environmental planning projects.

Project Responsibilities: Ms. Randall created maps and figures for the IRMP. She also coordinated the GIS data for entry onto the figures.

Steele, James, R.G., Engineering Geologist/Hydrologist, Tetra Tech, Inc.

B.A., 1987, Geological Sciences and Geography, University of California, Santa Barbara
Years of Experience: 10

Mr. Steele has over 10 years of professional experience performing geotechnical and environmental assessment and remediation projects at sites throughout California, including underground fuel storage tank (UST) sites, oil fields, in support of commercial property acquisitions, and for various construction

projects. His technical background includes expertise in environmental, geotechnical, and hydrogeologic techniques and principles. His project experience includes geotechnical studies, environmental preliminary site assessments (Phase I), environmental secondary site assessments (Phase II), environmental remediation (Phase III), and environmental verification monitoring (Phase IV), and National Environmental Policy Act (NEPA) studies.

Project Responsibilities: Mr. Steele reviewed and provided guidance on the Climate, Soils, Landforms/Geology, and Water Resources Sections.

Wilson, Michelle, Environmental Scientist, Tetra Tech, Inc.

B.A., 1993, Environmental Science (concentration in Biology), University of California, Berkeley
Minor: Resource Management
Years of Experience: 5

Ms. Michelle Wilson has a background in endangered species, herpetology, environmental toxicology, and terrestrial and aquatic ecology with over 5 years of experience in conducting biological characterizations, ecological and human health risk assessments, environmental impact analyses, and contaminant characterizations at hazardous waste sites. Tasks performed for biological characterizations include biological surveys, resource inventory and mapping, endangered species monitoring, and literature database development.

Project Responsibilities: Ms. Wilson contributed to the Regulatory Agency Oversight/Requirements, Fish and Wildlife Interagency Coordination, Applicable Regional Biodiversity and Conservation Planning Efforts, Resources Management Program, Wildlife, Land Management, Key Resources Requiring Protection and Management, Program Goals and Priorities, Program Implementation Recommendations, Cooperative Resource Planning, Applicable Regulations and Permits, Potential Program Funding Sources, and Program Data Management sections. She also contributed to the biological field survey conducted for this document.

6.0 ORGANIZATIONS, INDIVIDUALS, AND AGENCIES CONTACTED

Adams, Evelyn
Library Technician, Ventura County Resource Management Agency, Ventura, California. Contacted in person in November 1998.

Bentley, Diane
Facilities Planning Branch, Public Works, Naval Construction Battalion Center, Port Hueneme, California. Contacted in person in February 1999.

Carr, Tom
Public Works, CBC Port Hueneme, California. Contacted by telephone in February 1999.

Casuga, Sam
Port Hueneme Mosquito Program, California. Contacted by telephone in January 1999.

Contreras, Joe
Public Works, CBC Port Hueneme, California. Contacted by telephone in February 1999.

Damron, Beverly
Environmental Protection Specialist, Environmental Department, CBC Port Hueneme, California. Contacted by telephone in March 1999.

Danza Jim
Facilities Planning Branch, Public Works, Naval Construction Battalion Center, Port Hueneme, California. Contacted in person in June 1999.

Dickson, John
California Coastal Commission, Southern California Coastal Wetlands Inventory, San Francisco, California. Contacted by telephone in November 1998.

Fischer, Bill
Naval Facilities Engineering Control (NAVFAC), Southwest Division, Natural Resources Management, San Diego. Contacted by telephone in February 1999.

Garcia, George
Golf Course Maintenance Manager, Morale, Welfare, and Recreation (MWR), CBC Port Hueneme, California. Contacted in person in December 1998.

Jewett, Steve
Ventura County Natural Resource Conservation District, Somis, California. Contacted in person in September 1998.

Johnson, Charles
Ventura County Museum of History and Art, Librarian, Ventura, California. Contacted in person in October 1998.

Johnson, James

Technical Services Division, California Coastal Commission, Ventura, California. Contacted by telephone in November 1998.

Marsh, Carol

Staff Historian, NAVFAC Historian's office, CBC Port Hueneme, California. Contacted in person in August 1998.

McCarrel, Steve

Environmental Department, CBC Port Hueneme, California. Contacted by telephone in March 1999.

Mortensen, Charles

Installation Coordinator, Tetra Tech EMI Inc, Sandpoint, Idaho. Contacted by telephone in November 1998.

Mussman, Bill

CBC Port Hueneme, California. Contacted by telephone in February 1999.

Ortiz, Andrew

CBC Port Hueneme, California. Contacted by telephone in February 1999.

Partee, La Mon

MWR Recycling, CBC Port Hueneme, California. Contacted by telephone in February 1999.

Pringle, Gail

Environmental Department, CBC Port Hueneme, California. Contacted in person and by telephone from July 1998 to March 1999.

Quizada, Manuel

MWR Golf Course, CBC Port Hueneme, California. Contacted by telephone in January 1999.

Reuning, Bob

Family Housing, CBC Port Hueneme, California. Contacted by telephone in February 1999.

Sitar, Jim

MWR, CBC Port Hueneme, California. Contacted by telephone in February 1999.

Swift, Camm

Fisheries Biologist, Private Consultant, California. Contacted by telephone in July 1999.

Thomas, Tim

Botanist, United States Fish and Wildlife Service, California. Contacted by telephone in June 1999.

Thompson, Dean

CBC Port Hueneme, California. Contacted by telephone in February 1999.

Transano, Vincent

Senior Historian, CBC Port Hueneme Museum, California. Contacted 1999.

Treanor, Robert R.

Commissioner, California Department of Fish and Game, Sacramento, California. Contacted by e-mail in February 1999.

Whetje, Morgan

Biologist, California Department of Fish and Game, Santa Barbara, California. Contacted by telephone in March 1999.

Whitney, Allison

Santa Barbara County Public Works Department, Santa Barbara, California. Contacted by telephone in March 1999.

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1998e State and Federally Listed Endangered and Threatened Animals of California. The Resources Agency, CA. July 1998.

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Jennings, M.R., and M.P. Hayes

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8.0 ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
AFV	alternative fuel vehicles
APHIS	Animal and Plant Health Inspection Service
AOC	Area of Concern
ARB	Air Resources Board
BEAP	Base Exterior Architecture Plan
bgs	below ground surface
BMP	Best Management Practices
BOWTS	Bilge and Oily Wastewater Treatment System
B.P.	Before Present
BTEX	benzene, toluene, ethylbenzene, and total xylene
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
Cal EPA	California Environmental Protection Agency
CalEPPC	California Exotic Pest Plants Committee
CBC	Construction Battalion Center
CCC	California Coastal Commission
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CDFG	California Department of Fish and Game
cm	centimeter
CMWD	Calleguas Municipal Water District
CNG	compressed natural gas
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CRWQCB	California Regional Water Quality Control Board
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DoD	Department of Defense
DOE	Department of Energy
DPR	Department of Pesticide Regulation
DTSC	Department of Toxic Substances Control
EA	environmental assessment
EIR	environmental impact report
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F	Fahrenheit
FE	federally endangered
FGDC	Federal Geographic Data Committee

FSC	federal species of concern
ft/yr	feet per year
g	gravity
GCL	geosynthetic clay liner
GIS	Geographic Information System
gpd	gallons per day
gpd/ft^2	gallons per day per square foot
GPR	ground-penetrating radar
GPS	global positioning system
HARP	Historic and Archaeological Resources Protection Plan
HHW	Navy Household Hazardous Waste
IPM	Integrated pest management
IRMP	Integrated Natural and Cultural Resources Management Plan
IRP	Installation Restoration Program
km	kilometer
LF	linear feet
LNAPL	light non-aqueous phase liquid
mm	millimeter
m/sec	meters per second
mg/L	milligrams per liter
MRPP	Monitoring and Reporting Program Plan
msl	mean sea level
MTBE	methyl tertiary-butyl ether
MWR	Morale, Welfare, and Recreation
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NBII	National Biological Information Infrastructure
NECA	National Environmental Compliance Account
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFC	National Marine Fisheries Commission
NMFS	National Marine Fisheries Service
NDDB	Natural Diversity Data Base
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSWC	Naval Surface Warfare Center

OBL	obligate
O&M	Operations and Maintenance
ORV	off road vehicle
PA	Programmatic Agreement
PAHS	polycyclic aromatic hydrocarbons
P2	pollution prevention
Pb	lead
PRB	Project Review Board
PWA	Public Works Administration
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
SAIA	Sikes Act Improvement Amendments
SCE	Southern California Edison
SE	California state endangered
SERDP	Strategic Environmental Research and Development Program
SHPO	State Historic Preservation Officer
SWEF	Surface Warfare Engineering Facility
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
ULV	ultra low volume
USACE	U.S. Army Corps of Engineers
U.S. EPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UWCD	United Water Conservation District
UV	ultraviolet
WIP	Work in Progress
WDR	Waste Discharge Requirement

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APPENDIX A
REGULATORY REQUIREMENTS

1.0 DEPARTMENT OF DEFENSE DIRECTIVE 4700.4 (DODDIR 4700.4), NATURAL RESOURCES MANAGEMENT PROGRAM

Department of Defense Directive 4700.4 requires the following:

- Natural resources under control of the Department of Defense (DoD) shall be managed to support the military mission, while practicing the principles of multiple use and sustained yield, using scientific methods and an inter-disciplinary approach.

- Watersheds and natural landscapes, soils, forests, fish and wildlife, and protected species shall be conserved and managed as vital elements of DoD's natural program. DoD actions that affect natural resources in the U.S. shall comply with the policy and requirements of DoD Directive 6050.1 and the more stringent of applicable Federal or local laws.

- DoD lands shall be available to the public and DoD employees for enjoyment and use of natural resources, except when it is determined that a military mission prevents such access for safety or security reasons or that the natural resources will not support such use.

- If natural resources under DoD control are impacted by hazardous substance released by another party, that party is potentially liable. Funds recovered by the DoD because of natural resources damage claims shall be used for restoration, replacement, or acquisition of equivalent natural resources.

- Enforcement of laws primarily aimed at protecting natural resources and recreation activities that depend on natural resources is an integral part of a natural resources program and shall be coordinated with or under the direction of the natural resources manager for the affected area (WHS 1999).

DODDIR 4700.4 (24 January 1989) requires that the Department of the Navy implement and maintain a balanced and integrated program for the management of natural resources.

2.0 DEPARTMENT OF DEFENSE DIRECTIVE 4710.1 (DODDIR 4710.1), ARCHEOLOGICAL AND HISTORIC RESOURCES MANAGEMENT

DODDIR 4710.1 (21 June 1984) requires that the Department of the Navy implement and maintain an archeological and historic preservation program.

3.0 DEPARTMENT OF DEFENSE INSTRUCTION 4715.3 (DOD I 4715.3), ENVIRONMENTAL CONSERVATION PROGRAM

DOD I 4715.3 (03 May 1996) implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on DoD property. General conservation management policies are defined. Several policies stated are as follows:

- All DoD conservation programs shall work to guarantee continued access to our land, air and water resources for realistic military training and testing while ensuring that natural and cultural resources are entrusted to DoD care are sustained in a healthy condition for scientific research, education, and other compatible uses for future generations.

- All DoD installations shall maintain compliance with all applicable Executive Orders and Federal and natural and cultural resources statutory and regulatory requirements, and State regulations.

- Native Americans shall have access to DoD sites and resources that are of religious importance, or are important to the continuance of their cultures.

- Federal or State conservation officials shall be given access to DoD controlled natural and cultural resources to conduct official business consistent with the installations policies and regulations.

Natural resources management criteria include protecting and enhancing resources for multiple use, sustainable yield and biological integrity. Integrated Natural Resources Management Plans (INRMPs) shall be prepared, maintained, and implemented for all lands and waters under DoD control that have suitable habitat for conserving and managing natural ecosystems. Promotion of biodiversity and management of biologically or geographically significant or sensitive natural resources is required. Threatened and endangered species management and recovery efforts on DoD lands and waters shall be consistent with laws; opportunities to conserve federally listed species and associated ecosystems shall be identified. Consistent with ecosystem-based management, altered or degraded landscapes and associated habitats shall be restored and rehabilitated whenever practical. Additionally, best management practices shall be used to minimize nonpoint sources of water pollution (WHS 1999).

Cultural resources under control of DoD shall be identified, protected, curated, and interpreted through a comprehensive program that complies with legally mandated requirements and results in sound and responsible stewardship. DoD installations shall develop a program to preserve the historic character and function of military properties. Integrated Cultural Resources Management Plans (ICRMPs) shall be prepared, maintained, and implemented for all lands and waters under DoD control. An economic analysis shall be conducted on all National Register eligible historic properties considered for demolition and replacement. Native American human remains and cultural items shall be managed and repatriated to culturally affiliated or lineally descended Native American organizations (WHS 1999).

Under DoD I 4715.3 (03 May 1996), the Department of the Navy is required to ensure that current and planned installation programs, plans, and projects are integrated and compatible with natural and cultural resources programs, plans, and projects. Proven scientific data collection methods and sampling techniques are required to develop and update natural and cultural resources inventories. Cooperative agreements may be entered into with other federal agencies, states, local governments, nongovernmental

organizations and individuals to provide for the maintenance and improvement of natural or conservation research on DoD installations (WHS 1999).

4.0 SECNAVINST 6240.6E SECRETARY OF THE NAVY INSTRUCTION 6240.6E (SECNAVINST 6240.6E), DEPARTMENT OF THE NAVY ENVIRONMENTAL PROTECTION AND NATURAL RESOURCES MANAGEMENT PROGRAM

SECNAVINST 6240.6E assigns responsibility to the Chief of Naval Operations and the Commandant of the Marine Corps for the development and implementation of natural resources programs on all land and water areas under the jurisdiction of the Department of the Navy.

5.0 NAVY OPERATIONS AND NATURAL RESOURCES MANAGEMENT PROCEDURAL MANUAL, VOLUME II (PROCEDURAL MANUAL 73, VOLUME II)

Volume II of the *Navy Operations and Natural Resources Management Procedural Manual* addresses all Chief of Naval Operations natural resources program requirements, guidelines, and standards.

6.0 DEPARTMENT OF THE NAVY HISTORIC AND ARCHEOLOGICAL RESOURCES PROTECTION (HARP) PLANNING GUIDELINES

The *Historic and Archeological Resources Protection (HARP) Planning Guidelines* (Department of the Navy 1997) provides assistance to the Navy and Marine Corps in the development and implementation of HARP Plans. Assistance in coordinating pre-existing HARP plans with ICRMPs anticipated to replace HARP plans is also described. Major laws relevant to historic and archeological resources and the National Environmental Policy Act (NEPA) should be considered in developing a plan. Consultation with parties on and off the installation is required, while others may need to be consulted to determine management of resources on the installation. Management issues and categorization of the built environment are defined. The planning and decision making process should be specific about roles, responsibilities, and time frames to ensure proper consideration and procedures for historic and archeological resources (Department of the Navy 1997).

The Historic and Archeological Resources Protection (HARP) Plan for the years 1998-2003 for Construction Battalion Center, Port Hueneme, Ventura County, California is the current HARP plan in place for CBC Port Hueneme.

7.0 ENDANGERED SPECIES ACT (ESA) OF 1973, AS AMENDED

The *Endangered Species Act (ESA) of 1973, as amended* is an attempt to protect all listed and candidate threatened or endangered species or proposed threatened or endangered species, and their critical habitat. In order to comply with this regulation, CBC Port Hueneme must avoid take of listed species and contribute to the recovery of these species. It is often the case that threatened and endangered species, both plant and animal, require habitat for their survival that is rare and/or declining.

The ESA is divided into 17 sections. Section 7 of the Act ("Interagency Cooperation") requires federal agencies to seek consultation with and assistance of the Departments of the Interior and Commerce before undertaking actions that would potentially jeopardize the continued existence of endangered or threatened species or result in the destruction of any critical habitat associated with the species. Section 7(a) gives broad authority to the U.S. Fish and Wildlife Service (USFWS), as part of the Department of the Interior, to review any action authorized, funded, or carried out by a federal agency that has been determined to affect a threatened or endangered species (with the exception of marine species) or associated designated critical habitat. The National Marine Fisheries Service (NMFS) plays a similar role for marine species. The USFWS or the NMFS has the authority, under this section, to comment on several actions such as Corps of Engineers permits, military actions or construction projects, federal highway projects, and Coast Guard actions. Any federal license, permit, sale, or grant is subject to a Section 7 consultation (Tetra Tech 1996).

After an action has been proposed by a federal agency that may affect a listed species or critical habitat, a request for formal consultation is submitted to the USFWS. The USFWS then has 90 days to complete the consultation. A Biological Opinion must be issued within 45 days of the close of the consultation period. The Biological Opinion states whether or not the proposed action is likely to jeopardize a listed species and its critical habitat. When jeopardy Biological Opinions are given, the USFWS must provide reasonable and prudent alternatives that would avoid a jeopardy situation. These alternatives must be consistent with the agency's legal authority and jurisdiction, consistent with the intended purposes of the action, and economically and technologically feasible (Finger 1995).

The 1978 Amendments created the Endangered Species Committee, which is empowered to provide exemptions to federal agencies or states from the requirements of consultation under Section 7(a)(2). According to the 1979 Amendments to the ESA, consultation and the resultant Biological Opinion should be based upon the "best scientific and commercial data available." Under the 1982 Amendments, "incidental take statements" may be issued with a jeopardy Biological Opinion. This permit allows takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant (Federal Register 1986).

8.0 MARINE MAMMAL PROTECTION ACT (16 U.S.C. 1361 *ET SEQ.*)

Section 101(a)(5)(A) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and regulations are issued. Permission may be granted for periods of 5 years or less if the NMFS finds that the taking will have a negligible impact on the species or stock(s); will not have an unmitigatable adverse impact on the availability of the species or stock(s) for subsistence uses; and the permissible methods of taking and requirements pertaining to the monitoring and reporting of such taking are set forth.

9.0 SIKES ACT, AS AMENDED (PUBLIC LAW 105-85 OF 18 NOVEMBER 1997)

Under the Natural Resource Management on Military Lands Act of 1960 (16 U.S.C. § 670a et seq.), commonly known as the Sikes Act, as amended according to the Sikes Act Improvement Act of 1997,

> The Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate the program, the

> Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary.

As part of the Act, this plan shall be prepared as a cooperative effort between the USFWS and the appropriate state fish and wildlife agency (i.e., California Department of Fish and Game [CDFG]). It should, to the "extent appropriate and applicable," incorporate the following components:

- Fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation;
- Fish and wildlife habitat enhancement or modifications;
- Wetland protection, enhancement, restoration, where necessary for support of fish, wildlife, or plants;
- Integration of, and consistency among, the various activities conducted under the plan;
- Establishment of specific natural resource management goals and objectives and time frames for proposed actions;
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources;
- Public access to the military installation that is necessary or appropriate for the use described in the last item, subject to requirements necessary to ensure safety and military security;
- Enforcement of applicable natural resource laws (including regulations);
- No net loss in the capacity of military installation lands to support the military mission of the installation; and
- Such other activities as the Secretary of the military department determines appropriate.

10.0 EXOTIC ORGANISMS, EXECUTIVE ORDER 11987

Exotic Organisms, Executive Order 11987 was enacted to restrict the introduction of exotic species into natural ecosystems.

Executive Order 11987 would require the Navy to restrict the use of Federal resources for the purpose of introducing exotic species into natural ecosystems of the United States, or introducing native species into ecosystems outside the United States where they do not naturally occur. Executive Order 11987 is replaced by the *Invasive Species, Executive Order 13112* (discussed below).

11.0 INVASIVE SPECIES, EXECUTIVE ORDER 13112

Invasive species, Executive Order 13112 of February 3, 1999 requires federal agencies to implement the following:

- Prevent the introduction of invasive species;
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner;
- Monitor invasive species populations accurately and reliably;
- Provide for restoration of native species and habitat conditions in ecosystems that have been invaded;
- Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and
- Promote public education on invasive species and the means to address them.

The Executive Order does not authorize, fund or support actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless federal agencies determine and have made public that the benefits of such actions outweigh the potential harm caused by invasive species (NARA 1999).

Executive Order 13112 creates an Invasive Species Council whose members include the Secretaries of State, Treasury, Defense, Interior, Agriculture, Commerce, Transportation, and the Administrator of the Environmental Protection Agency. The Invasive Species Council will develop a National Invasive Species Management Plan (Management Plan) within 18 months (by August 2000) and will update the plan every two years. The Management Plan shall recommend specific objectives and measures to prevent the introduction of invasive species, and to control and minimize the economic, ecological, and human health impacts caused by invasive species. The Council will encourage planning and action at the local, tribal, state, regional and ecosystem-based levels to achieve the goals and objectives of the Management Plan. A coordinated, up-to-date information-sharing system that utilizes the internet will be established to provide access to and exchange of information concerning invasive species.

Executive Order 13112 would require the Department of the Navy to meet the goals and objectives defined by the Management Plan including but not limited to control of invasive species populations, and restoration of native species and habitat. Executive Order 13112 replaces Executive Order 11987, Exotic Organisms.

12.0 NATIONAL ENVIRONMENTAL PROTECTION ACT (NEPA)

The *National Environmental Policy Act (NEPA)* (Public Law [P.L.] 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). The Council of Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508) require an environmental assessment (EA), which initially identifies whether the federal action will have significant impacts. An environmental impact statement (EIS) is prepared when the action will have significant impacts; a finding of no significant impact (FONSI) is prepared when the action will not have any significant impacts (40 CFR 1501.3, 1501.4) (Jones and Stokes Associates, Inc 1995).

NEPA would require the Navy to analyze the potential environmental impacts of major proposed actions and alternatives and to use these analyses as a decision making tool on whether to proceed with the proposed action.

Management recommendations for the IRMP at CBC Port Hueneme are not yet subject to NEPA; however, implementation of the goals and objectives of the IRMP would require future NEPA documentation on a project-by-project basis.

13.0 WETLANDS PROTECTION ACT, EXECUTIVE ORDER 11990

The *Wetlands Protection Act, Executive Order 11990* was enacted to avoid the long and short term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands wherever there is a possible alternative. The Wetlands Protection Act requires federal agencies to minimize the destruction, loss, and degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands whenever practicable.

Executive Order 11990 would require the Navy to avoid construction or management practices that would adversely affect wetlands unless there is no practicable alternative to such construction, and the proposed action includes all practicable measures to minimize harm to the wetlands. In making this finding, the Navy may take into account economic, environmental and other pertinent factors (US Army Corps of Engineers 1977).

The Navy would also be required to provide opportunity for early public review of any plans or proposals for new construction in wetlands, in accordance with Section 2(b) of Executive Order 11514, as amended.

14.0 FLOODPLAIN MANAGEMENT, EXECUTIVE ORDER 11988

Floodplain Management, Executive Order 11988 directs all Federal agencies to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by floodplains.

Executive Order 11988 would require the Navy to avoid construction in floodplains unless there is no practicable alternative to such construction, and the proposed action includes all practicable measures to minimize harm to or within the floodplain. The construction of structures would have to be in accordance with the standards and criteria of the National Flood Insurance Program. The Navy would also be required to ensure that its planning programs and budget requests reflect consideration of floodplain hazards and floodplain management.

To demonstrate compliance with the Executive Order, the Navy would be required to provide opportunity for early public review for construction in floodplains.

15.0 NATIONAL HISTORIC PRESERVATION ACT OF 1966, AS AMENDED

The *National Historic Preservation Act (NHPA)* was passed by Congress in 1966 to establish the federal government's policy on historic preservation. Through the Act, Congress sought to make the federal government an active participant in preservation efforts. This was the result of a growing perception that modern development was encroaching significantly on the nation's prehistoric and historic cultural heritage by destroying or altering archaeological sites and historic structures. Section 110 of the NHPA,

as amended (16 U.S.C. § 470h), directs that "The heads of all Federal agencies shall assume responsibility for the preservation of historic properties which are owned or controlled by such agency." Each federal agency must establish a preservation program for the identification, evaluation, and nomination of properties to the National Register of Historic Places (NRHP) and for the protection of these historic properties. The U.S. Navy and CBC Port Hueneme are therefore the stewards of the National Register listed and eligible properties under their jurisdiction.

Section 106 of the NHPA, as amended (16 U.S.C. § 470f) and its implementing regulation, Protection of Historic Properties (36 CFR § 800) require federal agencies to consider the effects of their actions on properties listed, or eligible for listing, on the NRHP. Section 106 states that, in the event that any activity (action, project, or program) might result in a change to the characteristics or use of an NRHP listed or eligible property, a series of compliance steps must be followed to ascertain the best course of action, if any, to mitigate damage to or a compromise of the historic integrity of that property. Section 106 requires agencies to consult the State Historic Preservation Office (SHPO) to establish the area of potential effect (APE) of any proposed undertaking, determine whether any National Register listed or eligible properties exist within the APE, and determine whether such properties will be affected by the proposed undertaking. If so, it must also be determined whether the effect will be adverse. In the case of an adverse effect, the Advisory Council on Historic Preservation (ACHP) must be notified and given the opportunity to comment and approve or disapprove the undertaking. The Naval Facilities Engineering Command (Southwest Division) currently assists CBC Port Hueneme in its compliance with Sections 106 and 110 of the NHPA and in its interactions with the SHPO and ACHP.

To facilitate adherence to Sections 106 and 110 of the NHPA, the National Park Service (NPS) has developed guidelines for the evaluation of cultural resources for eligibility to the NRHP. These guidelines apply to prehistoric and historic-period archaeological sites as well as historic buildings, structures, and objects.

The NPS has developed four criteria for identifying and assessing the historical significance of cultural resources to determine NRHP eligibility (Table A-1). At least one criterion of the National Register Criteria of Evaluation must be met for a property to be considered eligible to the NRHP (NPS 1991). Federal laws and regulations regarding the management and treatment of historic properties are invoked by the property's NRHP eligibility as determined in consultation with the State Historic Preservation Office (SHPO). It is not necessary that a potentially eligible property be listed on the NRHP to be subject to special management considerations.

In addition to historic significance, a property must have integrity to be eligible to the NRHP. Integrity is the property's ability to convey its demonstrated historic significance. Seven individual elements comprise integrity (Table A-2). It is not required that an historic property displays all these qualities. A property must have only two of these aspects of integrity to be considered eligible to the National Register (NPS 1991). For example, a moved structure has lost its integrity of location, but is not automatically disqualified from NRHP inclusion if it retains other aspects of integrity (National Park Service 1986, 1987).

Table A-1
Criteria for Inclusion of a Property on the National Register of Historic Places

Criterion	Association	Characteristic
A	Event	Properties associated with events that have made a significant contribution to the broad patterns of U.S. history.
B	Person	Properties associated with the lives of persons significant in U.S. history.
C	Design/Construction	Properties that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
D	Information Potential	Properties that have yielded, or may be likely to yield, information important in prehistory or history.

Source: National Park Service 1991.

Table A-2
Qualities of Integrity Related to Eligibility for the National Register of Historic Places

Quality	Description
Location	The place the historic property was constructed or the historic event occurred.
Design	The combination of elements creating the property's form, plan, space, structure, and style.
Setting	The physical environment of the historic property.
Materials	The physical elements combined at a particular period of time and in a particular pattern or configuration to form a historic property.
Workmanship	The physical evidence of the craft of a particular culture or people during any given period.
Feeling	The property's expression of the aesthetic or historic sense of a particular period of time.
Association	The direct link between an important historic event or person and the property.

Source: National Park Service 1991.

16.0 NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT (NAGPRA) OF 1990

In November of 1990, President George Bush signed the *Native American Graves Protection and Repatriation Act (NAGPRA)* (25 U.S.C. § 3001, 43 CFR § 10). The purpose of this law is to address the rights of lineal descendants and members of Indian tribes and Native Hawaiian groups to ownership of Native American human remains and funerary or sacred objects. The law provides for the identification of Native American human remains and funerary or sacred objects that are in federal possession, in the possession of an institution or state or local government receiving federal funds, or discovered on federal or tribal lands, and their return to the appropriate Native American representatives. When any undertaking is proposed on federally owned land, such as CBC Port Hueneme, that could potentially result in the excavation of Native American human remains or funerary and sacred objects, NAGPRA requires that the responsible federal agency official or Native American tribal official be notified. If Native American human remains or funerary or sacred objects are discovered, the activity that resulted in the discovery must be suspended. The cultural resources program coordinator at the Naval Facilities Engineering Command (Southwest Division) must then initiate consultation with Native American tribal officials, religious leaders, and lineal descendants of the appropriate tribe, to determine the disposition of the recovered remains.

In 1994, in compliance with NAGPRA, the Saint Louis District of the U.S. Army Corps of Engineers, under contract to Engineering Field Activity West, Naval Facilities Engineering Command, conducted a survey of museums, educational institutions, and private collections in search of Native American human remains and funerary or sacred objects that had originated within CBC Port Hueneme. No resources of this type were located (Uribe & Associates 1998).

17.0 ARCHAEOLOGICAL RESOURCES PROTECTION ACT OF 1979

In 1979, Congress established the *Archaeological Resources Protection Act (ARPA)* (16 U.S.C. § 470aa-470ll) to prevent the disturbance of archaeological resources and sites on public and Indian lands. The passage of ARPA was stimulated by the realization that archaeological resources on public and Indian lands are often easily accessible and are, therefore, endangered by vandalism and unauthorized collection for commercial purposes. Under ARPA, unauthorized excavation, removal, damage, alteration, defacement, and trafficking of archaeological resources illegally removed from federal or tribal lands are punishable by fines and imprisonment. Archaeological sites located on federal lands including CBC Port Hueneme must be investigated only by qualified professional archaeologists. Investigators intending to work at CBC Port Hueneme must obtain a permit from the cultural resources program coordinator at the Naval Facilities Engineering Command (Southwest Division) before collecting artifacts or conducting excavation. The locations of National Register listed or eligible archaeological resources must be kept confidential, and not released to the general public or to Navy personnel unless on a need-to-know basis.

ARPA is also intended to encourage cooperation and the exchange of archaeological information between the federal government, state and local governments, and professional archaeologists. The law provides for the sharing of archaeological data between universities, museums, and other scientific or educational institutions. In addition, ARPA facilitates communication, cooperation, and exchange with private individuals who have collections of archaeological materials and data which were collected before enactment of the law.

APPENDIX C
HISTORIC AND CULTURAL RESOURCES MITIGATION SUGGESTIONS AND HARP EXECUTIVE SUMMARY

1.0 INTRODUCTION

Potential effects to historic properties at CBC Port Hueneme may result from single-occurrence undertakings, such as new construction; routine or repetitive actions, such as repairs or maintenance to existing buildings; or natural phenomena, such as the minor damage caused to the Thomas R. Bard mansion by the Northridge earthquake. While damage by natural processes is not considered a serious threat to the preservation of National Register of Historic Places (NRHP) listed or eligible properties on the base, avoidance and mitigation strategies exist to eliminate or minimize adverse effects due to human activities (Uribe & Associates 1998).

1.1 AVOIDANCE OF ADVERSE EFFECTS

Avoidance is the best course of action in dealing with potential adverse effects to historic properties from human activities. Avoidance can include rerouting or relocating new projects; planning undertakings around historic resources in such a way that historic feeling, setting, or association are not compromised; or protecting historic properties from accidental damage during new construction projects.

1.2 MITIGATION SUGGESTIONS

When the adverse impact of an undertaking cannot be avoided, mitigation is required. Mitigation involves consultations between the Navy and the Base Historic Preservation Office (BHPO), the State Historic Preservation Office (SHPO), interested parties (private citizens, contractors, Ventura County Historical Society, etc.), and the Advisory Council on Historic Preservation (ACHP) with the goal of arriving at a mutually acceptable strategy to resolve the adverse impact. In the event of an unavoidable undertaking that could have an adverse impact on buildings such as the Thomas R. Bard mansion, the Richard Bard house, and the Farrell house, the most effective strategies would be to alter or restrict the magnitude of the undertaking and protect the historic resources as much as possible to lessen the degree of effect. Protection can be in the form of erecting barriers, using protective coverings such as tarps, and restricting personnel and equipment from certain areas. Protection should also include the presence of qualified historians or archaeologists to monitor activities and ensure that proper procedures are followed. In the event of ground-breaking activities, a monitor should be present to ensure the proper treatment of any archaeological materials that may be encountered.

If a historic property must be destroyed or greatly altered, extensive documentation and recordation provide a mitigation strategy that is a last resort. In order to salvage the historic value of the resource, the property would be described in detail through the use of various techniques. For buildings and structures, the process most commonly used is known as Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentation.

Should HABS/HAER documentation become necessary, the Regional Office of the National Park Service (NPS) determines both the appropriate level of documentation and the final repository for the records. The Western Regional Office, whose territory includes California, is located in San Francisco (NPS 1985). Different levels of HABS/HAER documentation exist. Level I recordation, the most rigorous level of documentation appropriate for National Historic Landmarks, includes large-format, perspective-corrected view camera photography; measured drawings; original research to compile the report for the

historic property; and strict guidelines for archival preservation of the materials, with a basic durability performance standard of 500 years. This level is not necessary or desirable for all properties. By contrast, the simplest form of HABS/HAER documentation, Level IV, consists of an inventory card with a black and white photograph (NPS 1990b).

The documentation should not only focus on a property's historical associations with events or persons, but also on the history of the aesthetic developments and technology associated with the resource. For example, the historic revival movement in architecture influenced Myron Hunt's design for the Thomas R. Bard mansion, while the concurrent Arts and Crafts, or Craftsman style was the result of a quite different aesthetic sensibility reflected in the Edward and Mary Farrell house. The documentation process should be tailored to take these factors into account.

An important part of the documentation process that preserves the value of CBC Port Hueneme historic properties involves obtaining their original plans and subsequent alteration blueprints. These provide a continuous log of their evolutionary process with regard to architectural form and function. Efforts should also be made to understand not only the original function of a specific historic property but the history of its function as a CBC Port Hueneme facility.