

**Final Integrated Natural Resources
Management Plan (INRMP)
Presidio of Monterey and
Ord Military Community
Monterey County, California**

Prepared for

United States Department of the Army
Corps of Engineers
Sacramento District
1325 J Street
Sacramento, California 95814-2922

Harding ESE, Inc. Project No. 53633-1

Stephen Dee
Senior Environmental Planner

James C. Breitlow
Principal Environmental Scientist

May 29, 2001



Engineering and Environmental Services
90 Digital Drive
Novato, CA 94949 — (415) 883-0112

**Final Integrated Natural Resources
Management Plan (INRMP)
Presidio of Monterey and
Ord Military Community
Monterey County, California**

Harding ESE, Inc. Project No. 53633-1

This document was prepared by Harding ESE, Inc. (formerly Harding Lawson Associates) at the direction of the U.S. Army Corps of Engineers (USACE), Sacramento District for the sole use of USACE and the Installation, the only intended beneficiaries of this work. No other party should rely on the information contained herein without the prior written consent of the Army. This report and the interpretations, conclusions, and recommendations contained within are based in part on information presented in other documents that are cited in the text and listed in the references. Therefore, this report is subject to the limitations and qualifications presented in the referenced documents.

CONTENTS

EXECUTIVE SUMMARY.....	IX
PART I GENERAL	1
1.0 BACKGROUND	2
1.1 Regulatory Requirements.....	2
1.1.1 Army Regulation 200-3.....	2
1.1.2 Compliance Requirements	3
1.1.3 Army Guidelines	4
1.1.4 Agency Cooperation.....	4
1.2 Installation Location	4
1.2.1 POM.....	4
1.2.2 OMC.....	5
1.3 Installation History	5
1.3.1 POM.....	5
1.3.2 OMC.....	6
1.4 Consistency with Military Mission.....	6
1.4.1 POM.....	6
1.4.1.1 Defense Language Institute Foreign Language Center	6
1.4.1.2 Other Commands at POM	7
1.4.2 OMC.....	7
2.0 LAND USE	8
2.1 POM	8
2.2 OMC	8
2.2.1 Residential Housing.....	8
2.2.2 Army Administration/Support.....	9
3.0 EXISTING CONDITIONS AT THE POM AND OMC	10
3.1 Climate	10
3.2 Topography.....	10
3.2.1 POM.....	10
3.2.2 OMC.....	10
3.3 Soils	10
3.3.1 POM.....	10
3.3.2 OMC.....	11
3.4 Natural Vegetation.....	12
3.4.1 POM.....	12
3.4.1.1 General Habitat Types.....	12
3.4.1.2 Special Status Species	12
3.4.2 OMC.....	14
3.4.2.1 General Habitat Types.....	14
3.4.2.2 Special Status Species	15
3.5 Off-Road Vehicle Use.....	15
3.5.1 POM.....	15
3.5.2 OMC.....	16
3.6 Drainage System.....	16

3.6.1	POM	16
3.6.1.1	Surface Water Runoff	16
3.6.1.2	Storm Drain System	16
3.6.1.3	Flooding	17
3.6.1.4	Wetland Areas	17
3.6.2	OMC	17
3.6.2.1	Surface Water Runoff	17
3.6.2.2	Storm Drain System	17
3.6.2.3	Flooding	18
3.6.2.4	Wetland Areas	18
3.7	Soil Eroded Areas	18
3.7.1	POM	18
3.7.1.1	Landsliding	18
3.7.1.2	Erosion	18
3.7.2	OMC	19
3.7.2.1	Landsliding	19
3.7.2.2	Erosion	19
4.0	GENERAL MANAGEMENT OF THE POM AND OMC	20
4.1	Soil Erosion Control	20
4.1.1	POM	20
4.1.2	OMC	21
4.2	Drainage Requirements	21
4.2.1	POM	21
4.2.2	OMC	21
4.3	Fire Protection	22
4.3.1	POM	22
4.3.1.1	Fire Service	22
4.3.1.2	Firebreaks	22
4.3.1.3	Prescribed Burning	22
4.3.2	OMC	23
4.3.2.1	Fire Service	23
4.3.2.2	Firebreaks	23
4.3.2.3	Prescribed Burning	23
4.4	Resource Requirements	23
4.4.1	Grounds Maintenance	23
4.4.2	Natural Resources Management	24
4.4.3	Equipment, Supplies, and Materials	24
4.5	Revisions	24
PART II LAND MANAGEMENT AND GROUNDS MAINTENANCE		25
1.0	BACKGROUND	26
1.1	Regulatory Framework	26
1.2	Grounds Maintenance	26
2.0	LAND USE CATEGORIES AND MANAGEMENT REQUIREMENTS	27
2.1	Improved Grounds on the POM and OMC	27
2.1.1	Land Use Inventory	27
2.1.1.1	Grass and Lawn	27

2.1.1.2	Disturbed Ground	28
2.1.1.3	Developed Lands	28
2.1.1.4	Cemeteries	28
2.1.2	Habitat Concerns and Management Requirements	29
2.1.3	Landscape Maintenance	29
2.1.3.1	Mowing	29
2.1.3.2	Fertilizing	29
2.1.3.3	Pruning	30
2.1.3.4	Irrigation	30
2.2	Semi-Improved Grounds on the POM and OMC	32
2.2.1	Land Use Inventory	32
2.2.1.1	Horticultural Tree Plantings	32
2.2.2	Habitat Concerns and Management Requirements	33
2.2.3	Landscape Maintenance	33
2.3	Unimproved Grounds on the POM and OMC	34
2.3.1	Land Use Inventory	34
2.3.1.1	Coast Live Oak Woodland	34
2.3.1.2	Central Maritime Chaparral	34
2.3.1.3	Coastal Scrub	34
2.3.1.4	Annual Grassland	35
2.3.1.5	Monterey Pine Forest	35
2.3.1.6	Riparian Forest	35
2.3.2	Habitat Concerns and Management Requirements	36
2.3.3	Landscape Maintenance	36
3.0	OPPORTUNITIES FOR LANDSCAPING AT THE POM AND OMC	37
3.1	Improved and Semi-Improved Grounds	37
3.2	Unimproved Grounds	38
3.3	Historic District	39
4.0	BEST MANAGEMENT PRACTICES	40
4.1	Management Responsibilities	40
4.2	General Landscape Specifications	40
4.2.1	Sources and Standards of Plant Materials	40
4.2.2	Planting Seasons	40
4.2.3	Nursery Stock Planting Methods	41
4.3	Fertilizers and Soil Amendments	41
4.3.1	Fertilizers	42
4.3.1.1	Fertilizer Types	42
4.3.1.2	Application	43
4.3.1.3	Storage	43
4.3.2	Soil Amendments	43
4.4	Irrigation	44
4.4.1	Irrigation Design	44
4.4.2	New and Replacement Irrigation Systems	45
4.4.3	Operation of Irrigation Systems	45
4.4.4	Irrigation Standards	45
4.5	Maintenance of Tree, Shrub, and Groundcover Plants	46
4.5.1	Shrubs	48
4.5.2	Horticultural Tree Plantings	48

4.5.3	Pruning After Transplanting	49
4.5.4	Protection from Equipment	49
4.6	Policing	49
5.0	DISEASE, INSECT CONTROL AND SANITATION	50
5.1	Integrated Pest Management	50
5.2	Pests of Concern on the POM and OMC	50
5.2.1	Pests of Natural and Urban Landscapes	50
5.2.1.1	Animal Pests	50
5.2.2	Other Pests of Forested and Landscaped Areas	51
5.2.3	Structural Pests	53
5.2.4	Undesirable Plant Pests	54
5.3	Coordination with Federal, State, and Local Agencies	55
5.3.1	Federal Agencies	56
5.3.2	State Agencies	56
5.3.3	Local Agencies	57
6.0	ANNUAL WORK PLAN	58
PART III FOREST MANAGEMENT		59
1.0	FOREST MANAGEMENT	60
PART IV FISH AND WILDLIFE MANAGEMENT		61
1.0	GENERAL INFORMATION	62
1.1	Background	62
1.2	Regulatory Background	62
2.0	FISH AND WILDLIFE RESOURCES	63
2.1	POM	63
2.1.1	Wildlife Species	63
2.1.2	Special-Status Species	64
2.2	OMC	64
2.2.1	Wildlife Species	64
2.2.2	Special-Status Species	66
3.0	FISH AND WILDLIFE MANAGEMENT PROGRAM	67
3.1	Management Objectives	67
3.2	Wildlife Habitat Management and Maintenance	67
3.2.1	POM	67
3.2.2	OMC	68
3.3	Cooperative Research and Resource Management	70
PART V OUTDOOR RECREATION		71
1.0	GENERAL INFORMATION	72
1.1	Background	72
1.1.1	Objectives	72
1.1.2	Outdoor Recreation and Cultural Values	72

1.1.3	Preparation and Implementation of Outdoor Recreation Plan	72
1.2	Regulatory Background	72
1.2.1	Federal Outdoor Recreation Planning	73
1.2.2	State Outdoor Recreation Planning	73
1.2.2.1	SCORP Objectives	74
1.2.2.2	Coordination of SCORP With INRMP	74
1.2.3	Coordination of Cultural Resources	74
1.3	Public Access, Safety, and Security	75
2.0	CLASSIFICATION OF OUTDOOR RECREATION AND CULTURAL VALUES	76
2.1	Class I General Outdoor Recreation Areas	76
2.2	Class II Natural Environment Areas	76
2.3	Class III Special Interest Areas	76
2.3.1	POM Historic Districts	77
2.3.1.1	POM Historic District	77
2.3.1.2	El Castillo Historic District	77
2.3.2	Sloat Monument Scenic Overlook	78
3.0	MANAGEMENT OF OUTDOOR RECREATION AND CULTURAL VALUES	79
3.1	Class I General Outdoor Recreation Areas	79
3.2	Class II Natural Environmental Areas	79
3.3	Class III Special Interest Areas	80
3.3.1	POM Historic District	80
3.3.2	Sloat Monument Scenic Overlook	81
REFERENCES	82

TABLES

1	Monthly Climate Data for Monterey 1961-1990
2	Plant Species Observed at the POM and OMC
3	Plant Species Expected at the POM and OMC
4	Normal Year ETo for City of Monterey
5	Multiplying Factors for Turfgrass Irrigation
6	Turfgrass 3-Day Water Requirements
7	Estimated Values for Species, Density, and Microclimate Factors
8	Native Species Suitable for Planting in Monterey Pine and Riparian Forest at the POM and OMC
9	Recommended Grass Varieties for Lawn Planting at the POM and OMC
10	Species Suitable for Planting in Improved Grounds at the POM and OMC
11	Invasive Species that should be Avoided at the POM and OMC
12	Scheduled Grounds Maintenance Service - Improved Grounds
13	Scheduled Grounds Maintenance Service - Semi-Improved Grounds
14	List of Wildlife Species Potentially Occurring at the POM
15	List of Wildlife Species Potentially Occurring at the OMC

FIGURES

1	Regional Location Map
2	POM Site Location

3	OMC Site Location
4	POM Site Land Use
5	OMC Land Use
6	POM Topography
7	OMC Topography
8	POM Soils Map
9	OMC Soils Map
10	Known Distribution of Monterey Pine Forest on POM Lands
11	Known Distribution of Hooker's Manzanita on POM Lands
12	Known Distribution of Small-Leaved Lomatium on POM Lands
13	Known Distribution of Yadon's Piperia on POM Lands
14	Known Distribution of Monterey Spineflower on OMC Lands
15	Known Distribution of Sandmat Manzanita on OMC Lands
16	Known Distribution of Monterey Ceanothus on OMC Lands
17	Known Distribution of Virgate Eriastrum on OMC Lands
18	POM Storm Drain System
19	OMC Storm Drain System
20	POM Organizational Chart
21	Vegetation Cover Classifications, POM
22	Vegetation Cover Classifications, OMC
23	POM Outdoor Recreation and Cultural Resources

APPENDIX

A	ENVIRONMENTAL ASSESSMENT
B	ENDANGERED SPECIES MANAGEMENT PLAN

DISTRIBUTION

EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) for the Presidio of Monterey (POM) and Ord Military Community (OMC) has been prepared in accordance with Army Regulation (AR) 200-3 and the Guidelines to Prepare Integrated Natural Resources Management Plans for Army Installations and Activities (*U.S. Army Environmental Center, 1997*). The Army is in the process of converting portions of Fort Ord to civilian reuse (land referred to as the former Fort Ord) and realigning the remaining property for continuing Army use (land referred to as the OMC). For the OMC, this plan covers only those lands being permanently retained by the Army. Land areas identified for civilian reuse, the former Fort Ord, are not included in this INRMP. The *Installation-Wide Multispecies Habitat Management Plan for the Former Fort Ord, California (U.S. Army, 1997a)* will continue to guide management of identified sensitive biological resources on lands identified for civilian re-use and held for the interim by the Army and lands to be retained by the Army. Information contained in this document is designed to guide the overall management of natural resources on permanently-held Army lands at the POM and OMC.

Under the Sikes Act authorized by Congress (1962), INRMPs are to be developed and maintained for all Army installations. The INRMP is intended to be a component and supporting element of the Installation Master Plan. This plan has been coordinated with the U.S. Fish and Wildlife Service and California Department of Fish and Game and made available for public comment. New and continuing mission activities that affect natural resources should be coordinated with appropriate natural resources managers.

Under AR 200-3 (Chapter 9, Section 9.1 (a)), the scope of an INRMP at each Army installation should include the following five parts:

- Part I General. To be prepared by installations having 500 or more acres of improved, semi-improved, and unimproved grounds combined, or 50 or more acres of improved grounds.
- Part II Land Management and Grounds Maintenance. To be prepared by installations having 500 or more acres of improved, semi-improved, and unimproved grounds combined, or 50 or more acres of improved grounds.
- Part III Forest Management. To be prepared by installations having 100 or more acres of commercial forests. In this INRMP, Part III is not included because neither the POM nor OMC contain 100 or more acres of commercial forest.
- Part IV Fish and Wildlife Management. To be prepared by installations having land and water areas suitable for the management of fish and wildlife resources. In this INRMP, this section is abbreviated because both the POM and OMC have limited fish and wildlife resources.
- Part V Outdoor Recreation and Cultural Values. To be prepared by installations with outdoor recreation programs which depend upon maintenance and management of natural resources. In this INRMP, Part V is abbreviated because both the POM and OMC contain minimal outdoor recreation resources. This section is primarily focused on cultural resources located on the POM.

PART I
GENERAL

1.0 BACKGROUND

This Integrated Natural Resources Management Plan (INRMP) for the Presidio of Monterey (POM) and Ord Military Community (OMC) has been prepared in accordance with Army Regulation (AR) 200-3 (*U.S. Army, 1995a*). At the time of this document preparation, the Army was in the process of converting portions of Fort Ord to civilian reuse (land referred to as the former Fort Ord) and realigning the remaining property for continuing Army use (land referred to as the OMC). For the OMC, this plan covers only those lands being retained by the Army. Land areas identified for non-military reuse, the former Fort Ord, are not included in this INRMP but are managed under the *Installation-Wide Multispecies Habitat Management Plan for the Former Fort Ord, California (U.S. Army, 1997a)*. Information contained in this document is designed to guide the management of natural resources at the POM and OMC. Figures 1, 2, and 3 show the regional and local context of the POM and OMC.

1.1 Regulatory Requirements

1.1.1 Army Regulation 200-3

As authorized by Congress in the Sikes Act, the Army is required to develop and maintain an INRMP for each Army installation. AR 200-3 requires INRMPs to be prepared, implemented, and monitored by natural resources management professionals. The plans should be coordinated with appropriate federal, state, and local natural resources managers and agencies with natural resources expertise, and should be made available for public comment. The INRMP should be a component and supporting element of the installation master plan. New and continuing mission activities that affect natural resources should be coordinated with appropriate natural resources managers. Also, see AR 200-1 (e.g., Chapter 15, Sections 15-3 and 15-5).

Each installation INRMP, and major revisions thereof, is required to be forwarded to the Major Army Command (MACOM) for approval. The approved plan, together with the applicable technical manuals, will be the technical basis for the installation implementation. Review, approval, and distribution of annual revisions should be in accordance with provisions established by the MACOM.

The natural resources management plan is considered integrated under the following conditions:

- All renewable natural resources and areas of critical or special concern from a technical and policy standpoint are addressed;
- Natural resources management methodologies sustain the capabilities of the renewable resources to support military requirements;
- Current inventories and conditions of natural resources; goals; management methods; schedules of activities and projects; priorities; responsibilities of installation planners and decision makers; monitoring systems; protection and enforcement systems; land use restrictions, limitations, and potential or capabilities; and resource requirements including professional and technical manpower are identified;
- The INRMP and other plans and regulations including the Endangered Species Management Plan (ESMP) and Endangered Species Act, are consistent; and

- The Plan is compatible with the Installation Master Plan, Pest Management Plan, and Master Training Schedule.

The scope of INRMPs generally include five parts. These are summarized below, with a brief statement of whether each of these parts is included in this INRMP.

- Part I General. To be prepared by installations having 500 or more acres of improved, semi-improved, and unimproved grounds combined, or 50 or more acres of improved grounds. This part is included in the INRMP.
- Part II Land Management and Grounds Maintenance. To be prepared by installations having 500 or more acres of improved, semi-improved, and unimproved grounds combined, or 50 or more acres of improved grounds. This part is included in the INRMP.
- Part III Forest Management. To be prepared by installations having 100 or more acres of commercial forests. In this INRMP, Part III is not included because neither the POM nor OMC contain 100 or more acres of commercial forest.
- Part IV Fish and Wildlife Management. To be prepared by installations having land and water areas suitable for the management of fish and wildlife resources. In this INRMP, this Section is abbreviated and focused toward the limited fish and wildlife resources present at the POM and OMC.
- Part V Outdoor Recreation and Cultural Values. To be prepared by installations with outdoor recreation programs which depend upon maintenance and management of natural resources. In this INRMP, Part V is abbreviated because the POM and OMC contain minimal outdoor recreation resources. The Section focuses primarily on cultural resources present at the POM.

1.1.2 Compliance Requirements

Preparation of the INRMP must be coordinated with federal laws and executive orders established for the protection of natural resources. This INRMP is consistent with applicable legal requirements as identified below. The following list, although not inclusive, includes the majority of the legal requirements that the Presidio of Monterey would be concerned with regarding natural resources management:

- Sikes Act of 1962 (as reauthorized in 1997);
- National Environmental Policy Act (NEPA) of 1969;
- Endangered Species Act of 1973;
- Army Regulation (AR) 200-4, Cultural Resources Management;
- AR 200-3, Natural Resources Management;
- AR 200-1, Environmental Protection and Enhancement;
- Presidio of Monterey Regulation 870-2 (Cultural Resources);
- Guidelines to Prepare INRMPs for Army Installations and Activities;
- National Historic Preservation Act (NHPA) of 1966 (as amended through 1992);
- Archeological Resources Protection Act (ARPA) of 1979;

Final

- American Indian Religious Freedom Act (AIRFA) of 1978;
- Executive Order 13007 (Indian Sacred Sites);
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990;
- Federal Noxious Weed Act of 1974;
- Clean Water Act of 1987;
- Clean Air Act (as amended through 1990);
- Federal Insecticide, Fungicide, and Rodenticide Act;
- Protection of Wetlands, 1977, Executive Order 11990; and
- Migratory Bird Treaty Act.

1.1.3 Army Guidelines

To aid in preparing INRMPs, the Army developed a series of technical manuals (TMs) (*U.S. Army, 1982a*). The TMs contain information and/or recommendations for natural resource management that are not uniformly consistent with current Best Management Practices for natural resources management. To prepare this INRMP, where appropriate, outdated information contained in the TMs was supplemented with more current information regarding natural resources management goals. The TMs used to prepare this INRMP include: TM 5-630, Natural Resources Land Management; TM 5-633, Natural Resources Fish and Wildlife Management; and TM 5-635, Natural Resources Outdoor Recreation and Cultural Values. Citations for additional references used to prepare the INRMP are included at the end of this document.

In addition, the Army published this Preparation Guidelines for Integrated Natural Resource Management Plans (*U.S. Army Environmental Center, 1997*) for use in preparing INRMPs. The purpose of the guidelines is to provide natural resources managers at Army installations with guidance on preparing INRMPs to insure consistency with federal laws, Army policy, and established natural resources management practices. Where appropriate, information in these guidelines was used in preparing this INRMP.

1.1.4 Agency Cooperation

United States Code (USC) 16, Section 670(a) requires cooperation among the Army installation, the U.S. Fish and Wildlife Service (USFWS), and the host state for planning, maintaining, and coordinating fish and wildlife management activities on the installation. The USFWS and CDFG have received copies of the INRMP for review and comment on the portions of the plan dealing with fish and wildlife resources.

1.2 Installation Location

1.2.1 POM

The POM is located on an approximately 1.5-mile long, quarter-mile wide stretch of land at the southern end of Monterey Bay, within the City of Monterey (Figure 2). Located southwest of the OMC, the POM lies between Monterey Bay and State Route (SR) 68. The downtown area of Pacific Grove is

approximately one mile northwest of the installation with portions of the city abutting the POM. The POM is served by the Monterey Peninsula Airport which is located to the east of the installation and south of SR 218.

1.2.2 OMC

The OMC is located along the Pacific Ocean in northern Monterey County, California approximately 100 miles south of San Francisco (Figure 3). The installation occupies lands formerly under the jurisdiction of Fort Ord. The present the OMC lands are the only lands being retained by the Army from the Fort Ord property after the Base Realignment and Closure (BRAC) process. The main highway in the vicinity of the OMC, Highway 1 (Pacific Coast Highway), is located west of the installation. West of Highway 1, the Union Pacific Railroad Line is the primary passenger and freight rail connection between San Francisco and Los Angeles. Cities adjacent to the OMC include Seaside, located approximately one mile south of the site, Monterey, located approximately three miles southwest of the site, and Marina, located approximately two miles north of the site. The former Fritzsche Army Airfield is located northeast of the OMC. Local passenger air service is provided by the Monterey Peninsula Municipal Airport located southwest of the OMC, and adjacent to SR 218 (*U.S. Army, 1992a*).

1.3 Installation History

1.3.1 POM

The POM, which has been known at various times as Fort Halleck, Ord Barracks, Monterey Barracks and Fort Stockton, was officially redesignated as the Presidio of Monterey in 1904, in honor of the original Spanish fort. From 1904 to 1910 a school of musketry was operated on the post, a forerunner of today's Infantry Center at Fort Benning, Georgia. Several regiments rotated through the POM between 1902 and 1919. Between the two world wars, the post was the home of the 11th Cavalry and the 2nd Battalion, 76th Field Artillery. These units remained at the POM until 1940. In 1941, the POM became a reception center for inductees. Declared inactive on December 22, 1944, the post was reactivated in 1945. For a few months, the post was a staging area for civil affairs personnel preparing for the occupation of Japan. On June 19, 1946, it became home to the Military Intelligence Service Language School, and was then redesignated the Army Language School on September 1, 1947. Both are forerunners of today's Defense Language Institute (*U.S. Army, 1998a*).

The Military Intelligence Service Language School (MISLS) moved to the POM from Fort Snelling, Minnesota on June 19, 1946, and the school was expanded to teach two dozen languages in addition to the Japanese originally taught. On September 1, 1947 the MISLS was renamed the Army Language School (ALS). In addition to Army personnel, the ALS also trained some Air Force, Navy, and Marine linguists. The school was subsequently redesignated as the Defense Language Institute (DLI), West Coast Branch, on July 1, 1963. In 1973, the DLI was placed under the command of the U.S. Army Training and Doctrine Command. In 1974, DLI the headquarters and the DLI East Coast Branch were merged with the West Coast Branch at the POM. In 1976, the school at Monterey became the Defense Language Institute Foreign Language Center (*U.S. Army, 1995b; U.S. Army, 1995c; J. Bonds et al, 1986*).

More than 145,000 students, from basic training recruits to senior officers, studying over 30 languages, have graduated from the DLI since 1941. The DLI provides resident foreign language instruction in support of national security requirements, supports and evaluates command language programs worldwide, conducts academic research into the language learning process, and administers a worldwide standard language test and evaluation program (*U.S. Army, 1995c*).

1.3.2 OMC

The OMC is on land that was formerly part of Fort Ord. Fort Ord was established in 1917 from land designated as City of Monterey Tract No. 1 and several privately owned ranches. The installation was originally called Gigling Reservation and was a subinstallation of the POM. The reservation was renamed Camp Ord in 1933 after Major General Edward Ord, an important figure in California military history (*U.S. Army, 1992a*).

Initially, the reservation was used to drill the 11th Cavalry stationed at the POM. Before 1938, the only improvements at Camp Ord were a caretakers house and a few bivouac sites. Beginning in 1940, many facilities were built at Camp Ord using funds from the Works Progress Administration. These areas included the East Garrison buildings and Stilwell Hall. In 1940, the camp was renamed Fort Ord and the 7th Infantry Division was reactivated and stationed there. Following the Japanese attack on Pearl Harbor, Fort Ord was expanded and construction increased dramatically. Fort Ord became an important staging area for units deployed to the Pacific theater of operations during World War II, and was used as a processing center for deactivated personnel when the war ended.

During the Korean War, Fort Ord was used primarily as a basic and advanced training facility. In 1953, the installations of Camp Roberts and Fort Hunter Liggett in the upper Salinas Valley were placed under the command of Fort Ord as subinstallations. Fort Ord remained an active military installation for the housing and training of Army troops from its reactivation just before World War II up until its closure in 1994.

Since closing in 1994, the Army has retained 796 of the approximate 28,000 acres of Fort Ord to provide support services for the POM. These lands include housing, administrative areas, and equipment maintenance areas. The retained property has been designated the OMC.

1.4 Consistency with Military Mission

This INRMP is designed to protect and enhance the lands of the POM and OMC by providing a natural resources management program that is consistent with the Army's military mission. This INRMP discusses the relationship between each installation's military mission and its natural resources. In addition, the plan addresses natural resource management issues as they relate to land management and grounds maintenance, fish and wildlife management, endangered species protection and enhancement, cultural resources, and outdoor recreation. The plan addresses stewardship of natural resources on an ecosystem scale and provides a means for the Army to protect biodiversity and to provide high quality military readiness consistent with the military mission. The plan demonstrates that the Army's military mission and natural resource management goals on the POM and OMC are compatible. The following discusses the military missions of the POM and OMC.

1.4.1 POM

1.4.1.1 Defense Language Institute Foreign Language Center

The largest command on the POM is the Defense Language Institute Foreign Language Center (DLI). The mission of the DLI is to train, sustain, and evaluate foreign language skills under the guidelines of the Defense Foreign Language Program (DFLP). The DFLP provides the Department of Defense and other Federal agencies with linguists fully capable of supporting the United States' national interests worldwide. In effectively accomplishing its three primary mission areas, the DLI ensures that our military forces are prepared to meet global foreign language requirements (*U.S. Army, 1995c*).

1.4.1.2 Other Commands at POM

A number of other commands have been established at the POM to assist service members during their stay at the POM while attending the DLI. A brief description of each command and its mission follows (*U.S. Army, 1995c*):

U.S. Army, 229th Military Intelligence Battalion (AT2P – MIB). The mission of the battalion is to support the academic mission of the DLI, to execute common military training, to conduct Training and Doctrine Command-directed soldierization, and to provide operational, security, administrative, and logistical support to assigned Army service members.

The Marine Corps Detachment (MCD). The mission of the Marine Corps Detachment at the DLI is to conduct and support training in support of the Marine Corps training requirements, in accordance with standard inter-service training directives and agreements; to furnish guidance on Marine Corps policy; to provide administrative control and assistance to all Marine Corps personnel at the DLI and Naval Postgraduate School; and to ensure that all matters pertaining to the Marine Corps and its personnel are considered by the DLI.

The Air Force 311th Training Squadron (311TRS). The mission of the 311th Training Squadron is to prepare Air Force students at the DLI for academic and follow-on military training success; to provide students with an Air Force orientation, motivation, and physical training; to augment DLI language training with remedial and supplement student assistance as required; and to provide a controlled military environment, enhancing student leadership, development, discipline, and morale.

The Naval Security Group Detachment Monterey (NSGD). The mission of the Naval Security Group Detachment Monterey is to act as an advocate and supporter for all Navy personnel attending language training at the DLI and to help prepare the new sailor for duty as a Cryptologic Technician (Interpretive).

1.4.2 OMC

The OMC is on land formerly occupied by Fort Ord. The OMC is now a subinstallation of the POM. With the closing of Fort Ord, the new mission for the retained land was identified as providing support for the POM. In support of this mission, a number of students attending the DLI are housed at the OMC. In addition, public works facilities are also located at the OMC.

2.0 LAND USE

Land at the POM and OMC is divided into three general categories: improved, semi-improved, and unimproved. Improved and semi-improved grounds refer to the developed portions of the installation, and unimproved grounds are primarily undeveloped open space areas. Land uses at the POM and OMC include Army Administrative Support, Education, Housing, Recreation/Open Space, Hospital, and Historic Preserve. Figures 4 and 5 show present land uses at the POM and OMC. A summary of land uses for the POM and OMC is presented below.

2.1 POM

Land at the POM is primarily categorized as improved and semi-improved in the lower portion of the POM and unimproved in the upper portion, which contains the Huckleberry Hill Nature Preserve. Improved grounds include roads, structures, buildings, fields, parking lots, and other fully maintained areas. Semi-improved grounds are located in the urban forest area adjacent to and north of Kit Carson Road. Unimproved lands are located in the upper POM at the Huckleberry Hill Nature Preserve. Land uses on the POM are institutional and include education, administration, housing, recreation, and health care facilities (Figure 4). The central and eastern portions of the POM, below the 450-foot elevation contour, commonly known as the middle and lower POM, are the most heavily developed and are considered improved grounds. These developed areas support structures, paved surfaces, lawns, and horticultural tree and shrub plantings. In addition, the developed areas support the DLI. Buildings on the middle and lower POM provide classrooms, administrative, and support functions for the base mission. The lower POM, site of the historic district, has been leased to the City of Monterey as an historic preserve (*U.S. Army, 1995d; U.S. Army, 1994a*).

The unimproved upper portion of the POM, known as the Huckleberry Hill Nature Preserve, has been designated as open space (Figure 4). Monterey pine forest dominates the vegetation cover of the POM above the 450-foot elevation contour. The preserve is currently leased to and managed by the City of Monterey. The preserve is operated with the goal of retaining the forest while providing a recreation area for residents to enjoy for future generations (*U.S. Army, 1995d; City of Monterey, 1987*). In addition, Soldier Field, located in the lower POM, is also leased to the City of Monterey for recreational use.

2.2 OMC

The OMC is primarily developed and is comprised of improved grounds with limited unimproved buffer areas. The following types of land uses are present at the OMC: residential housing, and Army administration/support (Figure 5).

2.2.1 Residential Housing

The majority of the OMC is devoted to residential housing for Department of Defense (DOD) personnel (Figure 5). The housing areas are all located south of Lightfighter Road, the main entrance to the OMC, and include:

- Portions of Stilwell Park (Parcel F 2.3, and the north portion of Parcel F 2.2), located south of the main gate, east of Highway 1 and west of the North-South Road;
- Portions of Hayes Park (Parcel F 2.1, and the south portion of Parcel F 2.2), located south of Stilwell Park, east of Highway 1 and west of the North-South Road;

- Marshall Park, located east of the North-South Road and south of Gigling Road; and
- Fitch Park, located south of Marshall Park and east of the North-South Road.

2.2.2 Army Administration/Support

Army administration and support facilities are located throughout the OMC (Figure 5), and include:

- DOD Center, located east of Marshall Park and south of Gigling Road. The site houses the Defense Finance and Accounting System and the Defense Maneuver Data Center;
- Department of Public Works (DPW) support area, located south of Inter-Garrison Road and north of Gigling Road on Eighth Avenue;
- Army support facilities, including the General Stilwell Community Center, commissary, post exchange, and child development center, located north of Gigling Road and west of the Marshall Park housing area;
- BRAC Offices and Federal Police, located north of Gigling Road and east of the North-South Road;
- Directorate of Environmental and Natural Resources (DENR), located north of Gigling Road and east of the North-South Road; and
- Youth services center, the main chapel, and library, located east of the North-South Road and west of the Marshall Park Housing area.

3.0 EXISTING CONDITIONS AT THE POM AND OMC

3.1 Climate

Located along the Monterey Peninsula, the POM and OMC are characterized by cool summers, mild winters, and low annual precipitation. Because the Monterey Peninsula is immediately adjacent to the Pacific Ocean, the marine influence dominates the climatic pattern, with local variations determined largely by topography. The prevailing climatic condition for Monterey Bay is the sea breeze/inland breeze regime. The temperature of the marine layer of air associated with the sea breeze is regulated by the ocean creating a climate whereby the air temperature near and at the coast remains within a few degrees of the water temperature. Water temperature is on average 50 degrees Fahrenheit (°F). Air temperatures near the coast are uniform throughout the year, with an average annual temperature of approximately 60 °F (*U.S. Army, 1984a; Western Regional Climate Center, 1997*).

During the summer months, days are generally sunny and dry. Coastal morning and evening fog is common and frequently blankets coastal communities. In the fall, the onshore breezes decline and the fog subsides resulting in warmer weather. Average daytime high temperatures range between 60 and 70 °F with average low temperatures ranging from 43 to 53 °F. Over 90 percent of the area's precipitation occurs between November 1 and April 30. Precipitation amounts vary greatly as a result of the maritime influence and terrain. Average annual precipitation is 18.87 inches as recorded at the location (*U.S. Army, 1992a; Western Regional Climate Center, 1997*). Table 1 contains a summary of Monterey's monthly climate data for the years 1961-1990 (*Western Regional Climate Center, 1997*).

3.2 Topography

3.2.1 POM

The topography of the POM rises from the eastern boundary at Lighthouse Avenue, approximately 30 feet above mean sea level (msl), to 126 feet msl at Sloat Monument (Figure 6). Two hills are prominent at the POM; one near Bishop Avenue with has an elevation of 595 feet msl, and the second, Presidio Knoll, has an elevation of more than over 770 feet msl (*U.S. Army, 1984a*).

3.2.2 OMC

The OMC is situated between the Pacific Ocean and the hilly terrain of the center portion of the former Fort Ord, primarily on flat ground inland from the coastal dunes and bluffs and east of Highway 1 (Figure 7; *U.S. Army, 1992c*). Topography at the OMC ranges between approximately 100 to 450 feet msl.

3.3 Soils

3.3.1 POM

The following two major soil series are found on the POM (Figure 8; *U.S. Army, 1984a; U.S. Department of Agriculture, 1978*):

- Narlon Series. A poorly drained soil with moderate erosion hazard potential, prevalent on the eastern two-thirds of the POM; and

- Sheridan Series. A coarse sandy loam usually underlain by granitic and schistose rock, covering much of the Presidio Knoll and lower POM Historic Preserve.

The majority of the middle and lower POM, is underlain by Narlon loamy fine sand. This soil is gently to moderately sloping and located on marine terraces. Clay subsoil is located at a depth of up to 20 inches. Slopes are mostly in the range of 3 to 6 percent. Runoff is slow to medium, allowing shallow ponds to form during prolonged wet periods. Erosion hazard is moderate (U.S. Army, 1984a; U.S. Department of Agriculture, 1978).

The upper portion of the POM, is underlain by Sheridan coarse sandy loam. The soils are moderately sloping to strongly sloping. These soils are also found on the lower side slopes of granitic uplands or on small rounded ridgetops, similar to the preserve area. Slopes are between 15 and 30 percent. Runoff is medium, and the erosion hazard is moderate due to the steep slope (U.S. Department of Agriculture, 1978).

The former POM landfill is located adjacent to Mason Road, and has been heavily disturbed. The area's soil and underlying material have been excavated for refuse disposal. Drainage, permeability, surface runoff, depth of the root zone, and available water capacity are all variable (U.S. Department of Agriculture, 1978).

3.3.2 OMC

The following two major soil series underlay the OMC (Figure 9):

- Oceano Series. Consists of excessively drained soils, formed in wind-transported sands on now-stabilized dunes. Slopes are generally 2 to 15 percent. Erosion potential is high in localized storm drainage areas;
- Baywood Series. Consists of excessively drained soils that form in stabilized sand dunes. Slopes are generally 2 to 15 percent. Erosion potential is slight to moderate.

The Oceano series extends from the beach dunes eastward through nearly all of the OMC. Vegetation in this series consists of annual grasses, forbs, and some scattered scrub oak or brush. The surface layer is grayish brown, with medium-acid loamy sand approximately 18 inches thick. The subsoil ranges from brown to light yellowish-brown, medium-acid loamy sand with clay bands and is approximately 55 inches thick. The subsoil is underlain by very pale brown, slightly acid loam sand that extends more than 80 inches. Permeability of the Oceano series is rapid, and the available water capacity is about 4 inches. Roots can penetrate to a depth of more than 60 inches (U.S. Army, 1992d; U.S. Department of Agriculture, 1978).

The Baywood series is similar to the Oceano series, with the exception that the Baywood series soils drain more slowly than the Oceano series. The Baywood series consists of somewhat excessively drained soils that form in stabilized sand dunes. The soils are found on gently sloping stabilized dune land at the southwestern and southeastern tips of the OMC. Permeability of the Baywood series is rapid and the available water capacity is 2.5 to 3 inches. Root penetration exceeds 60 inches. Runoff is slow to medium, and the erosion potential is slight to moderate. If vegetation or soil structure is compromised, the soil is subject to wind and water erosion (U.S. Army, 1992d; U.S. Department of Agriculture, 1978).

3.4 Natural Vegetation

3.4.1 POM

3.4.1.1 General Habitat Types

Vegetation in the developed or lower portion of the POM can be divided into four main groups: non-native grasses and forbs; irrigated lawns; landscape plantings; and mixed exotic and native trees and shrubs. Non-native grasses and forbs dominate disturbed areas throughout the POM. Irrigated lawns are scattered throughout the developed portion of the POM. Landscape plantings, including ornamental shrubs and herbs, are maintained adjacent to most POM buildings. Mixed assemblages of exotic and native trees and shrubs are found at several locations on the POM, including Presidio Knoll. The most common exotics include blackwood acacia (*Acacia melanoxydon*), Sydney golden wattle (*Acacia longifolia*), French broom (*Genista monspessulana*), and blue gum (*Encalyptus globulus*). Some of these stands also contain planted or naturally established Monterey pines (*Pinus radiata*). The largest stand of mixed exotic and native trees and shrubs occurs between Artillery Road and the reservation boundary, and between the entrance on Pacific Street (*U.S. Army, 1984a*).

Vegetation in the undeveloped Presidio Knoll area consists of a dominant Monterey pine forest. Understory in the Monterey pine community includes mixed grasses, California huckleberry (*Vaccinium ovatum*), shaggy-bark manzanita (*Arctostaphylos tomentosa*), California coffeeberry (*Rhamnus californica*), French broom, and Coast live oak (*Quercus a. agrifolia*). Pine and broom are most common along the disturbed edges of dirt roads crossing Presidio Knoll. Most of the Monterey pines are mature individuals in open to dense stands, with a crown height from 30 to 80 feet (*U.S. Army, 1984a*). The southernmost corner of the POM, along the western slope of the Presidio Knoll, supports a central maritime chaparral plant community dominated by broad mounds of manzanita interspersed with Monterey pine and coast live oak (*U.S. Army, 1984a*). Additional descriptions of vegetation are found in Part II Land Management and Grounds Maintenance.

3.4.1.2 Special Status Species

Special-status plants and animals are species that fall into the following categories:

- Plants listed, or proposed for listing, as threatened or endangered under the federal Endangered Species Act (50 CFR 17.12 [listed] and various notices in the Federal Register [proposed species]);
- Plants that are candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (55 Federal Register [FR] 6184, February 21, 1990);
- Plants listed, or proposed for listing, by the State of California as threatened or endangered under the California Endangered Species Act (14 CCR 670.5);
- Plants listed under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.);
- Plants that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA; *State CEQA Guidelines, Section 15380*);

- Plants considered by California Native Plant Society (CNPS) to be “rare, threatened, or endangered in California” (Lists 1B¹ and 2² as updated by CNPS);
- Plants listed by CNPS for which more information is needed to determine their status and plants of limited distribution (List 3³ and 4⁴ as updated by CNPS), which may be included as special-status species on the basis of local significance or recent biological information;
- Animals currently listed by the federal government as rare, threatened, or endangered;
- Animals proposed for listings as rare, threatened or endangered by the USFWS;
- Animals that are federal candidates for listing by USFWS;
- Animals designated by USFWS as a “Species of Concern” (former Federal Category 2 candidate);
- Animals recommended for candidate status by USFWS;
- Animals currently listed by the State of California as threatened or endangered;
- Animals that are California candidates for listing as threatened or endangered;
- Animals designated by the CDFG as a “Species of Special Concern;”
- Animals designated by the California Natural Diversity Data base as a “Special Animal.”

Four special-status plant species occur at the POM: Monterey pine (CNPS List 1B), Hooker’s manzanita (*Arctostaphylos hookeri* ssp. *hookeri*) (CNPS List 1B), small-leaved lomatium (*Lomatium parvifolium*)

(*CNPS List 4*), and Yadon’s piperia (aka Yadon’s rein orchid [*Piperia yadoni*] federally endangered CNPS 1B; *U.S. Army, 1995d*). Monterey pine occurs naturally in coastal areas with winter rainfall and frequent summer fogs. Along the immediate coast, Monterey pine dominates forests on coastal terraces and Pleistocene dune deposits. In more inland areas, Monterey pine forest integrates with regionally dominant plant communities such as redwood or Douglas fir forest, coast live oak forest, grassland, and chaparral. The inland limit of naturally occurring Monterey pine forest generally corresponds with the limit of persistent summer fog. Historically, Monterey pine forest was the dominant vegetation at the POM. At present, Monterey pine forest dominates the natural vegetation cover of the POM above the 450-foot elevation contour (Figure 10). With the developed area of the POM, over half of the original forest has been removed. Monterey pines occur in developed areas on base either as naturally occurring or as landscape plantings (*U.S. Army, 1995d*).

Hooker’s manzanita is a shrub in the heath family (*Ericaceae*). It has no federal or state listing status, but is considered rare and endangered in California by the CNPS (List 1B). Endemic to only the Monterey Bay area, populations are known to exist in Larking Valley, Prunedale Hills, former Fort Ord, POM, Monterey Peninsula, and along the northern end of the Santa Lucia Range. Former Fort Ord supports the largest population. At the POM, Hooker’s manzanita occurs in the understory of the Monterey pine forest on Huckleberry Hill Nature Preserve (Figure 11). Hooker’s manzanita is also planted in median strips

¹ Plants rare, threatened, or endangered in California and elsewhere (*CNPS, 1994*).

² Plants rare, threatened, or endangered in California, but more common elsewhere (*CNPS, 1994*).

³ Plants about which we need more information; a review list (*CNPS, 1994*).

⁴ Plants of limited distribution; a watch list (*CNPS, 1994*).

and other landscaped areas throughout the POM. Overall, however, the native occurrence of Hooker's manzanita has declined due to habitat loss brought about by coastal development (*U.S. Army, 1995d*).

Small-leaved lomatium is an erect, taprooted perennial forb in the carrot family. It has no federal or state listing status but is recognized in California as a plant of limited distribution by CNPS (List 4).

Small-leaved lomatium is found in Monterey, Santa Cruz, and San Luis Obispo Counties and occurs in pine forest and chaparral habitats on serpentine outcrops. At the POM, small-leaved lomatium grows in the understory of Monterey pine forest and in chaparral dominated by Hooker's manzanita on the Huckleberry Hill Nature Preserve (Figure 12). Small-leaved lomatium populations have also declined as a consequence of coastal development in Monterey pine forest and chaparral habitats on the POM (*U.S. Army, 1995d*).

Yadon's piperia, a perennial herb in the orchid family, inhabits coastal areas in Monterey County from Elkhorn Slough to the Monterey Peninsula. Yadon's piperia is federally listed as endangered and by the CNPS as List 1B. Yadon's piperia occurs in maritime chaparral and in closed-cone conifer forests including Bishop pine (*Pinus muricata*) and Monterey pine forests. It typically grows in openings with grassy cover. In chaparral, it is often found growing beneath low shrubs (often Hooker's manzanita) with its inflorescence emerging from the shrub canopy in early summer. At the POM, Yadon's piperia occurs primarily in Monterey pine forest (Figure 13). One population occurs in a relatively open grassy area adjacent to pine forest near the cemetery and dormitories. Two small populations are known to occur in the Huckleberry Hill Nature Preserve associated with Monterey pine forest and shrub understory. Yadon's piperia is threatened by urban development, recreational development, and competition from non-native species (*U.S. Army, 1995d*).

An Endangered Species Management Plan (*U.S. Army, 1999b*) has been prepared for the POM. Of the four special-status species known at the POM, two are included in the management plan, Yadon's piperia and Hooker's manzanita. Monterey pine is not included in this plan because the majority of this type of forest is already being preserved and managed at the Huckleberry Hill Nature Preserve by the City of Monterey. Small-leaved lomatium has no federal status and existing populations will be retained in the preserve.

During special-status wildlife species surveys conducted at the POM, a sharp-shinned hawk (*Accipiter striatus*) was observed at the Huckleberry Hill Nature Preserve on December 1, 1994 and one was observed again on May 4, 1995 at the same location (*Jones & Stokes Associates [J&SA], 1995*). No other special-status mammal, reptile, or amphibian species were observed, nor were raptor nests found. The sharp-shinned hawk is considered a species of special concern by the CDFG. The sharp-shinned hawk is primarily found in riparian forests, conifer forests, and oak woodlands, and the observed bird(s) likely used the POM for foraging. Monterey pine forest at POM is considered potential nesting habitat. No nests, pellets, droppings, or other evidence of breeding or frequent use were observed at the POM (*J&SA, 1995*).

3.4.2 OMC

3.4.2.1 General Habitat Types

The OMC lands consist primarily of disturbed vegetation associated with developed areas of the former Fort Ord (*U.S. Army, 1992c*). Annex lands were once vegetated by central maritime chaparral. Maritime chaparral is characterized by a wide variety of sclerophyllous (hard, drought-adapted leaf) shrubs occurring in moderate to high density. This chaparral community occupies sites that have sandy, well-drained substrates occurring within the zone of coastal summer fog. Maritime chaparral intergrades

with the coastal strand community west of Highway 1 and a mixed chaparral community east of the OMC (*U.S. Army, 1992b*).

3.4.2.2 Special Status Species

Four special status plant species have the potential to occur on the OMC lands: Monterey spineflower (*Chorizanthe pungens* var. *pungens*) (federally threatened, CNPS List 1B), Sandmat manzanita (*Arctostaphylos pumila*) (federal species of concern, CNPS List 1B); Monterey ceanothus (*Ceanothus cuneatus* var. *rigidus*) (federal species of concern, CNPS List 4); and virgate eriastrum (*Eriastrum virgatum*) (CNPS List 4; *U.S. Army, 1992b*).

Monterey spineflower colonizes open or disturbed sandy sites in coastal dune, coastal scrub, grassland, and maritime chaparral habitats. It occurs along the coast of southern Santa Cruz and northern Monterey counties and inland to the western edge of the Salinas Valley. The former Fort Ord supports the largest known population of Monterey spineflower (*U.S. Army, 1997a*). Figure 14 indicates known locations of Monterey spineflower on the OMC lands (*U.S. Army, 1992e*).

Sandmat manzanita occurs in maritime chaparral and coast live oak woodland. Sandmat manzanita occurs at scattered locations around the Monterey Peninsula and in extensive stands on the former Fort Ord (*U.S. Army, 1997a*). Figure 15 indicates the location of sandmat manzanita on the OMC lands (*U.S. Army, 1992b*).

Monterey ceanothus occurs in maritime chaparral, closed-cone coniferous forests, and coastal scrub. It occurs along the coast at the former Fort Ord, Toro Regional Park, Monterey Airport, and near Prunedale. The largest population is found on the former Fort Ord (*U.S. Army, 1997a*). The land east and southeast of Fitch Park Housing Area east of the North-South Road and east of the OMC has the highest density of Monterey ceanothus (Figure 16; *U.S. Army, 1992b*).

Virgate eriastrum occurs east and south of the Fitch Park Housing Area east of the North-South Road at the OMC (Figure 17). The plant is listed by the CNPS (List 4). It is afforded no federal or state protection (*U.S. Army, 1992b*).

Special status wildlife species that have the potential to occur on the OMC land cover types include the loggerhead shrike (*Lanius ludovicianus*), a federal and state species of concern, and a federally-designated Migratory Nongame Bird of Management Concern (MNBMC); coast horned lizard (*Phrynosoma coronatum*), a federal species of concern and a state fully-protected species; California horned lark (*Eremophila alpestris actia*), a state species of concern; California black legless lizard (*Anniella pulchra nigra*), a state protected species; burrowing owl (*Speotyto [Athene] cunicularia hypugea*), a federal and state species of concern and a federally designated MNBMC; Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*), a federal and state species of concern; and Monterey ornate shrew (*Sorex ornatus salarius*), a federal and state species of concern.

3.5 Off-Road Vehicle Use

3.5.1 POM

The POM does not contain areas designated for recreational off-road vehicle use. The POM does, however, have a series of unpaved roads that provide access to the Huckleberry Hill Nature Preserve area above the 450-foot elevation level. Vehicular access to these roads is restricted to service vehicles for maintenance purposes.

3.5.2 OMC

Off-road vehicle use is not permitted on any OMC lands.

3.6 Drainage System

3.6.1 POM

3.6.1.1 Surface Water Runoff

The POM's surface water runoff is collected by the installation's storm drain system and discharged to the Pacific Ocean or Monterey Bay (*U.S. Army, 1994a*). For some storm drains, drainage water leaves the POM and enters the storm drain systems of the cities of Pacific Grove and Monterey which in turn discharge into the Pacific Ocean or Monterey Bay (*U.S. Army, 1984a*).

3.6.1.2 Storm Drain System

The POM discharges stormwater runoff to Monterey Bay through five storm drains and two natural stream channels. The storm drain system at the POM is divided into various zones as shown on Figure 18. According to the POM DPW, the current stormwater drainage system is being evaluated and assessed by the City of Monterey. The City is in the process of updating information (as of August 1999) regarding the stormwater drainage system including the preparation of a map showing the locations and types of culverts, drains, and pipes at the POM. Information will be provided to the POM upon completion of the City's inventory (*Helms, 1998*).

Stormwater discharge into the bay is regulated by the Regional Water Quality Control Board (RWQCB) Central Coast Region through the National Pollutant Discharge Elimination System (NPDES) permit process. Stormwater associated with the AAFES gas station and the outdoor recreation facilities are regulated as industrial activities by State Water Resources Control Board (SWRCB) under the installation's NPDES General Permit. Discharges are required to conform to the NPDES permit requirements, depending on the type of storm drain discharge. Currently, the POM is in compliance with its NPDES permit requirements (*Nguyen, 1997*).

Information is presented below for storm drains and channels, including the type and location at the POM.

The two open drainage channels include:

- Drainage Channel Southwest of the POM Dormitories and east of Huckleberry Hill Nature Preserve. An open ditch that runs southwest and exits the POM west of Johnson Street and southwest of the entrance to the POM at Franklin Street; and
- Drainage Channel running along the southern border of the POM to Lighthouse Avenue. An open drainage ditch that runs along the southern border of POM from east of the entrance to the POM at High Street to Lighthouse Avenue.

The five storm drains include:

- North POM. A 36-inch reinforced concrete pipe (RCP) that drains the north part of the POM;
- Southern Boundary. A 51-inch RCP that runs along the southern boundary of the POM;

- South-central Portion of the POM. A 24-inch RCP that drains the south central area of the POM in the dormitory area;
- Northwest of the Huckleberry Hill Nature Preserve. A 24-inch RCP that drains the northwest portion of the POM along Highway 68; and
- Northeast of Huckleberry Hill Nature Preserve. A 30-inch RCP that drains into Pacific Grove's storm drain system.

In addition to the main drainage channels and storm drains, a series of smaller storm drains serve specific portions of the base (Figure 18). These smaller drains collect stormwater and discharge to larger drains eventually flowing into the base's main storm drains previously described above. Several types of piping are used including vitrified clay, steel, concrete, and corrugated steel. In general, the pipes serve individual buildings, or groups of buildings, and are between 12 and 24 inches in diameter.

3.6.1.3 Flooding

The Federal Emergency Management Agency (FEMA) has developed floodplain maps for the land areas occupied by the POM and OMC. The POM is outside of the 100-year flood zone, and is designated by FEMA as Zone C, an area of minimal flooding (*U.S. Army, 1995b*).

3.6.1.4 Wetland Areas

No extensive wetland or marsh areas exist on the POM lands. However, limited wetland resources occur along an intermittent stream that follows the southeastern boundary of the POM from Franklin Street to Lighthouse Avenue (see Plate 18).

3.6.2 OMC

3.6.2.1 Surface Water Runoff

Surface water runoff within the OMC is conveyed by drainage systems consisting of natural channels and constructed storm drain systems. Drainage patterns are influenced by the topography of the area; they are not well developed because most rainfall runoff directly infiltrates the sand and gravelly soils that dominate this area (*U.S. Army, 1992c*).

3.6.2.2 Storm Drain System

The storm drain system at the OMC, was initially built in the 1940s as a separate system from the sanitary sewer lines. The storm drain system consists of an extensive system of storm sewer branches that feed into major lines running either directly to the ocean or to inland drainage systems. Portions of the storm drain system have been replaced over time; storm drain failures do however, continue to occur. The only ongoing maintenance performed at this time is the periodic clearing of sediment and debris from culverts (*U.S. Army, 1992c*).

The drainage system of the OMC collects surface water runoff from the housing and recreational areas, motor pools, maintenance yards, and industrial facilities. Runoff mainly discharges at four ocean outfalls located west of Highway 1. A few small storm drain outfalls also empty storm water runoff into depressions and open fields within the Main Garrison of the former Fort Ord (*U.S. Army, 1992c*). In addition to serving the OMC, the stormwater system serves lands that have been transferred to local reuse agencies.

There are no open drainage channels located within the OMC. Storm drains serving the OMC include four outfalls located west of Highway 1 discharging to the ocean. A summary of major storm drains, including the type and location at the OMC, is as follows:

- Ocean outfall, Former Beach Firing Range 4. A concrete pipe that drains to the ocean adjacent to Beach Firing Range 5;
- Ocean outfalls, Stilwell Hall. Two outfalls are located south of Stilwell Hall, one adjacent to Beach Firing Range 8, and one just south of Stilwell Hall which has recently failed resulting in severe erosion; and
- Ocean outfall. A corrugated metal pipe located south of Range 9 and adjacent to the sewage treatment plant.

In addition to the main drainage channels and storm drains, a series of smaller storm drains serve individual portions of the OMC (Figure 19). These smaller drains collect storm water and discharge to larger drains eventually flowing into the Pacific Ocean. Two types of piping are used at the OMC, corrugated metal and concrete. In general, the pipes serve individual buildings, or groups of buildings, and range from 12 to 36 inches in diameter.

3.6.2.3 Flooding

The installation is not located within the 100-year floodplain (*U.S. Army, 1992c*). No flood control measures are required.

3.6.2.4 Wetland Areas

No wetland areas are located at the OMC.

3.7 Soil Eroded Areas

3.7.1 POM

3.7.1.1 Landsliding

Landslides have historically occurred on the Monterey peninsula on steep slopes. The POM has areas located on the installation that are subject to erosion and landslides. The steep slopes of Presidio Knoll may be especially susceptible to landslide hazards. Presidio Knoll soils, comprised of sandy or coarse sandy loams and underlain by clay subsoil, sandstone, and granitic bedrock, are often located on steep slopes. In particular, the Sheridan series soils, a coarse sandy loam usually underlain by granitic and schistose rock, cover much of the Presidio Knoll area. Much of the Sheridan soils are underlain by clay and clay loam subsoils and are potentially susceptible to landslides (*U.S. Army, 1984a*).

3.7.1.2 Erosion

Severe erosion has historically occurred on unpaved roads throughout the Presidio Knoll area. Gully erosion and overland sheet flow have removed much of the topsoil and uncovered the clay and clay loam subsoils of Sheridan series soils. Erosion hazard in this soil type is moderate, and runoff is rapid. Existing erosion is concentrated in steep areas along the extension of Rifle Range Road, adjacent to Highway 68, along the southern border near Forest Ridge Road, and along fire roads leading to the Huckleberry Hill Nature Preserve (*U.S. Army, 1984a*). The City of Monterey, which manages the Huckleberry Hill Nature Preserve, has controlled landsliding and erosion within the Huckleberry Hill

Final

area. Guidelines and objectives for erosion control in this area are presented in Section 4.2 of this part of the INRMP.

3.7.2 OMC

3.7.2.1 Landsliding

Due to the relatively flat and developed nature of the OMC, landsliding is not an issue requiring documentation and analysis.

3.7.2.2 Erosion

The OMC is highly susceptible to wind erosion in areas where vegetation has been removed. Vegetation and attendant development of soil structure in the surface horizons of the Oceano and Baywood soils, which comprise the majority of the OMC lands, retards wind erosion and lowers the erosion hazard unless the topsoil has been removed or disturbed. Where organic matter or soil structure is not present, loose sand associated with the Oceano and Baywood soils has a wind erosion potential of 310 tons per acre, the highest erosion potential of any soil type in the Wind Erosion Equation rating system. Wind erosion results in sand blowing from exposed soil surfaces and damaging existing and planted vegetation. This erosion continues until source areas are stabilized or revegetated (*U.S. Army, 1992a*).

4.0 GENERAL MANAGEMENT OF THE POM AND OMC

4.1 Soil Erosion Control

4.1.1 POM

The lower elevations of the POM, adjacent to Lighthouse Avenue and Monterey Bay, are developed and have low erosion potential. According to the POM DPW, erosion control measures are developed on a project-specific basis. The installation's current drainage system provides culverts and drainages for surface water runoff (*Elliot, 1998*).

The upper elevations at the POM, primarily the Huckleberry Hill Nature Preserve, are undeveloped with the exception of water storage tanks and service roads. These underdeveloped areas have the highest potential for erosion due to the steep slopes and potentially-erodible soils that occur in the area. In the past, erosion has occurred on service roads throughout the Huckleberry Hill Nature Preserve. As a result, the City of Monterey, the current manager of the Preserve, has implemented the following annual erosion control measures (*Reid, 1998*):

- Road Grading. Access roads within the Preserve are graded and crowned as needed such that access roads are consistent with the slope and grade of surrounding lands;
- Water Bars and Cutouts. Water bars and cutouts are constructed in areas of high erosion potential to channel water away from roads and high erosion areas. Water bars are cut on all existing sloped firebreaks, roads, and trails approximately every one hundred feet;
- Vehicle Access. Vehicles are prohibited in erosion prone areas. In addition, during severe winter weather, vehicle access is limited on roads within the preserve to reduce erosion; and,
- Vegetation Removal. To the extent possible, unnecessary soil disturbance should be avoided during vegetation management activities, non-native vegetation removal.

Erosion control outside of the Huckleberry Hill Nature Preserve is managed by the Army. Middle and lower POM lands are less steep-sloped. Consequently, erosion control measures developed by the City of Monterey for the Huckleberry Hill Nature Preserve are not appropriate. The following erosion control measures should be implemented for the middle and lower POM:

- Interim Erosion Control. Cover bare ground identified with the potential for erosion with weed-free straw (rice or saltgrass) and biodegradable erosion control matting, until erosion control vegetation becomes established; and
- Erosion Control Seed Mix. Revegetate erodible soils with a mixture of native seed that totals 30 lbs/acre and includes at least 2 lbs/acre of two of the following grasses: blue wildrye (*Elymus glaucus*), nodding needlegrass (*Nassella cernua*), purple needlegrass (*Nassella pulchra*), red fescue (*Festuca rubra*), and tufted hairgrass (*Deschampsia cespitosa holiciformis*); 5 lbs/acre of wildflower seed that include at least two of the following: California poppy (*Eschscholzia californica*), blue-eyed grass (*Sisyrinchium bellum*), sky lupine (*Lupinus nanus*), and yarrow (*Achillea millifolium*); and 5 lbs/acre non-invasive, non-native nurse crops that includes crimson clover (*Trifolium incarnatum*) and sterile wheatgrass (*Triticum aestivum*) seed. Erosion control mixes of non-native invasive plants (e.g., rye grass [*Lolium multiflorum*] mixes) may not be used.

4.1.2 OMC

Although the OMC is primarily developed, the potential for erosion exists. Excavation caving, embankment piping, and very high water infiltration rates should be taken into consideration when disturbing the Baywood and Oceano soils. Improper use of these soils could result in severe erosion. Due to the extent of paved surfaces and structures, relatively flat landscape, and high infiltration capacity of the soils, water erosion at the OMC is not considered a serious threat. Wind erosion, however, could affect areas that are disturbed, non-vegetated areas, and areas subject to soil disturbance (*U.S. Army, 1992a*). To protect against wind erosion at the OMC, the following measures should be implemented:

- Revegetation. Where possible, restore soil cover through revegetation of existing degraded areas. During revegetation, native species should be used. In addition, the planting of trees, particularly coast live oak and Monterey cypress, can serve to provide wind protection;
- Erosion Control Seed Mix. Revegetation to erodible soil with a 30 lbs/acre seed mix comprised of the following: 5 lbs/acre of purple needlegrass (*Nassella pulchra*); 5 lbs/acre of pacific fescue (*Vulpia microstachys*); 10 lbs/acre of red fescue (*Festuca rubra*); 1 lb/acre of California poppy (*Eschscholzia californica*); 1 lb/acre of yarrow (*Achillea millefolium*); 3 lbs/acre of sky lupine (*Lupinus nanus*), and 5 lbs/acre of crimson clover (*Trifolium incarnatum*); and,
- Annual Review. Review erosion conditions for the OMC annually.

4.2 Drainage Requirements

4.2.1 POM

The POM Directorate of Public Works (DPW) is responsible for operation and maintenance of the storm drain system. Activities carried about by the POM DPW include maintaining and repairing drainage channels and the existing storm drain system. The POM DPW lets contracts for repair and maintenance activities to the Naval Support Activity Monterey Bay (NSAMB). To ensure repair and clearing of blocked drainage channels and the storm drain system is performed when required, the following measure is recommended:

- Develop and implement an annual inspection plan for open drainage channels and the storm drain system.

The 100-year floodplain map indicates that the areas surrounding the POM are designated as Zone C, areas of minimal flooding, and therefore, no management measures are required for flooding.

4.2.2 OMC

The POM DPW is responsible for operation and maintenance of the storm drain system at the OMC. The work is contracted out to the Marina Coast Water District (MCWD). As with the POM, to ensure repair and clearing of open drainage channels and the storm drain system is performed when required, the following guideline is recommended:

- Develop and implement an annual inspection plan for open drainage channels and storm drain system.

Flooding is not considered a serious problem at the OMC because installation facilities are not within a 100-year floodplain (*U.S. Army, 1992c*). In addition, the soils located at the OMC are well-drained, have a high infiltration capacity, and can absorb large amounts of surface water. As such, no corrective measures are necessary at the OMC.

Final

4.3 Fire Protection

4.3.1 POM

4.3.1.1 Fire Service

The City of Monterey Fire Department provides fire protection services to the POM. In the case of a wildfire on the installation, the City of Monterey is part of the Monterey County Mutual Aid Agreement which ensures cooperative response of neighboring fire agencies to fires that are beyond the capability of the local agency to control. In most cases, the first responder to the POM would be the California Department of Forestry (CDF), located at 4180 Forest Lake Road (*Mize, 1998*).

The City of Monterey has 51 full-time fire protection employees located at the following stations: Headquarters Station, in downtown Monterey; New Monterey, located in Cannery Row; and North Monterey Station, adjacent to the Naval Postgraduate School. The following equipment resources are located at these stations (*Mize, 1998*):

- Headquarters Station. Two engine companies, one ladder company, one rescue unit, and one tank truck;
- New Monterey Station. One engine company; and
- North Monterey Station. One engine company, and one brush truck.

The POM is equipped with an automated fire alarm system that notifies the City of Monterey and CDF Fire Stations simultaneously.

4.3.1.2 Firebreaks

The lower half of the POM is developed. Constructed firebreaks are not present, nor appropriate, in this area. Paved surfaces, including roads, structures, and buildings, act as fire breaks. The undeveloped area of the POM (Huckleberry Hill Nature Preserve), has a series of roads that serve as fire breaks. In some cases, erosion on these lands adjacent to the Preserve has rendered some service roads impassable.

Periodically, the Huckleberry Hill Nature Preserve area requires substantial brush clearance to reduce accumulation of combustible fuel on the ground. Insect and disease problems in connection with natural mortality has resulted in a buildup of debris throughout the nature preserve. A certain amount of organic litter is necessary to cycle nutrients back into the soil for living trees and shrubs. However, an excess amount can increase the potential for high-intensity fires. To decrease the potential for wildfires on the POM the following measure is recommended:

- Periodic removal of dead and decaying forest debris should be conducted.

4.3.1.3 Prescribed Burning

No prescribed burning occurs at the POM. The Huckleberry Hill Nature Preserve Area is susceptible to wildfires. The City of Monterey has investigated the possibility for prescribed burns and determined that controlled burning on the Preserve is not recommended due to its close proximity to urban land uses. The City, however, does have an active vegetation removal program. The City relies on the CDF brush removal crews to remove brushy fuel (greater than 3 inches in diameter) from Preserve lands on an annual

basis (*Reid, 1998*). The clearing takes place in spring and is conducted under the coordination of the City Fire Department (*Elliott, 1997*). No measures for prescribed burning are recommended.

4.3.2 OMC

4.3.2.1 Fire Service

The Naval Support Activity Monterey Bay provides fire service to the OMC. The fire station is located in Building #4400 on North-South Road. In addition, the Monterey County Mutual Aid Agreement ensures cooperative response of neighboring fire agencies to fires that are beyond the capability of the local agency to control (*Riso, 1998*). A summary of the Naval Support Activity Monterey Bay's resources is presented below:

- Staff. Eight personnel per shift, and one fire prevention officer serving the OMC;
- Wildland Engines. Four wildland engines;
- Wildland/Structural/Air Crash Rescue. One engine;
- Structural Engines. Three structural engines; and
- Rescue Squad. One rescue squad.

4.3.2.2 Firebreaks

The OMC is heavily developed and has one firebreak at the eastern edge of Fitch Park Housing Area. Existing roads, developed building sites, and other paved areas also serve as firebreaks. The OMC is adjacent to the former Fort Ord which is highly susceptible to wildfire. To decrease the potential for wildfires, the following measure is recommended:

- Maintain the firebreak on the east side of the Fitch Park Housing Area and clear vegetation as necessary between existing buildings and adjacent native plant communities.

4.3.2.3 Prescribed Burning

No prescribed burning occurs on the OMC lands. The OMC is located adjacent to undeveloped portions of the former Fort Ord some of which are highly susceptible to wildfire. Some adjacent areas are subject to burning to meet ordnance removal and habitat management objectives. To protect the OMC lands from wildfires, the following measure is recommended:

- Vegetation management should be coordinated such that buffer areas (low vegetation, periodically disced or mowed) of at least 100 feet are established between habitat management areas.

4.4 Resource Requirements

This Section presents the resource requirements for managing natural resources at the POM and OMC. An organizational chart is included as Figure 20. The following summarizes the resource requirements for the POM and OMC:

4.4.1 Grounds Maintenance

The POM DPW provides overall coordination and oversight for grounds maintenance activities at the POM and OMC. Grounds maintenance services are normally contracted to a commercial enterprise that

Final

provides services such as mowing, trimming, edging, irrigation, weed removal, and fertilization. The POM DPW is currently in the process of identifying a contractor to continue grounds maintenance services. For further information about grounds maintenance activities at the installation, refer to Part II, Land Management and Grounds Maintenance, of this INRMP.

4.4.2 Natural Resources Management

Natural resources management activities on the POM and OMC are carried out by the POM Directorate of Environmental & Natural Resources (DENR) and the POM DPW. The POM DENR has designated a Natural Resources Program Manager to oversee Army lands at the POM and OMC. The Natural Resources Program Manager ensures that natural resources activities are consistent with existing plans, including the Endangered Species Management Plan (ESMP), the Installation Master Plan, and other applicable plans and regulations. In addition, the Natural Resources Program Manager ensures that natural resources activities are consistent with the installation's mission.

Army natural resources management activities on the POM and OMC are primarily performed by volunteers. The POM DENR has identified a need to enhance and promote the volunteer program in order to obtain the necessary labor to support natural resources activities on Army lands. To assist the POM DENR, the following recommendations are provided:

- Promote and reestablish the volunteer program, using volunteers to conduct weed removal and brush removal, and to plant native vegetation; and
- Identify additional funding sources to implement measures recommended in this INRMP for natural resources management activities.

Natural resources management activities on City of Monterey leased lands are managed by the City. The Monterey City Forester protects and manages natural resources activities at the Huckleberry Hill Nature Preserve, including vegetation removal and enhancement. The City Forester has prepared the Huckleberry Hill Forest Management Plan to guide natural resources management activities on the Preserve (City of Monterey, 1987).

4.4.3 Equipment, Supplies, and Materials

The POM DPW is responsible for providing equipment, supplies, personnel, and funding for the Army's natural resources management activities at the POM and OMC. For City of Monterey-leased lands, the City is responsible for supplying equipment, labor, and supplies used to carry out natural resources management activities.

4.5 Revisions

Revisions to the INRMP will be made at intervals sufficient to keep the plan current. A major revision will be conducted every three-to-five years as needed. Page revisions will be made when major revisions are unnecessary. Previously prepared information within the original plan related to soils, climate, land use history, and geography, although requiring no revision, should be carried forward to the revised plan.

PART II

LAND MANAGEMENT AND GROUNDS MAINTENANCE

1.0 BACKGROUND

1.1 Regulatory Framework

Section 3-1a of AR 200-3, requires the Army's land management operations to be consistent with the latest conservation and land management principles. Carrying out national land use and conservation policies is required on all federal lands to the extent practicable and in concert with the assigned mission. Army commanders within the continental United States are required to actively cooperate with local, state, and federal organizations in carrying out national land use and conservation policies in accordance with accepted scientific and professional standards and practices.

Installation commanders are required by AR 200-3 to plan land utilization with an awareness of the potential environmental effects of proposed actions. Mission requirements for the land should avoid or minimize adverse effects and restore or enhance environmental quality. Actions are required to be carried out in accordance with the provisions of AR 200-3, AR 200-2, AR 210-21, AR 420-74, 420-76, TM 5-629, TM 5-630, TM 5-632, *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the treatment of Cultural Landscapes* (U.S. Department of the Interior, 1996) and applicable federal, state, and local laws and regulations.

1.2 Grounds Maintenance

Grounds should be maintained at the levels and intensities necessary to meet the designated use criteria, to protect, and enhance the natural resources, and to ensure a pleasing appearance in harmony with the natural landscape. Improved grounds should be maintained to the degree required to maintain permanent cover of desired plants comparable with similar public facilities in the area. The Army Community of Excellence (ACOE) and self-help programs are to be an integral and active force in grounds maintenance/landscape improvement and installation beautification initiatives. The appropriate environmental directorate should provide technical guidance and approved materials to all interested occupants, building managers, tenants, as well as other personnel interested in improving their living and working areas on the installation.

Costs for maintaining grounds should be managed by providing the minimum amount of mowed area and irrigated landscape plantings necessary to accomplish management objectives. Low maintenance landscape species, reforestation, natural areas, and wildlife habitat will further reduce long-term maintenance costs. Standards of maintenance of all categories of grounds will comply with TM 5-630, Natural Resources Land Management and with applicable BMPs recommended by pertinent agencies such as, University of California Division of Agriculture and Natural Resources, Monterey County Agricultural Department, California Department of Forestry, California Environmental Protection Agency, U.S. Department of Agriculture, and the Regional Water Quality Control Board.

2.0 LAND USE CATEGORIES AND MANAGEMENT REQUIREMENTS

The three categories of grounds present at the POM and OMC are improved, semi-improved, and unimproved. These categories are defined based on the frequency and intensity of maintenance activities. Vegetative cover types within these categories have been described in Flora and Fauna Baseline Study of the Presidio of Monterey, California (*J&SA, 1995*) for the POM and in Flora and Fauna Baseline Study of Fort Ord, California (*U.S. Army, 1992b*). At the POM, these grounds categories include the following cover types: Monterey pine forest, horticultural tree plantings, grass lawn, disturbed ground, and developed lands. Cover types at the OMC include central maritime chaparral, coastal scrub, coast live oak woodland, and developed land. Cover types within each grounds category at the POM and OMC are described below and shown in Figures 21 and 22. The following sections describe the vegetative cover type within each grounds category, habitat management concerns regarding special-status species, if applicable, and grounds management requirements. Plant species known to occur on the POM and OMC are included in Tables 2 and 3, respectively.

2.1 Improved Grounds on the POM and OMC

Improved grounds at the POM and OMC include land on which intensive maintenance activities are planned and performed annually as fixed requirements. These activities include mowing, irrigating, fertilizing, dust and erosion control, drainage system maintenance, installation and maintenance of landscape plantings, and other intensive practices. Cover types occurring within lands designated as improved grounds at the POM include, grass and lawn, disturbed ground, and developed lands. Similar cover types also occur on the OMC where improved grounds are primarily lawns or landscaping located adjacent to buildings and in common areas of residential housing. Although buildings and pavement in developed areas on the POM and OMC are technically defined as unimproved (per TM 5-630), these features are shown as improved on Figures 21 and 22.

2.1.1 Land Use Inventory

2.1.1.1 Grass and Lawn

On the POM and OMC, grass and lawn in the improved cover category includes areas that are vegetated with turf grasses and forbs. These areas are managed by periodic mowing and supplemental irrigation. Grasses and lawns can be found throughout the developed portion of the POM and OMC and include athletic fields, parade grounds, yards and common areas in family housing and barracks, academic areas, and other scattered sites. Typical species associated with this cover type include fescue varieties (*Festuca* spp.), kikuyu grass (*Pennisetum clandestinum*), hare barley (*Hordeum murinum* spp.), hop clover (*Trifolium campestre*), English daisy (*Bellis perennis*), cutleaf plantain (*Plantago coronopus*), California bur clover (*Medicago polymorpha*), and rattail fescue (*Vulpia myuros*). Two subtypes are common on the POM:

- Open Grass and Lawn. This category includes all treeless areas with grass cover. The subtype includes approximately 9 acres and covers approximately 2.3 percent of the total POM area.
- Grass and Lawn with Scattered Trees. This subtype includes all areas with grass cover that support scattered trees (Monterey pine and Monterey cypress) at less than 20 percent total cover. The subtype includes approximately 19.5 acres and covers 5 percent of the total POM area.

On the OMC, grasses and lawns can be found throughout the developed portion and include elementary schools, parade grounds, yards and common areas in family housing, and other scattered sites. Typical species include: kikuyu grass, fescue, hare barley, hop clover, English daisy, cutleaf plantain, California bur clover, and rattail fescue. This cover category is not mapped on the OMC.

2.1.1.2 Disturbed Ground

On the POM and OMC, disturbed ground in the improved cover category includes areas that have been cleared through grading, filling, erosion, or other activities or events that remove vegetation. The cover category is not mapped on the OMC. Portions of disturbed grounds on the POM are non-vegetated as a result of recent clearing or disturbance. Other areas are vegetated with a predominance of non-native species adapted to colonizing disturbed areas. These two subtypes on the POM are described below:

- **Bare Ground.** Bare ground includes areas subject to severe, recent ground disturbance and the removal of vegetation. Over time and dependent on management, these sites will transition to grassland, broom thicket, and/or Monterey pine forest. The subtype includes 5.1 acres and covers 1.3 percent of the total POM area.
- **Broom Thicket.** Broom thickets occur on disturbed sites and contain dense stands of French or Scotch broom. Scotch broom tends to dominate and is prevalent along road edges in the Huckleberry Hill Nature Preserve. Plant species associated with broom thickets includes California huckleberry (*Vaccinium ovatum*), bush monkeyflower (*Mimulus aurantiacus*), and grasses. The subtype includes 1.6 acres and covers 0.4 percent of the total POM area.

2.1.1.3 Developed Lands

Developed lands in the improved cover category include buildings, paved surfaces, and intervening lawns and horticultural tree and shrub plantings. Typical horticultural trees and shrubs found at developed sites on the POM are Monterey pine, rosemary (*Rosmarinus officinalis*), ceanothus (*Ceanothus* spp.), Hooker's manzanita (*Arctostaphylos h. hookeri*), shiny green xylosma (*Xylosma congestum*), pittosporum varieties (*Pittosporum* spp.), indian hawthorn (*Raphiolepis indica*) and oleander (*Nerium oleander*). This subtype includes 186 acres and covers 47 percent of the total POM area. This area includes buildings, roadways, and other unvegetated land uses within this cover type.

There are scattered areas of unimproved grounds within the developed portion of the POM that support a variety of grasses and forbs. Species that typically occur in these areas include: rattail fescue (*Vulpia myuros*), rip-gut grass (*Bromus diandrus*), cut-leaf plantain, slender wild oat, and red stem filaree (*Erodium cicutarium*).

Similar to this cover category on the POM, developed sites on the OMC support structures, paved surfaces, and intervening lawns and horticultural tree and shrub plantings. Commonly planted species include trees such as eucalyptus and acacia, and shrubs such as indian hawthorn, shiny green xylosma, pittosporum, rosemary, and myoporum (*myoporum laetum*). Improved grounds at the OMC comprises approximately 615 acres and covers approximately 77 percent of the total OMC area.

2.1.1.4 Cemeteries

There is one cemetery on POM, which is located to the west of the Taylor Street entrance on the northern boundary of the base (Figure 21). The cemetery consists of irrigated lawn and scattered horticultural plantings of blackwood acacia (*Acacia melanoxylon*), Monterey pine, and Monterey cypress. The

cemetery is defined as improved grounds and is maintained regularly by mowing and fertilizing the grass, and by pruning and or removing damaged or diseased trees.

2.1.2 Habitat Concerns and Management Requirements

No naturally occurring sensitive species are found on developed lands on the POM or OMC. On the POM however, Hooker's manzanita has been planted as a landscape species. Hooker's manzanita is a federal species of concern and has been identified by the installation as sensitive. Pruning or other maintenance activities performed on planted Hooker's manzanita should be avoided, where practicable. Most nesting birds in landscape trees and shrub species are protected under the Migratory Bird Treaty Act (United States Code Title 16, Chapter 7). Activities that may disturb nesting birds in these areas should be cleared in advance with the DENR. Maintenance activities conducted on improved lands should be implemented to avoid impacts to adjacent semi-improved and unimproved areas.

2.1.3 Landscape Maintenance

This Section describes general best management guidelines for maintaining improved grounds landscapes at the POM and OMC. Improved grounds are maintained with periodic mowing, fertilizing, pruning, and supplemental planting and periodic irrigation. The following section addresses specific mowing, fertilization, and irrigation practices that should be implemented at the POM and OMC. General best management guidelines for pruning and supplemental planting on the POM and OMC is presented in Section 4, Best Management Practices.

2.1.3.1 Mowing

Figures 13 and 14 depict grass and lawn areas that require frequent mowing. Lawns, cemeteries, physical training areas (ball diamonds, football fields), parade grounds, and similar areas of turf should be mowed to a height of 2 to 3 inches. During hot weather, lawn areas should be cut to 3 to 4 inches. Lawns maintained by occupants of individual residences, quarters, and company detachments who are responsible for maintaining their own grass and lawn areas, should also follow these specifications. Mow improved grounds at intervals (depending on season and temperatures) sufficient to prevent the lawn grasses from exceeding 5 inches in height.

2.1.3.2 Fertilizing

Best management guidelines for fertilizer application are described in Section 4, Best Management Practices. The following section presents specific guidelines for the type of fertilizer and application rates to be used on improved grounds at the POM and OMC.

Landscape trees and shrubs. Trees and shrubs should be fertilized annually, or as necessary, with an all-purpose complete fertilizer composed of nitrogen (N), phosphorus (P), and potassium (K) except in special cases. No fertilizer is needed for mature trees. All decisions about nutrient needs for mature trees should be made on a case by case basis by a qualified, competent arborist certified by the International Society of Arboriculture (ISA). Fertilizing young trees may be done through irrigation with soluble fertilizer as part of an irrigation regiment or if applied to 2" to 4" deep holes. No hole should be made within 2' to 4' of the base of the trunk. Otherwise roots may be damaged by holes and/or fertilizer compound. The NPK ratio of the fertilizer should be 12-12-12, or 16-16-16 or comparable. One pound of fertilizer should be applied for each inch of tree diameter. Between ¼ and ½ pound of fertilizer should be applied for each shrub, depending on height.

Recreation areas and parade grounds. Fertilizer should be applied to turf on recreation areas and parade grounds at a minimum of four times annually. These areas generally require 2 to 5 pounds of nitrogen per 1,000 square feet annually. This is calculated by multiplying the percentage of nitrogen in the fertilizer formulation by the total weight of product applied. Apply mixed grade fertilizers as supported by field soil tests. Suitable turf fertilizers used should have an NPK ratio of 30-4-4 or comparable.

Open areas on improved grounds. Open areas and parkways not usually subject to traffic but maintained as improved will be fertilized only to the extent necessary to maintain a suitable plant cover to control erosion. These areas may require a complete fertilizer applied at moderate rates (100 pounds of 10-6-4 per acre). Nonirrigated grasslands should only be fertilized during the initial establishment period (one to three years).

2.1.3.3 Pruning

Pruning shrubs and trees on improved grounds should follow guidelines presented in Section 4, Best Management Practices. Trees should be pruned after planting and during the first few years of growth to encourage good branching structure. Trees should also be pruned after damage from disease or storms. Shrubs should be pruned as required to maintain desired appearance.

2.1.3.4 Irrigation

Landscaped areas at the POM and OMC receive little or no irrigation during the dry season. However, highly landscaped areas adjacent to buildings, lawns, parade grounds, and recreational areas require regular irrigation. Some areas adjacent to buildings have well established landscaping and may only require watering a few times during the dry season (May-October). These areas should only be irrigated at a frequency and duration sufficient to maintain uniform growth and appearance. A schedule for irrigating landscaped areas depends on the drought tolerance of the planted species. Appropriate frequency may include no summer irrigation for well established plants adapted to the local climate, occasional summer watering at approximately one month intervals, or regular watering at weekly to biweekly intervals. Identification of soil types is important in determining the duration and frequency of watering. It is also important to take into account the wide variation in soil absorption capabilities, when determining watering schedules. Features such as steep slopes, erosion problems, and high water tables are of concern. Unless the soil is extremely porous, water applied to steeply inclined areas will tend to run off if applied at rates that may be acceptable on lesser slopes. Precise volumes and schedule should be made by the contractor conducting grounds maintenance using methods described below.

The amount of irrigation necessary for a given region is the water required to maintain a balance of soil moisture that offsets evaporation and transpirational losses by the vegetation (evapotranspiration). The evapotranspiration rate is the combined loss of water from the soil due to evaporation and transpiration from plant leaves. This rate varies daily and is dependent on the local climate.

Daily evapotranspiration rates can be calculated using Leaflet 21426, Determining Daily Reference Evapotranspiration (ET_o) prepared by the Cooperative Extension University of California, Division of Agriculture and Natural Resources (Extension Office). The ET_o rate can be useful to calculate appropriate irrigation volumes that can be used without causing excessive runoff. Irrigation volumes can be calculated for specific vegetation types using Extension Office Leaflet 21493 Estimating Water Requirements of Landscape Plantings, and Leaflet 21432 Lawn Watering Requirements Along California's Central California Coast. Normal annual ET_o is displayed in Table 4.

When irrigating improved grounds, the following guidelines are recommended.

Grass and Lawn. High use areas such as improved lawns, parade grounds, and recreational areas require regular irrigation. A general schedule for watering lawn areas during the dry season (approximately May through October) can be developed using the following method.

For turfgrass, the amount of water that needs to be applied every three-days is calculated as follows. First a multiplying factor must be generated to determine how much water the irrigation system delivers in a given time period. This factor is multiplied by the appropriate monthly water requirement (which is calculated from crop type and the regional ETo) to calculate the recommended duration of watering every three days.

The multiplying factor is calculated by measuring an average depth (in inches) of water measured in a 15-minute can test. This is done by placing several flat-bottomed cans of equal sizes at various locations on lawns or other sprinkler irrigated areas. The water is turned on and the volumes of water in the cans is measured after 15 minutes. If the volumes vary considerably, the system should be adjusted so that water is broadcast evenly. Table 5 displays the multiplying factors that correspond to different water volumes collected during the can test.

The multiplying factor is then multiplied by the monthly requirement to determine how long to irrigate turfgrass every three days. Table 6 displays monthly turfgrass three-day water requirements.

Using this method, an example of irrigation requirements is as follows: June irrigation time for a cool season grass lawn area (the type of lawn in high-use areas at the POM and OMC). Assume the 15-minute test determines that 3/8 inch of water is delivered by the irrigation system. The approximate multiplying factor (Table 5) would be 40. Because cool season grasses during the month of June have a 3-day requirement of 0.38 (Table 4), the length of irrigation every three days would be 15.2 minutes ($0.38 \times 40 = 15.2$ minutes).

New Turf. New turf requires a constant supply of moisture. Light, frequent sprinkling is recommended in lieu of heavy application, but care should be taken to prevent puddling and runoff. Daily application may be necessary during very warm periods. For best results, all newly seeded areas receiving irrigation should be mulched. Continue irrigation as needed until the turf is established, which normally occurs after 30 to 60 days.

Other Landscaping. For other landscaping (trees, shrubs and flower beds) the Landscape Coefficient (K_L) Method is used to calculate irrigation requirements. The amount of water lost via evapotranspiration from a landscape planting varies as a function of the species planted, the density of the vegetation, and microclimatic conditions. By evaluating each factor and assigning it a numeric value, water loss relative to reference evaporation can be estimated. The following relationship uses an evaluation of each factor to produce a single K_L .

$K_L = k_s \times k_d \times k_{mc}$, where K_L is the Landscape Coefficient, k_s is the species factor, k_d is the density factor, k_{mc} is the microclimate factor.

K_L is used to approximate water loss from a landscape. (ET_L) relative to normal evapotranspiration rates, where $ET_L = K_L \times ETo$. Table 7 provides estimated values for species, density and microclimate factors and can be used to determine K_L for landscape vegetation types.

The variable factors used to calculate K_L include the species factor (k_s), density factor (k_d) and microclimate factor (k_{mc}). The species factor is either low, average, or high and is based on the individual species water requirements (e.g., a "low" species factor would be assigned to drought-resistant plantings). The density factor is based on the surface area covered by

vegetation. A higher density factor is assigned to mature landscaping (that covers greater than 100 percent of the ground surface) than to newly planted or sparsely covered areas that (cover less than 30 percent of the ground surface). The microclimate factor accounts for differences in exposure, soils, and wind. A low microclimate factor is assigned to shady, protected areas. A high microclimate factor is assigned to landscaped areas surrounded by paved areas, or in windy, exposed locations. Areas intermediate in exposure are assigned an average value. In general, average values can be assigned to these factors and field observations can be used to corroborate irrigation volume calculations.

Irrigation managers can estimate water loss via evapotranspiration (ET_L) for a landscape to determine how much water the landscape requires each week or month. By combining K_L with information on irrigation efficiency and application rate, soil water holding capacity, root zone depth and infiltration rate, irrigation managers can determine specific run times and cycles. These K_L values are only estimates, and landscape contractors managing irrigation schedules are advised to monitor their landscapes whenever implementing new schedules, and to be prepared to modify the schedules based on observations as needed.

As an example of the K_L Formula Method, anticipated irrigation requirements for June are calculated as following for a dense mixed planting of drought-resistant trees, shrubs and groundcovers located in the full sun and exposed to the wind.

Using Table 7, K_s is determined to be 0.2, K_d is determined to be 1.3, and K_{mc} is determined to be 1.4 with $K_L = k_s \times k_d \times k_{mc}$. Then K_L is equal to 1.46. To determine ET_L , K_L is multiplied by an ET_o of 4.1 (from Table 4), and ET_L equals 5.99 inches.

Landscaping at the POM and OMC should be irrigated as necessary with water volumes estimated using the calculations described above to maintain minimum soil moisture. Browning and retarding of grass and plants should not occur, excepting natural senescence, seasonal leaf drop and dormancy. Accepted irrigation formulae as described in this section, and in the installation's standard operating procedures, should be used to establish irrigation methods and calculate the amount of water needed.

2.2 Semi-Improved Grounds on the POM and OMC

Semi-improved grounds include areas on which periodic maintenance is performed at a lower frequency and intensity than on improved grounds. Activities on semi-improved grounds normally include soil sterilization, weed and brush control, drainage maintenance, and mowing for fire protection. At the POM, semi-improved grounds include some horticultural tree plantings. At the OMC semi-improved grounds occur as a buffer between developed land (such as buildings and residential housing) and undeveloped areas.

2.2.1 Land Use Inventory

2.2.1.1 Horticultural Tree Plantings

There are approximately 37.4 acres of horticultural tree plantings on the POM, covering approximately 9.5 percent of the total POM area. This cover type is not differentiated from developed lands. Horticultural tree plantings on the OMC are not differentiated from developed lands, and the extent of this cover type has never been mapped.

The following four subtypes of tree plantings are recognized to occur on the POM:

- **Monterey Pine Plantings.** Monterey pine (*Pinus radiata*) plantings include areas where Monterey pines were planted or established naturally within and around developed areas of the POM. These differ from Monterey pine forest subtypes by reduced density and coverage. The understory includes managed turf areas, bare ground, horticultural plants, or French broom (*Genista monspessulana*) thickets.
- **Monterey Cypress Plantings.** Monterey cypress (*Cupressus macrocarpa*) plantings include pure, or nearly pure, horticultural stands of Monterey cypress with an understory of managed grass or bare ground. Monterey cypress is native to the Monterey Peninsula, but soils associated with native occurrences do not exist at the POM.
- **Eucalyptus Plantings.** *Eucalyptus* spp. plantings include horticultural stands of pure, or nearly pure, stands of non-native eucalyptus trees. Understory vegetation is generally sparse to lacking due to chemicals released from the buildup of eucalyptus leaves (duff) that retards the germination and/or growth of other plants (allelopathy).
- **Mixed Tree Plantings.** This subtype includes a mix of tree species including Monterey pine, Monterey cypress, eucalyptus, coast live oak (*Quercus agrifolia*), and wattle (*Acacia* sp.). The Master Plan of the POM (*Beach-Philpot, 1982*) includes a map of tree cover, list of horticultural species planted, and their site distribution.

On the POM, horticultural tree plantings in the semi-improved cover category include stands of native and non-native trees that were planted or naturalized along roads and around buildings and structures.

2.2.2 Habitat Concerns and Management Requirements

Semi-improved lands on the POM and OMC are important as buffer zones between developed areas and native habitat areas. On the POM, this cover category includes horticultural tree plantings that are comprised of native species such as Monterey pine, Monterey cypress, and coast live oak. In many areas, Hooker's manzanita has been planted as an understory species. Irrigation should not be conducted under native California tree species at the POM or OMC. Landscape maintenance activities in semi-developed areas could affect nesting birds or other animal species. On the OMC, semi-improved lands adjacent to chaparral habitat could provide habitat for Monterey spineflower, Monterey ceanothus, and sandmat manzanita.

2.2.3 Landscape Maintenance

Semi-improved grounds require limited landscape maintenance at the POM and OMC. Semi-improved horticultural tree plantings require some maintenance in the understory, such as annual mowing or weed cutting to reduce potential fire hazards or to facilitate roadway visibility. New plantings required to replace trees lost from disease or storms should be watered and fertilized until established. Diseased trees may be retained depending on tree type and severity of the infection or pathogen. Many trees coexist with infections for long periods before decline or death occurs. Treatment of certain diseases may be preferable to removal. Maintenance fertilization should be limited to amounts and types required to prevent loss of vegetation cover. In most areas, fertilizers should not be required.

Irrigation is not recommended in most areas classified as semi-improved. No irrigation, trenching, compaction or other soil condition altering activities should occur within the dripline of naturally-occurring Monterey pine, coast live oak trees, and planted Monterey cypress trees unless

necessary or unavoidable. Exceptions when necessary can be made on a case by case basis by a qualified ISA Arborist. Summer irrigation could weaken the trees and encourage pathogens. Some small scale irrigation (hand watering) may be appropriate for the first and second year of newly planted trees in improved (developed) areas. Where feasible, a native shrub understory could be planted in these areas to enhance the wildlife and aesthetic value. Native plantings may require adherence to specified planting methods and seasons, including limited irrigation through the establishment period.

Roadside mowing should be performed only as necessary to provide marginal strips for emergency use, maintain sight distances for road, signs, and traffic safety structures, and reduce fire hazard. Requirements for mowing should be determined by evaluation of local conditions and road use. Mow clear zones of road shoulders at intervals sufficient to prevent vegetative growth from exceeding 8 inches. Mowing on road shoulders should not encroach into habitat areas.

2.3 Unimproved Grounds on the POM and OMC

Unimproved grounds at the POM and OMC include all other land not classified in the improved and semi-improved grounds categories. Habitat areas specific to the POM include Monterey pine and riparian forest. Areas specific to the OMC are coast live oak woodland, central maritime chaparral, coastal scrub and annual grassland. Activities on unimproved grounds do not occur on a regular basis and generally are unpredictable, activities are dependent upon variables such as mission requirements and changing conditions due to fire. Vegetated areas are described below.

2.3.1 Land Use Inventory

2.3.1.1 Coast Live Oak Woodland

Coast live oak woodland borders the OMC on the southern and eastern edges. This community extends into and surrounds portions of Marshall and Fitch Park housing areas. This community is characterized by a 20 to 90 percent tree cover of coast live oak with an understory of shrub species such as poison oak (*Toxicodendron diversilobum*), coyote brush (*Baccharis pilularis*), shaggy bark manzanita (*Arctostaphylos tomentosa*) and an herbaceous layer composed of California hedge nettle (*Stachys bullata*), California brome and miner's lettuce (*Claytonia perfoliata*). Approximately 106 acres of coast live oak woodland occurs on the OMC, covering approximately 13 percent of the total land area.

2.3.1.2 Central Maritime Chaparral

Central maritime chaparral adjoins the OMC along a portion of the southern edge of Fitch Park and occurs as a few isolated strips between yards in residential areas (Figure 22). This community on Annex lands is poorly differentiated from coast live oak woodland and coastal scrub but is dominated by shaggy bark manzanita, poison oak, black sage (*Salvia mellifera*) and coyote brush. Approximately 19 acres covering approximately 2.4 percent of the total land area.

2.3.1.3 Coastal Scrub

Coastal scrub occurs as a small patch in the Marshall park housing area on the OMC. This community is dominated by poison oak, California sagebrush (*Artemisia californica*), mock heather (*Ericameria ericoidies*), tree lupine (*Lupinus arboreus*) and coyote brush. Approximately 5.2 of coastal scrub occurs on the OMC covering 0.7 percent of the total land area.

2.3.1.4 Annual Grassland

On the OMC annual grassland occupies open areas adjacent to the Stilwell Park housing area to the north between the residential area and Light Fighter Drive and to the southwest between housing and Highway 1. Additionally, several small areas of annual grassland occur as buffer zones between developing areas and oak woodland (Figure 22). This community is characterized by mostly annual grasses and perennial and annual forbs including soft chess, slender wild oat, filaree (*Erodium* sp.), ripgut brome and silver hairgrass (*Aira caryophyllea*). Approximately 55 acres of annual grassland occurs on the OMC, covering 7 percent of the total land area.

2.3.1.5 Monterey Pine Forest

Monterey pine forest occurs principally in the undeveloped southwestern portion of the POM on the Huckleberry Hill Nature Preserve and adjacent areas. Smaller patches are interspersed within developed areas of the POM west and north of Huckleberry Hill Nature Preserve. The forest generally consists of nearly pure stands of even-aged Monterey pine. The canopy is typically closed but develops openings where the forest is more mature and multi-aged. On Huckleberry Hill Nature Preserve, the understory is comprised of a closed canopy of sclerophyllous shrub species (various evergreen or “hard shrubs”). In forested areas within developed areas of the POM, the understory is typically open and grassy with scattered shrubs although some areas with a hard shrub understory are present. Two subtypes of Monterey pine forest are recognized on the POM, including:

Monterey Pine Forest with Shrub Understory. This subtype is dominated by Monterey pine in the overstory and sclerophyllous chaparral vegetation in the understory. Dominant understory shrubs include shaggy-barked manzanita, California huckleberry (*Vaccinium ovatum*), bush monkeyflower, poison-oak, California coffeeberry (*Rhamnus californica*), and Hooker’s manzanita. Herbaceous species associated with this subtype are generally found around shrub and forest gaps, and include Douglas’ iris (*Iris douglasii*), small-leaved lomatium (*Lomatium parvifolium*) Pacific peavine (*Lathyrus vestitus*), Pacific sanicle (*Sanicula crassicaulis*), and Monterey sedge (*Carex hartfordii*). A variant of this type of forest with a mesic understory is confined to a moist canyon in the northwest portion of the Huckleberry Hill Nature Preserve. The canopy is dominated almost exclusively by Monterey pine with a dense, lush understory composed of poison-oak, salal, bush monkeyflower, California blackberry, and woodrose. Herbaceous vegetation includes California hedge nettle, yerba buena (*Satureja douglasii*), toothwort (*Cardamine californica*), and several grass species. Approximately 120 acres of this subtype occurs on the POM, covering 31 percent of the total land area.

Monterey Pine Forest with Grassy Understory. This subtype occurs in the forest patch east of the new sports arena. The overstory is dominated by Monterey pine, and the understory is dominated by herbaceous vegetation including California brome (*Bromus carinatus*), rattlesnake grass (*Briza major*), slender wild oat, Monterey sedge, California buttercup (*Ranunculus californicus*) and Douglas’ iris. Scattered shrubs, including coast live oak, California huckleberry, and Hooker’s manzanita, are spread throughout this subtype but are not dominant understory elements. The understory of this subtype was likely cleared at some time allowing grasses to become established. Approximately 9.8 acres of this subtype occurs on the POM, covering approximately 2.5 percent of the total land area.

2.3.1.6 Riparian Forest

Riparian forest habitat is found along an intermittent stream that follows the southeastern boundary of the POM from Franklin Street to Lighthouse Avenue. Approximately 4.5 acres of riparian forest occurs on the POM, covering 1.2 percent of the total land area. Based on the dominant tree cover, this land use

element can be separated into two subtypes. Riparian forest dominated by Monterey pine and coast live oak occupy the upper slopes and upper elevations of the stream corridor. Dominant tree cover is provided by Monterey pine and coast live oak with scattered arroyo willows (*Salix lasiolepis*) and other species that constitute less than 10 percent of the canopy cover. The understory is dominated by California blackberry (*Rubus ursinus*), poison-oak, California huckleberry, bush monkeyflower, California coffeeberry, and French broom, with additional herbaceous species such as goose grass (*Galium aparine*), soft chess (*Bromus hordeaceus*), leather-leaf fern (*Polypodium scolieri*), Bermuda buttercup (*Oxalis pes-caprae*), and three-cornered onion (*Allium tribracteatum*). Riparian forest dominated by coast live oak occurs along the lower slopes, bank, and land bed at the lower stream reaches. Coast live oak covers over 80 percent of the canopy, while arroyo willow is a common associate in the wetter areas. The understory is composed of native and non-native species including California blackberry, California wild grape (*Vitis californica*), California manroot (*Marah fabaceus*), poison-oak, French broom, Himalayan blackberry (*Rubus discolor*), English ivy (*Hedera helix*), German ivy (*Senecio mikanioides*), and periwinkle (*Vinca major*).

Several invasive, non-native plants are present in the riparian forest habitat associated with the drainage channel located along the southern border of the POM. The most invasive species present include French broom, English ivy, and German ivy. These species often displace native vegetation, and ivies may cause the decline or death of native trees.

2.3.2 Habitat Concerns and Management Requirements

All natural habitat on the installation occurs on unimproved lands on the POM and OMC. These habitats also support special-status species described in Part IV of this document. Landscape management personnel should be required to undergo endangered species training to help them become familiar with the special-status habitats and species at both the POM and OMC.

2.3.3 Landscape Maintenance

No landscape maintenance is expected to be required on unimproved lands at the POM and OMC. Landscape activities should not intrude into unimproved habitat areas. As opportunities arise, non-native vegetation should be removed and replaced with native species in areas adjacent to natural habitats such as oak woodland, chaparral, riparian, and pine forest. Replacement plantings along the banks of the drainage should be installed in middle to late autumn to take advantage of seasonal rainfall for plant establishment. Generally, unimproved areas will not require fertilization except to increase density of vegetation for erosion control, or to enable initial establishment of native plantings.

3.0 OPPORTUNITIES FOR LANDSCAPING AT THE POM AND OMC

Landscaping at the POM and OMC should be functional in design and species composition, compatible with adjacent surroundings, and complementary to the architectural features and the natural and historic setting of the surrounding area. Formal landscape designs should be limited to high visibility areas and those where an attractive appearance is necessary, including main buildings and road entrances, ceremonial areas, and the historic district.

Landscape plantings on the majority of the POM and OMC should emphasize low maintenance, drought-tolerant, deer-resistant, non-invasive species. Invasive plant species and those which attract or serve as hosts to pests should not be used. Plant species indigenous to the Monterey Peninsula area are adapted to the soils and climate of the region and are therefore, typically drought-tolerant and require little maintenance. Indigenous species should be used in landscape plantings wherever feasible. Drought-resistant shrub plantings should be used in favor of lawns and other high water-demand landscaping. A list of species suitable for planting on improved and semi-improved grounds of the POM and OMC is provided in Tables 8, 9, and 10. DENR should be contacted prior to using plant species not listed in these Tables. The list identifies those species native to the Monterey Peninsula region. New, large scale landscaping at new facilities with improved areas should have a landscape design prepared and approved by the DENR. Installation of new or replacement landscaping should adhere to the general specifications provided in the Best Management Practices Section of this INRMP.

3.1 Improved and Semi-Improved Grounds

Priority areas for installing or retaining lawns include the roadway entrances to the POM and OMC, the lawns in the historic district at the POM, and in landscaped areas around the family housing areas. Lawns in other areas of the POM and OMC are considered low priority, and, where feasible, should be replaced with other forms of landscaping which require less maintenance and are more drought-resistant. Where lawns are deemed necessary, the use of drought-tolerant varieties of grass including tall fescues, dwarf fescues, double dwarf fescues, red and Chewings fescue, and bentgrass is advised. Table 9 provides recommended grass varieties and planting specifications. Generally, lawns should be established with a balanced mixture of grass species depending on environmental conditions and projected use.

Several unlandscaped areas, characterized by bare ground or a cover of non-native weed, (ruderal) species are scattered throughout the POM and OMC. Landscaping should be installed in these areas as opportunities arise. New landscaping should be done to replace dead or known invasive plant material. Monterey pines killed by pine pitch canker may be replaced by coast live oak trees or other native species such as Monterey cypress, Monterey pine, coast redwood, madrone, etc., as appropriate to the site and conditions. Priority areas for installing new landscaping and improving existing landscaping depend on the intensity of use. Heavily used areas would be preferred over lightly used areas. Priority areas for installing new landscaping and improving existing landscaping at the POM include:

- New landscaping around the new fitness center;
- New landscaping around the new recreation center; and
- New landscaping around the Weckerling Building.

Landscaping opportunities at the OMC include:

- Residential Housing Areas; and
- DOD Center; and
- Commissary/PX; and
- Child Development Center, Porter Youth Center and Post Chapel; and
- DENR/DLE and DPW.

3.2 Unimproved Grounds

Planting in native plant communities of unimproved grounds, such as the Monterey pine forest on the POM, riparian forest on the POM, coast live oak woodland on the OMC, and central maritime chaparral on the OMC is not recommended and should only be done to enhance or restore habitat and should be strictly limited to species indigenous to those communities. The primary purpose of any planting in unimproved grounds should be to increase the habitat value of native communities and should only be accomplished in coordination with the DENR. To conserve the integrity of the local genetic stock, plant materials should be obtained by collecting propagules from existing populations as near to the planting site as possible. Table 10 lists species suitable for planting in native communities.

Buffer Areas. Buffer areas at the POM and OMC include landscaped areas between developed areas and adjacent native habitats (maritime chaparral and coast live oak woodland). Enhancing buffer zones will serve to reduce intrusion of invasive species in these areas, and help provide habitat for animals that are natural controls for insect plant pathogens. Buffer areas should be landscaped with species native to Monterey pine forest, chaparral, and coast live oak woodland habitat to the extent feasible. As recommended above, native plant material should be collected from existing local vegetation as near to the planting site as possible.

Two types of buffer areas are present on the POM: barren or landscaped areas between developed portions of the base and Monterey pine forest (urban forest and native habitat present on Huckleberry Hill Nature Preserve) and barren or landscaped areas between developed areas of the POM and the adjacent community. Buffer areas adjacent to Monterey pine forest should be landscaped with species native to this habitat.

Landscaping in buffer areas adjacent to the City of Monterey should adhere to recommendations from the DENR and city forester. Landscaping should blend in with the character of landscaping in adjacent communities, and avoid encroaching on adjoining properties. Plants with the potential to invade or encroach upon adjacent areas should be avoided. These include vines, rhizomatous species, and trees with spreading roots or branches or those that could grow tall enough to shade or otherwise intrude upon adjacent properties.

Invasive Plants. Several invasive plant species are present at the POM and OMC. These species displace and exclude native vegetation and landscaping, and generally provide limited value for wildlife. Controlling the spread of these species can be highly maintenance-intensive. Under no circumstances should invasive species be planted for landscaping. As opportunities arise, steps should be taken to eradicate these species from the POM and OMC. A list of invasive species present on the POM and OMC is provided in Table 11.

- Monterey Pine Forest. Landscaping is not recommended in Monterey pine forest on undeveloped portions of the POM. Monterey pines located on the Monterey Peninsula and on the POM have not been regenerating at a rate that will ensure the continued success of the forest over the long term. Factors contributing to the decline of the forest include disease, insect infestations, and competition with introduced non-native species for sun light, water, and nutrients. As opportunities arise, new pine trees should be planted to diversify the age structure of native stands, and the understory of buffer plantings should be enhanced with appropriate species. Due to pine pitch canker, which is increasingly prevalent on the Monterey Peninsula, replacement strategies developed for Monterey pine should follow current best management practices recommended by the USFWS, CDFG, CDF, and local agencies. At this time, pine pitch canker is not known to occur in the Huckleberry Hill Nature Preserve. As previously mentioned, pine forest on the Huckleberry Hill Nature Preserve is managed by the City of Monterey. However, to help limit the spread of this disease into the Preserve, the installation should follow recommendations presented in Section 5.2, and attempt to enhance the understory of pine forest areas on the POM lands adjacent to Huckleberry Hill Nature Preserve. Enhancing the understory of Monterey pine forest areas adjacent to native habitat may serve as a buffer between the native forest and human-induced stresses (e.g., soil compaction, weed competition and, introduction of pollutants) associated with developed areas. The cost associated with removing trees killed by pine pitch canker justifies the effort of preserving and enhancing buffer habitat. Invasive species should be removed and the understory should be replaced with native species in order to restore the shrub understory of this area. Eradication of undesirables should be done by physical removal and through herbicide application. The establishment of understory will lead to improving habitat for bird species which feed on the insects that are vectors for pine pitch canker (Reid, 1998).

3.3 Historic District

Many opportunities exist to improve landscaping in the historic district on the POM. The area is currently covered by lawn with scattered trees. If the opportunity arises, the area could be upgraded to include landscaping associated with elements that enhance the historic significance of the POM, such as interpretive trails, visitor center, etc. Any changes to the landscaping should adhere to *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (U.S. Department of the Interior, 1996). These guidelines stress identifying (cover types, genus, species, cultivar as well as color, scale, form, bloom and texture), retaining and preserving the existing landscaping and hardscape elements. The condition of the plantings should be evaluated to determine age and health. The historical significance of the plantings should be investigated and non-surviving vegetative features, if any, could be reconstructed to depict the documented historic appearance of this area. Because the City of Monterey leases the lower part of the POM, which includes the historic district, any landscape plans should be reviewed by appropriate personnel at the DENR and the City of Monterey.

4.0 BEST MANAGEMENT PRACTICES

4.1 Management Responsibilities

Grounds maintenance services for communal and separate lawns or landscaped areas for the POM and OMC are provided by DPW. Normally, grounds maintenance of improved and semi-improved grounds at the POM and OMC is contracted to a landscape maintenance firm. The current contract is included as Appendix A. This contract indicates locations of the grounds and maintenance activities currently conducted by the installation. At the POM and OMC, landscaping on individually occupied residences are maintained by occupants. The City of Monterey manages Huckleberry Hill Nature Preserve and portions of the historic district.

4.2 General Landscape Specifications

The following sections outline considerations for landscaping previously unlandscaped areas, replacing or renovating trees, shrubs, vines and lawns, and conducting enhancement plantings in native habitats on the POM and OMC. Included are recommended planting size, method, spacing, and maintenance methods (e.g., including irrigation, pruning and fertilizing). Tables 3, 5 and 6 list species suitable for planting in specific areas.

4.2.1 Sources and Standards of Plant Materials

Landscape Plantings. Where feasible, native tree and shrub plantings should be one-gallon or less in size to maximize the ability of plants to naturalize in the area planted. Trees in five-gallon containers are acceptable. Plants should be purchased in a disease-free, healthy condition. Over-age material, plants with poorly balanced branching, and weak-stemmed plants should be rejected upon delivery.

Lawn and Grass Plantings. Seed specifications should meet the requirements of Federal Specification JJJ-S-181, which will state minimum percentages of germination and purity, maximum percentages of hard seed and weed seed, and the kinds of seed. Weed seed will not exceed 1 percent of the total. For grass seeds, percent germination and percent hard seed may be combined into one requirement for purchase or planting contracts. Weed seed will not exceed 1 percent of the total. Table 9 provides recommended grass species for use on the POM and OMC with appropriate application rates. Lower rates may be used under ideal seedbed conditions or where rapid vegetative coverage is not necessary.

Native Plantings. Indigenous plant materials can be obtained by collecting propagules (e.g., seeds, cuttings) from existing populations as close to the planting site as possible. Propagule collection should be directed by a biologist with experience in native plant biology and in a manner which avoids impacts to the habitat. The types of propagules that should be collected depend on the species in question and could include seeds, cuttings, or divisions. Transplanting of entire plants and bulbs should not be conducted. Volunteers or contract growers may be used to propagate native plant material or this material may be purchased directly from local vendors.

4.2.2 Planting Seasons

At the POM and OMC, October through December is normally the optimal time for planting. This allows roots to develop during the rainy season prior to the onset of cold weather. Early spring is (March and April) the next preferred planting time. However, because of the relatively cool summers experienced at the POM and OMC, transpirational stress is relatively low compared to inland areas. With proper

irrigation, trees, shrubs, and vines can be planted any time of the year. Anti-desiccants can be used as a transplanting aid to increase moisture retention if planting occurs during the warm season. Lawn seeding should be done during relatively cool periods of early spring or late autumn.

4.2.3 Nursery Stock Planting Methods

General best management planting practices are described below:

- **Plant Material Purchasing.** Nursery stock may be purchased balled, bare-rooted or in nursery containers. Stock should be labeled with species and variety. Shipments of planting stock should be carefully scheduled to permit immediate planting upon receipt. If convenient, nursery stock should be inspected at the nursery to ensure that material is of satisfactory quality. Stock should be guaranteed as to identification of species and variety specified and be free from diseases and insects.

General Planting. For all nursery stock, dig planting pits deep and wide enough to accommodate all the roots without crowding or twisting. Prepare all pits with straight sides. Dig tree pits at least 2 feet wider than the spread of roots or ball of earth. During the excavation of planting pits, separate the soil into three piles: sod (if present), topsoil, and subsoil. Use the salvaged sod elsewhere to repair grass areas if applicable. Arrange the soil piles to keep open the side of the pit from which the tree will be placed. If existing soil consists of sand or gravel or contains excessive building refuse, discard the material removed from holes and use good quality clay or silt loam. Mix topsoil and subsoil with an organic soil amendment such as fir bark mulch, peat moss or topsoil at a rate of 50 percent native soil to 50 percent soil amendment. Dig tree pits at least 2 feet deep or deep enough to permit at least 6 inches of topsoil below the roots. Shape the pit bottom so that the center is slightly raised for proper drainage. Place at least 6 inches of compacted topsoil in the bottom of the pit. Work soil under the ball to eliminate air pockets. Level plants and backfill the space between balled and burlapped plants and side of planting pit with good loam topsoil or improved native soil. Place backfill in 6-inch layers and firm soil about the roots. Plant trees and shrubs so that the ground surface relative to the stem is the same as at the nursery. Construct a saucer-like depression in the soil to permit irrigation. Water the new planting thoroughly to insure complete saturation of the root zone and surrounding soil.

Staking. Stake all trees that are subject to strong winds. Stakes will also be useful to protect newly planted material from traffic, mowing or weeding equipment, and similar hazards. Except for large trees (20 feet or taller) where rigid supports are required, avoid the use of long guy wires that affect ease of lawn maintenance and endanger personnel safety. Stakes should be placed within 2 feet of plants. Stakes should be of sufficient length that after planting they are at least half the height of the plant. Securely fasten the tree to the stakes using tree ties. Protect tree bark by using tree ties that are manufactured for this purpose. Stake tree-like shrubs and small evergreen trees with single stakes placed on the side toward prevailing winds. Set the stake about 1 foot from the trunk and about 2 feet deep. When planting bare-root stock, drive the stake before setting the plant to prevent injury to the roots. Tree stakes should be removed from trees as soon as the tree is rooted or established securely enough to withstand wind or other factors which may cause unnatural lean or failure.

4.3 Fertilizers and Soil Amendments

The major or primary plant food elements are nitrogen, phosphorus, and potassium. Calcium, magnesium, and sulfur are often referred to as secondary plant food elements. Primary activity in plant metabolism and deficiency symptoms are described below:

- Nitrogen (N) promotes rapid vegetative growth and gives the plants a healthy green color. It is effective in protein production. Small amounts are stored in the organic matter contained in the soil.

This frequently needs to be supplemented with nitrogen from chemical sources since many soils are deficient in nitrogen. Principle symptoms of nitrogen-starved plants are: stunted growth; pale yellow color, particularly in the leaves; "firing" or burning of the tips and margins of the leaves, starting at the bottom of the plant first.

- Phosphorus (P) is an active ingredient of the plant-protoplasm. It affects the rate of cell division, seed formation and plant hardiness. Many soils do not have adequate available phosphorus. Superphosphate is the common phosphorus carrier used to replenish phosphorus supplies. Some of the symptoms of phosphate-starved plants are: small growth; spindly stalk; delayed maturity; purplish discoloration of foliage or leaves of some plants; tips of older leaves often die; lack of or poor seed development.
- Potassium (K) is essential to all plant growth. Its specific functions are not well understood but it is suggested that it stimulates some chemical processes, aids in the absorption of other elements into the plant, and helps the plant resist diseases, cold and other adverse conditions. Potassium, like nitrogen, leaches quite readily. Some soils, especially sandy soils, need applications of commercial potash. Potassium starvation is common on most heavily cropped soils. The symptoms of a potassium starved plant are: plants grow slowly; margins of leaves develop a "scorched effect" starting first on the older leaves; stalk or stems are weak and plants "lodge" easily; seed or fruit is shriveled; resistance to rusts and other diseases is reduced.

Minor elements are often referred to as trace elements or micro-nutrient plant foods, since very small amounts in the soil solution are adequate for normal plant growth. These elements are boron, copper, iron, chlorine, manganese, molybdenum and zinc. Most fertilizer formulations, in addition to NPK, include specific minor elements.

4.3.1 Fertilizers

Fertilizers containing nitrogen, phosphorus, and potassium are called complete fertilizers. State laws and industry standards require that the percentage of each element be indicated on each bag of fertilizer. On these labels, the nitrogen content is expressed directly as nitrogen; phosphorus content is expressed in terms of phosphoric acid (P_2O_5), and the potassium content is given as potash (K_2O). The fertilizer grade is expressed in three numbers to indicate the percentage content of nitrogen, phosphoric acid, and potash, in this sequence. Therefore, a 10-6-4 grade of fertilizer is shown on the label as containing a minimum of 10 percent nitrogen, 6 percent phosphoric acid, and 4 percent potash. Likewise, a 20-0-0 grade of fertilizer contains a minimum of 20 percent nitrogen, but no phosphoric acid or potash. Manufacturers of mixed fertilizers usually make sure that their products contain the other minor elements needed for healthy plant growth in the geographic locations where their sales of fertilizer are anticipated.

4.3.1.1 Fertilizer Types

Nitrogen fertilizers are essential for growing wear-resistant turf. Common types and grades of nitrogen fertilizers include the following.

- Sulfate of ammonia is an inorganic fertilizer that contains approximately 20 percent nitrogen. It is widely used in the western United States and is sometimes preferred on western soils because the sulfur tends to correct alkalinity; and
- Ammonium nitrate is an inorganic fertilizer which contains approximately 33.5 percent nitrogen. It is a widely used nitrogen fertilizer because of its relative low cost.

Common types of inorganic phosphate fertilizers include the following.

- Superphosphate contains approximately 20 percent available phosphoric acid and is the most common source of phosphate in the United States. The material is manufactured in pulverized and granulated forms;
- Triple super-phosphate is similar to superphosphate in fertilizing action and recommended uses. As the material contains 40 percent or more available phosphoric acid, the rate of application is half or less than half the rate of application for superphosphate; and
- Potash-bearing fertilizers supply potassium. Potash deficiencies are not as common as those of nitrogen and phosphorus, but are of considerable importance in some areas. Sandy soils are most likely to be deficient in potassium; most clays are adequately supplied with this element.

4.3.1.2 Application

Uniform distribution of fertilizer is necessary. Modern fertilizer distributors provide economical and efficient distribution. Personnel should be trained in broadcasting by hand onto small irregular areas so that each handful is carefully scattered and each subsequent "throw" is continuous with the preceding one. Distribute half the fertilizer in one direction and the other half at right angles for both mechanical and hand methods. Apply fertilizers containing inorganic nitrogen (ammonium nitrate, nitrate of soda, or sulfate of ammonia) only to soils having adequate soil moisture. Do not apply fertilizer to grass when the leaves are wet from recent rains or dew. This is an important precaution for fertilizers that contain inorganic nitrogen.

4.3.1.3 Storage

Do not store ammonium nitrate and nitrate of soda in buildings in which organic materials are stored. Purchase only enough fertilizer to supply installation requirements for one year or less. Lengthy storage results in broken bags and caked or wet materials. Store in dry shelters, even if storage time is only for a few weeks. Tarpaulins may be used for temporary protection for a few days.

4.3.2 Soil Amendments

A number of materials other than fertilizers are useful for improving soils at the POM and OMC. These can include gypsum, sulfur, fir bark mulch, and soil.

Gypsum. Gypsum has long been used as a soil conditioner, and its primary role is related to its flocculating action on the clay particles. Gypsum can be used as a soil amendment where alkalinity and poor soil structure due to excessive salts are problems. Certain sodium salts destroy the "crumb structure" of soils causing poor drainage and unsatisfactory aeration. An excess of these salts will result in poor plant growth. Gypsum combines with sodium to become a soluble salt which is leached from the soil by rains and irrigation water.

Sulfur. Occasionally, it may be advisable to use agricultural sulfur to lower the pH and stimulate growth of certain plants, particularly those of the plant family ericaceae (e.g., rhododendron, azalea, and heaths). Both sulfur and aluminum sulfate can be used, but powdered sulfur is preferred since it is long-lasting, more effective, and less toxic to plants. Agricultural sulfur should be applied in moderate quantities, at a rate of one to two pounds per 100 square feet, and worked well into the soil. Another one to two pounds per 100 square feet should be applied several months later if tests indicate that the pH is still higher than desired.

Fir bark mulch. Fir bark mulch is relatively undecomposed organic material. It consists partially decomposed coniferous bark material. This substance will provide a long term nitrogen source and is relatively free of weed seed. Pine bark mulch should not be used under any condition, since it may harbor pine pitch canker.

4.4 Irrigation

Water is distributed to landscaping either using underground irrigation systems with pop-up sprinkler heads or from existing outlets which include standard hose bibs and quick couplers. Water is also supplied to vegetation via hand-placed hose end sprinklers.

Irrigation on the POM and OMC is conducted in developed areas to maintain landscape plantings or in unimproved areas during the establishment period of native plantings. Future planting of new or replacement landscaping in developed areas should take into consideration the availability of existing water supplies, and be geared toward developing increasingly drought-resistant plantings. This includes potential plantings to enhance buffer zones adjacent to natural areas or to enhance landscaping in developed areas. Systems should be designed to maximize water conservation. Pipelines and sprinklers must be sized and located to supply only the amount of water needed to meet the irrigation demand. Irrigation systems should be operated only when necessary and should not provide more water than the soil can absorb. Timing of irrigation should be set to occur during periods that irrigated lands are not being used and when transpiration and evaporation are at a minimum. As funds become available, existing landscaping should be replaced with drought-resistant species to limit water usage, and older more wasteful irrigation systems should be replaced with modern water-conserving equipment.

General recommendations for new and existing irrigation systems should incorporate considerations of design, location and available equipment in addition to water source, quality and availability.

4.4.1 Irrigation Design

All landscaping projects require assistance from irrigation experts and associated specialists. Engineers or irrigation technicians familiar with hydraulic design should be used for effective design of irrigation systems. Designs should consider the moisture requirements of the plant species to be irrigated and local rainfall patterns to determine optimal volumes and frequency of the irrigation. During the design process additional factors such as soil type, slope, runoff, and water quality should be evaluated. Where water is to be applied to a fixed location, consideration should be given to permanent systems with automatic control capability. Areas such as athletic fields, parade grounds, training, and administrative areas require irrigation to maintain healthy turf color and growth.

Mainline pipe should be located in areas where installation and maintenance can occur with minimum interruption to the landscape. The lateral circuits should be arranged so that pressure losses are kept to a minimum. Sprinkler heads should be located so that all areas which require irrigation are covered, and spray is directed away from buildings and streets.

Care must be taken to insure that installation of irrigation systems is completed according to plans and specifications. After completion, construction as-built plans of all permanent systems should be kept on file. All valve locations should be shown on the plans and should be referenced to three permanent landmarks wherever possible.

At the POM and OMC, potable water is used for irrigation purposes. Any future designs must insure that the proposed tie-in point to an existing water system will furnish sufficient flow at adequate pressures to

supply the existing and proposed domestic, industrial, fireflow and irrigation requirements and will not interfere with the normal domestic requirements.

4.4.2 New and Replacement Irrigation Systems

New and replacement irrigation systems should be designed with consideration of plant species, climate, soils, and topography. The use and management of a new or existing irrigation system should reflect good husbandry of water resources. Irrigation systems must comply with the National Plumbing Code and public health regulations concerning backflow prevention devices and system materials. Emphasis should be placed on low water use, drip irrigation systems for new installations. Existing irrigation systems should be converted to drip systems as funding permits. TM 5-630 contains technical specifications for the components of irrigation systems.

4.4.3 Operation of Irrigation Systems

The responsibility for operating, scheduling, and inspecting irrigation systems at the POM and OMC should be clearly defined. Optimal performance of an irrigation system is attainable only by skilled operators due to the widely varying irrigation requirements experienced over a typical irrigation season. Information gained during operation of the system should be combined with the instructions of the designer and used to formulate a set of standard operating procedures for the system. These procedures, together with a copy of the as-built plans, should be made available to the individuals responsible for operations. The criteria for water use during emergency conditions should be predetermined with the installation commander.

Field checks of ground moisture after the sprinkling cycle should be conducted to adjust the system. Field operation tests can be performed using readily available materials. Hose output should be measured by recording the time required to fill a garbage can of known capacity. The rate in gallons per minute is determined by dividing the capacity of the can in gallons by the minutes required to fill the container. Sprinkler flow rates should be measured by placing several cans in the spray pattern for an hour. After one hour, the depth collected in the cans is measured, and the output is expressed as inches per hour.

4.4.4 Irrigation Standards

Irrigation systems should be designed to optimize water usage depending on vegetation and climate. The amount of irrigation water necessary for an application consists of the vegetation water requirements plus the water required to maintain soil moisture at an appropriate level to support the vegetation. Section 2.1.3.4 of this Part, discusses methodology for calculating irrigation requirements.

Sprinklers should be set to avoid spraying water into doorways, windows, porches, parking areas, streets, driveways and walkways. Irrigation should not be done within six feet of the trunks of oak pine or cypress. Sprinklers should not be set to run in any position long enough to create runoff or ponding. Sprinklers should not be left unattended for more than thirty minutes without being checked for proper operation, wind drift, runoff or coverage. Sprinklers should not be obstructed in any way that limits irrigation of intended areas. Equipment should not be of types that deliver high-intensity streams that could cause damage to plants or to finished surfaces.

Irrigation systems should be equipped with a metering device. The meter should be used to aid in developing an optimal irrigation schedule. It can also be used to help identify malfunctions in the system and can indicate where maintenance is necessary.

Routine maintenance should be scheduled as needed to prevent major breakdowns. Records should be kept on irrigation system components that experience failure. Periodic review of records will assist in identifying trouble spots requiring remedial action. Maintenance records will also help the system manager determine how large an inventory of spare parts should be kept on hand for emergency repairs. Items such as sprinkler heads, drip systems and valves generally require regular maintenance. Most equipment is designed so replacement of these parts can be achieved with minimal effect on the operation of the system. Seasonal irrigation needs should be included within the standard operating procedures. Irrigation of landscape areas should not occur during the rainy season between December and April.

4.5 Maintenance of Tree, Shrub, and Groundcover Plants

Landscape pruning should be conducted by personnel knowledgeable in the growth and flowering habits of landscape species to prevent damage to plants. Typical damage caused by improper pruning are: stubs of tree branches, stripped bark adjacent to pruning wounds, shrub branches cut off at the ends rather than at their origin, and removal of lower limbs of conifers. Most ornamental shrubs and shade trees may be pruned at any time of the year. Fertilization after severe pruning should be undertaken to assist the plant in recovery. General recommendations for pruning trees and shrubs follows:

Pruning. When done properly, pruning can improve a tree's health and appearance, as well as increase the life expectancy of the tree. Proper pruning opens the canopy of the tree to permit more air movement and sunlight penetration. Pruning cuts vary depending upon the objective, and these objectives should be established prior to beginning any pruning operation. Two standard objectives for pruning are; hazard reduction pruning and maintenance pruning. Hazard reduction pruning is recommended when the primary objective is to reduce the danger to a specific target caused by visibly defined hazards in a tree. Maintenance pruning is recommended when the primary objective is to maintain or improve tree health and structure, and includes hazard-reduction pruning. Guidance for pruning is based upon *ANSI A300 Tree, Shrub and Other Woody Plant Maintenance Standard Practices* – 1995. Managers of landscape maintenance activities should obtain this guidance from the American National Standards Institute and require contractors to follow the standard practices contained therein.

Hazard reduction pruning and maintenance pruning should be of the types and objectives as described below:

- Crown cleaning consisting of the selective removal of one or more of the following items: dead, dying, or diseased branches, weak branches and watersprouts;
- Crown thinning, which is the selective removal of branches to increase light penetration, air movement, and reduce weight;
- Crown raising consisting of removal of lower branches of a tree to provide clearance;
- Crown reduction, also called crown shaping, to decrease the height and/or spread of a tree. May be done to compensate for loss of rootage. Consideration should be given to the ability of a species to sustain this type of pruning;
- Vista pruning, selective thinning of framework limbs or specific areas of the crown to allow a view of an object from a predetermined point; and
- Crown restoration pruning, performed to improve the structure, form and appearance of trees which have been severely headed, vandalized, or storm-damaged.

Pruning cuts include thinning and heading back or a combination of both. Thinning cuts consist of the removal of a lateral branch at its point of origin or the shortening of a branch or stem by cutting to a lateral large enough to assume the terminal role. A heading cut should rarely be used on mature trees, yet may be appropriate for specific purposes such as, but not limited to, training young trees; pollarding, shaping terminal flowering trees, storm damage repair, etc. A heading cut should consist of cutting a currently growing or one-year-old shoot back to a bud, or cutting an older branch or stem back to a stub or lateral branch not sufficiently large enough to assume the terminal role. When removing a lateral branch at its point of origin on the trunk or parent limb, the final cut should be made in branch tissue close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub.

When removing a leader or length of a branch, the angle of the cut should bisect the angle between the branch bark ridge and an imaginary line perpendicular to the leader being removed. If dead branches are being removed, the final cut should be made just outside the collar of live tissue. Cuts should not be made flush with the stem of the tree. If the collar has grown out along the branch stub, only the dead stub should be removed. The live collar should remain intact and uninjured. To prevent damage to the parent limb when removing a branch with a narrow branch attachment, the final cut should be made from the bottom of the branch up.

When pruning mature trees remove branches in such a manner so as not to cause damage to other parts of the tree or to other plants or property. Branches too large to support with one hand should be pre-cut to avoid splitting or tearing of the bark. Where necessary, ropes or other equipment should be used to lower large branches or portions of branches to the ground. When a branch is cut back to a lateral, not more than one-fourth of its leaf surface should be removed. The lateral remaining should be large enough to assume the terminal role. Not more than one-fourth of the foliage on a mature tree should be removed within a growing season. Upon completion of pruning on a mature tree, one-half of the foliage should remain evenly distributed in the lower two-thirds of the crown and individual limbs. When done properly, pruning will increase the life expectancy of the tree. Proper pruning opens the canopy of the tree to permit more air movement and sunlight penetration.

Pruning cuts also include thinning and heading back or a combination of both. Thinning cuts consist of the removal of a lateral branch at its point of origin or the shortening of a branch or stem by cutting to a lateral large enough to assume the terminal role. A heading cut should rarely be used on mature trees, yet may be appropriate for specific purposes such as, but not limited to, training young trees; pollarding, shaping terminal flowering trees, storm damage repair, etc. A heading cut should consist of cutting a currently growing or one-year-old shoot back to a bud, or cutting an older branch or stem back to a stub or lateral branch not sufficiently large enough to assume the terminal role. When removing a lateral branch at its point of origin on the trunk or parent limb, the final cut should be made in branch tissue close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a overly long stub.

Equipment Management. Pine pitch canker (discussed in Section 5.2.2) can be spread from tree to tree by the use of contaminated equipment including chainsaws, handsaws, pruning tools and chippers. There are several precautions described in Section 5.2.2 to reduce the spread of this fungus. Of primary importance is to avoid using tools which have, or may have, been in contact with an infected pine to prune or shape another pine. The optimum approach is to maintain separate sets of tools for use in uninfected and infected stands. Chipped material should be composted, and should not be used as mulch until thoroughly decomposed (one year or more). Additional measures are described in Section 5.2.2.

An ISA-certified arborist should oversee and supervise all tree care operations to assure proper methods and precautions are taken to protect the health and appearance of the tree.

4.5.1 Shrubs

Prune shrubs by removing the older canes at their bases rather than by clipping the ends of the branches. Remove part of the old growth each year to renew a shrub that consists entirely of old canes. Heavy annual pruning of most shrubs is undesirable because it is expensive, and in the case of flowering shrubs, may destroy the wood that produces flowers.

Old shrubs sometimes require pruning to force them to renew their growth. Heavy pruning for neglected flowering shrubs may be necessary to encourage continued blooming. In general, shrubs that produce blooms on new wood should be pruned during the winter and shrubs that produce blooms on older wood should be pruned after blooming.

4.5.2 Horticultural Tree Plantings

Trees should be pruned to maintain shape, health and prevent or treat disease infestations. Tree pruning on the POM and OMC should incorporate the following guidelines into pruning programs:

- To avoid frequent re pruning, anticipate tree growth for two years or more and prune accordingly;
- Prune young shade trees to produce a sturdy framework;
- Remove lower branches of shade and deciduous trees gradually as the tree develops to encourage a well developed crown;
- Remove branches broken by wind or storms;
- Do not remove the lower branches of ornamental conifers and broadleaf evergreens;
- Remove branches that extend over buildings and endanger roofs, eaves, and windows or hang within eight feet of sidewalks and private drives;
- Prune trees along streets to provide clearance for buses, moving vans, and similar vehicles;
- Cut back branches that overhang or grow into power lines. Anticipate the effects of wind and rain on branches which might fall on power lines. Shape the entire tree rather than notch the top;
- Remove dead or broken branches and those that turn back toward the center of the tree. Thin out branches that interfere with each other. Plan cuts to leave wide crotches rather than narrow ones. Wide crotches are more resistant to splitting;
- When pruning, if a branch cannot be held up with one hand while sawing with the other, undercut the branch one foot from the trunk and saw off the branch just outside the undercut. This procedure removes most of the weight of heavy limbs and prevents stripping the bark. This is an improper method of finishing pruning cuts. Refer to the ANSI pruning standards;
- Prevent multiple leaders from developing on street trees, especially conifers;
- When severe pruning is necessary to correct extensive damage or neglect, prune during dormant periods or in the early spring to permit recovery while growth is rapid. This is especially important for broadleaf evergreens;
- Remove strangling roots; and

- A State certified Arborist should supervise all phases of work concerning trees including planting, maintenance, and removal.

4.5.3 Pruning After Transplanting

Prune trees at the time of planting to improve structure and to reduce top growth to compensate for roots lost in transportation and planting. Remove closely parallel branches, crossed and broken limbs, and superfluous growth at the base of the main branches. When removing a branch do not make the cut flush with the main branch. This practice creates permanent wounds that the tree cannot effectively wall off. Decay and infections occur with flush cuts, branch and whole tree failure can result. Refer to ANSI pruning standards above.

4.5.4 Protection from Equipment

Young trees are easily damaged by maintenance equipment, especially power mowers and string trimmers. Large mature trees may also be injured. Instruct the operators frequently regarding use of equipment in planted areas. If necessary, place stakes or other protective products near trees.

4.6 Policing

The DPW Contract Quality Assurance Plan is intended to ensure that maintenance occurs as required, including methods, responsibility, timing, and priorities. Regularly-scheduled monitoring should be conducted for all ground maintenance activities in lands maintained as improved and semi-improved. Monitoring should be conducted at two week intervals during the dry months of May to October. Monitoring should be done to document that lawn, ground cover, shrubs, and trees are being pruned, watered and fertilized as necessary to maintain a uniform appearance and growth. Monitoring should also confirm that all systems under the responsibility of the installation are in proper working order.

5.0 DISEASE, INSECT CONTROL AND SANITATION

Pest surveillance and control activities on the POM and OMC are conducted in accordance with Standard Operating Procedures (SOPs). SOPs applicable to the pest management program at the POM and OMC are identified in the Pest Management Plan (PMP; *USACE 1994*). SOPs should be periodically updated to reflect changes in jurisdiction, administrative authority management practices, and level use.

Medicinally-important pests are discussed below only as control activities that may affect ground maintenance.

The Army Pest Management Program is responsible for protecting Army personnel and material from illness and damage by pests, wherever in the world they reside. The program includes both medical and operational responsibilities. While these responsibilities overlap, Health Services Command (HSC) focuses on preventing and minimizing medical consequences of pests and pest management operations while the Assistant Chief of Staff for Installation Management and the Army Environmental Center concentrate on safe, effective implementation of day to day pest management operations and environmental considerations of pest management operations.

5.1 Integrated Pest Management

Pest control on the POM and OMC should stress an integrated pest management approach. Integrated Pest Management (IPM) is the use of multiple control methods to prevent or suppress pests in a given situation. Although IPM emphasizes the use of non-chemical strategies, chemical controls are options that are used in conjunction with other methods. While any one of these methods may solve a pest problem, several methods are often used concurrently, particularly if long-term control is needed. Chemical control is generally a temporary measure, and, in the long term, is more expensive. Non-chemical control, which may initially be more expensive than chemicals, is often more cost-effective in the long term. Non-chemical controls also have the added advantage of being nontoxic, thereby reducing the potential risk to human health and the environment. The four basic principles of IPM include: physical and mechanical control, cultural control, biological control, and chemical control.

5.2 Pests of Concern on the POM and OMC

5.2.1 Pests of Natural and Urban Landscapes

Planted trees, shrubs, and lawns occur around buildings and housing throughout the installation. Various invertebrates, including aphids, garden snails, spider mites, and oak moths, have historically been pests in these landscapes. Vertebrates including California ground squirrels and Botta's pocket gophers can be major pests in landscape areas because they damage soils and vegetation. These rodents also create dirt mounds and burrow systems that are hazards to landscaping equipment and personnel. Surveillance for invertebrate pests in landscaped areas should be conducted periodically. Measures identified in the PMP will be used to control these pests based on the surveillance and service requests. Rodent populations are controlled mainly by mechanical methods in these areas. Registered rodenticides may also be used to eliminate ground squirrels and pocket gophers.

5.2.1.1 Animal Pests

Small mammals, such as raccoons, ground squirrels, gophers, and moles can be problem pests. Raccoons can become urban pests when food water and shelter are made available in residential areas. Ground squirrels are able to adjust well to human habitats and cause constant problems as a result of their feeding

on landscape vegetation, burrowing in lawns and road banks, and occasional chewing of underground utilities. Ground squirrels can be present in large numbers, their burrowing activities can destroy government property, and they harbor diseases communicable to humans.

Gophers and moles create unsightly mounds in lawns. Gophers in particular damage tree and shrub roots and damage garden beds. Surveillance and control should be conducted by the contracted pest controller. Trapping should be the preferred method of control followed by chemical control if necessary.

A preventive maintenance and control program for rodents and vertebrate pests is necessary to keep populations low. Educating housing residents on the need to ensure garbage cans are securely closed and pet food and water are not left outside will significantly reduce the occurrences of raccoons within housing areas. Gophers and moles should be eradicated from all lawns, ball fields, and flower and shrub beds. Year-round inspections for gophers should be conducted weekly in the spring and biweekly at other times as necessary. Ground squirrels should be surveyed for and controlled in February, May, and October. All vertebrate pests should be controlled using integrated pest management practices in accordance with the Installation Pest Management Plan.

5.2.2 Other Pests of Forested and Landscaped Areas

On the POM and OMC, control of outbreaks of the following pests should be primarily through mechanical removal of affected branches, limbs and/or entire trees. Planting appropriate species and implementation of good horticultural practices will reduce the environmental stress that commonly precipitates outbreaks of insect pests. Of particular importance is the fungal disease pine pitch canker, *Fusarium subgalutinans f.sp. pini*, which infests several conifer species. Monterey pine is particularly susceptible to this fungus.

First discovered in California in 1986, its range is spreading and now includes 16 coastal and adjacent inland counties from Mendocino to San Diego. There is no cure and thousands of Monterey and Bishop pine trees have been killed.

Bark beetles, which carry the fungus, primarily infest Monterey and Bishop pines but also feed and breed on inland forest trees such as ponderosa pine and others. As yet, the disease has not been found in the Sierra Nevada or other heavily forested parts of the state. Transport, disposal and use of diseased material should be done so as not to spread the disease to uninfested areas. Insects spread the disease locally, but people are responsible for long-distance spread. Pine firewood, logs, chips, branches, needles, cones, and trees may all be a source of the disease.

University of California scientists are currently doing studies to characterize the survival of the pine pitch canker fungus, and associated insects in pine green waste, but the full results are not yet in. The fungus can survive in cut wood for up to one year. The fungus also survives in soil up to eight weeks or more. Insects may survive in cut wood or chips for many months. Chipping does not eliminate insects or fungus. When branch tips infested with twig beetles are chipped, some insects may emerge up to 12 weeks after chipping. Undoubtedly, some insects will survive even longer in chipped material. All of these findings implicate pine green waste as a viable source for the spread of pine pitch canker disease.

California counties with infestations of pine pitch canker include Alameda, Contra Costa, Los Angeles, Marin, Monterey, Mendocino, Orange, San Benito, San Diego, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, and Sonoma. Although the disease is most likely to be encountered in either Monterey or Bishop pines, most pine species and Douglas fir (*Pseudotsuga menziesii*) are susceptible to the disease. In a position paper approved on January 23, 1997, and modified in February 1998, the California Department of Forestry and Fire Protection (CDF) Pine Pitch Canker

Task Force recommends the following actions to reduce the spread of pine pitch canker to uninfested areas:

- Tools and machinery which are used to prune, cut, or chip trees with pine pitch canker disease should be cleaned and sterilized with Lysol or a 10 percent solution of bleach (one part household bleach in nine parts water) before use on uninfected trees or in uninfested areas. One alternative to avoid repeated cleaning of equipment is to reserve one set of equipment for use only in infested areas and another set for use only in uninfested areas;
- Limbs and small pieces of wood from diseased trees may be chipped and the mulch deposited on site or burned. Any material removed from the site should be tightly covered with a tarpaulin during transit and taken to the nearest landfill or designated disposal facility for prompt burial, chipping and composting, or burning. Diseased wood should not be transported out of infested counties;
- Logs from diseased trees may be split for firewood for local use, but the wood should be seasoned beneath a tightly sealed, clear plastic tarp to prevent the buildup of destructive insects;
- Seeds collected in pine pitch canker infested areas can carry the pathogen, even if they are taken from cones on apparently healthy trees. Pine seeds should not be transported out of pitch canker infested areas;
- Unless pine chips have been composted, do not transport pine chips out of infested counties. Thoroughly composting chips prior to transport should greatly reduce or eliminate the potential for disease spread;
- Within infested areas, the use of infected chips for mulch would contribute little to the total number of sources of the disease. However, it is best to use chips near the site of origin to minimize dispersal of the pathogen to uninfested areas within an infested county. Avoid using potentially infested chips near healthy pines or Douglas fir;
- Do not transport pine logs with intact bark out of infested counties. Removing all bark prior to transport should greatly reduce the potential for disease spread, as would prompt milling of the logs;
- Pine bark should not be transported out of infested counties. Handling, disposal and use is the same as for other pine green waste; and
- Any untreated pine material that originates within infested counties is a potential source of pine pitch canker disease, unless the material has been treated to eliminate the disease.

For further information, contact:

Don Owen
California Department of Forestry and Fire Protection
6105 Airport Road
Redding, California 96002
Phone: (916) 224-2494

or

Gary Kelly
PO Box SS

Carmel, California 93921
Phone: (408) 624-3543

Pine pitch canker is currently a problem in planted areas at the POM and OMC. At this time the disease has not been detected on the Huckleberry Hill Nature Preserve. Measures recommended by the Task Force should be incorporated into standard operating procedures for dealing with diseased trees. In particular, to reduce the possibility of the disease spreading into the Preserve, measures that reduce the availability of breeding material for the insects that transmit the fungus should be implemented. All cut and fallen branches and trees infested with the disease should be destroyed immediately. Bark should be removed prior to transport and material should be completely tarped prior to transport. No chipped or composted materials from diseased trees should be introduced to areas adjacent to the Preserve. Diseased pine wood, bark, or pine green waste green should be burned, thoroughly composted, or taken to a landfill for disposal. Compost derived from diseased material could still harbor the fungus and should be used only in already-infested areas.

Other Plant Pests

- Western gall rust. Western gall rust (*Peridermium harkessii*) is a fungal infestation that generally attacks trees less than 20 years old (Reid, 1987). The infection causes a spherical gall to form on branches. Where this forms on a main branch it can kill the tree. At Huckleberry Hill Nature Preserve on the POM, western gall rust is widespread and severe throughout the forest. Peak production of spores that spread the disease occurs in February and March. There are no controls for this disease beyond direct removal of afflicted branches. Branches on trees observed with western gall rust that occur in developed areas on improved grounds should be removed.
- Dwarf mistletoe. Dwarf mistletoe (*Arceuthobium campylopodium*) is a parasitic flowering plant that occurs on pines. Dwarf mistletoe forms dense clusters of shoots generally on trees larger than 4 inches in diameter at breast height (DBH). All size trees can be damaged or deformed or in the case of heavy infestations, killed. Control of dwarf mistletoe is through removal of infected branches or trees. There are no known chemical cures.
- Red turpentine bark beetle. Red turpentine bark beetle (*Dendroctonus valens*) is the most destructive insect pest of Monterey pine in the area. The insect is a dark reddish brown and is approximately $\frac{1}{3}$ of an inch long. The insect generally attacks exposed surface roots or the lower trunk of mature trees. Mechanical removal or application of Lindane is the only proven control method.
- Monterey Pine Engraver beetle. Monterey engraver beetle (*Ips radiata*) is the second most destructive insect pest to Monterey pine trees in the Monterey Bay area. This insect is $\frac{1}{16}$ to $\frac{1}{8}$ of an inch long and is a dark brown color. It infests branches of saplings and mature trees. This insect is known to infest pine trees that are experiencing moisture stress or other problems, and is the major destroyer of Monterey pines planted outside their natural range. To stop a partial infestation, the complete and sanitary removal of all affected limbs is required. If more than $\frac{2}{3}$ of the canopy has been affected by this pest, complete removal of the tree is recommended.

5.2.3 Structural Pests

Structural pests occur within and beneath the buildings and structures located on the POM and OMC. The use of any method, including chemicals, to control structural pests in historic buildings, requires consultation with the DENR cultural resources staff. The use of chemicals to control termites or other pests may also require consultation with the California State Historic Preservation Officer (SHPO) to determine whether an adverse effect on the building could be caused by pest management activities.

Structural pests are subterranean termites can occur in wooden buildings on the installation. These insects occur infrequently on the POM and OMC and generally cause little damage because of ongoing surveillance and corrective action. Monitoring for these pests is conducted periodically along foundations of all wooden structures in developed areas. If termite use is discovered, the extent of infestation is assessed, and a local contractor specializing in termite eradication may be hired to eliminate these insects. To reduce the potential for termite infestations, the soil under foundation pads of all new buildings is treated by contractors with approved chemicals to prevent termites from becoming established in these areas.

- Subterranean Termites. Household and nuisance pests include ants, crickets, ground beetles, cockroaches, other crawling insects, fleas, and spiders. Vertebrate pests in this category include cliff swallows and house mice. These pests have the potential to occur in or around any of the buildings on the installation. Surveillance for nuisance pests is conducted daily by food handling personnel in the food handling facilities. Surveillance and pest control activities for food service, storage, and handling facilities are conducted in accordance with an established SOP (Appendix F in the PMP). Preventative maintenance (PVNTMED) surveillance requirements for cockroaches, filth flies, and miscellaneous pests are outlined in PVNTMED SOP D-9 (Appendix E of the PMP). Management activities in food handling facilities include the use of sticky traps for monitoring and control of invertebrate pests, and mechanical traps to control rodent populations.
- Cliff Swallows. Surveillance for cliff swallows occurs periodically in the spring around the outside of the former Silas B. Hayes Hospital. Cliff swallows are discouraged from building nests on structures by removing sources of water used in making the mud nests and the removal of partially built nests. The DENR should be notified prior to these nests being removed. Consultation with the USFWS and CDFG should occur as the birds are protected under the Migratory Bird Treaty Act. Nuisance pests are a minor problem because of routine surveillance, control measures, and proper sanitation.

5.2.4 Undesirable Plant Pests

In developed areas, control of weeds requires application of appropriate herbicides. In housing areas, plant control activities are conducted primarily by grounds maintenance staff. Some control of unwanted plants is done mechanically using mowers or weed eaters. Coordination with the DENR natural resources staff is required if plant control is proposed in undeveloped habitat. In native habitat areas, weeds are a problem as they effectively remove habitat from naturally occurring species, and generally adversely modify the value of the habitat for native flora and fauna. Where feasible at the POM and OMC, invasive exotic weed species should be controlled to prevent their spread into adjacent native habitats such as Huckleberry Hill Nature Preserve on Former Fort Ord.

A preventive maintenance control program for weeds and landscape pests should include:

- Weed control on road shoulders and cracks in pavement for road protection;
- Poison oak control (in developed residential areas only);
- Eradication of pampas grass in family housing areas;
- Selective weed control in landscaping, along fence lines, at recreation and athletic areas such as running tracks and ball fields; and
- Year-round survey and control of weeds and landscape pests.

The following paragraphs describe noxious weed species at the POM and OMC:

- Pampas grass. This tussock-forming grass species rapidly colonizes disturbed areas. The plume-like flower heads produce large quantities of airborne seed. The sharp edged leaves make it difficult to pull out of the ground. Small plants can be manually removed. Larger more established plants can be excavated with roots or can be cut off at the ground surface, and then sprayed using herbicide following regrowth. Alternatively, if removal or spraying is not feasible, the flower heads can be removed twice annually, in June and September, and destroyed to limit seed production.
- Kikuyu grass. This species is a common component of lawns and grassy areas on the POM and OMC lands. This grass rapidly colonizes disturbed and mesic natural areas. The plant generally reproduces asexually from fragments. Primary control in developed areas, where feasible and warranted, should be through the use of herbicides. This species should not be encouraged in lawn areas. New lawn plantings should use grass species identified in Table 4. In natural areas, this species should be removed through manual removal and selective herbicide application.
- Hottentot fig and Chilean iceplant. These species rapidly colonize disturbed sandy areas and were widely planted to control erosion. These species are not recommended for any additional landscape plantings. Primary control should be manually removal followed by limited herbicide application.
- French broom. This species rapidly colonizes disturbed areas at the POM especially in Monterey pine forest. Primary control should be by manual removal. Seedlings can be effectively controlled with herbicides. Control will require continued maintenance as the seed of this species remains viable in the soil for decades.
- German ivy. This plant is a problem in riparian forest at the POM. Primary control should be manual removal followed by limited herbicide application.
- English ivy. This plant is a problem in riparian forest at the POM. Primary control should be manual removal followed by limited herbicide application.
- Invasive tree species. Several existing tree species on the POM and OMC are capable of spreading into disturbed and natural areas. Primary tree species of concern include blue gum eucalyptus, blackwood, and golden wattle acacia. These species are not recommended for planting as landscape species and seedlings of these trees should be removed as they are observed on improved, unimproved, and semi-improved grounds on the POM and OMC.

5.3 Coordination with Federal, State, and Local Agencies

A list of organizations involved with, or who have an impact on pest management programs, is included in Appendix O of the PMP.

The PMP gives special attention to any pesticide application that:

- Employs restricted-use pesticides;
- Employs any pesticide that may significantly contaminate surface or ground water;
- Will include 259 or more hectares (640 acres) in one pesticide application;
- Employs pesticides on or adjacent to child care facilities;

- May adversely affect endangered or other protected species or habitats; and/or
- Involves aerial application of pesticides.

Liaison should be maintained between the PMC and PVNTMED personnel at the Health Clinic to determine the prevalence of disease vectors and other public health pests in the area surrounding the installation.

5.3.1 Federal Agencies

U.S. Environmental Protection Agency (USEPA). The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) was originally passed in 1947, and required the U.S. Department of Agriculture (USDA) to register all pesticides before they were made available on the market. The USDA was required to refuse registration to all pesticides that were unsafe or ineffective and remove them from the market.

In 1970, the administration of FIFRA was passed to the newly created USEPA. FIFRA required that no pesticide may be sold unless the manufacturer registers the product with USEPA and the USEPA approves its use. The USEPA can restrict or prohibit use of any pesticide. USEPA guidelines should be followed for the appropriate use, handling, storage, and disposal of pesticides.

U.S. Fish and Wildlife Service (USFWS). Section 7 of the federal Endangered Species Act (ESA) requires federal agencies to consult with the USFWS or National Marine Fisheries Service (NMFS) to ensure that any action that a federal agency authorizes, funds, or carries out is not likely to jeopardize the continued survival of a listed species or result in the adverse modification or destruction of its critical habitat. Coordination with the USFWS is also required if species proposed for listing are likely to be jeopardized.

Consultations with the USFWS and CDFG are required by the Migratory Bird Treaty Act if proposed pest management activities could directly or indirectly harm migratory birds. The pest control contractor should consult with the PMC/installation biologist on proposed activities to control migratory birds (e.g., swallows and other nesting birds). The DENR would be responsible for coordination with USFWS and CDFG.

U.S. Army. Pesticide application and handling will be in accordance with applicable guidance given in AR 200-1, AR 420-76, TM 5-629, TM 5-630, TM 5-632 and AR 420-74. All uses of pesticides will be in strict compliance with a currently approved USEPA label, unless approved otherwise by the USEPA or applicable federal regulation. Pesticides will be limited to standard items as listed in the DOD Section of Federal Supply Catalogs, unless approved in writing by the MACOM. Army regulations for pesticide application at the POM and OMC include:

- All pesticide applications must be made by state or federally certified pest control applicators;
- All mixing and storing of pesticides must be done in an Army approved facility (not available at the POM or OMC); and
- No herbicides may be used at child care facilities.

5.3.2 State Agencies

State Historic Preservation Officer. Nearly half of the POM is a designated historic district. If structural- or landscaping-related pest management activities (e.g., termite control) could potentially affect the integrity of historic properties, the PMC and the installation cultural resources specialist must be

contacted. If required, the installation cultural resources specialist would coordinate with SHPO and the Advisory Council on Historic Preservation, in compliance with Section 106 of the National Historic Preservation Act, to consider the effect of the proposed pest management activity on the integrity of the historic resource.

California Department of Fish and Game. Army policy requires that pest management activities be conducted to avoid adverse impacts on special-status species not legally protected under federal laws and regulations. These species are listed in Part IV of this IMRMP. The installation biologist would be responsible for coordination with the CDFG, if necessary. Predator control and activities affecting migratory birds must also be coordinated with the CDFG; the PMC/installation biologist would be responsible for coordination.

California Environmental Protection Agency. Pesticide users must comply with the FIFRA, and each state may pass additional laws regulating pesticide use. California's requirements are both more comprehensive and more stringent than FIFRA provisions. Pesticide regulation in the state of California was administered by the California Department of Food and Agriculture (DFA) before 1991, under the Pesticide Branch. When the California Environmental Protection Agency (CalEPA) was formed in 1991, pesticide regulation was transferred from the DFA to the newly formed agency under the Department of Pesticide Regulation (CalEPA-DPR).

5.3.3 Local Agencies

Monterey County Agricultural Commissioner. Administration and enforcement of pesticide laws and regulations at the county level are the responsibilities of county agricultural commissioners, with coordination, supervision, and training provided by CalEPA-DPR. Both USEPA and CalEPA-DPR classify pesticides as suitable for either general or restricted-use. California designates all USEPA-designated restricted-use pesticides as restricted-use in California, and has designated additional restricted-use pesticides. Pesticides are designated for restricted use if they are potentially hazardous to applicators, the public, or the environment because of acute or chronic toxicity, eye or skin irritation, potential for drift and resulting damage to nontarget plants, or for other reasons.

Permits from county agricultural commissioners are required for use of restricted-use materials, except for some applications by certified commercial pesticide applicators. County agricultural commissioners may impose conditions or limitations on the use of restricted-use materials (Food and Agricultural Code Section 14006). For example, the agricultural commissioner may adopt conditions specifying minimum proximities for applications to protect environmentally sensitive areas. Restricted-use pesticides may be used only where it is reasonably certain that no injury will result and where no nonrestricted material or procedure is equally effective and practical. A list of restricted materials is found in Title 3, California Code of Regulations, Section 6400 (Appendix P of the PMP).

6.0 ANNUAL WORK PLAN

Table 12 includes an annual work plan form that outlines guidelines for grounds maintenance and land management for the POM and OMC. An annual work plan should be prepared using this form in conjunction with developing a maintenance schedule. Suggested schedules for maintaining improved and semi-improved grounds are provided in Tables 13 and 14.

PART III
FOREST MANAGEMENT

1.0 FOREST MANAGEMENT

The *Guidelines to Prepare Integrated Natural Resources Management Plans for Army Installations and Activities* (U.S. Army Environmental Center, 1997) and *Army Regulation 200-3 Chapter 9, INRMP, Section 3, Forest Management* contain guidelines for the preparation of forest management plans for installations that have timber harvest programs. Both the POM and OMC do not have active timber harvest programs and, therefore, do not require the preparation of a forest management plan as part of the Integrated Natural Resources Management Plan.

PART IV
FISH AND WILDLIFE MANAGEMENT

1.0 GENERAL INFORMATION

1.1 Background

The Army is committed to the wise management of the limited resources on the POM and OMC in a manner that is compatible with the military mission. To meet this goal, this abbreviated Fish and Wildlife Management Program was developed with the following objectives:

- Protect and preserve existing important wildlife species and those threatened by extinction;
- Integrate wildlife management practices with other natural resources management work, with an emphasis on multiple-uses;
- Protect and preserve the beauty inherent to the natural environment; and
- Protect and enhance recreational benefits for installation personnel and the general public.

1.2 Regulatory Background

In accordance with AR 200-3 (*U.S. Army, 1995a*), each installation's Fish and Wildlife Management Program should provide for the management of wildlife populations and their habitats consistent with the Installation mission, accepted scientific principles and total natural resources program. Further, the program must comply with the Endangered Species Act and other applicable laws and regulations. Emphasis should be placed on the maintenance and restoration of habitat favorable to the production of wildlife, particularly federally-listed species protected under the Endangered Species Act, as amended.

AR 200-3 sets forth a classification system for Army installations based on the suitability of a conservation or management program for fish and wildlife resources. The POM and OMC have few fish and wildlife resources; there are no lakes or permanent streams, and no hunting, fishing or trapping occurs. Therefore, under AR 200-3, the POM and OMC would be classified as a Category II installation (installations that lack adequate land and water resources suitable for fish and wildlife management). For Category II installations, the Fish and Wildlife Management program should be developed as an abbreviated plan based on installation resources and management objectives. Consequently, this plan only addresses requirements associated with the introduction of new or exotic species, population management, and habitat management.

2.0 FISH AND WILDLIFE RESOURCES

As a result of general development of the POM and OMC, the majority of fish and wildlife resources on the POM are located in the Huckleberry Hill Nature Preserve, and on the OMC, in the coast live oak woodland and maritime chaparral adjacent to the installation. Wildlife habitat elements, such as roosting and nesting sites, escape cover, migration/travel/dispersion corridors, and foraging habitat, have been lost or altered. This has resulted in very low native species populations and diversity, and high populations of species able to exploit human food resources and use buildings or other anthropogenic structures for cover and nesting.

2.1 POM

2.1.1 Wildlife Species

The variety of land uses on the POM provide different habitat elements, such as forage, roost, cover, breeding, water, and dispersion corridors that support species with different habitat needs. Because of the small size of the base and proximity to urban areas, no hunting is allowed at the POM. Upland wildlife species include native California quail (*Cillipepla californica*), American crow (*Corvus brachyrhynchos*), band-tailed pigeon (*Columba fasciata*), mourning dove (*Zenaida macroura*), western gray squirrel (*Sciurus griseus*), brush rabbit (*Sylvilagus bachmani*), desert cottontail (*Sylvilagus audubonii*), black-tailed hare (*Lepus californicus*), American badger (*Taxidea taxus*), gray fox (*Urocyon cinereoargenteus*), black-tailed deer (*Odocoileus hemionus columbianus*), and raccoon (*Procyon lotor*). Non-native species include wild boar (*Sus scrofa*) based on historical sightings. Inventories of wildlife species known to occur at the POM are provided in Table 15. Fish and wildlife habitats are detailed below.

- **Suburban Habitat.** The land use classifications of grass and lawn, horticultural tree plantings, and disturbed ground approximate the suburban wildlife habitat category described by *McBride and Reid (1988)*. These areas are typified by landscaped areas in close proximity to extensive areas of natural vegetation. No fish have been found in these habitats. Typical native wildlife species inhabiting these cover types are western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), scrub jay (*Aphelocoma coerulescens*), northern mockingbird (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), and striped skunk (*Mephitis mephitis*). Non-native species include Virginia opossum (*Didelphis virginiana*) and domestic cat (*Felis catus*).
- **Urban Habitat.** Developed and bare ground land use classifications approximate the urban and urban residential wildlife habitat categories (*McBride and Reid, 1988*). These areas contain a mosaic of landscaped areas, including shade trees, lawns, hedges, and planted gardens. No fish or aquatic fauna are found in these habitats. Typical native wildlife species inhabiting these cover types are striped skunk, house finch, and western fence lizard. Non-native species include rock dove (*Columba livia*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), Norway rat (*Rattus norvegicus*), Virginia opossum, and domestic cat.
- **Monterey Pine Forest.** Monterey pine forest occurs on the POM in the Huckleberry Hill Nature Preserve. This habitat type typically occurs in patches with an understory that includes chaparral species. No fish or aquatic organisms are found in this habitat. Many native species, such as mourning dove, California quail, black-tailed hare, and black-tailed deer and non-native species use this habitat for cover and forage, but few species utilize the habitat for breeding due to the forest's patchy composition. Native species include raptors such as the red-tailed hawk (*Buteo jamaicensis*),

which use the canopy for perching, roosting, and nesting. Native insectivorous species such as pygmy nuthatches (*Sitta pygmaea*) and Townsend's warblers (*Dendroica townsendi*) forage in the tree bark. Native dark-eyed juncos (*Junco hyemalis*), northern flickers (*Colaptes auratus*), and spotted towhees (*Pipilo erythrophthalmus*) forage on the forest floor. The scattered oak trees in the forest provide mast (acorn crops) for scrub jays, acorn woodpeckers (*Melanerpes formicivorus*), and black-tailed deer. Fallen trees provide cover for amphibians such as the arboreal salamander (*Aneides lugubris*) and California slender salamander (*Batrachoseps attenuatus*).

- **Riparian Habitat.** Riparian wildlife habitat occurs on the POM; the riparian corridor is composed of Monterey pine and coast live oak forest and coast live oak riparian forest cover along an intermittent stream course. Although surveys have not been conducted to confirm their presence, it is possible that fish may be found in the stream. Based on habitat characteristics, fish species may include mosquito fish (*Gambusia affinis*), stickleback (*Gasterosteus* sp.), and introduced minnows. It is unlikely that fish species harvested for recreational or commercial purposes are present in the stream. Riparian areas generally have a rich array of terrestrial vertebrate species; however, few species were found at the POM (J&SA, 1995). Native species reported included scrub jay, raccoon and black-tailed deer. Typical non-native species include domestic cat and Norway rat.
- **Broom Thicket.** The broom thicket habitat was reported to provide cover for wildlife species that forage in surrounding cover types (J&SA, 1995). Native species include scrub jay and western meadowlark (*Sturnella neglecta*).

2.1.2 Special-Status Species

Special-status species generally include those species designated by state and federal resource agencies as being biologically rare, restricted in distribution, declining throughout their range, or those that have a critical or vulnerable stage in their life cycle that warrants monitoring.

During special-status species surveys conducted at the POM, a sharp-shinned hawk (*Accipiter striatus*) was observed at the Huckleberry Hill Nature Preserve on December 1, 1994 and one was observed again on May 4, 1995 at the same location (J&SA, 1995). No other special-status mammal, reptile, or amphibian species were observed, nor were raptor nests found. The sharp-shinned hawk is considered a species of special concern by the CDFG. The sharp-shinned hawk is primarily found in riparian forests, conifer forests, and oak woodlands, and the observed bird(s) likely use the POM for foraging. The Monterey pine forests at the POM are considered potential nesting habitat. No nests, pellets, guano, or other evidence of breeding or frequent use were observed at the POM (J&SA, 1995).

Four special-status plant species have been recorded at the POM. These include Monterey pine, Hooker's manzanita, small-leaved lomatium, and Yadon's piperia. All are inhabitants of the Monterey pine forest.

2.2 OMC

2.2.1 Wildlife Species

The OMC consists of developed and undeveloped land use classifications. The developed portions of the OMC are bordered by large tracts of coast live oak woodland, central maritime chaparral, and coastal scrub plant communities extending into the installation from the east. Annual grasslands can be found among the residential areas in the southern and northern portions of the installation. These habitats include and have the capacity to support a wide variety of both native and non-native animal species. However, there are no aquatic habitats to support fish. There is no hunting or fishing allowed on the

OMC. Inventories of wildlife species known to occur at the OMC are provided in Table 16. Wildlife habitats are described below.

- Annual Grassland. Annual Grassland occupies open areas adjacent to the Stilwell Park housing area to the north, between the residential area and Lightfighter Drive, and to the southwest, between the housing area and Highway 1. Additionally, several small areas of annual grassland occur as buffer zones between developed areas and coast live oak woodland. Grasslands have the potential to support both native and non-native animal species. Native species include brush rabbit, western fence lizard, black legless lizard (*Anniella pulchra nigra*), burrowing owl (*Athene cunicularia hypugea*), Botta's pocket gopher (*Thomomys bottae*), western spadefoot (*Scaphiopus hammondi*), gray fox, and deer mouse (*Peromyscus maniculatus*). Typical non-native species that inhabit this land cover include rock dove.
- Coast Live Oak Woodland. Coast Live Oak Woodland borders the OMC on the south and eastern edges and extends into portions of Marshall and Fitch Park housing areas. This community is characterized by a 20-90 percent tree cover dominated by coast live oak with an understory ranging from grasses to dense shrub cover. This type of habitat is highly variable and has the capacity to support a wide range of animal species. The trees provide roosting and perching for native raptor species including red-tailed hawk, sharp-shinned hawk (*Accipiter striatus*), and American kestrel (*Falco sparverius*). Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*) can also be found nesting in the branches and bases of densely foliated oaks. Mast from these trees supports the woodrat, acorn woodpecker, and black-tailed deer. Species found in the understory include California quail, black-tailed hare, and desert cottontail. A variety of birds can be found foraging in the woodland, including plain titmouse (*Baeolophus*), hermit thrush (*Catharus guttatus*), American robin (*Turdus migratorius*), and loggerhead shrike (*Lanius ludovicianus*). Southern alligator lizard (*Gerrhonotus multicarinatus*), Botta's pocket gopher, western fence lizard, and California ground squirrel (*Spermophilus beecheyi*) are common inhabitants of this land cover type. Species potentially occurring in this habitat include black legless lizard and Monterey ornate shrew (*Sorex ornatus salarius*). Coyote (*Canis latrans*), mountain lion (*Felis concolor*), and bobcat (*Lynx rufus*) may be transient visitors from surrounding areas, but the areas within the OMC are unlikely to provide permanent habitat.
- Central Maritime Chaparral. Central Maritime Chaparral adjoins the OMC along a portion of the southern edge of Fitch Park and occurs as intermittent strips among yards in the residential area. This community is poorly differentiated from coast live oak and coastal scrub on the OMC and many of the same species found in the oak woodland, with the exception of larger animals, can be found here as well. Examples of native species found in this habitat include raccoon, loggerhead shrike (*Lanius ludovicianus*), bushtit (*Psaltriparus minimus*), brush mouse (*Peromyscus boylii*), mourning dove, arboreal salamander, house wren (*Troglodytes aedon*), and barn swallow (*Hirundo rustica*).
- Coastal Scrub. Coastal Scrub occupies a small section of land in the Marshall Park housing area. Species expected in this area include many of the same found in central maritime chaparral and coast live oak woodland and may include coast horned lizard (*Phrynosoma coronatum*).

2.2.2 Special-Status Species

Special status wildlife species that have the potential to occur on the OMC land cover types include the loggerhead shrike, a federal and state species of concern, and a federally-designated Migratory Nongame Bird of Management Concern (MNBMC); coast horned lizard (*Phrynosoma coronatum*), a federal species of concern and a state fully-protected species of concern; California horned lark (*Eremophila alpestris actia*), a state species of concern; California black legless lizard (*Anniella pulchra nigra*), a state protected species of concern; burrowing owl (*Speotyto [Athene] cunicularia hypugea*), a federal and state species of concern and a federally designated MNBMC; Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*), a federal and state species of concern; and Monterey ornate shrew (*Sorex ornatus salarius*), a federal and state species of concern.

3.0 FISH AND WILDLIFE MANAGEMENT PROGRAM

3.1 Management Objectives

The objectives of the Natural Resources Fish and Wildlife Management program at the POM and OMC include:

- Protection of endangered and threatened species;
- Preservation of corridors for black legless lizards and coast horned lizards traveling to and from habitat areas;
- Operation of existing natural areas to maintain or enhance populations of native wildlife species;
- Discouragement of practices that promote the establishment of exotic or alien species and the corresponding displacement of native species;
- Encouragement of native habitat suitable for growth and reproduction of native wildlife species;
- Provision of corridors for animal species traveling to and from habitat areas; and
- Enhancement of recreational nature activities, such as bird and animal watching pursuits

3.2 Wildlife Habitat Management and Maintenance

3.2.1 POM

Based on the land use classifications and typical wildlife associates, the primary native habitats at the POM are the Monterey pine forest and riparian forest. No wetlands occur on the POM, and due to the lack of perennial stream flows and standing water, no game fish populations occur on the POM. Other land use classifications, particularly horticultural tree plantings, grass and lawn, and developed land, provide more limited habitat for wildlife due to the lack of sufficient sources of native food or cover. The following measures are recommended (in descending priority) to preserve and protect existing native wildlife habitats, and achieve the objectives outlined above.

- Protect endangered and threatened species by avoiding adverse impacts to known resources, preserving areas containing sensitive species, monitoring populations, and enhancing existing habitat consistent with recommendations outlined in the Endangered Species Management Plan for the POM and OMC;
- Conduct periodic inventory of resources of Monterey pine stands, sensitive plant and wildlife populations, and exotic species within habitat to document population trends and habitat quality;
- Avoid new construction and intrusive operation and maintenance practices in Monterey pine forest and riparian habitats, and preserve sensitive resources;
- Support and encourage research of other agencies/conservation groups monitoring and evaluating pine pitch canker;

- In cooperation with the City of Monterey and other agencies, conduct active management of Monterey pine forest to slow the spread of pine pitch canker;
- Increase the structural heterogeneity of existing habitat by encouraging a multi-strata canopy through exotic plant removal and supplemental planting of Monterey pines;
- Create buffer areas in open landscape or unvegetated open areas contiguous to forested areas and plant native vegetation to increase the diversity of cover types surrounding forest habitat;
- To the extent practical, remove intrusive exotic vegetation from natural areas;
- Attempt to bridge islands of native forest by creating corridors with supplemental plantings to reduce gap size and increase carrying capacity of forest habitat;
- Leave non-diseased, felled tree trunks in place and create brush piles, rubble mounds, and other similar structures in order to increase cover for small reptiles, amphibians, and mammals (*Martin and Steele, 1986; Yoakum et al., 1980*);
- Leave non-diseased snags (standing dead trees) in place to provide habitat for cavity nesters. In situations in which snags cannot be left due either to health and safety concerns or to remove diseased trees, construct and install a variety of different-sized nest boxes and bat boxes to attract cavity nesters (*Teaford, 1986; Mitchell, 1988*);
- Landscape areas dominated by bare ground or ruderal species with a native mix of drought-tolerant herbaceous and shrub species (identified in Part II of this INRMP) that will provide food sources, escape cover, roost, and nesting sites for native wildlife species;
- Gradually replace horticultural plants with native species to enhance urban wildlife use of the POM; and
- Enhance bird and animal watching opportunities by opening non-sensitive areas to the public, develop interpretive trail guides and signs for self-guided tours, and encourage educational and research opportunities for schools, universities, and local conservation groups.

Establishment and maintenance of wildlife food, such as annual and perennial plants, should be consistent with landscaping at the POM as outlined in Part II of this INRMP. The pallet of plants recommended for establishment in the semi-developed areas include species that provide seeds, berries, mast, and other potential food sources for wildlife.

Due to the urbanized character of the lands surrounding the POM, large predators such as coyote, mountain lion, and bobcat are unlikely to present chronic problems. Depredation of small vertebrate native fauna are more likely caused by domestic and feral cats. Trapping and relocation or destruction of domestic animals is a potentially difficult community relations issue for the POM. Consequently, it is recommended that trapping and relocation/dispatch of predators be conducted in coordination with the Society for the Prevention of Cruelty to Animals (SPCA), Humane Society, and the CDFG.

3.2.2 OMC

Based on the land use classifications and typical wildlife associates, the primary native habitats at the OMC are the coast live oak woodland, central maritime chaparral, and coastal scrub. No wetlands occur on the OMC, and due to lack of perennial stream flows and standing water, no fish populations are known

to exist. Other land use classifications, particularly horticultural tree plantings, grass and lawn, and developed land, provide limited use to wildlife due to the lack of sufficient sources of native food and/or cover. The following measures are recommended (in descending priority) to preserve and protect these native wildlife habitats, and achieve the objectives outlined above.

- Protect endangered and threatened species by avoiding known resources, preserving areas containing sensitive species, monitoring populations, and enhancing existing habitat consistent with recommendations outlined in the *Endangered Species Management Plan*;
- Conduct periodic inventories of resources (coast live oak stands, and sensitive plant and wildlife populations) such as habitat monitoring/census, inventory of species use, documentation of population trends, status of sensitive species populations, extent and damage caused by nuisance species;
- Avoid new construction and intrusive operation and maintenance practices in coast live oak woodland, central maritime chaparral, and coastal scrub;
- Increase the structural heterogeneity of existing habitat by encouraging a multi-strata canopy through exotic plant removal or supplemental planting of native species;
- To the extent practicable, remove intrusive exotic vegetation from natural areas;
- Attempt to bridge islands of native woodland with supplemental plantings to reduce gap size and increase carrying capacity of woodland habitat;
- Leave non-diseased, felled tree trunks in place and create brush piles, rubble mounds, and other similar structures in order to increase cover for small reptiles, amphibians, and mammals (*Martin and Steele, 1986; Yoakum et al., 1980*);
- Leave non-diseased snags in place to provide habitat for cavity nesters. In situations in which snags cannot be left due either to health and safety concerns or to remove diseased trees, construct and install a variety of different-sized nest boxes and bat boxes to attract cavity nesters (*Teaford, 1986; Mitchell, 1988*);
- Create buffer areas in open landscape or unvegetated open areas contiguous to woodland areas and plant with native herbs and shrubs to increase the diversity of cover types surrounding woodland habitat;
- Landscape areas dominated by bare ground or ruderal species with a native mix of drought-tolerant herbaceous and shrub species (identified in Part II of this INRMP) that will provide food sources, escape cover, roost, and nesting sites for native wildlife species;
- Gradually replace horticultural plants with native species to enhance wildlife use of the OMC; and
- Enhance bird and animal watching by opening non-sensitive areas to the public; develop interpretive trail guides and signs for self-guided tours, and encourage educational and research opportunities for schools, universities, and local conservation groups.

Establishment and maintenance of wildlife food, such as annual and perennial plants, should be consistent with landscaping at the OMC as presented in Part II of this INRMP. The pallet of plants recommended for establishment in the semi-developed areas include species that provide seeds, berries, mast, and other potential food sources for wildlife.

Due to extensive areas of wild lands surrounding the OMC, large predators such as coyote, mountain lion, and bobcat are potential problems for domestic pets and occupants of the area. In addition, depredation of native fauna by domestic pets from the housing area is a potential problem at the OMC. Trapping and relocation or destruction of wild and domestic animals is a potentially difficult community relations issue for the POM. Consequently, it is recommended that trapping and relocation/dispatch of predators be conducted in coordination with the SPCA, Humane Society, and CDFG.

3.3 Cooperative Research and Resource Management

The POM and OMC offer numerous research opportunities in fish and wildlife management. To the extent practical, opportunities for collaboration and cooperation with other agencies and private entities should be pursued by the Army. The following is a partial list of existing resources and programs that may be suitable for cooperative research and management.

- Preservation in perpetuity of sensitive resources including threatened and endangered species, stream/riparian habitat, Huckleberry Hill Nature Preserve;
- Ongoing habitat monitoring/inventories such as species use, population trends, sensitive species populations, nuisance species, and impacts to threatened and endangered species;
- Monitoring and evaluation of disease in habitats and species;
- Active management of Monterey pine forest at the POM to slow the spread of pine pitch canker; and
- Eradication or control of nuisance plant and wildlife species.

PART V
OUTDOOR RECREATION

1.0 GENERAL INFORMATION

1.1 Background

1.1.1 Objectives

This part of the INRMP provides guidelines for planning and management of outdoor recreation and cultural resources at the POM and OMC. Outdoor recreation and cultural values management should be integrated with the management of other natural resources, and should be compatible with the military mission. Emphasis is given to providing recommendations towards improving the management and use of outdoor recreation and cultural resources in order to promote and enhance these resources for current and future users of the base.

1.1.2 Outdoor Recreation and Cultural Values

Outdoor recreation resources are natural resources which provide, or may provide, opportunities for leisure activities. Resources include land and water areas zoned and managed for multiple use; they do not include recreation facilities, programs, and opportunities normally associated with urban developments, such as playgrounds, golf courses, tennis courts, and ball fields. Cultural values include archeological and historical resources that have special or unique cultural importance. The POM and OMC objectives for outdoor recreation and cultural values include:

- Maximize outdoor recreation opportunities to achieve physical, cultural, and spiritual benefits within the principles of multiple land use and consistent with the military mission;
- Manage special interest areas to reflect the archeological, botanical, geological, historic, or scenic importance of the area; and
- Consider natural resource values in the development of plans, projects, and programs that affect those resources.

1.1.3 Preparation and Implementation of Outdoor Recreation Plan

Installations having semi-improved and unimproved grounds suitable for outdoor recreation are required to develop an outdoor recreation plan as part of the INRMP. The scope and content of the plan is determined by the unique conditions at the installation. The plan should be revised as necessary to meet changing conditions at the installation. To assist in managing outdoor recreation and cultural values at the POM and OMC, a map delineating these areas is presented as Figure 23 (*U.S. Army, 1982a*).

Any improvements to outdoor recreation facilities must be consistent with other sections of this INRMP including the Fish and Wildlife and Land Management and Grounds Maintenance components, as well as the Endangered Species Management Plan (ESMP). Improvements to areas managed by the City of Monterey should be coordinated with facilities maintenance activities.

1.2 Regulatory Background

In accordance with AR 200-3 (*U.S. Army, 1995a*), each installation's INRMP should provide a management plan for outdoor recreation and cultural values, include classification of recreational and

cultural resources, and measures to protect and preserve those resources. This abbreviated plan provides general guidance for the management of outdoor recreation and cultural resources.

1.2.1 Federal Outdoor Recreation Planning

Under the Department of the Interior, the former Heritage Conservation and Recreation Service (HCRS), abolished in 1981, with responsibilities transferred to the National Park Service, was challenged with developing information concerning national recreation needs and plans and cultural resources preservation (*U.S. Army, 1982a*). The resulting uniform classification system is used by federal facilities, including Army installations, in the management of outdoor recreation resources.

The HCRS system delineates methodology to delineate and manage suitable land and water areas for specific recreation activities under the principles of multiple use management. In accordance with the Army TM 5-635, Natural Resources Outdoor Recreation and Cultural Values (*U.S. Army, 1982a*), the following classifications are used.

- Class I General Outdoor Recreation. Existing recreation areas, and areas with suitable characteristics to accommodate intensive recreation activities;
- Class II Natural Environment. Areas which are capable of supporting dispersed recreation activities in conjunction with other uses; and
- Class III Special Interest Areas. Areas containing resources of archeological, botanical, geological, historical, or scenic importance, which are managed exclusively for preservation and protection, including:
 - Cultural Resources. Cultural resources are defined as expressions of human culture and history in the physical environment. Resources include culturally significant landscapes, archeological sites, Native American and other sacred places, and artifacts. In central California, cultural resources are typically associated with prehistoric period, Spanish and Mexican exploration, Missionization and settlement, and American settlement and development. Such resources are considered significant if they meet one or more criteria set forth by federal laws and regulations.
 - Botanical Areas. Sites containing individual specimens, groups, or communities of plants which are significant because of form, color, occurrence, location, life history, arrangement, rarity, or other features.
 - Geological Areas. Areas of outstanding formation or historical features of the earth's development.
 - Scenic Areas. Individual areas of outstanding natural beauty and scenic splendor which require active management to preserve these qualities.

1.2.2 State Outdoor Recreation Planning

The National Park Service authorizes states to plan for outdoor recreation planning, and requires each state to prepare a State Comprehensive Outdoor Recreation Plan (SCORP) for approval by the NPS (*Chaplick, 1997*). As part of the Army's guidance on the development of outdoor recreation resources, it is recommended that each installation obtain a copy of the SCORP (*U.S. Army, 1982a*). The California SCORP identifies current recreational trends and needs in the state, and provides policies and guidelines

for the management and development of outdoor recreation resources throughout California for federal, state, local, and private lands (*Department of Parks and Recreation, 1993*).

This INRMP provides general guidance on outdoor recreation and natural environment areas specific to the POM and OMC. Class I areas on the POM, the El Castillo district, are within acreage recently leased to the City of Monterey. The City is developing a Master Plan to address specific issues relating to recreation activities within the district. Class II and III areas are addressed below.

1.2.2.1 SCORP Objectives

The California Department of Parks and Recreation is responsible for California's statewide outdoor recreation planning program. The major objectives of the state's program are to:

- Identify the statewide outdoor recreation needs of the public;
- Provide a policy and program framework in which public and private recreation suppliers can work together to meet the public's outdoor recreation needs;
- Enable government agencies and the private sector to work together to devise solutions, mobilize resources, and resolve conflicts related to outdoor recreation matters; and
- Maintain California's eligibility to receive funding from the federal Land and Water Conservation Fund.

1.2.2.2 Coordination of SCORP With INRMP

California's SCORP addresses coordination of state outdoor recreation planning with DOD preparation of INRMPs. In summary, the DOD is required to manage its natural resources to protect significant natural and cultural sites, and, wherever possible, to provide for multipurpose uses and public access in order to be consistent with state policy. To help meet this mandate, the DOD entered into a Memorandum of Understanding (MOU) in 1987 with the National Park Service to develop a natural resource management plan for each DOD facility. Under the outdoor recreation and cultural values section of the INRMP, goals have been developed to allow public access, where it is compatible with the military mission of the installation, to enhance current natural resource-based recreation opportunities, and to identify new recreation opportunities (*California Department of Parks and Recreation, 1993*). Access policies for each military installation is determined by its military mission and the overall status of national defense readiness.

1.2.3 Coordination of Cultural Resources

In addition to the federal and state requirements for outdoor recreation, the installation requires each INRMP to comply with applicable regulations and legislation regarding cultural resources, including the following regulations, laws, and executive orders:

- Section 106 of the National Historic Preservation Act (36 CFR 800);
- Army Regulation AR 200-4 (Cultural Resources Management);
- Presidio of Monterey Regulation 870-2;
- Archaeological Resources Protection Act (ARPA);

- Native American Graves Protection and Repatriation Act (NAGPRA);
- American Indian Religious Freedom Act (AIRFA); and
- Executive Order 13007 (Indian Sacred Sites).

For the POM and OMC, it may also be appropriate to coordinate cultural resources management issues and concerns with the City of Monterey.

1.3 Public Access, Safety, and Security

The POM and OMC are open installations, with unrestricted access for military and civilian personnel. By providing access to all persons, the outdoor recreation resources at the POM and OMC are consistent with California's SCORP.

Access to sacred cultural resource sites is protected on the POM and OMC. The American Indian Religious Freedom Act, enacted in 1978, proclaims the protection and preservation of traditional American Indian religions a federal policy. AIRFA specifically addresses access to sacred sites, in addition to the use of plants, animal and other resources. Known sacred sites on the POM include the Rumsen village *Hunnukul*, the waterfront area along the "Old Presidio" grounds, Natividad (between the Salinas and Pajaro Rivers), and CA-MNT-15 (*Roberts and Zahniser, 1980; Adams, 1978*). Federal agencies are required to consult with federally-recognized Native American groups and traditionalists, and to take into consideration any adverse effect on traditional religious practices during decision making. The POM is located in the southern extent of a large land base occupied by speakers of the Costanoan language at the time of first European contact. Currently, this Native American group is represented by the members of the Esselen Nation. In 1770, the Costanoan, or Ohlonean, resided within 50 separate and politically autonomous tribelets (*Levy, 1978*). The installation is currently within a territory occupied by the Rumsen triblet. Speakers of the Rumsen numbered about 800 at the time of contact, occupying the lower Carmel, Sur, and lower Salinas rivers (*Levy, 1970*). Access to these and other identified Native American sacred sites is protected under AIRFA.

As open installations, the POM and OMC have no safety or security issues with regard to use of any lands or facilities. The POM and OMC have no mission requirements that would temporarily close the installations to public access for outdoor recreation, and have no safety or security restrictions.

2.0 CLASSIFICATION OF OUTDOOR RECREATION AND CULTURAL VALUES

Based on the HCRS and Army classification systems, outdoor recreation and cultural values at the POM and OMC are categorized as follows.

2.1 Class I General Outdoor Recreation Areas

Class I General Outdoor Recreation Areas have suitable characteristics to accommodate intensive recreation activities such as camping, and various winter and water sports. Such areas are primarily managed for intensive recreational use. On the POM, Civil War re-enactment camping and associated activities and Sloat monument ceremony occur annually in the lower POM. There are no lands on the OMC that are suitable for classification as Class I Areas.

2.2 Class II Natural Environment Areas

Class II Natural Environment Areas include lands that are capable of supporting dispersed recreation activities in conjunction with other uses such as hunting, fishing, bird watching, pleasure driving, hiking, sight-seeing, tourist activities, climbing, and riding. There are no lands on the OMC that are suitable for classification as Class II Areas.

The POM contains Class II Natural Environmental Areas on lands associated with the Huckleberry Hill Nature Preserve. The Huckleberry Hill Nature Preserve, located in the upper POM, is managed by the City of Monterey under a lease with the POM. The Preserve contains a trail system which provides access to various parts of the Preserve for bird watching, nature walking, bicycling, hiking and general sight-seeing.

The Preserve's main feature is related to the dominant plant community, Monterey pine, located in the undisturbed areas and covering approximately 80 acres. The Monterey pine has been designated as "rare" by the California Native Plant Society. The Huckleberry Hill Nature Preserve contains the major contiguous area of open space on the POM. In addition, it also contains quality wildlife habitat, and is the most likely area to be utilized by native wildlife species (*U.S. Army, 1984a; J&SA, 1995*).

2.3 Class III Special Interest Areas

Class III Special Interest Areas contain features which are of archeological, botanical, geological, historical, or scenic importance. These areas are managed exclusively for the preservation and protection of the value identified. There are no lands suitable for Class III uses on the OMC.

At the POM, Class III Special Interest Areas are primarily located in the lower reaches of the installation. Significant features at the POM include the following:

- Presidio of Monterey Historic Districts; and
- Scenic overlook located at Sloat Monument.

2.3.1 POM Historic Districts

2.3.1.1 POM Historic District

The POM Historic District includes 119 historic architectural and landscape resources over approximately 75 acres (*Jackson Research Associates, 1985a*). The period of significance for this district is 1902-1945, when it operated as a cavalry-infantry-artillery cantonment. Of particular significance was the initial planning and construction of the post occurred in the years 1902-1910. The vast majority of original structures are still standing and are unmodified (*Jackson Research Associates, 1985a; J&SA, 1994*).

Over time, the historic district has retained much of its integrity; its setting is essentially as it was just after base construction was completed. Architecturally, the district is unusual among California Army posts in that the style is distinctive to the Quartermaster Corps, with no direct equivalent in civilian architecture. The district contains three areas, the parade grounds, Officers' Row, and the cavalry quarters. The parade grounds is approximately 7 acres in size and served as the visual and functional center of the district. Officers' Row is a horseshoe-shaped cluster of single-family residences, with a smaller group of duplexes, which rings the crest of a hill overlooking the parade ground. The cavalry quarters include four barracks and ten officers quarters (*Jackson Research Associates, 1985a*).

The historic district also includes World War II-era contributing properties and landscape features that contribute to its significance (*J&SA, 1994*).

2.3.1.2 El Castillo Historic District

In 1967, the Central California Archaeological Foundation initiated archeological work at El Castillo and CA-MNT-101, located in the southeast portion of the POM. In 1971, archeological and historic resources sites were nominated to the National Register of Historic Places (NRHP) as a district. The boundary of the early nomination was somewhat vague, but included 60 acres containing El Castillo, Fort Mervine, monuments to Father Serra and Commodore Sloat, and four archeological sites. The lower Presidio, located on the Monterey Bay side of the POM historic district, has since been designated an historic preserve (*J&SA, 1994*). Currently, the City of Monterey is developing a Master Plan that will accurately define and evaluate the district (*Pike, 1998*).

The amended historic district, identified in 1992, does not address properties included in the 1971 El Castillo Historic District. *Page and Turnbull (1994)* proposed additional amendments in the district in the updated Presidio of Monterey Historic Preservation Plan and Maintenance Manual. However, much of the El Castillo Historic District is located within the boundaries of the amended the POM Historic District. An historic preserve has been established at the POM, which conforms approximately with the boundaries of the El Castillo Historic District. Designation as an historic preserve is used by the Army for planning purposes to indicate that the area is highly sensitive for known and unidentified archeological resources (*J&SA, 1994*).

2.3.2 Sloat Monument Scenic Overlook

Scenic Areas are areas of outstanding natural beauty and scenic splendor which require special management to preserve these qualities. Sloat Monument is located in the lower POM, providing one of the best on-base vantage points of the Monterey Bay. Few on-base sites have clear views of the City of Monterey and Monterey Bay. The Monument is located on land currently within the 50-year lease to the City of Monterey. A Master Plan is in progress by the City of Monterey to assess the archeological district within the lease and provide for the protection of aesthetic assets.

3.0 MANAGEMENT OF OUTDOOR RECREATION AND CULTURAL VALUES

In managing outdoor recreation and cultural resources, installations with semi-improved and unimproved grounds suitable for outdoor recreation are required to develop an outdoor recreation plan as part of the INRMP. This Section provides guidelines for managing outdoor recreation and cultural resources at the POM and OMC. As noted in Section 2.0, there are no Class I, II or III resources located on the OMC, therefore, this Section only addresses resources located at the POM.

3.1 Class I General Outdoor Recreation Areas

The POM historic district and Sloat Monument are used annually by avocational historic groups in reenactment activities and ceremonies. Activities relating to the Civil War infantry reenactment include cannon firing, marching, cavalry, and over-night camping, and may potentially include use of the horse stable located in the historic district. The July 7, 1846 landing of Commodore John Sloat, which resulted in claiming California for the United States, is celebrated annually in a ceremony at the Sloat Monument on Presidio Hill. These activities occur on lands leased to the City of Monterey, and are being considered in a Master Plan addressing outdoor recreation and cultural resources.

Objectives relating to the management of Class I Natural Environmental Areas are currently being developed by City of Monterey, the lessee of the historic district. The Master Plan will encourage these annual activities and allow for access to the historic district and Sloat Monument (*Pike, 1998*).

3.2 Class II Natural Environmental Areas

The Huckleberry Hill Nature Preserve, a Class II Natural Environmental Area, is located in the Upper POM. It is managed by the City of Monterey through a lease with the Army. The City of Monterey has prepared a Huckleberry Hill Nature Preserve Forest Management Plan to recognize and recommend methods for managing native Monterey pine forest on the preserve. Objectives contained within the Forest Management Plan are designed to enhance and promote continued existence of the forest. Under each objective, the forest management plan contains guidelines for achieving those objectives. The objectives include the following:

- Enhance, maintain, and promote the growth of native vegetation existing on the 81 acres leased from the Army, designated as the Huckleberry Hill Nature Preserve;
- Control erosion problems associated with existing roads, firebreaks, and trails on highly erosive soils;
- Devise and implement a plan for reforestation, utilizing native seed to encourage a uneven age stand of Monterey pine, to ensure their confirmed existence;
- Minimize human disturbances and reduce negative impacts associated with noxious weeds, destructive forest insects, and disease;
- Reduce fire hazards and maintain fire control standards associated with mature, even-aged native Monterey pine forest; and
- Provide for the protection and proliferation of wildlife within the nature preserve.

3.3 Class III Special Interest Areas

3.3.1 POM Historic District

Lower POM contains the National Register El Castillo archeological district. The district is presently within the City of Monterey lease of the lower POM signed in 1996. The city of Monterey is developing a Master Plan for definition and preservation of the district, as well as a military interpretive park for the period of significance (*Pike, 1998*). To manage and protect the historic district, the *Preservation and Maintenance Manual for the Presidio of Monterey Historic District* was prepared to provide guidance to the installation on preservation and maintenance issues (*Jackson Research Associates, 1985b*); this document was updated and refined in the *Presidio of Monterey Historic Preservation Plan and Maintenance Manual (Page and Turnbull, 1994)*. Currently, these documents are used as the general guide for maintenance of buildings within the historic district. A Programmatic Agreement (PA) for routine maintenance on the POM was executed in 1993 between the Army, the State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation (ACHP). The PA and Preservation and Maintenance Manuals, which incorporate the Department of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings, guide building maintenance on the POM. For purposes of this INRMP the following additional guidelines have been developed for the POM Historic District (*J&SA, 1994*):

- Routine maintenance should comply with the PA and Preservation and Maintenance Manual for the POM Historic District; and
- New construction projects located in the POM Historic District will comply with Section 106 of the National Historic Preservation Act (NHPA).

The lower POM contains historic and prehistoric archeological sites within the archeological El Castillo Historic District and Preserve. Of the seven previously recorded prehistoric site (CA-MNT-15, -101, -697, -929, -930, -931, -932) only CA-MNT-15 and CA-MNT-101 are recommended for management by the POM (*Jackson Research Associates, 1985a*). Preservation measures provide guidelines for the protection of known archeological sites and historic resources on the POM and OMC, as well as undiscovered archeological sites. The following guidelines govern new construction or demolition at the POM:

- New construction is subject to Section 106 compliance under the NHPA. Under Section 106 of the NHPA, the effects of an undertaking on cultural resources must be considered;
- As part of compliance with Section 106, the Army will consult with SHPO and ACHP prior to initiation of any proposed action;
- Archeological and Native American monitors are required during projects which cause ground surface disturbance. In the event that cultural resources are encountered, construction activities in the vicinity of the unanticipated discovery should cease until a qualified archeologist evaluates the artifacts. Below-surface prehistoric deposits may include prehistoric midden soils, lithic or cobblestone or flaked tools, and/or tool flaking debris, all of which are significant in interpreting pre-18th century land use. If human remains are identified, the provisions of the Native American Graves Protection and Repatriation Act of 1990 will be followed. Historic period materials encountered below surface may include refuse deposits, glass and ceramic fragments, iron tool, leather buttons, or materials associated with local settlement and economic pursuits and transportation corridors; and

- When impacts to archeological sites cannot be avoided, archeological mitigations will be directed. This includes archival research and inventory, architectural or archeological testing and evaluation, intensive documentation, and monitoring.

3.3.2 Sloat Monument Scenic Overlook

The scenic overlook at the Sloat Monument including views of Monterey Bay, consistent with the installation mission, should be protected. For planned construction on the installation, the following guidelines should be followed:

- New construction should be situated to avoid impeding existing views at the Sloat Monument;
- If new construction may potentially block existing views, that construction should be sited downslope of the existing view and be limited to one story; and
- If interference with existing views from the Sloat Monument cannot be avoided, then construction of an elevated observation platform that provides views from the Sloat Monument should be installed as a mitigation measure.

REFERENCES

- Adams, Margaret P, 1978. Oral history interview conducted by Louis Roberts and Jack Zahniser at U.S. Army Museum, Monterey, California. October 27.
- Bonds, J.D., K.J. Tribbey, and K.A. Civitarrese, 1986. *Update of the Initial Installation Assessments of Fort Ord and Subinstallations, Presidio of Monterey and Fort Hunter Liggett*. Prepared by Environmental Science and Engineering. August.
- California Native Plant Society, 1994. *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California*. Special Publication No.1. Fifth Edition.
- California, State of, Department of Parks and Recreation, 1993. California Outdoor Recreation Plan. Department of Parks and Recreation, State of California. Sacramento, California. April.
- Chaplick, Joan, 1997. National Park Service. Personal communication. August 1.
- City of Monterey, 1987. *Huckleberry Hill Forest Management Plan*. Prepared by Robert Reid, Urban Forester, City of Monterey.
- Elliott, John, 1997. Presidio of Monterey, Department of Public Works. Personal communication. June 18.
- _____, 1998. POM Directorate of Public Works. Personal communication regarding storm drainage system, utilities, and land management at the POM. September.
- Gudgel, Mona, 1998. Monterey County Historical Society, Executive Director. Personal communications regarding the El Castillo Historic District. August 7.
- Helms, George, 1998. POM Directorate of Public Works. Personal communication regarding the stormdrain system, grounds maintenance contract, and surface water drainage at the POM.
- Jackson Research Associates, 1985a. Presidio of Monterey Cultural Resources Report. Prepared with assistance from the Far Western Anthropological Research Group. Davis, California. October.
- _____, 1985b. *Preservation and Maintenance Manual for the Presidio of Monterey Historic District*. Davis, California. October.
- Johnson, Patti, 1998. Sacramento District Army Corps of Engineers, Archeologist. Personal communications regarding cultural resources at the POM and OMC. August 25.
- Jones & Stokes Associates (J&SA), Inc., 1994. Environmental Assessment for the Presidio of Monterey General Instructional Facility, Audio Visual Center, Academic Auditorium, and Other Improvements. Prepared for the U.S. Army Corps of Engineers. Sacramento, California. April.
- _____, 1995. Final Flora and Fauna Baseline Study of the Presidio of Monterey, California. Prepared for U.S. Army Corps of Engineers, Sacramento District. July 21.
- Levy, Richard, 1970. Costanoan Internal Relationships. Paper Presented to the 9th Conference on American Indian Languages, San Diego, California; Manuscript in Levy's possession.

- _____, 1978. Costanoan. In *California*, edited by R. F. Heizer, 485-495. *Handbook of North American Indians*, Vol. 8, W.G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Martin, C. and J. Steele, Jr., 1986. *Brush Piles: Section 5.3.1, U.S. Army Corps of Engineers Wildlife Resources Management Manual*. Technical Report EL-86-13, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- McBride, J.R. and C. Reid, 1988. Urban. In: *A Guide to Wildlife Habitats of California*. K.E. Mayer and W.F. Laudenslayer, Jr., (eds). California Department of Forestry and Fire Protection. Sacramento, California.
- Mitchell, W., 1988. *Songbird Nest Boxes: Section 5.1.8, U.S. Army Corps of Engineers Wildlife Resources Management Manual*. Technical Report EL-88-19, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- Mize, Greg, 1998. City of Monterey Fire Department. Personal communication regarding fire protection service at the POM. September.
- Nguyen, Chieko, 1997. Memorandum regarding Draft INRMP, December 2.
- Page and Turnbull, 1994. Presidio of Monterey Historic Preservation Plan and Maintenance Manual. Prepared for the U.S. Army Corps of Engineers. Sacramento, California. October.
- Pike, Marty, 1998. City of Monterey, Cultural Arts and Historic Facility Manager. Personal communications regarding City of Monterey-POM lease of El Castillo Historic District. August 25.
- Pine Pitch Canker Task Force, 1997. *Transport, Disposal, and Use of Woody Material Infested with the Pine Pitch Canker Fungus*. Position Paper. January.
- Presidio of Monterey, DEH, Master Plans Branch, EPS Division and Jones & Stokes Associates with assistance of Mundie & Associates and Wilbur Smith Associates.
- _____, 1986. *Update of the Initial Installation Assessments of Fort Ord and Subinstallations, Presidio of Monterey, and Fort Hunter Liggett*. Prepared by Environmental Science and Engineering, Inc.
- _____, 1995c. *Welcome to the Presidio of Monterey*. Prepared by the Presidio of Monterey Public Affairs Office.
- _____, 1998. Presidio of Monterey Web Page for POM History. POM-WWW.army.mil/pages/History.htm.
- Reid, Robert, 1998. City of Monterey. Personal communication with Robert Reid, City of Monterey Forester regarding management of the Huckleberry Hill Nature Preserve. September.
- Riso, 1998. Naval Supply Activity Monterey Bay. Personal communication with Chief Riso, Naval Supply Monterey Bay regarding fire protection services at the OMC. September.
- Roberts, L. and J. Zahniser, 1980. Intensive Cultural Resources Survey Report, Presidio of Monterey, California. Prepared for the U.S. Army Corps of Engineers. Sacramento, California.
- Rodrigues, Kay, 1997. Presidio of Monterey, Public Affairs Office. Personal communication. June 18.

- Salmon, Bill, 1998. Presidio of Monterey, Cultural Resources Officer. Personal communications regarding City of Monterey-POM lease, El Castillo Historic District, and outdoor recreation. August 24.
- Teaford, J., 1986. *Squirrel Nest Boxes: Section 5.1.1, U.S. Army Corps of Engineers Wildlife Resources Management Manual*. Technical Report EL-86-11. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- U.S. Army, (no date). *Drainage Plan - Presidio of Monterey*. Prepared by Brown and Caldwell for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1982a. Technical Manuals 5-630, Natural Resources Land Management TM 5-633, Natural Resources Fish and Wildlife Management; and TM 5-635, Natural Resources Outdoor Recreation and Cultural Values.
- _____, 1982b. *Analysis of Existing Facilities/Environmental Assessment Report*. Master Plan. Basic Information Maps. Prepared by Beach-Philpot Associates for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1984a. *Final Environmental Assessment. Master Plan Presidio of Monterey*. Prepared by Jones & Stokes.
- _____, 1984b. *Tabulation of Existing and Required Facilities, Master Plan, Presidio of Monterey*. Prepared by Jones & Stokes Associates for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1990. *Design Guide Fort Ord Complex (Fort Ord, Fort Hunter Liggett, Presidio of Monterey). Vol. I, Executive Summary*. Prepared by Nakata Planning Group for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1992a. *Environmental Impact Statement Fort Ord Disposal and Reuse*. Prepared by Jones & Stokes Associates, Inc., for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1992b. *Land Use Baseline Flora and Fauna Study of Fort Ord, California*. Prepared by Jones & Stokes Associates, Inc., for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1992c. *Other Physical Attributes of Fort Ord, California*. Prepared by Jones & Stokes Associates, Inc., for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1992d. *Soils Baseline Study of Fort Ord, California*. Prepared by Jones & Stokes Associates, Inc., for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1994a. *Finding of No Significant Impact/Environmental Assessment for the Presidio of Monterey General Instruction Facility III, Audiovisual Center, Academic Auditorium, and Other Improvements*. Prepared by Jones & Stokes Associates for the U.S. Army Corps of Engineers, Sacramento District.
- _____, 1995a. *Army Regulation 200-3 Natural Resources-Land, Forest and Wildlife Management*. Headquarters, Department of the Army, Washington DC. February.
- _____, 1995b. *Environmental Assessment Landfill Closure Presidio of Monterey Landfill Monterey, California*. Prepared by Harding Lawson Associates.
- _____, 1995d. *Baseline Flora and Fauna Study Presidio of Monterey Landfill Monterey, California*. Prepared by Jones & Stokes Associates, Inc.

_____, 1997a. *Installation-Wide Multispecies Habitat Management Plan for the Former Fort Ord, California*. Prepared by the U.S. Army Corps of Engineers, Sacramento District. April 1997.

_____, 1997b. *Guidelines to Prepare Integrated Natural Resources Management Plans for Army Installations and Activities*. Prepared by the U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland. Prepared with support from Horne Engineering Services, Inc, Fairfax, Virginia.

_____, 1998b. *Endangered Species Management Plan*. Prepared by HLA for the U.S. Army Corps of Engineers.

U.S. Department of Agriculture, 1978. *Soil Survey of Monterey County, California*. Prepared by the Soil Conservation Service in cooperation with the U.S. Forest Service and the University of California Agricultural Experiment Station.

Western Regional Climate Center, 1997. *Climate Data for the City of Monterey*. Prepared by the Western Regional Climate Center. January.

Yoakum, J., W. Dasmann, H. Sanderson, C. Nixon, and H. Crawford, 1980. *Habitat Improvement Techniques*. In: *Wildlife Management Techniques Manual*. S. Schemnitz, ed. The Wildlife Society, Washington, DC.

USACE, 1994. *Pest Management Plan for the Presidio of Monterey and Annex*. Prepared for the Presidio of Monterey, California and U.S. Army Corps of Engineers, Sacramento, California. December 9, 1994.

DISTRIBUTION

Final Integrated Natural Resources
Management Plan (INRMP)
Presidio of Monterey and
Ord Military Community
Monterey County, California

May 29, 2001

Copy No. ____

Copies 1 - 10: Mr. William Collins
 Directorate of Environmental and
 Natural Resources Management
 Building 4463 Gigling Road, Room 101
 Seaside, California 93955

Copies 11 - 17: Harding ESE, Inc. Files

Quality Control Reviewer

Donald Kane
Associate Environmental Scientist

JC/TG/MB57312.doc -EPP

TABLES

Table 1. Monthly Climate Data for Monterey 1961-1990
Integrated Natural Resources Plan
POM and OMC
Monterey County, California

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Average Maximum Temperature (F)	60.1	61.3	62.0	63.4	64.2	66.7	68.1	69.3	71.6	70.2	64.7	60.0	65.1
Average Minimum Temperature (F)	43.5	44.6	44.9	45.7	47.6	50.1	51.8	53.0	53.0	51.2	47.3	43.5	48.0
Average Total Precipitation (in.)	3.43	3.18	3.03	1.58	0.47	0.20	0.09	0.13	0.28	1.00	2.65	2.82	18.87

Note: Information is computed from available daily data during the 1961-1990 period. No adjustments are made for missing data or time of observation.

Source: Western Regional Climate Center.

**Table 2. Plant Species Observed
at the POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Abelia grandiflora</i>	Glossy abelia	I	S	DL
<i>Acacia baileyana</i>	Bailey acacia	I	T	HT
<i>Acacia longifolia</i>	Sydney golden wattle	I	S	HT
<i>Acacia melanoxylon</i>	Black wood acacia	I	T	HT
<i>Acer macrophyllum</i>	Big leaf maple	I	T	DL
<i>Achillea millefolium</i>	Yarrow	N	F	MPF, RF
<i>Adenostoma fasciculatum</i>	Chamise	N	S	MPF
<i>Agapanthus africanus.</i>	Lily-of-the-Nile	I	M	DL
<i>Agave</i> sp.	Agave	I	M	DL
<i>Agrostis pallens</i>	Bentgrass	N	G	GL
<i>Aira caryophyllea</i>	Silver European hairgrass	I	G	ALL
<i>Allium tribracteatum</i>	Three-cornered onion	I	M	RF
<i>Amelanchier</i> sp.	Service-berry	I	S/T	MPF
<i>Anagallis arvensis</i>	Scarlet pimpernel	N	F	ALL
<i>Arbutus menziesii</i>	Madrone	N	T	MPF
<i>Arbutus unedo</i>	Strawberry tree	I	T	HT
<i>Arctostaphylos hookeri</i>	Hooker's manzanita	N	S	MPF
<i>Arctostaphylos tomentosa</i>	Shaggy-barked manzanita	N	S	MPF
<i>Arctotis</i> sp.	African daisy	I	F	DL
<i>Avena barbata</i>	Slender wild oat	I	G	MPF, RF, DG
<i>Avena fatua</i>	Wild oat	I	G	MPF, RF, DG
<i>Baccharis pilularis</i>	Coyote brush	N	S	MPF
<i>Bambusa glaucescens</i> 'golden goddess'	Golden goddess bamboo	I	G	DG
<i>Bellis perennis</i>	English daisy	I	F	GL
<i>Betula pendula</i>	Weeping birch	I	T	HT
<i>Briza maxima</i>	Rattlesnake grass	I	G	MPF, RF, DG
<i>Briza minor</i>	Quaking grass	I	G	MPF, RF, DG
<i>Bromus carinatus</i>	California brome	N	G	RF, MPF
<i>Bromus diandrus</i>	Ripgut grass	I	G	ALL
<i>Bromus hordeaceus</i>	Soft chess	I	G	ALL

Final

JC/TG:MB57312.doc-EPP
May 29, 2001

Harding ESE, Inc.

1 of 7

**Table 2. Plant Species Observed
at the POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Bromus tectorum</i>	Cheat grass	I	G	MPF
<i>Calamagrostis nutkaensis</i>	Pacific reedgrass	N	G	MPF, RF
<i>Calochortus albus</i>	Globe lily	N	M	MPF, RF
<i>Camassonia ovata</i>	Sun cup	N	F	MPF, RF
<i>Cardamine californica</i>	Toothwort	N	F	MPF, RF
<i>Carex densa</i>	Dense sedge	N	M	MPF, RF
<i>Carex harfordii</i>	Monterey sedge	N	M	MPF, RF
<i>Carpobrotus edulis</i>	African iceplant	I	F	ALL
<i>Castilleja affinis</i>	Coastal paintbrush	N	F	MPF, RF
<i>Ceanothus</i> sp.	Creeping ceanothus	I	S	DL
<i>Ceanothus dentatus</i>	Dwarf ceanothus	N	S	MPF
<i>Ceanothus thyrsiflorus</i>	Blue blossom	N	S	MPF
<i>Cedrus atlantica</i>	Atlas cedar	I	T	HT
<i>Cerastium glomeratum</i>	Mouse-ear chickweed	I	F	ALL
<i>Chlorogalum pomeridianum</i>	Soap plant	N	M	MPF, RF
<i>Cirsium occidentale</i>	Cobwebby thistle	N	F	RF, MPF, DG, DL
<i>Cirsium vulgare</i>	Bull thistle	I	F	DL, DG, RF
<i>Cistus</i> sp.	Rock rose	I	S	DL
<i>Claytonia perfoliata</i>	Miner's lettuce	N	F	MPF, RF
<i>Conium maculatum</i>	Poison hemlock	I	F	RF
<i>Conyza bonariensis</i>	South American conyza	I	F	ALL
<i>Cordyline australis</i>	Dracaena	I	M	DL
<i>Cortaderia jubata</i>	Pampas grass	I	G	DG, RF
<i>Cortaderia selloana</i>	Pampas grass	I	G	DG, RF
<i>Cotoneaster</i> sp.	Cotoneaster	I	S	DG
<i>Cotula australis</i>	Australian brass-buttons	I	F	GL
<i>Crassula argentea</i>	Jade plant	I	F	DL
<i>Cupressus macrocarpa</i>	Monterey cypress	I	T	HT, GL
<i>Cytisus scoparius</i>	Scotch broom	I	S	DG, MPF, RF
<i>Deschampsia cespitosa</i>	Pacific tufted hairgrass	N	G	RF, MPF

Final

JC/TG:MB57312.doc-EPP
May 29, 2001

Harding ESE, Inc.

2 of 7

**Table 2. Plant Species Observed
at the POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Dichelostemma capitatum</i>	Blue dicks	N	M	MPF, RF
<i>Dodonaea viscosa</i>	Hopseed bush	I	S	DL
<i>Dryopteris arguta</i>	Wood fem	N	F	MPF, RF
<i>Dudleya</i> sp.	Dudleya	N	F	MPF
<i>Echium fatuosum</i>	Pride of Madiera	I	S	DL
<i>Elymus glaucus</i>	Blue wildrye	N	G	RF, MPF
<i>Erechtites glomerata</i>	Australian fireweed	I	F	MPF, RF, DG
<i>Eriophyllum confertiflorum</i>	Golden yarrow	N	S	MPF
<i>Erodium botrys</i>	Broadleaf filaree	I	F	ALL
<i>Erodium cicutarium</i>	Redstem filaree	I	F	ALL
<i>Eschscholzia californica</i>	California poppy	N	F	RF, MPF, DG
<i>Eucalyptus camodulensis</i>	Red gum	I	T	HT
<i>Eucalyptus globulus</i>	Bluegum eucalyptus	I	T	HT
<i>Eucalyptus lehmanii</i>	Bushy yate	I	T	HT
<i>Eucalyptus potheyanthemos</i>	Silver dollar eucalyptus	I	T	HT
<i>Eugenia</i> sp.	Brush cherry	I	S	DL
<i>Euryops pectinatus</i>	African daisy	I	S	DL
<i>Festuca</i> sp.	Fescue	I	G	GL
<i>Filago californica</i>	California filago	N	F	MPF, RF
<i>Foeniculum vulgare</i>	Fennel	I	F	DG
<i>Fragaria vesca</i>	Wood strawberry	N	F	MPF
<i>Fritillaria affinis</i>	Checker lily	N	M	MPF
<i>Galium aparine</i>	Goose grass	N	F	RF, MPF
<i>Galium californicum</i>	California bedstraw	N	F	RF, MPF
<i>Gaultheria shouldon</i>	Salal	N	S	MPF
<i>Gazania linearis</i>	Gazania	I	F	DL
<i>Genista monspessulana</i>	French broom	I	S	DG, MPF, RF
<i>Geranium molle</i>	Annual cranesbill	I	F	ALL
<i>Gnaphalium luteo-album</i>	Cudweed everlasting	I	F	ALL
<i>Hedera helix</i>	English ivy	I	V	RF, DL

**Table 2. Plant Species Observed
at the POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Helianthemum scoparium</i>	Peak rush-rose	N	F	MPF
<i>Heteromeles arbutifolia</i>	Toyon	N	S	MPF,RP
<i>Holcus lanatus</i>	Common velvet grass	I	G	ALL
<i>Hordeum murinum leporinum</i>	Hare barley	I	G	ALL
<i>Hypochaeris glabra</i>	Smooth cat's-ear	I	F	ALL
<i>Ilex aquifolium</i>	English holly	I	S	DL
<i>Iris douglasiana</i>	Douglas iris	N	M	RF, MPF
<i>Juncus bufonius</i>	Toad rush	N	M	RF, MPF, DG
<i>Juncus effusus</i>	Soft rush	N	M	RF, MPF
<i>Juncus falcatus</i>	Sickle-leaf rush	N	M	RF, MPF
<i>Juncus patens</i>	Spreading rush	N	M	RF, MPF
<i>Juncus tenuis</i>	Slender rush	N	M	RF, MPF
<i>Juniperus chinensis</i> 'Torulosa'	Hollywood juniper	I	S	DL
<i>Lathyrus vestitus</i>	Pacific peavine	N	F	RF, MPF
<i>Lessingia filaginifolia</i>	California aster	N	F	RF, MPF
<i>Liquidambar styraciflua</i>	American sweet gum	I	T	HT
<i>Lolium multiflorum</i>	Italian ryegrass	I	G	ALL
<i>Lomatium californicum</i>	California lomatium	N	F	MPF
<i>Lomatium parvifolium</i>	Small-leaved lomatium	N	F	MPF
<i>Lonicera hispidula</i>	California honeysuckle	N	V	MPF
<i>Lonicera involucrata</i>	Twinberry	N	S	MPF
<i>Lotus formosissimus</i>	Seaside trefoil	N	F	RF, MPF, DG
<i>Lotus humistratus</i>	Short-padded lotus	N	F	RF, MPF, DG
<i>Lotus indica</i>	Sourclover	I	F	RF, MPF, DG
<i>Lotus wrangelianus</i>	Trefoil	N	F	RF, MPF, DG
<i>Lupinus</i> sp.	Lupine	I	F	RF, MPF, DG
<i>Malacothrix californica</i>	California malacothrix	N	F	MPF
<i>Marah fabaceus</i>	California manroot	N	V	RF, MPF
<i>Medicago polymorpha</i>	California burclover	I	F	ALL
<i>Melilotus officinalis</i>	Yellow sweetclover	I	F	DG

**Table 2. Plant Species Observed
at the POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Mimulus aurantiacus</i>	Bush monkeyflower	N	S	MPF
<i>Myrtus communis</i>	Myrtle	I	S	DL
<i>Nandina domestica</i>	Heavenly bamboo	I	S	DL
<i>Nasella cernua</i>	Nodding needlegrass	N	G	MPF
<i>Nerium oleander</i>	Oleander	I	S	DL
<i>Oxalis pes-caprae</i>	Bermuda buttercup	I	F	DG, GL, DL, RF
<i>Pedicularis densiflora</i>	Indian warrior	N	F	MPF
<i>Pelargonium</i> sp.	Garden geranium	I	F	DG
<i>Pennisetum clandestinum</i>	Kikuyu grass	I	G	ALL
<i>Phalaris californica</i>	California canarygrass	I	G	RF, DG, MPF
<i>Phormium tenax</i>	New Zealand flax	I	M	DL
<i>Pinus radiata</i>	Monterey pine	N	T	MPF, HT
<i>Piperia yadonii</i>	Yadon's piperia (rein orchid)	N	F	MPF
<i>Pittosporum</i> spp.	Tobira	I	S	DG
<i>Plantago coronopus</i>	Cut-leaf plantain	I	F	DG
<i>Plantago lanceolata</i>	English plantain	I	F	DL, LG, DG
<i>Poa annua</i>	Annual bluegrass	I	G	DL, LG, DG
<i>Podocarpus macrocarpa</i>	Yew pine	I	S	DG
<i>Polypodium scolieri</i>	Leather-leaf fem	N	F	MPF
<i>Potentilla glandulosa</i>	Cinquefoil	N	F	MPF
<i>Prunus</i> sp.	Plum	I	T	DG
<i>Pteridium aquilinum</i>	Bracken fem	N	F	MPF
<i>Quercus agrifolia</i>	Coast live oak	N	T	MPF, RF
<i>Ranunculus californica</i>	California buttercup	N	F	MPF
<i>Raphanus sativus</i>	Radish	I	F	DG
<i>Rhamnus californica</i>	California coffeeberry	N	S	MPF
<i>Rhus integrifolia</i>	Lemonadeberry	I	S	MPF
<i>Rosa californica</i>	California rose	N	S	MPF
<i>Rosa gymnocarpa</i>	Woodrose	N	S	MPF
<i>Rosmarinus officinalis</i>	Rosemary	I	S	DL

Final

JC/TG:MB57312.doc-EPP
May 29, 2001

Harding ESE, Inc.

5 of 7

**Table 2. Plant Species Observed
at the POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Rubus discolor</i>	Himalaya berry	I	V	RP
<i>Rubus ursinus</i>	California blackberry	N	V	MPF, RP
<i>Rumex acetosella</i>	Sheep sorrel	I	F	MPF, RF, DG
<i>Rumex crispus</i>	Curly dock	I	F	RF
<i>Salix lasiolepis</i>	Arroyo willow	N	S/T	RF
<i>Salix scouleriana</i>	Scouler's willow	N	S/T	RF
<i>Sanicula crassicaulis</i>	Pacific sanicle	N	F	MPF
<i>Sanicula lacinata</i>	Coast sanicle	N	F	MPF
<i>Satureja douglasii</i>	Yerba buena	N	F	RF, MPF
<i>Senecio mikanioides</i>	German ivy	I	V	RF
<i>Senecio sylvaticus</i>	Ragwort	I	F	DG
<i>Senecio vulgaris</i>	Common groundsel	I	F	ALL
<i>Sequoia sempervirens</i>	Coast redwood	I	T	HT
<i>Sidalcea</i> sp.	Checkerbloom	N	F	MPF
<i>Silene gallica</i>	Catchfly	I	F	RF, MPF
<i>Sisyrinchium bellum</i>	Blue-eyed grass	N	M	MPF
<i>Solanum umbelliferum</i>	Blue witch	N	S	MPF
<i>Solidago californica</i>	California goldenrod	N	F	RF
<i>Sonchus asper</i>	Prickly sow thistle	I	F	DG
<i>Spergula arvensis</i>	Spurrey	I	F	DG
<i>Stachys bullata</i>	California hedge nettle	N	F	MPF, RF
<i>Stellaria media</i>	Common chickweed	I	F	MPF, RF, DG
<i>Symphoricarpos mollis</i>	Creeping snowberry	N	S	MPF, RF
<i>Taraxacum officinale</i>	Dandelion	I	F	GL, DG
<i>Toxicodendron diversilobum</i>	Poison-oak	N	S	MPF, RP
<i>Trifolium campestre</i>	Hop clover	I	F	GL
<i>Trifolium hirtum</i>	Rose clover	I	F	ALL
<i>Triteleia ixioides</i>	Golden brodiaea	N	M	MPF
<i>Tropaeolum majus</i>	Garden nasturtium	I	F	RF
<i>Typha latifolia</i>	Broad-leaved cattail	N	M	RF

**Table 2. Plant Species Observed
at the POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Vaccinium ovatum</i>	California huckleberry	N	S	MPF
<i>Veronica persicaria</i>	Persian speedwell	I	F	RF
<i>Vicia sativa</i>	Spring vetch	I	F	MPF, RF, DG
<i>Vicia villosa</i>	Hairy vetch	I	F	MPF, RF, DG
<i>Vinca major</i>	Periwinkle	I	F	RF
<i>Vitis californica</i>	California wild grape	N	V	RF
<i>Vulpia myuros</i>	Rattail fescue	I	G	ALL
<i>Washingtonia robusta</i>	Mexican fan palm	I	T	DL
<i>Wyethia angustifolia</i>	Narrow-leaf mules ears	N	F	MPF
<i>Xylosma</i> sp.	Xylosma	I	S	DG
<i>Piperia yadoni</i>	Yadon's piperia	N	F	MPF
<i>Yucca</i> sp.	Yucca	I	M	DL
<i>Zantedeschia aethiopica</i>	Calla lily	I	M	DL
<i>Zigadenus fremontii</i>	Death camas	N	M	MPF

Life Form	Native Status	Principal Community
T = TREE	N =NATIVE	HT = Horticultural Trees
S = SHRUB	I = INTRODUCED	DL = Developed Lands
G = GRASS		MPF = Monterey Pine Forest
F = FORB (Dicot or Fern)		GL = Grass and Lawn
V = VINE		RF = Riparian Forest
M = MONOCOT (not a grass)		DG = Disturbed Ground

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Abelia grandiflora</i>	Glossy abelia	I	S	H
<i>Acacia baileyana</i>	Bailey acacia	I	T	H
<i>Acacia longifolia</i>	Sydney golden wattle	I	T	H
<i>Acacia melanoxylon</i>	black wood acacia	I	T	H
<i>Acer</i> sp.	Maple	I	T	H
<i>Achillea millefolium</i>	Yarrow	N	F	H
<i>Adenostoma fasciculatum</i>	Chamise	N	S	MC
<i>Agapanthus</i> sp.	lily-of-the-Nile	I	F	H
<i>Agave</i> sp.	Agave	I	F	H
<i>Agrostis pallens</i>	Bentgrass	N	G	OW, MC
<i>Aira caryophylla</i>	silver European hairgrass	I	G	D, OW, CS, MC
<i>Anagallis arvensis</i>	Scarlet pimpernel	I	F	D, OW, H
<i>Anthriscus caucalis</i>	bur-chervil	I	F	MC,R
<i>Arbutus unedo</i>	Strawberry tree	I	T	H
<i>Arctostaphylos pumila</i>	Sandmat manzanita	N	S	MC
<i>Arctostaphylos tomentosa</i>	Shaggy-barked manzanita	N	S	MC, OW
<i>Arctotis</i> sp.	African daisy	I	F	H
<i>Artemisia californica</i>	California sagebrush	N	S	CS
<i>Athysanus pusillus</i>	dwarf athysanus	N	F	MC,G,CS
<i>Avena barbata</i>	Slender wild oat	I	G	G, D, OW
<i>Avena fatua</i>	wild oat	I	G	G, D, OW
<i>Baccharis pilularis</i>	Coyote brush	N	S	CS,SD,OW,M C
<i>Bellis perennis</i>	English daisy	I	F	H
<i>Betula</i> sp.	Birch	I	T	H
<i>Brassica nigra</i>	black mustard	I	F	G, D
<i>Briza maxima</i>	Rattlesnake grass	I	G	G, D, OW
<i>Briza minor</i>	little quaking grass	I	G	G, D, OW
<i>Bromus carinatus</i>	California brome	N	G	G, D, OW

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Bromus diandrus</i>	Ripgut grass	I	G	G, D, OW
<i>Bromus hordeaceus</i>	soft chess	I	G	G, D, OW
<i>Bromus madritensis rubens</i>	Red brome	I	G	G, D, OW, MC
<i>Calyptridium monandrum</i>	Common calyptridium	N	F	MC
<i>Calystegia subacaulis</i>	Hill morning-glory	N	F	G
<i>Camissonia micrantha</i>	Miniature evening primrose	N	F	CS,MC,G
<i>Camissonia ovata</i>	sun cup	N	F	CS,MC,G
<i>Cardamine californica</i>	Milkmaids	N	F	OW
<i>Cardionema ramosissimum</i>	Sand mat	N	F	CS,SD,MC
<i>Carduus pycnocephalus</i>	Italian thistle	I	F	G, OW
<i>Carex globosa</i>	Round-fruited sedge	N	M	MC
<i>Carpobrotus edulis</i>	African iceplant	I	F	D
<i>Castilleja densiflorus</i>	owl's clover	N	F	G
<i>Castilleja exserta</i>	Purple owl's clover	N	F	G,MC,SD
<i>Ceanothus cuneatus rigidus</i>	Monterey ceanothus	N	S	MC
<i>Ceanothus dentatus</i>	tooth-leaved ceanothus	N	S	MC
<i>Centaurea melitensis</i>	Tocalote	I	F	G
<i>Cerastium glomeratum</i>	Mouse-ear chickweed	I	F	D, H
<i>Chlorogalum pomeridianum</i>	soap plant	N	M	OW
<i>Chorizanthe p. pungens</i>	Monterey spine-flower	N	F	MC,CS,OW,G
<i>Cirsium occidentale.</i>	Western thistle	N	F	OW
<i>Cirsium vulgare</i>	bull thistle	I	F	G,OW,CS
<i>Claytonia perfoliata</i>	miner's lettuce	N	F	OW
<i>Conium maculatum</i>	Poison hemlock	I	F	OW
<i>Conyza bonariensis</i>	South American conyza	I	F	D
<i>Conyza canadensis</i>	Western horseweed	N	F	R,G
<i>Cortaderia jubata</i>	Pampas grass	I	G	D
<i>Cotoneaster sp.</i>	Cotoneaster	I	S	H
<i>Cotula australis</i>	Australian brass-buttons	I	F	H
<i>Crassula erecta</i>	sand pygmy-stonecrop	N	F	MC,CS

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Croton californicus</i>	California croton	N	F	OW, CS
<i>Cupressus macrocarpa</i>	Monterey cypress	I	T	H
<i>Cytisus monspessulanus</i>	French broom	I	S	D,CS,G,MC
<i>Danthonia californica</i>	California oatgrass	N	G	OW, G
<i>Daucus pusillus</i>	Rattlesnake weed	N	F	OW,D,G
<i>Dichelostemma capitatum</i>	blue dicks	N	M	OW
<i>Dodonaea viscosa</i>	Hopseed bush	I	S	H
<i>Dryopteris arguta</i>	wood fem	N	F	OW
<i>Elymus glaucus</i>	blue wildrye	N	G	OW
<i>Erechtites glomerata</i>	Australian fireweed	I	F	OW
<i>Eremocarpus setigerus</i>	Turkey mullein	N	F	G
<i>Ericameria ericoides</i>	mock heather	N	S	CS
<i>Eriobotrya japonica</i>	Loquat	I	T	H
<i>Eriogonum nudum</i>	Naked buckwheat	N	F	CS,MC
<i>Eriophyllum confertiflorum</i>	Golden yarrow	N	S	CS, MC
<i>Erodium botrys</i>	Broadleaf filaree	I	F	ALL
<i>Erodium cicutarium</i>	Redstem filaree	I	F	ALL
<i>Escallonia</i> sp.	Escallonia	I	S	H
<i>Eschscholzia californica</i>	California poppy	N	F	OW, G
<i>Eucalyptus camodulensis</i>	red gum	I	T	H
<i>Eucalyptus ficifolia</i>	red flowering gum	I	T	H
<i>Eucalyptus globulus</i>	Bluegum eucalyptus	I	T	H
<i>Eucalyptus lehmanii</i>	Bushy yate	I	T	H
<i>Eucalyptus polyanthemos</i>	silver dollar gum	I	T	H
<i>Eugenia</i> sp.	brush cherry	I	S	H
<i>Festuca</i> sp.	Fescue	I	G	H
<i>Filago californica</i>	California filago	N	F	OW
<i>Filago gallica</i>	Wooly filago	I	F	MC,CS,G
<i>Foeniculum vulgare</i>	Fennel	I	F	D
<i>Galium aparine</i>	Bedstraw	N	F	OW

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Galium californicum</i>	California bedstraw	N	F	OW,CS,MC
<i>Gastridium ventricosum</i>	nit grass	I	G	G,D
<i>Gazania linearis</i>	Gazania	I	F	H
<i>Genista monspessulana</i>	French broom	I	S	D
<i>Geranium dissectum</i>	Dissected geranium	I	F	G,OW
<i>Geranium molle</i>	Annual cranesbill	I	F	H
<i>Gnaphalium luteo-album</i>	Cudweed everlasting	I	F	ALL
<i>Gnaphalium purpureum</i>	Purple cudweed	N	F	CS, MC, OW
<i>Gnaphalium ramosissimum</i>	pink everlasting	N	F	OW
<i>Hedera helix</i>	English ivy	I	V	H
<i>Helianthemum scoparium</i>	peak rush-rose	N	F	MC
<i>Heliotropium curassavicum</i>	Heliotrope	N	F	G
<i>Hemizonia corymbosa</i>	coast tarplant	N	F	G
<i>Hemizonia fasciculata</i>	Fasciculed tarplant	N	F	G
<i>Heteromeles arbutifolia</i>	Toyon	N	S	MC,OW
<i>Heterotheca grandiflora</i>	Telegraph weed	N	F	OW,G,CS,MC
<i>Hirschfeldia incana</i>	Summer mustard	I	F	G, D
<i>Holcus lanatus</i>	Common velvet grass	I	G	D
<i>Hordeum brachyantherum</i>	Meadow barley	N	G	G
<i>Hordeum murinum leporinum</i>	hare barley	I	G	G, D, OW
<i>Horkelia cuneata</i>	Wedge-leaf horkelia	N	F	MC,G,CS
<i>Hypochaeris glabra</i>	Smooth cat's-ear	I	F	ALL
<i>Hypochoeris radicata</i>	hairy cat's-ears	I	F	OW
<i>Ilex aquifolium</i>	English holly	I	S	H
<i>Juncus bufonius</i>	toad rush	N	SR	D
<i>Juniperus chinensis</i> 'Torulosa'	Hollywood juniper	I	S	H
<i>Lathyrus vestitus</i>	Pacific peavine	N	F	OW
<i>Layia hieracioides</i>	tall layia	N	F	CS,MC
<i>Layia platyglossa</i>	tidy tips	N	F	G
<i>Lepidium nitidum</i>	Common peppergrass	N	F	G

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Lessingia filaginifolia californica</i>	California aster	N	F	MC,AD,SD
<i>Lessingia plandulifera pectinata</i>	Valley lessingia	N	F	MC,CS
<i>Leymus triticoides</i>	Creeping ryegrass	N	G	G,OW
<i>Linaria canadensis</i>	Toadflax	N	F	G
<i>Liquidambar styraciflua</i>	American sweet gum	I	T	H
<i>Lolium multiflorum</i>	Italian ryegrass	I	G	G
<i>Lonicera hispidula</i>	California honeysuckle	N	V	OW
<i>Lotus heermannii</i>	Heerman's lotus	N	F	G
<i>Lotus humistratus</i>	short-podded lotus	N	F	G
<i>Lotus micranthus</i>	tiny lotus	N	F	G
<i>Lotus purshianus</i>	Pursh's lotus	N	F	G
<i>Lotus scoparius</i>	Deerweed	N	S	MC,CS
<i>Lotus wrangelianus</i>	Trefoil	N	F	G
<i>Lupinus arboreus</i>	bush lupine	N	S	CS
<i>Lupinus bicolor</i>	Bicolor lupine	N	F	G
<i>Lupinus nanus</i>	sky lupine	N	F	G
<i>Luzula subsessilis</i>	Woodrush	N	SR	G,OW
<i>Lyanthamnus floribundus</i>	Catalina ironwood	I	T	H
<i>Madia exigua</i>	little tarplant	N	F	G,MC,CS
<i>Madia gracilis</i>	Slender madia	N	F	G,MC,CS
<i>Madia radioides</i>	Woodland tarplant	N	F	G
<i>Malva parviflora</i>	Cheeseweed	I	F	G,D
<i>Marah fabaceus</i>	California manroot	N	V	OW
<i>Medicago polymorpha</i>	California burclover	I	F	ALL
<i>Melica californica</i>	California melic grass	N	G	G,MC,CS
<i>Melica imperfecta</i>	coast melic grass	N	G	G,MC,CS
<i>Melilotus indica</i>	Yellow sweet clover	I	F	OW,CS
<i>Micropus californicus</i>	Slender cottonseed	N	F	MC,CS
<i>Microseris lindleyi</i>	Uropappus	N	F	G

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Mimulus aurantiacus</i>	Sticky monkeyflower	N	S	CS,MC,OW
<i>Myoporum laetum</i>	salt bush	I	S/T	H
<i>Nandina domestica</i>	Heavenly bamboo	I	S	H
<i>Nasella lepida</i>	Foothill needlegrass	N	G	G
<i>Nasella pulchra</i>	Purple needlegrass	N	G	G
<i>Navarretia atractyloides</i>	Rough navarretia	N	F	MC
<i>Navarretia intertexta</i>	Needle-leaved navarretia	N	F	CS,MC
<i>Nemophila menziesii</i>	baby blue-eyes	N	M	OW
<i>Nerium oleander</i>	Oleander	I	S	H
<i>Oxalis pes-caprae</i>	Bermuda buttercup	I	F	D, H
<i>Pectocarya linearis</i>	Slender pectocarya	N	F	G,OW
<i>Pelargonium domesticum</i>	regal geranium	I	F	H
<i>Pelargonium hortorum</i>	Common geranium	I	F	H
<i>Pennisetum clandestinum</i>	Kikuyu grass	I	G	H, D
<i>Phalaris aquatica</i>	Harding grass	I	G	G
<i>Pinus densiflora</i> 'Umbraculifera'	Tanyosho pine	I	T	H
<i>Pinus pinea</i>	Italian stone pine	I	T	H
<i>Pinus radiata</i>	Monterey pine	I	T	H
<i>Piperia yadonii</i>	Yadon's piperia (rein orchid)	N	F	MPF
<i>Pittosporum crassifolium</i>	white pittosporum	I	S	H
<i>Pentagramma triangularis</i>	Goldenback fern	N	F	OW
<i>Plagiobothrys tenellus</i>	Slender popcornflower	N	F	G,MC
<i>Plantago coronopus</i>	cut-leaf plantain	I	F	ALL
<i>Plantago erecta</i>	California plantain	N	F	G,SD
<i>Plantago lanceolata</i>	English plantain	I	F	H, D, G
<i>Poa annua</i>	Annual bluegrass	I	G	H, D, G
<i>Podocarpus macrophyllus</i>	yew pine	I	S	H
<i>Polycarpon tetraphyllum</i>	four-leaved polycarp	I	F	H, D

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Polygala californica</i>	California milkwort	N	F	MC, OW
<i>Prunus</i> sp.	Plum	I	T	H
<i>Pteridium aquilinum pubescens</i>	Bracken fern	N	F	CS,OW,MC
<i>Pterostegia drymarioides</i>	fairy mist	N	F	G,OW,MC,CS
<i>Pyracantha fortuneana</i>	Firethorn	I	S	H
<i>Quercus agrifolia</i>	coast live oak	N	T	OW, H
<i>Quercus ilex</i>	holly oak	I	T	H
<i>Ranunculus californicus</i>	California buttercup	N	F	OW,G
<i>Raphanus sativus</i>	Radish	I	F	D
<i>Rhamnus californica</i>	California coffeeberry	N	S	MC,OW,CS
<i>Rosa californica</i>	California wild rose	N	S	OW,CS
<i>Rosmarinus officinalis</i>	Rosemary	I	S	H
<i>Rubus discolor</i>	Himalaya berry	I	V	OW
<i>Rubus ursinus</i>	Pacific blackberry	N	V	OW
<i>Rumex acetosella</i>	Sheep sorrel	I	F	G, OW,CS, MC
<i>Sagina apetala</i>	dwarf pearlwort	I	F	D
<i>Salix laevigata</i>	red willow	N	S/T	D
<i>Salix lasiolepis</i>	Arroyo willow	N	S/T	D
<i>Salvia mellifera</i>	black sage	N	S	MC,CS
<i>Sanicula crassicaulis</i>	Pacific sanicle	N	F	OW
<i>Satureja douglasii</i>	yerba buena	N	F	OW
<i>Senecio vulgaris</i>	Common groundsel	I	F	ALL
<i>Sequoia sempervirens</i>	coast redwood	I	T	H
<i>Sidalcea malviflora</i>	Checkerbloom	N	F	OW, G
<i>Silene gallica</i>	Catchfly	I	F	OW
<i>Silybum marianum</i>	milk thistle	I	F	G,OW
<i>Sisyrinchium bellum</i>	blue-eyed grass	N	M	G
<i>Solanum umbelliferum</i>	blue witch	N	S	MC
<i>Soliva sessilis</i>	Common soliva	I	F	D

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
<i>Sonchus asper</i>	Prickly sow thistle	I	F	ALL
<i>Sonchus oleraceus</i>	Common sow-thistle	I	F	D,G,CS
<i>Spergularia macrotheca</i>	Beach sandspurry	N	F	MC,D
<i>Spergularia rubra</i>	Purple sandspurry	I	F	D,MC,CS
<i>Stachys bullata</i>	California hedgenettle	N	F	G,OW
<i>Stellaria media</i>	Common chickweed	I	F	H, OW
<i>Symphoricarpos mollis</i>	Creeping snowberry	N	S	OW
<i>Taraxacum officinale</i>	Dandelion	I	F	H
<i>Thuja</i> sp.	Arborvitae	I	S	H
<i>Toxicodendron diversilobum</i>	Poison-oak	N	S	CS, MC, OW
<i>Trachelospermum jasminoides</i>	star jasmine	I	V	H
<i>Trifolium barbigenum</i>	Bearded clover	N	F	G
<i>Trifolium campestre</i>	hop clover	I	F	G
<i>Trifolium hirtum</i>	rose clover	I	F	H
<i>Trifolium repens</i>	white clover	I	F	H
<i>Trifolium variegatum</i>	White tip clover	N	F	G
<i>Trifolium willdenovii</i>	Tomcat clover	N	F	G, OW
<i>Triphysaria pusilla</i>	dwarf owl's clover	N	F	G
<i>Vicia americana</i>	American vetch	N	F	G,OW
<i>Vicia sativa</i>	Spring vetch	I	F	G,OW
<i>Vicia villosa</i>	hairy vetch	I	F	G,OW
<i>Vinca major</i>	Periwinkle	I	F	H
<i>Vulpia megalura</i>	Foxtail fescue	I	G	G
<i>Vulpia myuros</i>	Rattail fescue	I	G	G, D
<i>Vulpia octoflora</i>	six-weeks fescue	I	G	G
<i>Vulpia pacifica</i>	Pacific fescue	N	G	G
<i>Xylosma congestum</i>	shiny green xylosma	I	S	H
<i>Yucca</i> sp.	Yucca	I	F	H
<i>Zygadenus fremontii</i>	Fremont's zygadene	N	M	MC

**Table 3. Plant Species Expected
at the POM and OMC
Monterey County, California**

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
-----------------	-------------	------------------------	--------------	--------------------

Life Form	Native Status	Principal Community
-----------	---------------	---------------------

T = Tree	N =Native	CS = Coastal scrub
S = Shrub	I = Introduced	MC = Maritime chaparral
G = Grass		OW = Coast live oak woodland
F = Forb (Dicot or Fern)		G = Grassland
V = Vine		D = Disturbed sites
M = Monocot (not a grass)		H = Horticultural planting

**Table 4. Normal Year ETo for City of Monterey
POM and OMC
Monterey County, California**

Month	ETo (Inches)
January	1.7
February	1.8
March	2.7
April	3.5
May	4.0
June	4.1
July	4.3
August	4.1
September	3.5
October	2.8
November	1.9
December	1.5
Total	35.9

Define ETo

**Table 5. Multiplying Factors for
Turfgrass Irrigation
POM and OMC
Monterey County, California**

Average Water Depth (inches)	Multiplying Factor
1/8	120
3/16	80
1/4	60
5/16	48
3/8	40
7/16	34
1/8	30
9/16	27
5/8	24
11/16	22
3/4	20

Source: After Cooperative Extension University of California Leaflet 21432
Lawn Watering Requirements Along California's Central Coast.

**Table 6. Turfgrass 3-Day Water Requirements
POM and OMC
Monterey County, California**

Month	Water Requirements (minutes)	
	Cool Season Grass	Warm Season Grass
January	.11	.09
February	.16	.11
March	.21	.16
April	.28	.21
May	.34	.25
June	.38	.28
July	.37	.28
August	.33	.25
September	.30	.22
October	.23	.18
November	.15	.11
December	.10	.08

After Cooperative Extension University of California Leaflet 21432 *Lawn Watering Requirements along California's Central Coast.*

**Table 7. Estimated Values for Species, Density and Microclimate Factors
POM and OMC
Monterey County, California**

Vegetation Type	Species Factor (k_s)			Density Factor (k_d)			Microclimate Factor (k_{mc})		
	High	Average	Low	High	Average	Low	High	Average	Low
Trees	0.9	0.5	0.2	1.3	1	0.5	1.4	1	0.5
Shrubs	0.7	0.5	0.2	1.1	1	0.5	1.3	1	0.5
Groundcovers	0.7	0.5	0.2	1.1	1	0.5	1.2	1	0.5
Mixed: Trees, Shrubs, Groundcovers	0.9	0.5	0.2	1.3	1.1	0.6	1.4	1	0.5
Turfgrass	0.8	0.7	0.2	1	1	0.6	0.6	1.2	0.8

After Cooperative Extension University of California Leaflet 21432 *Lawn Watering Requirements along California's Central Coast*.

Table 8. Native Species Suitable for Planting in Monterey Pine and Riparian Forest at the POM and OMC, Monterey County, California

Scientific Name	Common Name	Recommended Community
Grasses		
<i>Agrostis pallens</i>	bentgrass	R or MPF
<i>Bromus carinatus</i>	California brome	R or MPF
<i>Calamagrostis nutkaensis</i>	Pacific reedgrass	R or MPF
<i>Danthonia californica</i>	California oatgrass	R or MPF
<i>Deschampsia cespitosa holciformis</i>	Pacific tufted hairgrass	R or MPF
<i>Elymus glaucus</i>	blue wildrye	R or MPF
<i>Festuca rubra.</i>	red fescue	R or MPF
<i>Nasella cernua</i>	nodding needlegrass	MPF
Forbs		
<i>Achillea millefolium</i>	yarrow	R or MPF
<i>Calochortus albus</i>	globe lily	R or MPF
<i>Carex densa</i>	dense sedge	R
<i>Carex harfordii</i>	Monterey sedge	R
<i>Chlorogalum pomeridianum</i>	soap plant	R or MPF
<i>Dryopteris arguta</i>	wood fem	R or MPF
<i>Eriophyllum confertiflorum</i>	golden yarrow	MPF
<i>Eschscholzia californica</i>	California poppy	R or MPF
<i>Fragaria vesca</i>	wood strawberry	R or MPF
<i>Helianthemum scoparium</i>	peak rush-rose	MPF
<i>Iris douglasiana</i>	Douglas iris	R or MPF
<i>Juncus bufonius</i>	toad rush	R
<i>Juncus effusus</i>	soft rush	R
<i>Juncus patens</i>	spreading rush	R
<i>Juncus tenuis</i>	slender rush	R
<i>Lessingia filaginifolia</i>	California aster	R or MPF
<i>Lupinus nanus</i>	lupine	R or MPF
<i>Polypodium scolieri</i>	leather-leaf fem	R or MPF
<i>Satureja douglasii</i>	yerba buena	R or MPF
<i>Sisyrinchium bellum</i>	blue-eyed grass	R or MPF
<i>Stachys bullata</i>	California hedge nettle	R

Table 8. Native Species Suitable for Planting in Monterey Pine and Riparian Forest at the POM and OMC, Monterey County, California

Scientific Name	Common Name	Recommended Community
Shrubs		
<i>Adenostoma fasciculatum</i>	chamise	MPF
<i>Arctostaphylos hookeri</i>	Hooker's manzanita	MPF
<i>Arctostaphylos tomentosa</i>	shaggy-barked manzanita	MPF
<i>Ceanothus dentatus</i>	dwarf ceanothus	R or MPF
<i>Ceanothus thyrsiflorus</i>	blue blossom	R or MPF
<i>Gaultheria shallon</i>	salal	R or MPF
<i>Heteromeles arbutifolia</i>	toyon	R or MPF
<i>Lonicera involucrata</i>	twinberry	R
<i>Mimulus aurantiacus</i>	bush monkeyflower	R or MPF
<i>Rhamnus californica</i>	California coffeeberry	R or MPF
<i>Rosa californica</i>	California rose	R
<i>Rosa gymnocarpa</i>	woodrose	R
<i>Symphoricarpos mollis</i>	creeping snowberry	R or MPF
<i>Vaccinium ovatum</i>	California huckleberry	R or MPF
Vines		
<i>Lonicera hispidula</i>	California honeysuckle	R or MPF
<i>Rubus ursinus</i>	California blackberry	R
<i>Vitis californica</i>	California wild grape	R
Trees		
<i>Arbutus menziesii</i>	madrone	MPF
<i>Pinus radiata</i>	Monterey pine	MPF
<i>Quercus agrifolia</i>	coast live oak	R or MPF
<i>Salix lasiolepis</i>	arroyo willow	R
<i>Salix scouleriana</i>	scouler's willow	R

MPF = Monterey Pine Forest

R = Riparian Forest

**Table 9. Recommended Grass Varieties for Lawn
Planting at the POM and OMC,
Monterey County, California**

Tall Fescue (<i>Restuca elatior</i>) Kind	Variety	Seeding Rate (pounds per 1,000 sq. ft.)
		10
Tall Fescue	‘Adventure’	10
Tall Fescue	‘Wrangler’	10
Tall Fescue	‘Taurus’	10
Tall Fescue	‘Earthsave’	10
Dwarf Fescue	‘Bonsai’	10
Dwarf Fescue	‘Twilight’	10
Dwarf Fescue	‘Avanti’	10

**Table 10. Species Suitable for Planting in Improved Grounds at the
POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced
Perennials		
<i>Achillea millefolium</i>	yarrow	N
<i>Agapanthus</i> sp.	lily-of-the-Nile	I
<i>Agave</i> sp.	agave	I
<i>Aloe</i> sp.	aloe	I
<i>Amaryllis belladonna</i>	pink ladies	I
<i>Crassula</i> sp.	stonecrop	I
<i>Dietes</i> sp.	fortnight iris	I
<i>Echeveria</i> sp.	hens and chicks	I
<i>Iris</i> ‘Pacific Coast Hybrids’	iris	N/I
<i>Lavandula</i> sp.	lavender	I
<i>Leonotis leonurus</i>	lion’s tail	I
<i>Pelargonium domesticum</i>	regal geranium	I
<i>Pelargonium hortorum</i>	common geranium	I
<i>Perovskia atriplicifolia</i>	Russian sage	I
<i>Phlomis fruticosa</i>	Jerusalem sage	I
<i>Phormium tenax</i>	New Zealand flax	I
<i>Romneya coulteri</i>	fried-egg flower	N
<i>Salvia leucantha</i>	Mexican bush sage	I
<i>Santolina chamaecyparissus</i>	santolina	I
<i>Verbena</i> sp.	verbena	I
<i>Epilobium canum</i>	California fuchsia	N
Groundcovers		
<i>Fragaria chiloensis</i>	beach strawberry	N
<i>Fragaria vesca</i>	wood strawberry	N
<i>Rosmarinus officinalis</i> ‘prostratus’	rosemary	I
<i>Salvia sonomensis</i>	creeping sage	N/I
<i>Satureja douglasii</i>	yerba buena	N
Shrubs		
<i>Abelia grandiflora</i>	glossy abelia	I
<i>Arctostaphylos</i> h. hookeri	Hooker’s manzanita	N

**Table 10. Species Suitable for Planting in Improved Grounds at the
POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced
<i>Arctostaphylos pumila</i>	sandmat manzanita	N
<i>Ceanothus dentatus</i>	tooth-leaf ceanothus	N
<i>Ceanothus thyrsiflorus</i>	Blue blossom	N
<i>Cistus</i> sp.	Rockrose	I
<i>Dodonea viscosa</i>	hopseed bush	I
<i>Escallonia exoniensis</i> 'Fradesii'	Frades' escallonia	I
<i>Escallonia rubra</i>	red escallonia	I
<i>Garrya elliptica</i>	silk tassel	N
<i>Gaultheria shallon</i>	salal	N
<i>Hakea laurina</i>	sweet hakea	I
<i>Heteromeles arbutifolia</i>	toyon	N
<i>Ilex aquifolium</i>	English holly	I
<i>Juniperus</i> sp.	juniper	I
<i>Laurus nobilis</i>	Grecian bay	I
<i>Lavatera bicolor</i>	bicolor tree mallow	I
<i>Lavatera thuringaceae</i>	tree mallow	I
<i>Lonicera involucrata</i>	twinberry	N
<i>Mimulus aurantiacus</i>	bush monkeyflower	N
<i>Myrica californica</i>	California wax myrtle	N
<i>Nandina domestica</i>	heavenly bamboo	I
<i>Nerium oleander</i>	oleander	I
<i>Pittosporum crassifolium</i>	white pittosporum	I
<i>Podocarpus macrophyllus</i>	yew pine	I
<i>Pyracantha fortuneana</i>	firethorn	I
<i>Raphiolepis</i> sp.	Indian hawthorn	I
<i>Rhamnus alaternus</i>	Italian buckthorn	I
<i>Rhamnus californica</i>	California coffeeberry	N
<i>Rhus integrifolia</i>	lemonadeberry	N/I
<i>Rosa californica</i>	California rose	N
<i>Rosa gymnocarpa</i>	woodrose	N
<i>Rosmarinus officinalis</i>	rosemary	I

**Table 10. Species Suitable for Planting in Improved Grounds at the
POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced
<i>Salvia clevelandii</i>	Cleveland's salvia	N
<i>Salvia greggii</i>	Mexican sage	I
<i>Salvia mellifera</i>	black sage	N
<i>Sollya heterophylla</i>	Australian bluebell creeper	I
<i>Taxus</i> sp.	yew	I
<i>Trichostema lanatum</i>	woolly bluecurls	N/I
<i>Vaccinium ovatum</i>	California huckleberry	N
<i>Westringia rosmariniformis</i>	westringia	I
<i>Xylosma congestum</i> .	shiny green xylosma	I
Vines		
<i>Bougainvillea</i> sp.	bougainvillea	I
<i>Wisteria sinensis</i>	Chinese wisteria	I
<i>Tecomaria capensis</i>	Cape honeysuckle	I
<i>Trachelospermum jasminoides</i>	star jasmine	I
<i>Vitis californica</i>	California wild grape	N
Trees		
<i>Aesculus californica</i>	buckeye	N
<i>Arbutus</i> 'Marina'	red-flowering madrone	I
<i>Arbutus menziesii</i>	madrone	N
<i>Arbutus unedo</i>	strawberry tree	I
<i>Cupressus macrocarpa</i>	Monterey cypress	N/I
<i>Eucalyptus ficifolia</i>	red flowering gum	I
<i>Lyonothamnus floribundus</i>	Catalina ironwood	N/I
<i>Myoporum laetum</i>	myoporum	I
<i>Olea europaea</i>	olive	I
<i>Pinus muricata</i> .	bishop pine	N
<i>Pinus radiata</i>	Monterey pine	N
<i>Quercus agrifolia</i>	coast live oak	N
<i>Quercus ilex</i>	holly oak	I
<i>Schinus molle</i>	California pepper	I

**Table 10. Species Suitable for Planting in Improved Grounds at the
POM and OMC, Monterey County, California**

Scientific Name	Common Name	Native / Introduced
<i>Schinus terebinthifolius</i>	Brazilian pepper	I
<i>Sequoia sempervirens</i>	coast redwood	N/I

N/I = Native to California but Introduced to the Installation

**Table 11. Invasive Species that Should be Avoided at the
POM and OMC,
Monterey County, California**

Scientific Name	Common Name	Recommended Eradication Method
Grasses		
<i>Cortaderia jubata</i>	pampas grass (jubata grass)	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Cortaderia selloana</i>	pampas grass	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Pennisetum clandestinum</i>	kikuyu grass	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Pennisetum setaceum</i>	fountain grass	mechanical removal (hand tools or equipment) or systemic herbicide
Forbs		
<i>Allium triquetrum</i>	three square onion	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Arctotis stoechefolia</i>	African daisy	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Carpobrotus edulis</i>	African iceplant	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Tropaeolum majus</i>	garden nasturtium	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Vinca major</i>	periwinkle	mechanical removal (hand tools or equipment) or systemic herbicide
Shrubs		
<i>Cytisus scoparius</i>	Scotch broom	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Genista monspessulana</i>	French broom	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Spartium junceum</i>	Spanish broom	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Ulex europaeus</i>	gorse	mechanical removal (hand tools or equipment) or systemic herbicide
Trees		
<i>Acacia decurrens</i>	green wattle	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Acacia longifolia</i>	Sydney golden wattle	mechanical removal; remove stumps or treat with a systemic herbicide

**Table 11. Invasive Species that Should be Avoided at the
POM and OMC,
Monterey County, California**

Scientific Name	Common Name	Recommended Eradication Method
<i>Acacia melanoxydon</i>	black wood acacia	mechanical removal; remove stumps or treat with a systemic herbicide
<i>Ailanthus altissima</i>	tree of heaven	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Albizia lophantha</i>	plume acacia	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Eucalyptus globulus</i>	bluegum eucalyptus	mechanical removal; remove stumps or treat with a systemic herbicide (note: trees supporting raptor nests should be retained)
Vines		
<i>Hedera helix</i>	English ivy	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Muehlenbeckia complexa</i>	mattress vine	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Rubus discolor</i>	Himalayan blackberry	mechanical removal (hand tools or equipment) or systemic herbicide
<i>Senecio mikanioides</i>	German ivy	mechanical removal (hand tools or equipment) or systemic herbicide

**Table 12. Scheduled Grounds
Maintenance Service – Improved Grounds
POM and OMC,
Monterey County, California**

Task	Time of Year	Frequency
Mowing	April 1-September 30	weekly at 6-8 day intervals.
	October 1 - March 31	12-16 day intervals (every other week)
Trimming and Pruning	April 1-September 30	weekly at 6-8 day intervals
Edging	All	Monthly
Irrigating	All	As needed
Weed Removal		
Lawns & Groundcover	During the months of February, May, August & November	90-95 day intervals
Paved Surfaces and Sidewalks	During the months of February, May, August & November	90-95 day intervals
Shrub beds	All	Monthly\28-32 day intervals
Lawn Aeration	During February, May & August	90-95 day intervals
Fertilization		
Lawns	During March, Jun and Sep	90-95 day intervals
Shrubs	During March, May, July and Sep	55-60 day intervals
Shrub Maintenance	During the months of February, April, Jun, August,, October, and December	55-60 day intervals

**Table 13. Scheduled Grounds
Maintenance Service – Semi-Improved Grounds
POM and OMC,
Monterey County, California**

Task	Time of Year	Frequency
Mowing	During the months of February, April, June, August, October and December	55-60 day intervals
Trimming and Pruning	During the months of February, April, June, August, October and December	55-60 day intervals
Edging	During the months of February, April, June, August, October and December	55-60 day intervals
Weed Removal		
Lawns and Groundcover	During the months of February, May, August & November	90-95 day intervals
Paved Surfaces and Sidewalks	During the months of February, May, August & November	90-95 day intervals
Fertilization		
Shrubs	During March, May, July and September	55-60 day intervals
Debris Removal	During the months of January, March, May, Jul, November	55-60 day intervals

**Table 14. List of Wildlife Species Potentially Occurring at the POM
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
BIRDS (AVES)	
Hawks and Falcons (Falconiformes)	
<i>Accipiter striatus</i>	Sharp-shinned hawk
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Cathartes aura</i>	Turkey vulture
<i>Elanus caeruleus</i>	White-tailed kite
<i>Accipiter cooperii</i>	Cooper's hawk
<i>Buteo lineatus</i>	Red-shouldered hawk
<i>Falco sparverius</i>	American kestrel
<i>Circus cyaneus</i>	Northern harrier
Shorebirds and Gulls (Charadriiformes)	
<i>Charadrius vociferus</i>	Killdeer
<i>Larus argentatus</i>	Herring gull
<i>Larus delawarensis</i>	Ring-billed gull
<i>Larus californicus</i>	California gull
<i>Larus occidentalis</i>	Western gull
<i>Larus glaucescens</i>	Glaucous-winged gull
Pigeons and Doves (Columbiformes)	
<i>Columbia livia</i>	Rock dove
<i>Zenaida macroura</i>	Mourning dove
<i>Columba fasciata</i>	Band-tailed pigeon
Swifts and Hummingbirds (Apodiformes)	
<i>Calypte anna</i>	Anna's hummingbird
<i>Aeronautes saxatalis</i>	White-throated swift
<i>Selasphorus sasin</i>	Allen's hummingbird
Kingfishers, Woodpeckers and Relatives (Coraciiformes)	
<i>Melanerpes formicivorus</i>	Acorn woodpecker
<i>Colaptes auratus</i>	Northern flicker
<i>Picoides nuttallii</i>	Nuttall's woodpecker
<i>Picoides pubescens</i>	Downy woodpecker
<i>Picoides villosus</i>	Hairy woodpecker
Perching Birds (Passeriformes)	

**Table 14. List of Wildlife Species Potentially Occurring at the POM
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
<i>Cyanocitta stelleri</i>	Steller's jay
<i>Aphelocoma coerulescens</i>	Scrub jay
<i>Corvus brachyrhynchos</i>	American crow
<i>Sitta pygmaea</i>	Pygmy nuthatch
<i>Turdus migratorius</i>	American robin
<i>Sturnus vulgaris</i>	European starling
<i>Dendroica townsendi</i>	Townsend's warbler
<i>Pipilo erythrophthalmus</i>	Rufous-sided towhee
<i>Junco hyemalis</i>	Dark-eyed junco
<i>Sturnella neglecta</i>	Western meadowlark
<i>Troglodytes aedon</i>	House wren
<i>Mimus polyglottos</i>	Northern mockingbird
<i>Contopus borealis</i>	Olive-sided flycatcher
<i>Tachycineta bicolor</i>	Tree swallow
<i>Hirundo pyrrhonota</i>	Cliff swallow
<i>Hirundo rustica</i>	Barn swallow
<i>Pica nuttalli</i>	Yellow-billed magpie
<i>Parus inornatus</i>	Plain titmouse
<i>Parus rufescens</i>	Chestnut-backed chickadee
<i>Psaltriparus minimus</i>	Bushtit
<i>Sialia mexicana</i>	Western bluebird
<i>Catharus ustulatus</i>	Swainson's thrush
<i>Catharus guttatus</i>	Hermit thrush
<i>Chamaea fasciata</i>	Wrentit
<i>Dendroica coronata</i>	Yellow-rumped warbler
<i>Passerculus sandwichensis</i>	Savannah sparrow
<i>Passerella iliaca</i>	Fox sparrow
<i>Melospiza melodia</i>	Song sparrow
<i>Agelaius phoeniceus</i>	Red-winged blackbird
<i>Pipilo crissalis</i>	California towhee
<i>Carpodacus purpureus</i>	Purple finch
<i>Carpodacus mexicanus</i>	House finch
<i>Passer domesticus</i>	House sparrow
Pheasants and Relatives (Galliformes)	
<i>Phasianus colchicus</i>	Ring-necked pheasant
<i>Cillipepla californica</i>	California quail
<i>Meleagris gallopavo</i>	Wild turkey
Owls (Strigiformes)	
<i>Tyto alba</i>	Barn owl
<i>Otus kennicottii</i>	Western screech-owl

**Table 14. List of Wildlife Species Potentially Occurring at the POM
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
<i>Bubo virginianus</i>	Great horned owl
MAMMALS (MAMMALIA)	
Opossums (Marsupialia)	
<i>Didelphis virginiana</i>	Virginia opossum
Rabbits and Hares (Lagomorpha)	
<i>Lepus californicus</i>	Black-tailed hare
<i>Sylvilagus bachmani</i>	Brush rabbit
<i>Sylvilagus audubonii</i>	Desert cottontail
Carnivores (Carnivora)	
<i>Felis sylvestris</i>	Domestic (feral) cat
<i>Procyon lotor</i>	Raccoon
<i>Taxidea taxus</i>	American badger
<i>Canis latrans</i>	Coyote
<i>Urocyon cinereoargenteus</i>	Gray fox
<i>Mephitis mephitis</i>	Striped skunk
<i>Spilogale gracilis</i>	Western spotted skunk
<i>Lynx rufus</i>	bobcat
<i>Mustela frenata</i>	Long-tailed weasel
Pigs and Deer (Artiodactyla)	
<i>Odocoileus hemionus columbianus</i>	Black-tailed deer
<i>Sus scrofa*</i>	Wild boar
Squirrels, Rats, Mice, and Relatives (Rodentia)	
<i>Sciurus griseus</i>	Western gray squirrel
<i>Thomomys bottae</i>	Botta's pocket gopher
<i>Peromyscus boylei</i>	Brush mouse
<i>Rattus norvegicus</i>	Norway rat
<i>Spermophilus beecheyi</i>	California ground squirrel
<i>Perognathus californicus</i>	California pocket mouse
<i>Reithrodontomys megalotis</i>	Western harvest mouse
<i>Mus musculus</i>	House mouse
<i>Peromyscus maniculatus</i>	Deer mouse

**Table 14. List of Wildlife Species Potentially Occurring at the POM
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
REPTILES (REPTILIA)	
Lizards and Snakes (Squamata)	
<i>Sceloporus occidentalis</i>	Western fence lizard
<i>Eumeces skiltonianus</i>	Western skink
<i>Gerrhonotus multicarinatus</i>	Southern alligator lizard
<i>Coluber constrictor</i>	Racer
<i>Pituophis melanoleucus</i>	Gopher snake
<i>Thamnophis sirtalis</i>	Common garter snake
<i>Crotalus viridis</i>	Western rattlesnake
AMPHIBIANS (AMPHIBIA)	
Salamanders (Caudata)	
<i>Taricha torosa</i>	California newt
<i>Batrachoseps attenuatus</i>	California slender salamander
<i>Aneides lugubris</i>	Arboreal salamander
Toads and Frogs (Salientia)	
<i>Bufo boreas</i>	Western toad
<i>Hyla regilla</i>	Pacific treefrog
*	Reported by POM staff

**Table 15. List of Wildlife Species Potentially Occurring at OMC
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
BIRDS (AVES)	
Vultures, Hawks, and Falcons (Falconiformes)	
<i>Cathartes aura</i>	Turkey vulture
<i>Elanus leucurus</i>	White-tailed kite
<i>Accipiter striatus</i>	Sharp-shinned hawk
<i>Accipiter cooperii</i>	Cooper's hawk
<i>Buteo lineatus</i>	Red-shouldered hawk
<i>Buteo jamaicensis</i>	Red-tailed hawk
<i>Falco sparverius</i>	American kestrel
<i>Circus cyaneus</i>	Northern harrier
Megapodes, Curassows, Pheasants, and Relatives (Galliformes)	
<i>Cillipepla californica</i>	California quail
<i>Meleagris gallopavo</i>	Wild turkey
Shorebirds, Gulls, and Relatives (Charadriiformes)	
<i>Charadrius vociferus</i>	Killdeer
<i>Larus delawarensis</i>	Ring-billed gull
<i>Larus californicus</i>	California gull
<i>Larus argentatus</i>	Herring gull
<i>Larus occidentalis</i>	Western gull
<i>Larus glaucescens</i>	Glaucous-winged gull
<i>Larus thayeri</i>	Thayer's gull
Pigeons and Doves (Columbiformes)	
<i>Columba livia</i>	Rock dove
<i>Columba fasciata</i>	Band-tailed pigeon
<i>Zenaida macroura</i>	Mourning dove
Cuckoos and Relatives (Cuculiformes)	
<i>Geococcyx californianus</i>	Greater roadrunner
Owls (Strigiformes)	
<i>Tyto alba</i>	Barn owl
<i>Otus kennicottii</i>	Western screech-owl
<i>Bubo virginianus</i>	Great horned owl
<i>Glaucidium gnoma</i>	Northern pygmy-owl

**Table 15. List of Wildlife Species Potentially Occurring at OMC
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
<i>Phalaenoptilus nuttallii</i>	Common poorwill
Swifts and Hummingbirds (Apodiformes)	
<i>Aeronautes saxatalis</i>	White-throated swift
<i>Calypte anna</i>	
<i>Selasphorus sasin</i>	Allen's hummingbird
Kingfishers, Woodpeckers and Relatives (Coraciiformes)	
<i>Melanerpes formicivorus</i>	Acorn woodpecker
<i>Picoides nuttallii</i>	Nuttall's woodpecker
<i>Picoides pubescens</i>	Downy woodpecker
<i>Picoides villosus</i>	Hairy woodpecker
<i>Colaptes auratus</i>	Northern flicker
Perching birds (Passeriformes)	
<i>Contopus borealis</i>	Olive-sided flycatcher
<i>Sayornis nigricans</i>	Black phoebe
<i>Sayornis saya</i>	Say's phoebe
<i>Eremophila alpestris</i> ssp	Horned lark
<i>Tachycineta bicolor</i>	Tree swallow
<i>Hirundo pyrrhonota</i>	Cliff swallow
<i>Hirundo rustica</i>	Barn swallow
<i>Aphelocoma coerulescens</i>	Scrub jay
<i>Pica nuttalli</i>	Yellow-billed magpie
<i>Corvus brachyrhynchos</i>	American crow
<i>Parus rufescens</i>	Chestnut-backed chickadee
<i>Parus inornatus</i>	Plain titmouse
<i>Psaltriparus minimus</i>	Bushtit
<i>Sitta pygmaea</i>	Pygmy nuthatch
<i>Certhia americana</i>	Brown creeper
<i>Thryomanes bewickii</i>	Bewick's wren
<i>Troglodytes aedon</i>	House wren
<i>Regulus calendula</i>	Ruby-crowned kinglet
<i>Sialia mexicana</i>	Western bluebird
<i>Catharus ustulatus</i>	Swainson's thrush
<i>Catharus guttatus</i>	Hermit thrush
<i>Turdus migratorius</i>	American robin
<i>Chamaea fasciata</i>	Wrentit
<i>Mimus polyglottos</i>	Northern mockingbird
<i>Toxostoma redivivum</i>	California thrasher
<i>Lanius ludovicianus</i>	Loggerhead shrike

**Table 15. List of Wildlife Species Potentially Occurring at OMC
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
<i>Sturnus vulgaris</i>	European starling
<i>Vireo huttoni</i>	Hutton's vireo
<i>Vireo gilvus</i>	Warbling vireo
<i>Vermivora celata</i>	Orange-crowned warbler
<i>Dendroica coronata</i>	Yellow-rumped warbler
<i>Dendroica townsendi</i>	Townsend's warbler
<i>Wilsonia pusilla</i>	Wilson's warbler
<i>Pheucticus melanocephalus</i>	Black-headed grosbeak
<i>Pipilo erythrophthalmus</i>	Spotted towhee
<i>Pipilo crissalis</i>	California towhee
<i>Passerculus sandwichensis</i>	Savannah sparrow
<i>Passerella iliaca</i>	Fox sparrow
<i>Melospiza melodia</i>	Song sparrow
<i>Zonotrichia atricapilla</i>	Golden-crowned sparrow
<i>Zonotrichia leucophrys</i>	White-crowned sparrow
<i>Junco hyemalis</i>	Dark-eyed junco
<i>Agelaius phoeniceus</i>	Red-winged blackbird
<i>Sturnella neglecta</i>	Western meadowlark
<i>Euphagus cyanocephalus</i>	Brewer's blackbird
<i>Molothrus ater</i>	Brown-headed cowbird
<i>Carpodacus purpureus</i>	Purple finch
<i>Carpodacus mexicanus</i>	House finch
<i>Carduelis psaltria</i>	Lesser goldfinch
<i>Carduelis tristis</i>	American goldfinch
<i>Passer domesticus</i>	House sparrow
<i>Contopus sordidulus</i>	Western wood-pewee
<i>Empidonax difficilis</i>	Pacific slope flycatcher
<i>Myiarchus cinerascens</i>	Ash-throated flycatcher
<i>Tachycineta thalassina</i>	Violet-green swallow
<i>Stelgidopteryx serripennis</i>	Northern rough-winged swallow
<i>Sitta carolinensis</i>	White-breasted nuthatch
<i>Troglodytes troglodytes</i>	Winter wren
<i>Regulus satrapa</i>	Golden-crowned kinglet

MAMMALS (MAMMALIA)

Opossums and Kangaroos (Marsupialia)

<i>Didelphis virginiana</i>	Virginia opossum
-----------------------------	------------------

Shrews and Moles (Insectivora)

Final

**Table 15. List of Wildlife Species Potentially Occurring at OMC
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
<i>Scapanus latimanus</i>	Broad-footed mole
Rabbits, Hares, and Pikas (Lagomorpha)	
<i>Sylvilagus audubonii</i>	Desert cottontail
<i>Lepus californicus</i>	Black-tailed hare
Squirrels, Rats, Mice, and Relatives (Rodentia)	
<i>Spermophilus beecheyi</i>	California ground squirrel
<i>Thomomys bottae</i>	Botta's pocket gopher
<i>Perognathus californicus</i>	California pocket mouse
<i>Reithrodontomys megalotis</i>	Western harvest mouse
<i>Reithrodontomys megalotis distichlis</i>	Salinas harvest mouse
<i>Peromyscus californicus</i>	California mouse
<i>Neotoma fuscipes luciana</i>	Monterey dusky-footed woodrat
<i>Microtus californicus</i>	California vole
<i>Dipodomys heermanni</i>	Heermann's kangaroo rat
<i>Peromyscus maniculatus</i>	Deer mouse
<i>Peromyscus boylii</i>	Brush mouse
Carnivores (Carnivora)	
<i>Canis latrans</i>	Coyote
<i>Urocyon cinereoargenteus</i>	Gray fox
<i>Vulpes vulpes</i>	Red fox
<i>Procyon lotor</i>	Raccoon
<i>Mustela frenata</i>	Long-tailed weasel
<i>Taxidea taxus</i>	American badger
<i>Spilogale gracilis</i>	Western spotted skunk
<i>Mephitis mephitis</i>	Striped skunk
<i>Felis concolor</i>	Mountain lion
<i>Lynx rufus</i>	Bobcat
Pigs, deer and Relatives (Artiodactyla)	
<i>Odocoileus hemionus columbianus</i>	Black tailed deer
<i>Sus scrofa</i>	Feral pig
TURTLES, LIZARDS, AND SNAKES (REPTILIA)	
Lizards and Snakes (Squamata)	
<i>Sceloporus occidentalis</i>	Western fence lizard

**Table 15. List of Wildlife Species Potentially Occurring at OMC
POM and OMC,
Monterey County, California**

Scientific Name	Common Name
<i>Phrynosoma coronatum</i>	Coast horned lizard
<i>Eumeces skiltonianus</i>	Western skink
<i>Gerrhonotus multicarinatus</i>	Southern alligator lizard
<i>Anniella pulchra pulchra</i>	California legless lizard
<i>Anniella pulchra nigra</i>	Black legless lizard
<i>Coluber constrictor</i>	Racer
<i>Masticophis lateralis</i>	California whipsnake
<i>Pituophis melanoleucus</i>	Gopher snake
<i>Thamnophis sirtalis</i>	Common garter snake
<i>Crotalus viridis helleri</i>	Western rattlesnake

SALAMANDERS, TOADS, AND FROGS (AMPHIBIA)

Salamanders (Caudata)

<i>Batrachoseps attenuatus</i>	California slender salamander
<i>Aneides lugubris</i>	Arboreal salamander

Toads and Frogs (Salientia)

<i>Scaphiopus hammondi</i>	Western spadefoot
<i>Bufo boreas</i>	Western toad
<i>Hyla regilla</i>	Pacific treefrog

FIGURES

Appendix A
Environmental Assessment

Appendix B
Endangered Species Management Plan

Make Tabs for:

T&E Species

Erosion Control

OMC Firebreaks

Landscaping

Best Management Practices

Pitch Canker Equipment

Suitable Plantings (Table 8)

Invasive Plants (Table 11)

Grounds Maintenance (Table 12)