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

November 2008

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November 2008

APPROVAL

This Integrated Natural Resources Management Plan Five-Year Review Revision meets the requirements of the Sikes Act (16 USC. 670a *et. Seq.*), as amended.

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EXECUTIVE SUMMARY

Pursuant to the Sikes Act of 1960, as amended, US Army Integrated Natural Resource Management Plans (INRMP) must be reviewed "as to operation and effect" to determine if existing INRMPs are being implemented to meet the requirements of the Sikes Act and contribute to the conservation and rehabilitation of natural resources on military installations (US Army, 2006a). The 2006 US Army Guidelines for the Implementation of the Sikes Act Improvement Act state that "reviews for operation and effect must be performed no less frequently than every five years." Therefore, this document constitutes the results of a five-year review of the 2001 Final Integrated Natural Resource Management Plan for the Presidio of Monterey (POM) and Ord Military Community (OMC).

The 2001 INRMP and this 2008 INRMP are 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. They discuss the relationship between the installation's military mission and its natural resources. In addition, the plans address 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 plans address stewardship of natural resources on an ecosystem scale and provide a means for the Army to protect biodiversity and provide high quality military readiness consistent with the military mission. The plans demonstrate that the Army's military mission and natural resource management goals on the POM and OMC are compatible.

The purpose of this document is to update the existing INRMP to include new mission activities and management strategies that may affect natural resources, revisit natural resource management prescriptions described in 2001 to determine efficacy, and update natural resource species lists and locations to include new survey data. It also addresses comments made by the US Fish and Wildlife Service (FWS) on the 2001 INRMP and includes an appendix on management of natural resources on the Satellite Communication Station at Camp Roberts, a subinstallation. The 2008 INRMP also includes a list of priority projects to be accomplished contingent upon availability of funding (Table 15).

Minor updates to the 2001 INRMP include: the addition of plan objectives, management of special status species on OMC, Yadon's piperia critical habitat exemption, identification of species at risk (SAR), forest management in the Huckleberry Hill Nature Preserve, environmentally and economically beneficial landscape practices, noxious weed management control plan, migratory bird conservation measures and bird list (Table 14), effects of contaminants on fish and wildlife, and the revision of maps of Ord Military Community to reflect the 2007 land exchange.

In addition, appendices C, D, E, F, and G have been added in response to FWS, City of Monterey and Army Environmental Command (AEC) comments. Appendix C contains the Huckleberry Hill Management Plan, Appendix D contains the 2005 Habitat Assessment Report Flora and Fauna Baseline Study of the Presidio of Monterey, Appendix E contains the American National Standards Institute Pruning Standards, Appendix F contains a description of subinstallation management and the Satellite Communication Facility Biological Opinion, and Appendix G contains the Guidance for Presidential Memorandum on Environmentally and Economically

Beneficial Landscape Practices. Appendix B, the Endangered Species Management Plan, has also been updated to include recent survey data on Yadon's piperia population size and plant locations.

This document has been prepared in accordance with Army Regulation (AR) 200-1 (US Army, 2007), the Guidelines to Prepare Integrated Natural Resources Management Plans for Army Installations and Activities (US Army, 1997b) and the Army Guidance for Implementation of the Sikes Act Improvement Act (US Army, 2006a).

PART I

GENERAL

1.0 BACKGROUND

The 2001 INRMP was signed on December 5, 2001. The INRMP utilized information collected during planning level surveys (landform, soil, biota, and water) that were conducted from 1990-2000. The 2008 INRMP updates this information with data collected from 2001-2006.

During preparation of the 2001 document, 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 Ord Military Community, OMC). The 2001 INRMP covered only those OMC lands being retained by the Army. Land areas identified for non-military reuse, the former Fort Ord, were not included and continue to be managed under the Installation-Wide Multispecies Habitat Management Plan for the Former Fort Ord, California (US Army, 1997a). The 2001 INRMP and this 2008 INRMP are designed to guide the management of natural resources at the Presidio of Monterey (POM) and OMC. Figures 1, 2, and 3 depict the regional and local context of the POM and OMC.

INRMPs are comprehensive plans for the management of all installation natural resources. They are prepared to assist installation commanders in their efforts to conserve and rehabilitate resources consistent with the use of military installations to ensure the preparedness of the Armed Forces (US Army, 2006a). The installation commander, garrison commander or other individual responsible for management of the installation, as authorized by the Army, will approve the installation's INRMP after receiving written concurrence from the next higher level. INRMPs are prepared in cooperation with the FWS and State Fish and Wildlife agencies (California Department of Fish and Game, CDFG). Mutual agreement among the agencies is the goal of the plan.

1.1 Regulatory Requirements

1.1.1 Army Regulation 200-1

As authorized by Congress in the Sikes Act, the Army is required to develop and maintain an INRMP for each Army installation. AR 200-1 (US Army, 2007a) 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.

The natural resource 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 resource 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), considered the INRMP Endangered Species Management Component (ESMC), and Endangered Species Act, are consistent; and
- The Plan is compatible with the Installation Master Plan, Pest Management Plan, and Master Training Schedule and developed in concert with other installation directorates and agencies as applicable.

The format of the 2001 INRMP and 2008 INRMP for the POM and OMC generally follows the Guidelines to Prepare Integrated Natural Resources Management Plans for Army Installations and Activities (US Army Environmental Center, 1997). The INRMP is divided into five parts. These parts are summarized below.

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. Part III has been updated to describe forest management of unimproved grounds.

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 the 2001 INRMP, this section was abbreviated and focused toward the limited fish and wildlife resources present at the POM and OMC. This section has been expanded to address migratory birds and species at risk.

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 the 2001 INRMP, Part V was abbreviated because the POM and OMC contain minimal outdoor recreation resources. The installation manages cultural resources under an approved Integrated Cultural Resource Management Plan (ICRMP).

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. The 2001 INRMP and this 2008 INRMP are consistent with applicable legal requirements as identified below. The following list, although

not exhaustive, includes the majority of the legal requirements for natural resource management at the Presidio of Monterey:

- Sikes Act of 1960 as amended;
- National Environmental Policy Act (NEPA) of 1969;
- Endangered Species Act (ESA) of 1973, as amended;
- AR 200-1, Environmental Protection and Enhancement;
- Presidio of Monterey Regulation 870-2 (Cultural Resources);
- Guidelines to Prepare INRMPs for Army Installations and Activities 1997;
- National Historic Preservation Act (NHPA) of 1966 (as amended through 1992);
- Archeological Resources Protection Act (ARPA) of 1979;
- The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the treatment of Cultural Landscapes 1996
- 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 (FIFRA) of 1996;
- Protection of Wetlands, 1977, Executive Order 11990;
- Migratory Bird Treaty Act (MBTA) of 1918, as amended;
- Guidelines for Implementing the Sikes Act Improvement Act (SAIA), 2006.
- Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management (Office of the President, 2007)

1.1.3 Army Guidelines

In 1997, the Preparation Guidelines for Integrated Natural Resources Management Plans (US Army Environmental Center, 1997) were distributed by the US Army for use in preparing INRMPs. The purpose of the document was to provide natural resources managers at Army installations guidance on preparing INRMPs to ensure consistency with federal laws, Army

policy, and established natural resources management practices. In addition, the US Army has established guidelines for implementing the Sikes Act Improvement Act (US Army, 2006a) and the Department of Defense (DOD) has created a US Army INRMP template (US Army, 2006b). The Guidance for Implementing the Sikes Act Improvement Act memorandum was used extensively during the revision process, but since the 2001 INRMP did not require a major revision, the 2008 INRMP did not follow the 2006 INRMP template. The new format will be used as prescribed during future five-year review revisions.

INRMP reviews will be conducted annually in order to keep the plan current. While the 2006 US Army Guidelines for the Implementation of The Sikes Act Improvement Act state that "reviews for operation and effect must be performed no less frequently than every five years" (US Army, 2006a), Installation Management Command, West Region (IMCOM-W) Guidance for Integrated Natural Resources Management Plans (US Army, 2007b) requires that "installations invite annual feedback from US Fish and Wildlife Service (FWS) and states on the effectiveness of the INRMP. Annual reviews will verify accomplishments and assess the need for the degree of INRMP revision required." Page revisions will be made when major revisions are unnecessary. Information that needs no revision within the original plan (e.g. soils, climate, land use history, and geography) should be carried forward to the revised plan.

1.1.4 Agency Cooperation

United States Code (USC) 16, Section 670(a) requires cooperation among the Army installation, the FWS, and the host state for planning, maintaining, and coordinating fish and wildlife management activities on the installation. The FWS and California Department of Fish and Game (CDFG) were involved during the creation of both the 2001 INRMP and 2008 INRMP.

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 OMC lands are the only lands that have been 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 (US 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 (US Army, 1998)

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 US 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 (DLI) (US Army, 1995c; J. Bonds et al, 1986).

Several hundred thousand 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 (US Army, 1995c).

1.3.2 OMC

The OMC consists of lands that were 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 (US 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 caretaker's 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

The 2001 INRMP and this 2008 INRMP are 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. They discuss the relationship between each installation's military mission and its natural resources. In addition, the plans address 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 plans address stewardship of natural resources on an ecosystem scale and provide a means for the Army to protect biodiversity and provide high quality military readiness consistent with the military mission. The plans demonstrate 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 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 (US 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 (US Army, 1995c):

US 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 Center for Information Dominance Detachment (CIDD). The mission of the CIDD 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 (Interpreter).

1.4.2 OMC

The OMC is on land formerly occupied by Fort Ord. 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.

1.5 Plan Objectives

This Integrated Natural Resource Management Plan was designed with the overarching objective of conserving and enhancing the natural resources of the Presidio of Monterey while supporting the Installation mission, meeting stewardship requirements and enhancing the quality of life for Department of Defense (DOD) personnel (US Army, 1997c). It is an integrated plan because it will be implemented in concert with other POM planning documents such as the 1984 Master Plan, 2004 Installation Pest Management Plan, and the 2004 Integrated Cultural Resource Management Plan (ICRMP). This 2008 INRMP retains and clarifies the plan objectives from the 2001 INRMP that were described in the 2001 Environmental Assessment (US Army, 2001; Appendix A).

Plan objectives are:

- Describe procedures for control of soil erosion related to activities such as road grading, water bars and cutouts, vehicle access, and vegetation removal;
- Ensure proper management of storm drain runoff;
- Outline fire prevention activities including the creation and maintenance of firebreaks, reduction of fire hazards and maintenance of fire control standards;
- Identify landscaping opportunities at the POM and OMC;
- Ensure the consideration and protection of special status species during development planning;
- Set guidelines for maintenance and management of existing landscaping;
- Develop guidelines for installing new landscaping or expanding or enhancing existing landscaping, emphasizing use of drought tolerant species indigenous to the Monterey Peninsula;
- Provide sources and standards for plant materials, planting seasons and planting methods;
- Address proper maintenance for lawns, horticultural trees and shrubs and native species;
- Outline pest management activities including methods for addressing animal pests, invasive plants, parasitic plants and fungal infestations;
- Describe appropriate coordination with other federal, state and local agencies;
- Ensure overall protection, proliferation, and success of special status species;
- Preserve wildlife habitat corridors to allow access to natural habitats and support migration patterns of native wildlife species;
- Protect native ecosystems to enhance and maintain native plant and wildlife populations, communities and assemblages;
- Discourage practices that promote the establishment of non-native species and the subsequent displacement of native species;
- Promote recreational nature activities such as hiking and bird watching in the Huckleberry Hill Nature Preserve;
- Retain an aesthetically pleasing natural environment to achieve maximum physical, cultural and spiritual benefits for users within the principles of multiple land use and consistent with the military mission;
- Ensure consideration of natural resource values in the development of plans, projects, and programs that affect those resources;

- Ensure protection of cultural resources, including archaeological sites, historic properties and landscapes, and traditional cultural properties, while conducting natural resource management activities;
- Employ an adaptive management strategy to assess efficacy of the natural resource management program.

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 in the area located between Building 630 and Hilltop Field in a Monterey pine forest, and the Huckleberry Hill Nature Preserve. Land uses on the POM are associated with the DLI 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 historic district, 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 in the historic district provide classrooms, administrative, and support functions for the base mission. The lower POM, site of an historic area and archeological sites, has been leased to the City of Monterey as an historic preserve (US Army, 1995c).

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 with a huckleberry and manzanita understory dominates the vegetative cover. The preserve is currently leased to and managed by the City of Monterey. The preserve is operated with the goal of retaining the forest in a natural state while providing an area for residents to enjoy for future generations (US Army, 1995d; Reid, 1987). Soldier Field, located in the historic district, is also leased to the City of Monterey for recreational use, but is considered part of the improved grounds. Housing units in the historic district were transferred to a private company in 2003 as part of the Residential Communities Initiative (RCI).

2.2 OMC

The OMC is primarily developed and is comprised of improved grounds with limited unimproved buffer areas. Two types of land uses are present at the OMC: residential housing and Army administration/support, as described below and represented in Figure 5.

2.2.1 Residential Housing at OMC

The majority of the OMC is devoted to residential housing for Department of Defense (DOD) personnel (Figure 5). OMC housing was transferred to a private company in 2003 as part of the Residential Communities Initiative. 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 General Jim MooreRoad;
- 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 General Jim Moore Blvd;
- Marshall Park, located east of the General Jim Moore Blvd and south of Gigling Road; and
- Fitch Park, located south of Marshall Park and east of the General Jim Moore Blvd.

2.2.2 Army Administration/Support at OMC

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;
- 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 General Jim Moore Blvd;
- Directorate of Public Works, Environmental Division (DPW-E) and Base Realignment and Closure personnel, located north of Gigling Road and east of the General Jim Moore Blvd;
- Directorate of Public Works located at Eighth Ave and Joe Llyod Way;
- Youth Services Center, the main chapel, and library, located east of the General Jim Moore Blvd and west of the Marshall Park Housing area; and
- Additional facilities for the Directorate of Logistics, Directorate of Morale, Welfare and Recreation, and Shaw contractors.

3.0 EXISTING CONDITIONS AT THE POM AND OMC

This section describes the climate, topography, soils, vegetation types and special status plant species, off-road vehicle use, drainage systems, wetlands and eroded areas at the POM and OMC. It is consistent with the affected environment section of the environmental assessment.

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 61 °F (Western Regional Climate Center, 2007).

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 temperature is 71 °F with average low temperatures of 48 °F (Western Regional Climate Center, 2007). 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 19.80 inches as recorded in Monterey from 1949-2006 (Western Regional Climate Center, 2007). Table 1 contains a summary of Monterey's monthly climate data for the years 1949-2006 (Western Regional Climate Center, 2007).

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 (US 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; US 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; US Army, 1984a; US 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 (US Army, 1984a; US 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 (US 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 (US 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 (flowering plants with non-woody stems such as wildflowers) 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 (US Army, 1992d; US 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 (US Army, 1992d; US Department of Agriculture, 1978).

3.4 Vegetation and Special Status Plant Species

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 (non-native 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 non-native and native trees and shrubs are found at several locations on the POM, including Presidio Knoll. The most common non-natives include blackwood acacia (*Acacia melonoxylon*), Sydney golden wattle (*Acacia longifolia*), French broom (*Genista monspessulana*), and blue gum eucalyptus (*Eucalyptus globulus*). Some of these mixed stands also contain planted or naturally established native Monterey pines (*Pinus radiata*).

Vegetation in the undeveloped Presidio Knoll area consists of a dominant Monterey pine forest. Understory in the Monterey pine community includes mixed grasses and forbs, California huckleberry (*Vaccinium ovatum*), shaggy-bark manzanita (aka woollyleaf manzanita [*Arctostaphylos tomentosa spp tomentosa*]), California coffeeberry (*Rhamnus californica*), coast live oak (*Quercus agrifolia*) and non-native French broom. Invasive French broom is most common along the disturbed edges of dirt roads and walking paths 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 (US 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 (US Army, 1984a). Additional descriptions of vegetation are found in Part II Land Management and Grounds Maintenance and Table 2.

3.4.1.2 Special Status Plant Species

Special status plants 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 1B[1] and 2[2] as updated by CNPS);
- Plants listed by CNPS for which more information is needed to determine their status and plants of limited distribution (List 3[3] and 4[4] as updated by CNPS), which may be included as special status species on the basis of local significance or recent biological information.
- Plant species identified by the US Army as species at risk (SAR). Species at risk are defined as native, regularly occurring species in the United States that are not federally listed under the US Endangered Species Act, but are either (1) candidates for listing under the ESA or (2) critically imperiled or imperiled across their range according to the NatureServe conservation status rank criteria (NatureServe, 2006).

Four special-status plant species occur at the POM: Monterey pine (CNPS List 1B), Hooker's manzanita *(Arctostaphylos hookeri* ssp. *hookeri)* (CNPS List 1B and SAR) small-leaved lomatium *(Lomatium parvifolium)* (CNPS List 4), and Yadon's piperia (aka Yadon's rein orchid [*Piperia yadonii*] (federally endangered and CNPS 1B) (US 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). Within the developed area of the

[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*).

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 (US 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 and other landscaped areas throughout the POM. Overall, the native occurrence of Hooker's manzanita has declined due to habitat loss brought about by coastal development and the suppression of fire (US Army, 1995d). Because of this, the US Army considers Hooker's manzanita a SAR on the Presidio of Monterey.

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 (US Army, 1995d). On the POM, small-leaved lomatium grow in areas that are currently managed as open space, but during the Master Plan revision process, may be designated for development.

Yadon's piperia, a perennial herb in the orchid family, inhabits patches of coastal areas in Monterey County between Elkhorn Slough and the Monterey Peninsula. Yadon's piperia is federally listed as endangered and considered rare or endangered by the CNPS as a List 1B species. 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 or duff and particularly likes acidic soils. 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 is managed in accordance with the POM and OMC Endangered Species Management Plan (Appendix B). It occurs primarily in Monterey pine forest (Figure 13). One population occurs in a relatively open grassy area covered with duff within the Monterey pine forest across from the cemetery and near the barracks at building 630. Smaller populations grow just outside the Huckleberry Hill Preserve boundary fence behind buildings 832 and 650. A few individual plants have also been documented in the Huckleberry Hill Nature Preserve and in the lower POM associated with Monterey pine forest and shrub understory. Yadon's piperia is threatened by facility and parking lot construction, urban development, recreational development, human disturbance, deer herbivory and competition from non-native species (US Army, 1995d; US Army, 2005; US Army, 2007). Managers have made efforts to protect these plants from impacts by creating educational brochures, placing signs within the habitat, and caging individual plants.

On October 18, 2006, the FWS proposed to designate 2,306 acres of land as critical habitat for Yadon's piperia. Presidio of Monterey lands were excluded from designation under Section 4 (a)

(3) of the ESA as amended, because "conservation efforts identified in the ESMP and INRMP provide benefits to Piperia yadonii occurring in habitats within the POM" (FWS, 2006). This exemption carried over to the Designation of Critical Habitat for Piperia yadonii Final Rule published on October 24, 2007 (FWS, 2007).

An Endangered Species Management Plan (ESMP) (US Army, 1999) has been prepared for the POM and reviews of the plan have occurred annually (Appendix B). 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 the ESMP 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 (Appendix C). Small-leaved lomatium has no federal status and is a CNPS List 4 species considered a plant with limited distribution. The existing populations of small-leaved lomatium will be retained and monitored during Yadon's piperia surveys on the POM as funding permits.

3.4.2 OMC

3.4.2.1 General Habitat Types

The OMC lands consist primarily of vegetation associated with disturbed and developed areas of the former Fort Ord (US Army, 1992c). OMC lands, also known as POM Annex lands, were once vegetated by central maritime chaparral. Maritime chaparral is characterized by a wide variety of sclerophyllous (hard, drought-adapted leaf) shrubs, dominated by manzanita, 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. The general habitat type found on OMC is coast live oak woodland. Dominant species include coast live oak and Monterey cypress (*Cupressus macrocarpa*), as well as non-native plantings. Mixed grasses and forbs comprise the understory.

3.4.2.2 Special Status Plant Species

Special status plant species on the OMC are managed in accordance with the Installation-Wide Multispecies Habitat Management Plan (HMP), Fort Ord, California, as amended (US Army, 1997a). The HMP states that, "Lands designated as "Development" have no management restrictions placed upon them as a result of this HMP. The biological resources found on these parcels are not considered essential to the long-term preservation of sensitive species at former Fort Ord. The Biological Opinion (BO) allows for development of these parcels, but it also requires identification of sensitive biological resources within these parcels that may be salvaged for use in restoration activities within reserve areas." In accordance with the HMP and associated Biological Opinion and amendments, OMC lands are managed for development and special status plant species habitat may be disturbed. All efforts will be made to salvage special status plant species during construction activities. The federally threatened Monterey spineflower, therefore, is not addressed in the POM and OMC Endangered Species Management Plan.

Figures 14, 15, 16, and 17 were created from data collected in 1992 for the Flora and Fauna Baseline Study of Fort Ord (US Army, 1992b). These maps indicate that small populations of Monterey spineflower (*Chorizanthe pungens var. pungens*), sandmat Manzanita (*Arctostaphylos pumila*), Monterey ceanothus (*Ceanothus cuneatus var. rigidus*), and virgate eristrum (*Eriastrum virgatum*) may occur on OMC. No recent surveys have been performed to confirm their presence or absence. Monterey spineflower is federally listed as threatened and a CNPS List 1B species; sandmat manzanita is a federal species of concern and a CNPS List 1B species; Monterey ceanothus is a federal species of concern and a CNPS List 4 species; and virgate eriastrum is a CNPS List 4 species (US Army, 1992b). These species are known to occur on neighboring lands that contain intact ecosystems; however, the majority of OMC lands have been disturbed and/or developed and, for the most part, native chapparal species have been replaced by coast live oak woodland, horticultural plantings, and non-native grasses. If, in the future, federally listed species are discovered on OMC lands, they will be managed in accordance with the Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California 1-8-99-F/C-39R (FWS, 1999).

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 (US Army, 1997a). Figure 14 indicates locations where Monterey spineflower was known to occur on the OMC lands in 1992 (US Army, 1992b).

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 (US Army, 1997a). Figure 15 indicates the 1992 location of sandmat manzanita on the OMC lands (US 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 (US Army, 1997a). The land east and southeast of Fitch Park Housing Area east of the General Jim Moore Road and east of the OMC has the highest density of Monterey ceanothus (Figure 16; US Army, 1992b).

Virgate eriastrum occurs east and south of the Fitch Park Housing Area east of the General Jim Moore Road at the OMC (Figure 17). It is afforded no federal or state protection.

3.5 Off-Road Vehicle Use

3.5.1 POM

The POM does not contain areas designated for recreational off-road vehicle use. However, the POM does have a series of unpaved roads that provide access within 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. These roads are maintained by the City of Monterey.

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 (US 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 (US 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. In August 1999, according to the POM Directorate of Public Works (DPW), the current stormwater drainage system was evaluated and assessed by the City of Monterey. The City updated the information regarding the stormwater drainage system and provided DPW with a map showing the locations and types of culverts, drains, and pipes at the POM (Baird, 2007).

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. Discharges are required to conform to the NPDES permit requirements, depending on the type of storm drain discharge. Any construction activities that affect stormwater must comply with the municipal stormwater permit. 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 (US 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). Two forest subtypes occur in this riparian area: central coast live oak riparian forest with Monterey pine and coast live oak forest with eucalyptus. Riparian plant species are detailed in Section 6.3.1.6. Unlike classic riparian habitats that typically support a variety of wildlife species, the POM's two riparian forest subtypes host few total species (US Army, 2005). This is primarily due to the presence of invasive, non-native plants that have replaced native vegetation and altered the natural riparian ecosystem. In 2007, a concerted effort was made to remove invasive English ivy (*Hedera helix*) and French broom (*Genista monspessulana*) from the riparian areas on the POM.

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 (US 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 (US Army, 1992c). Portions of the storm drain system have been replaced over time; however, storm drain failures do continue to occur. The only ongoing maintenance performed at this time is the periodic clearing of sediment and debris from culverts.

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 one ocean outfall located west of Highway 1. 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 one outfall located west of Highway 1 discharging to the ocean. This ocean outfall is known as the Former Beach Firing Range 4. It consists of a concrete pipe that drains to the ocean adjacent to Beach Firing Range 5.

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 (US 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 (US Army, 1984a).

3.7.1.2 Erosion

Severe erosion has historically occurred on unpaved roads and foot trails 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 (US Army, 1984a). The City of Monterey, which manages the Huckleberry Hill Nature Preserve, has controlled landsliding and erosion within the Huckleberry Hill area by planting chaparral species and creating water bars (Reid 1987; Reid 2007). Guidelines and objectives for erosion control in this area are presented in Section 4.1.1.

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 or 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 (US Army, 1992a).

4.0 GENERAL MANAGEMENT OF THE POM AND OMC

General management actions described in the following section reflect the Army's dedication to preserving and protecting the natural resources on the POM and OMC consistent with AR-200-1. Management actions include soil erosion control, proper drainage requirements, protection from wildfire, and other resource management requirements.

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 biannual erosion control measures (Reid, 1998; Reid, 2007):

- 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 including non-native vegetation removal.
- Chaparral Plantings. Where practicable, native pine and chaparral species are planted to stabilize the soil.
- Slurry. In limited instances a mixture composed of water, decomposed granite, and concrete is placed in a mixer and poured out as slurry onto the steeper road areas, then rolled with a roller to compact.

Erosion control outside of the Huckleberry Hill Nature Preserve is managed by the Army. Middle (historic district) 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, non-germinating straw (rice or saltgrass) and biodegradable erosion control jute 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 includes at least two of the following: California poppy (*Eschscholzia californica*), blue-eyed grass (*Sisyrinchium bellum*), sky lupine (*Lupinus nanus*), and yarrow (*Achillea millifolium*). This mix may also include 5 lbs/acre non-invasive, non-native nurse crops that avoid crimson clover (*Trifolium incarnatum*) but may include sterile wheatgrass (*Triticum aestivum*) seed. Erosion control mixes of non-native invasive plants (e.g., rye grass [*Lolium multiflorum*], kikuyu grass [*Pennisetum clandestinum*], tall fescue [*Festuca arundinacea*], or red brome [*Bromus madritensis rubens*] mixes) will 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, erosion from overland water flow at the OMC is not considered a serious threat. However, wind erosion could affect areas that are disturbed, nonvegetated areas, and areas subject to soil disturbance (US 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 5 lbs/acre of Pacific fescue (*Vulpia microstachys*); 10 lbs/acre of red fescue; 1 lb/acre of California poppy; 1 lb/acre of yarrow; 3 lbs/acre of sky lupine, and 5 lbs/acre of sterile wheatgrass (avoid crimson clover); and,

- Annual Review. Review erosion conditions for the OMC annually.

4.2 Drainage Requirements

4.2.1 POM

The POM 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 uses the City of Monterey for certain repair and maintenance activities. 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 performed solely by the Army. 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 (US 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.

4.3 Wildland Fire Protection

4.3.1 POM

4.3.1.1 Fire Service

There have been three wildfires on the upper POM over the last twenty years. One of these fires occurred in 1987 and started in the nearby community of Pebble Beach. The other two fires occurred in 1989 and 2006. One was human- caused by an improperly extinguished campfire and the other was lightening- caused. All three fires affected resources in the Huckleberry Hill Nature Preserve and were suppressed. Natural regeneration of Monterey pine has been extremely successful in the burned areas.

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 over fifty 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, Mazza, 2007):

- Headquarters Station. One engine company, one ladder company, one rescue unit;
- 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.

4.3.1.2 Fuel breaks

The lower half of the POM is developed. Constructed fuel breaks are not present, nor appropriate, in this area. Paved surfaces, primarily roads, act as fire breaks. The undeveloped area of the POM (Huckleberry Hill Nature Preserve) also has a series of roads, although unpaved, that serve as fuel breaks.

Periodically, the Huckleberry Hill Nature Preserve area requires brush clearance along the perimeter fence along Highway 68 and the removal of dead and downed wood from within the Preserve to reduce the accumulation of combustible fuel on the ground. Removal of living plants of Hooker's manazanita or Monterey pine is only done in order to reduce insect and disease problems. The buildup of debris throughout the nature preserve is due to lack of periodic fire. The Monterey pine forest is a fire dependent ecosystem where both the Monterey pine and Hooker's manzanita benefit from fire which scarifies and releases their seeds. Because the Preserve is in close proximity to an urban area, fires are suppressed for safety reasons. Over the years, downed limbs, fallen snags and pine needles (litter) accumulate on the forest floor. 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 practiced:

- Periodic removal of excess dead and decaying forest debris should be conducted. Removal activities should focus on debris and brushy fuel, but some large diameter downed logs will be left on the forest floor for small mammal and reptile habitat and in certain areas, when fire danger is low, brush will be piled to create habitat. The prescription used for leaving snags is 10-12% snag retention with largest diameter trees being the priority.

4.3.1.3 Prescribed Burning

No prescribed burning occurs at the POM. The Huckleberry Hill Nature Preserve Area is susceptible to wildfires. Many of the species found in the preserve have evolved within a regime of periodic fire and benefit from fire in the form of seed scarification. The City of Monterey has investigated the possibility of using prescribed burns in management of the Preserve 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 dead and downed vegetation removal program. The City relies on the CDF brush removal crews to remove brushy fuel (greater than 3 inches in diameter) from the forest floor of the Preserve on an annual basis or as needed (Reid, 1998; Reid, 2007). No live vegetation is removed. 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 POM Fire Department provides wildfire service support at OMC by making recommendations to Clarke-Pinnacle on forest debris removal and fuel breaks. The fire station is located in Building #4400 on General Jim Moore Blvd. 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).

4.3.2.2 Fuel breaks

The OMC is heavily developed and has fuel breaks along the perimeter boundary of the housing area. In addition, 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 fuel breaks and clear vegetation as necessary between existing buildings and adjacent native plant communities. If special status species at OMC must be removed, activities will be performed in accordance with the Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California 1-8-99-F/C-39R (FWS, 1999).

A written agreement exists with all adjacent landowners to ensure that fuel breaks are maintained on the other side of the Army's boundary fence.

4.3.2.3 Prescribed Burning

No prescribed burning has occurred on the OMC lands; however piling dead and downed forest debris into piles and burning these piles may occur in the future. The OMC is located adjacent to undeveloped portions of the former Fort Ord, which contains lands that are highly susceptible to wildfire. Some adjacent areas are subject to burning to meet ordnance removal and habitat

management objectives. Fuel breaks have been established to keep prescribed burns from entering OMC lands

4.3.3 Integrated Wildland Fire Management Plan

In a memorandum dated 24 February 2008, the POM Fire Chief requested that a waiver be granted to the Presidio of Monterey for preparation of an Integrated Wildfire Management Plan due to the fact that POM and OMC are primarily developed areas with very little open space. The 81- acre Huckleberry Hill Nature Preserve that is considered the only remaining wild land on the POM is managed by the City of Monterey, which provides fire protection and forestry services under a separate plan (Appendix C).

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 provides services such as mowing, trimming, edging, irrigation, weed removal, and fertilization. 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 DPW, Environmental Division (DPW-E). This division 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 1999 Endangered Species Management Plan (ESMP), the 2004 Pest Management Plan, the 1984 Installation Master Plan currently undergoing revision, 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 projects on the POM and OMC are primarily carried out by contractors. The DPW has identified the following to assist with natural resource management:

- 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 fire prevention, special status species preservation and ecosystem management. The City Forester has prepared the Huckleberry Hill Forest

Management Plan to guide natural resources management activities on the Preserve (City of Monterey, 1987, Appendix C).

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.

PART II

LAND MANAGEMENT AND GROUNDS MAINTENANCE

5.0 BACKGROUND

5.1 Regulatory Framework

Army Regulation 200-1, Chapter 4, 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 200-1 and 32 Code of Federal Regulations, Part 651-Environmental Effects of Army Actions 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 other Army Regulations, The Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for the treatment of Cultural Landscapes* (US Department of the Interior, 1996), *Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* (US EPA, 1995; Appendix G), *Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management* (Office of the President, 2007), and applicable federal, state, and local laws and regulations.

5.2 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. Xeriscaping, low maintenance landscape species, reforestation, natural areas, and wildlife habitat will further reduce long-term maintenance costs. Landscaping practices will comply with the *Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* (US EPA, 1995; Appendix G) and *Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management* (Office of the President, 2007). Standards of maintenance of all categories of grounds will comply with applicable Best Management Practices (BMP) recommended by

pertinent agencies such as the University of California Division of Agriculture and Natural Resources, Monterey County Agricultural Department, California Department of Forestry, California Environmental Protection Agency, US Department of Agriculture, and the Regional Water Quality Control Board.

6.0 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* (US Army, 1995d) for the POM and in *Land Use Baseline Flora and Fauna Baseline Study of Fort Ord, California* (US 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.

6.1 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.

6.1.1 Land Use Inventory

There are several types of land use within the improved grounds category. They are grass and lawn, disturbed ground, developed lands, and cemeteries. Within the improved grounds there are specific habitat concerns and management requirements as well as landscape maintenance procedures.

6.1.1.1 Grass and Lawn

On the POM and OMC, grass and lawn in the improved cover category include areas that are vegetated with native and non-native 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 (a California noxious weed), 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 near elementary schools, parade grounds, yards and common areas in family housing, and other scattered sites. Typical species are the same as those listed above. This cover category is not mapped on the OMC.

6.1.1.2 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 broom (*Genista monspessulana)* and sometimes Scotch broom (*Cytisus scoparius*). Both of these species are on the California noxious weed list. Broom species are prevalent along road edges in the upper Presidio, Huckleberry Hill Nature Preserve, and OMC. The City of Monterey forester has identified a third broom species Canary broom (*Cytisus canariensis*) on Huckleberry Hill (Reid, 1987). Plant species associated with broom thickets may include California huckleberry, bush monkeyflower (*Mimulus aurantiacus*), and grasses. The subtype is actively controlled on the POM so coverage varies with removal; however it is estimated that it covers over 25 acres on the POM. See Section 9.2.4 for a description of noxious weed management prescriptions.

6.1.1.3 Developed Lands

Developed lands in the improved cover category contain 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, 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.

There are scattered areas of unimproved grounds within the developed portion of the POM that support a variety of native and non-native grasses and forbs. Species that typically occur in these areas include: rattail fescue, rip-gut grass (*Bromus diandrus*), cut-leaf plantain (*Plantago coronopus*), slender wild oat (*Avena barbata*), 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 comprise approximately 615 acres and cover approximately 77 percent of the total OMC area.

6.1.1.4 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 non-irrigated lawn and scattered horticultural plantings of blackwood acacia, Monterey pine, and Monterey cypress. The cemetery is defined as improved grounds and is maintained regularly by mowing the grass, and by pruning and or removing damaged or diseased trees.

6.1.2 Habitat Concerns and Management Requirements

No naturally occurring sensitive species are found on developed lands on the POM or OMC. However, on the POM, Hooker's manzanita has been planted as a landscape species. Hooker's manzanita is considered a rare and endangered plant by California Native Plant Society, an Army SAR, 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. Some of the nesting birds in landscape tree and shrub species on developed lands of the POM are protected under the Migratory Bird Treaty Act (United States Code Title 16, Chapter 7; Table 14). Activities that may disturb migratory nesting birds in these areas should be reviewed and approved in advance with the DPW-E (See Section 13.1.2). In addition, approved maintenance activities conducted on improved lands should be implemented to avoid impacts to adjacent semi-improved and unimproved areas.

6.1.3 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, supplemental planting, and periodic irrigation (where designated). 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 are presented in Section 8.0, Best Management Practices.

6.1.3.1 Mowing

Figures 21 and 22 show the location of improved areas containing grass and lawn 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. 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.

6.1.3.2 Fertilizing

Best management guidelines for fertilizer application are described in Section 8.0, Best Management Practices. The following section describes 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. Except in special cases, 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). 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 (1) irrigation with soluble fertilizer as part of an irrigation regiment or (2) if applied to 2" to 4" deep holes. No hole should be made within 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). Non-irrigated grasslands should only be fertilized during the initial establishment period (one to three years).

6.1.3.3 Pruning

Pruning shrubs and trees on improved grounds should follow guidelines presented in Section 8.0, 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.

6.1.3.4 Irrigation

The majority of the 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 and irrigation practices should comply with the Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (US EPA, 1995; Appendix G) and Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management (Office of the President, 2007). Water-efficient irrigation practices that conserve energy and potable water should be employed. 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 and approved by DPW-E.

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 (ETo)* prepared by the Cooperative Extension University of California, Division of Agriculture and Natural Resources (Extension Office). The ETo 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 ETo is displayed in Table 3.

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.

- 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 volume 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 4 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 5 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 4) would be 40. Because cool season grasses during the month of June have a 3-day requirement of 0.38 (Table 5), the length of irrigation every three days would be 15.2 minutes (0.38 x 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 ETL = K_L x ETo. Table 6 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 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 mangers 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 6, 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 ETo of 4.1 (from Table 3), and ET_L equals 5.99 inches.

Landscaping at the POM and OMC should be irrigated as necessary, but with consideration for energy and water conservation, with water volumes estimated using the calculations described above to maintain minimum soil moisture. Browning and retarding of grass and plants should not occur, except for natural senescence, seasonal leaf drop and dormancy. Accepted irrigation formulas 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.

6.2 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.

6.2.1 Land Use Inventory

6.2.1.1 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 horticultural tree plantings has never been mapped.

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

- Monterey Pine Plantings. Monterey pine plantings include areas where Monterey pines were planted or established naturally within and around developed areas of the POM. These are not considered Monterey pine forest, because of their reduced density and cover. The understory includes managed turf areas, bare ground, horticultural plants, or invasive French broom thickets.

- Monterey Cypress Plantings. Monterey cypress 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, and wattle (*Acacia* sp.). The 1982 Master Plan Analysis of Existing Facilities/Environmental Assessment Report of the POM (US Army, 1982b) 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. In the future, the DPW will strive to use native plants for landscaping in accordance with the Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (US EPA, 1995; Appendix G).

6.2.2 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. Impacts include noise, habitat manipulation, and herbicide application. On the OMC, semi-improved lands adjacent to chaparral habitat could provide habitat for Monterey spineflower, Monterey ceanothus, and sandmat manzanita.

6.2.3 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 drip line 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. All persons that mow on semi-improved grounds on either the POM or OMC should avoid cutting newly planted tree and shrub seedlings.

6.3 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 in that activities are dependent upon variables

such as mission requirements and changing conditions due to fire danger. Vegetated areas are described below.

6.3.1 Land Use Inventory

6.3.1.1 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 and an herbaceous layer composed of California hedge nettle (*Stachys bullata*), California brome (*Bromus carinatus*), 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.

6.3.1.2 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.

6.3.1.3 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 acres of coastal scrub occur on the OMC covering 0.7 percent of the total land area.

6.3.1.4 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 (*Bromus hordeacus*), slender wild oat, filaree (*Erodium* sp.), rip-gut brome and silver hairgrass (*Aira caryophyllea*). Approximately 55 acres of annual grassland occurs on the OMC, covering 7 percent of the total land area.

6.3.1.5 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, bush monkeyflower, poison-oak, California coffeeberry, and Hooker's manzanita. Herbaceous species associated with this subtype are generally found around shrub and forest gaps, and include Douglas iris (*Iris douglasii*) a California noxious weed, small-leaved lomatium, 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 (*Gaultheria shallon*), bush monkeyflower, California blackberry, and wood rose (*Rosa gymnocarpa*). 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, 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.

6.3.1.6 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 occupies 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 toyon (*Heteromeles arbutibolia*) and other species that constitute less than 10 percent of the canopy cover. The understory is dominated by California blackberry, poison-oak, California huckleberry, bush monkeyflower, California coffeeberry, and French broom, with additional herbaceous species such as goose grass (*Galium*

aparine), soft chess, leather-leaf fern (*Polypodium scouleri*), 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 approximately 80 percent of the native canopy, but French broom is strongly competing for space. Arroyo willow is one of the few native species associated with the wettest 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, California blackberry, Himalayan blackberry (*Rubus discolor*), English ivy (*Hedera helix*), German ivy (*Senecio mikanioides*), periwinkle (*Vinca major*) nasturtium (*Tropaeolum majus*) and an unidentified non-native palm species. The palm is slated for removal to increase water for wildlife and native plants.

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.

6.3.2 Habitat Concerns and Management Requirements

All natural habitats on the installation occur on unimproved lands on the POM and OMC. These habitats also support special status species described in Part I and 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.

6.3.3 Landscape Maintenance

No landscape maintenance is expected to be required on unimproved lands at the POM and OMC except for removal and dead wooding of trees that pose a safety risk along walkways. 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.

7.0 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 preserving the cultural landscape. 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, native plant species (Tables 7-9). Invasive plant species and those which attract or serve as hosts to pests should not be used (Table 10) 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 (EPA, 1995). 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. DPW-E 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 DPW-E. Installation of new or replacement landscaping should adhere to the general specifications provided in the Best Management Practices Section of this INRMP.

7.1 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 Chewing's fescue (*Festuca rubra commutate*); red fescue (*Festuca rubia*); and bentgrass (*Agrostis spp.*) is advised. Tall fescue (*Festuca arundinacea*) should be avoided as it is a non-native invasive species. Table 8 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, but mixtures should never include invasive or noxious species.

Several unlandscaped areas, characterized by bare ground or a cover of non-native weed or ruderal species (a plant that grows in wasteland, trash, or disturbed ground) 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. Areas of new construction are priority areas for installing new landscaping. Any native trees removed during new construction must be replaced with the same species at a ratio of 2:1. Current landscape projects at the POM include:

- General Instruction Buildings FY08, FY09, FY10
- Dental Clinic
- POM Lodging

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
- DPW and DES Buildings.

7.2 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 DPW-E. 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 7 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, coast live oak woodland, and Monterey pine forest). 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: (1) barren or landscaped areas between developed portions of the base and Monterey pine forest (e.g.urban forest and native habitat present on Huckleberry Hill Nature Preserve) and (2) 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 DPW-E and the 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 (Table 10). These species displace and exclude native vegetation and landscaping, and generally provide limited value for wildlife. Four of these invasive species are on the California noxious weed list: French broom, Scotch broom, kikuyu grass and Douglas iris. 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 (see section 9.2.4). A list of non-native, invasive species present on the POM and OMC is provided in Table 10.

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 FWS, CDFG, CDF, City of Monterey and other local agencies. At this time, pine pitch canker may have spread to in the Huckleberry Hill Nature Preserve (Reid, 2007). As previously discussed, 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 9.2.2, 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).

7.3 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* (US 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 DPW-E and the City of Monterey.

8.0 BEST MANAGEMENT PRACTICES

8.1 Management Responsibilities

Grounds maintenance services for communal and separate lawns or landscaped areas for the POM and OMC are provided by DPW. Currently, grounds maintenance of improved and semi-improved grounds at the POM and OMC is contracted to a landscape maintenance firm. At the POM and OMC, landscaping on individually occupied residences is maintained by occupants and Clarke-Pinnacle. The City of Monterey manages Huckleberry Hill Nature Preserve and maintains portions of the historic district including Soldier Field.

8.2 General Landscape Specifications

The following sections outline considerations for landscaping previously unlandscaped areas, replacing 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 7, 8 and 9 list species suitable for planting in specific areas.

8.2.1 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 8 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.

8.2.2 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.

8.2.3 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 may impede 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.

8.3 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.

8.3.1 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 order, 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.

8.3.1.1 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 while most clay soils are adequately supplied with this element.

8.3.1.2 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.

8.3.1.3 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 fertilizers in dry shelters, even if storage time is only for a few weeks. Tarpaulins may be used for temporary protection for a few days. Currently, fertilizers are not stored on the POM, but are brought in as needed by the grounds maintenance contractor (Ryan, 2007).

8.3.2 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 of 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.

8.4 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 (EPA, 1995). 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.

8.4.1 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, fire flow and irrigation requirements and will not interfere with the normal domestic requirements.

8.4.2 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.

8.4.3 Operation of Irrigation Systems

The responsibility for operating, scheduling, and inspecting irrigation systems at the POM and OMC is shared by the DPW and the City of Monterey. 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.

8.4.4 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 6.1.3.4, 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. This causes the root system to rot, increasing the potential for trees to fall. 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 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.

8.5 Maintenance of Tree, Shrub, and Groundcover Plants

8.5.1 Tree Maintenance

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 strategies 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 American National Standard Institute ANSI A300 (Part 1) 2001 Revision Tree, Shrub and Other Woody Plant Maintenance Standard Practices (ANSI, 2001)(Appendix E). 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 roots. 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 truck 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 precut 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.

Equipment Management. Pine pitch canker 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 9.2.2 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).

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.

8.5.2 Shrub Maintenance

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. Avoid pruning Hooker's manzanita or toyon if possible.

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.

8.5.3 Horticultural Tree Planting Maintenance

Ornamental tree plantings 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 repruning, anticipate tree growth for two years or more and prune accordingly;
- Prune young shade trees to encourage a strong, evenly spaced branch structure;
- 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 unless necessary for safety reasons;
- Remove or trim branches that extend over buildings and encroach on roofs, eaves, and windows or are lower than eight feet above 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 as necessary. Anticipate the effects of wind and rain on branches which might fall on power lines;
- Remove dead or broken branches and those that turn back toward the center of the tree. Thin branches that interfere with each other. Plan pruning 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. Refer to the ANSI pruning standards (Appendix E);

- When possible, 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 girdling roots; and
- An International Society of Arboriculture (ISA) certified Arborist should supervise all phases of work concerning trees including planting, maintenance, and removal.

8.5.4 Pruning after Transplanting

Prune trees lightly 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 (Appendix E).

8.5.5 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 or plastic cones over tree seedlings. Appropriately sign the area so that maintenance workers know to avoid cutting the new plantings.

8.6 Policing

The DPW Contract Quality Assurance Plan is intended to ensure that maintenance occurs as required, including methods, responsibility, timing, and priorities. The position of Quality Assurance Evaluator is currently vacant. 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.

9.0 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 Installation Pest Management Plan (US Army, 2004). SOPs should be periodically updated to reflect changes in jurisdiction, administrative authority management practices, and level use. Medically-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, California Medical Detachment 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 Command concentrate on safe, effective implementation of day to day pest management operations and environmental considerations of pest management operations.

9.1 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 (including education on preventative measures), biological control, and chemical control.

9.2 Pests of Concern on the POM and OMC

9.2.1 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 (*Spermophilus beecheyi*) and Botta's pocket gophers (*Thomomys bottae*) 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 IPMP 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, primarily fumitoxins, are also being used in areas away from buildings to eliminate ground squirrels and pocket gophers.

9.2.1.1 Other 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 as appropriate in 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, if necessary, 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.

9.2.2 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 succumbed.

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 pine trees, 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 tarpaulin 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;
- 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; and
- Revegetate with pitch canker resistant pine seedlings.

For further information, contact:

California Department of Forestry and Fire Protection, 2221 Garden Road, Monterey, CA 93940, (831) 333-2606.

Pine pitch canker is currently a problem in planted areas at the POM and OMC and may have spread to the Monterey pine on the Huckleberry Hill Nature Preserve (Reid, 2007). 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, 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 wrapped in a tarp prior to transport. No chipped or composted materials from diseased trees should be introduced to uninfected areas. 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.

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. When 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 young trees (less than 25 years) observed with western gall rust that occur in developed areas on improved grounds should be removed (Morton, 2007a).
- Dwarf mistletoe. Dwarf mistletoe (*Arceuthobium campylopodium*) is a parasitic flowering plant that occurs on pines (Reid, 1987). 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 1/3 of an inch long. The insect generally attacks exposed surface roots or the lower trunk of mature trees. Mechanical removal is the method used for advanced infestations (Morton, 2007b). Dragnet and Astro insecticide may be used as a prophylactic technique to protect healthy trees from infestation near construction sites.

- 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 1/16 to 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 2/3 of the canopy has been affected by this pest, complete removal of the tree is recommended (Reid, 1987).

9.2.3 Structural Pests

Structural pests may 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 DPW and DPW-E 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) if the building is located within the POM historic district to determine whether an adverse effect on the building could be caused by pest management activities. Structural pests include subterranean termites that 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 certified 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 a certified pest controller with approved chemicals to prevent termites from becoming established in these areas.

Invertebrates. Household pests include ants, crickets, ground beetles, cockroaches, other crawling insects, fleas, and spiders. These pests have the potential to occur in or around any of the buildings on the installation. Surveillance for 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 Installation Pest Management Plan). Preventative Medicine (PVNTMED) surveillance requirements for cockroaches, filth flies, and miscellaneous pests are outlined in PVNTMED SOP D-9 (Appendix E of the IPMP). Management activities in facilities include the use of sticky traps, gel baits, and approved pesticides for monitoring and control of invertebrate pests

Vertebrate pests. Vertebrate pests include cliff swallows, raccoons and house mice. Surveillance for cliff swallows occurs periodically in the spring around the outside of the former Silas B. Hayes Hospital aka DMDC. 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 DPW-E should be notified prior to removal of these nests as consultation with the USFWS and CDFG, in addition to the acquisition of a permit, may be necessary because these birds are protected under the Migratory Bird Treaty Act. Cliff swallows are a minor problem because of routine surveillance, control measures, and proper sanitation. Rodent populations within structures on the installation are controlled using mechanical snap traps and glue traps. Raccoons carrying fleas inhabit subareas of buildings in the historic district on the POM. Pest control includes: treatment of fleas with a chemical pesticide, application of ammonia soaked rags in the subarea to deter raccoons and/or trapping and relocating raccoons using live traps, then sealing the animal entry ways. The SHPO must approve any permanent structural modifications to the historic buildings.

9.2.4 Undesirable Plant Pests

In developed areas, control of weeds requires application of appropriate herbicides. In housing areas, plant control activities are conducted primarily by the Clarke-Pinnacle grounds maintenance staff. Some control of unwanted plants is done mechanically using mowers or weed eaters. Coordination with the DPW-E natural resources staff is required if plant control is proposed in undeveloped habitat. In native habitat areas, weeds are a problem as they generally out-compete native plants for nutrients, water and growing space. They also adversely modify the value of the habitat for native flora and fauna. Where feasible at the POM and OMC, invasive, non-native weed species should be controlled to prevent their spread into adjacent native habitats such as endangered species habitat or the Huckleberry Hill Nature Preserve. The City of Monterey provides crews to remove broom thickets for force protection along fences and for fire hazard reduction.

Table 10 lists the invasive plant species that should be avoided and controlled on the POM and OMC. The US Army must comply with the Noxious Weed Act of 1974 that requires each federal agency to develop a management program to control undesirable plants on federal lands under the agency's jurisdiction (NMCWL, 2007). Noxious weeds are defined as any plant designated by a federal, state or county government to be injurious to public health, agriculture, recreation, wildlife or any public or private property (Sheley, et.al,. 1999). There are four noxious weeds on POM and OMC lands. They are French broom, Scotch broom, kikuyu grass, and Douglas iris (USDA, 2003). While total eradication of these weeds is impossible given current funding constraints and the large geographic area infested by the weeds, the DPW-E is currently actively removing the two broom species in areas deemed high priority: within endangered species habitat, riparian areas and where overgrowth impedes access for safety patrols. Kikuyu grass is controlled in developed areas as part of normal base operation landscape maintenance. Douglas iris is a native plant located primarily in undeveloped areas. No control measures have been implemented to date; however populations of this noxious weed will be monitored and individuals encroaching into sensitive areas such as endangered species habitat will be slated for manually removal.

A preventive maintenance control program for undesirable 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 and along trails for human health) ;
- Eradication of pampas grass (*Cortaderia jubata*) at OMC and within sensitive areas at POM;
- 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 some of the invasive weed species and control measures used at the POM and OMC. For a complete list, see Table 10.

- Pampas or jubata 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 with 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 8. In natural areas, this species should be removed through manual removal and selective herbicide application.
- Hottentot fig (aka African iceplant [*Carpobrotus edulis*]) and Chilean iceplant (*Carpobrotus chilensis*). 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 and Scotch broom. These species rapidly colonize 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 requires continued maintenance as the seed of this species remains viable in the soil for decades.
- Poison hemlock (*Conium maculatum*). This is a relatively new invader to the POM and managers are actively controlling it with herbicides and by manual removal. This plant is a highly toxic weed native to Europe. All parts of the plant are poisonous to humans and livestock.

- German ivy or Cape 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 acacia, and golden wattle acacia. These species are not recommended for planting as landscape species and naturally regenerated seedlings of these trees should be removed as they are observed on improved, unimproved, and semi-improved grounds on the POM and OMC.

9.3 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 IPMP.

The IPMP 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 IPMC and PVNTMED personnel to determine the prevalence of disease vectors and other public health pests in the area surrounding the installation.

9.3.1 Federal Agencies

US Environmental Protection Agency (USEPA). The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) was originally passed in 1947, and required the US 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.

US 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.

Under the Migratory Bird Treaty Act (MBTA), it is unlawful for Federal agencies to pursue, hunt, take, capture or kill any migratory bird except as permitted by regulation. The installation will obtain appropriate authorization from the USFWS before intentionally and directly taking any migratory bird species. 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 DPW-E is responsible for coordination with USFWS.

US Army. Pesticide application and handling will be in accordance with applicable guidance given in AR 200-1. 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 Army Environmental Command (AEC). 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
- All herbicides must receive prior approval for use by AEC.

9.3.2 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 INRMP. The installation natural resource specialist is responsible for coordination with the CDFG for predator control. The CDFG will then request the service of the USDA Animal and Plant Health Inspection Service Wildlife Biologist if capture or removal of a predator is necessary. Predator control that may affect migratory birds must also be coordinated with the USFWS.

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).

9.3.3 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 non-target 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 non-restricted 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 IPMP).

10.0 ANNUAL WORK PLAN

DPW has 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 11 and 12.

PART III

FOREST MANAGEMENT

11.0 FOREST MANAGEMENT

When the 2001 INRMP was written, Army Regulation (AR) 200-3 (US Army, 1995a) was the guiding regulation. It described the purpose of forest management on installations as necessary "to support and enhance the immediate and long term military mission and meet natural stewardship requirements set forth in federal laws. Forest ecosystems perform important, sometimes unique, natural resource functions in which we inherently value, and which are of benefit to all living things. The objectives and benefits of forest ecosystem management include: biodiversity of species and habitat; natural beauty; outdoor recreation opportunities; wildlife habitat, including habitat for threatened and endangered species of plants and animals; soil conservation and watershed protection, including erosion control; improvement of air and water quality; sustained production of commercially valuable forest products; noise abatement; and the sustainment of viable and diversified training lands to meet the military mission." Current regulation AR-200-1 (2007) requires Natural Resource Managers to "practice responsible stewardship of forested lands to support the mission."

Throughout the POM and OMC scattered stands of Monterey pine forest and coast live oak woodland exist; however, the largest contiguous Monterey pine forest on the Presidio of Monterey is located within the 81- acre Huckleberry Hill Nature Preserve. Huckleberry Hill Nature Preserve is leased to and managed by the City of Monterey. The Preserve is managed in accordance with the City's Huckleberry Hill Preserve Management Plan (Reid, 1987; Appendix C), which is based on sound forestry methods for managing native Monterey pine forests. Because this forest is comprised of mature stands of trees characterized by a high windthrow potential and a lack of adequate regeneration, the goal of the management of this forest is to retain an even forest canopy while allowing for outdoor recreation (Reid, 1987). The management objectives for the Huckleberry Hill Nature Preserve Management Plan are:

- to enhance, maintain and promote the growth of native vegetation existing on the 81 acres leased from the Army, designated as a nature preserve called Huckleberry Hill;
- to control erosion problems associated with existing roads, firebreaks, and trails on highly erosive soils;
- to devise and implement a plan for reforestation, utilizing native seed to encourage an uneven age stand of Monterey pine to ensure their existence for years to come;
- to minimize disturbance from man and reduce negative impacts associated with noxious weeds, destructive forest insects and disease;
- to reduce fire hazards and maintain fire control standards associated with overmature, even-aged native Monterey pine forest;
- to provide for the protection and proliferation of all the wildlife within the nature preserve.

Since 1987, the City of Monterey has managed the Huckleberry Hill Preserve with great success, attaining many of the objectives and goals described above. When methods (e.g. using slurry for soil erosion control) have not worked, they have employed adaptive management to reassess procedures and have used other innovative techniques that proved more successful. The

management strategy focuses on an ecosystem based approach that has resulted in the Preserve having the highest wildlife species diversity on the POM. The majority of the approximately one hundred migratory bird species found on the POM and OMC utilize the Huckleberry Hill habitat during part of their migration. Since the Monterey pine is considered a California Native Plant Society List 1B species, rare or endangered in California or elsewhere, the preservation of Huckleberry Hill Nature Preserve provides a regional benefit to the entire Monterey Peninsula.

PART IV

FISH AND WILDLIFE MANAGEMENT

12.0 GENERAL INFORMATION

12.1 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, a Fish and Wildlife Management Program was developed with the following objectives consistent with AR 200-1 (US Army, 2007a):

- Protect and preserve existing important wildlife species including those species at risk (SAR) or threatened by extinction;
- Promote biodiversity and ecosystem sustainability on Army lands and waters consistent with the mission and INRMP objectives;
- Manage flora and fauna consistent with scientific principles and in accordance with applicable laws and regulations, and, where lands and waters are suitable, for the conservation of indigenous flora and fauna;
- Manage habitat to conserve and enhance existing flora and fauna consistent with the Army goal to conserve, protect, and sustain biological diversity while supporting the accomplishment of the military mission;
- 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 natural landscapes; and
- Protect and enhance recreational benefits for installation personnel and the general public where possible given force protection constraints.

12.2 Regulatory Background

In accordance with AR 200-1 (US Army, 2007a), 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 of 1973, as amended, 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. AR-200-1 guides managers to promote biodiversity and ecosystem sustainability, manage flora and fauna consistent with scientific principles and laws, and manage habitat to conserve and enhance existing and indigenous flora and fauna.

Under the AR 200-3, Chapter 6, which was the guiding regulation during the creation of the 2001 INRMP, a classification system for Army installations based on the suitability of a conservation or management program for fish and wildlife resources was outlined. The POM and OMC have few fish and wildlife resources; there are no lakes or permanent streams, and no hunting, fishing or trapping is permitted. Therefore, under the old AR 200-3, the POM and OMC was classified as a Category II installation (installations that lack adequate land and water resources for feasible fish and wildlife management). Under AR 200-3, for Category II installations, the Fish and Wildlife Management program could be developed as an abbreviated plan based on installation resources and management objectives. Consequently, the INRMP only addresses requirements associated with special status species and the introduction of new or non-native wildlife species, population management, and habitat management.

13.0 FISH AND WILDLIFE RESOURCES

As a result of general development of the POM and OMC, wildlife habitat elements, such as roosting and nesting sites, escape cover, migration/travel/dispersion corridors, and foraging habitat, in general 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.

However, due to the integrity of the 81-acre Huckleberry Hill Nature Preserve, the POM contains an intact Monterey pine ecosystem that is rich in wildlife. On the OMC, the coast live oak woodland and maritime chaparral adjacent to the installation provide suitable habitat for wildlife. These minimally disturbed areas provide refuges for native wildlife species. There are no fish on the OMC due to the lack of water resources to support aquatic life. An intermittent stream is located along the southeastern boundary of the POM. Due to the intermittent nature of the stream, it is unlikely that it can support vertebrate aquatic life, but no presence/absence surveys have been performed. A small seasonal pond is located in the parking area off of Church Road on the lower POM. It was created during construction activities as a drainage pond to prevent rapid runoff from the impervious parking lot (Krebbs, 2007). It was designed for water to percolate through the pond bottom; however the water does not consistently drain and standing water is often retained, creating habitat for aquatic plants and insects. This pond provides prime habitat for mosquito larvae, so POM natural resource managers work in concert with the Salinas Mosquito Abatement Department to place mosquito fish in the water each summer to consume the mosquito larvae and control the mosquito population.

13.1 POM

13.1.1 Fish and Wildlife Species

The variety of land uses on the POM provide different habitat elements, such as forage, roosts, cover, breeding areas, water sources, 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, and Virginia opossum (*Didelphis virginiana*), domestic feral cat (*Felis cattus*) and Norway rat (*Rattus norvegicus*).

A list of wildlife species expected to occur at the POM is provided in Table 13. 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. Common 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 and domestic feral cat.

- 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. Common 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, Virginia opossum, and domestic cat.

- Monterey Pine Forest. Monterey pine forest occurs on the POM in the Huckleberry Hill Nature Preserve and in an undeveloped area located between Building 630 and Hilltop Field. 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, gray tree squirrel and black-tailed deer, as well as 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 and fallen trees provide cover for amphibians such as the arboreal salamander (*Aneides lugubris*) and California slender salamander (*Batrachoseps attenuatus*). During wildlife surveys performed in 2005, pygmy nuthatch, brown creepers (*Certhia americana*), dark-eyed juncos, band-tailed pigeon, American robin (*Turdus migratorious*), Steller's jay (*Aphelocoma coerulenscens*), scrub jay, acorn woodpecker, northern flicker and spotted towhee were observed in the Monterey pine habitat (US Army, 2005).

- 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 located along the southeastern boundary. Riparian vegetation is also found at the base of the landfill in the upper POM. Although surveys have not been conducted to confirm their presence, it is possible, but unlikely, that fish may be found in the stream below Franklin Gate. Based on habitat characteristics, fish species may include mosquito fish (*Gambusia affinis*), stickleback (*Gasterosteus* sp.), and introduced minnows. It is highly 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 (US Army, 1995d) primarily

due to the encroachment of invasive, non-native plant species such as French broom (which impedes access) and English ivy (which strangles native Monterey pine trees). Native species reported include scrub jay, raccoon and black-tailed deer. Typical non-native species include domestic cat and Norway rat. During a wildlife survey in 2005, avifauna observed included scrub jay, Stellar's jay, oak titmouse (*Baeolophus inornatus*), chesnut-backed chickadee (*Poecile rufescens*), California quail, and red-shouldered hawk (*Buteo lineatus)* (US Army, 2005). Other species less frequently seen include mountain lion (*Felis concolor*) and coyote (*Canis latrans*).

- Broom Thicket. The broom thicket habitat has been reported to provide cover for wildlife species that forage in surrounding cover types (US Army, 1995d). Native species include scrub jay and western meadowlark (*Sturnella neglecta*).

13.1.2 Special Status Fish and Wildlife Species

Special status species generally include those species federally listed as endangered, threatened, candidate species or a species of concern; or species at risk; or those designated by a state resource agency 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.

- Special status animals are species that fall into the following categories: Animals currently listed by the federal government as threatened or endangered species;
- Animals proposed for listings as 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) or Birds of Conservation Concern (FWS, 2002) or Migratory Nongame Birds of Management Concern (FWS, 1995);
- 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 Database as a "Special Animal."
- Animals identified by the US Army as species at risk (SAR). Species at risk are defined as native, regularly occurring species in the United States that are not federally listed under the US Endangered Species Act, but are either (1) candidates for listing under the ESA or (2) critically imperiled or imperiled across their range according to the NatureServe conservation status rank criteria (NatureServe, 2006).

During special-status wildlife species surveys conducted at the POM in 1994 and 1995, 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 (US Army, 1995d). The sharp-shinned hawk is considered a species of special concern by the CDFG. It is primarily found in riparian forests, conifer forests, and oak woodlands. The observed bird(s) likely used the POM for foraging. Monterey pine forest at POM is considered potential nesting habitat. However, no nests, pellets, droppings, or other evidence of breeding or frequent use were observed (US Army, 1995d).

On July 6 and 7, 2005, eight olive-sided flycatchers (*Contopus cooperi*) were observed during special status species surveys in the Monterey pine forest at the Huckleberry Hill Preserve (US Army, 2005; Appendix D). They were heard and seen perched in and flying among the Monterey pine trees. The olive-sided flycatcher is a federal species of concern designated as a Bird of Conservation Concern (BCC) (FWS, 2002) and a Pacific Coast Nongame Bird of Management Concern (FWS 1995) by the FWS. It is also a Watch List member, based upon its inclusion among species listed in the United States Bird Conservation Watch List (US Army, 2005). This neotropical migrant breeds in habitat along forest edges and openings including natural edges of open water. It prefers tall, prominent trees and snags, which serve as singing and foraging perches with unobstructed air space for foraging. The olive-sided flycatcher arrives in California in the spring where it breeds and nests, and it typically migrates in September (US Army, 2005). Other migratory birds known to occur on the POM that are not on the BCC list, but are protected by the Migratory Bird Act include the ash-throated flycatcher (*Myiarchus cinerascens*) and western flycatcher (*Empidonax difficilus*). While the flycatchers are summer migrants, winter migratory birds include the yellow-rumped warbler (*Dendroica coronata*) and Townsend's warbler (*Dendroica townsendi*) (Reid, 1987; FWS, 2003).

There are a little over 100 total species of migratory birds expected to use the POM and OMC during some point of their migratory journey (Reid, 1987; US Army, 1995d; US Army, 2001; US Army, 2005). These birds are protected under The Migratory Bird Treaty Act of 1918, as amended and are listed in Table 14. Under the Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Threats to migratory birds on the Installation include feral cats, exposure to pesticides from invertebrate pest and weed control, exposure to other possible contaminants including paint and diesel fuel, loss of Monterey pine and coast live oak habitat from building construction, disturbance due to loud noise from the use of mechanized equipment such as weed whackers and leaf blowers, and collisions with structures and equipment. Pursuant to Executive Order (EO) 13186 (January 17, 2001), a Memorandum of Understanding (MOU) between the US Department of Defense (DOD) and the FWS (DOD/FWS, 2006) was created to outline a collaborative approach to promote the conservation of migratory bird populations. To protect migratory birds on the POM and OMC, the Installation will adopt the following conservation measures from EO 13186 and the MOU:

- Identify and avoid management actions that have the potential to adversely affect migratory bird populations. Ensure that an analysis of effects of federal actions and

agency plans on migratory birds is included during the NEPA process or other established environmental review processes with emphasis on species of concern;

- Control the introduction, establishment, and spread of non-native plant and animal species that may harm migratory bird populations;
- Prevent or abate the pollution or detrimental alteration of installation habitats used by migratory birds;
- Work with partners to identify bird conservation sites and develop outreach educational materials as possible;
- Participate in efforts to collect data on migratory bird species, habitats, ecological conditions, watersheds, and significant conservation sites;
- Develop site specific mitigation measures to ameliorate impacts from proposed federal actions;
- And make every effort to protect, restore and enhance important habitats for migratory birds.

In addition to migratory bird species, the POM and OMC provide habitat for seven Birds of Conservation Concern (BCC) (FWS, 2002) and ten Non-game Birds of Management Concern (FWS, 1995).

The mountain lion is considered a specially protected mammal under California law. Individual cats are often drawn to the POM because of the presence of black-tailed deer, and OMC because of the high population of wild turkey, both prey species. Although mountain lions have not been observed during wildlife surveys, various observations have been reported to POM Police throughout the years (Reese, 2007). Mountain lions likely use the POM and OMC for hunting; however no evidence of denning or long-term habitation has been documented.

13.2 OMC

13.2.1 Fish and 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. Hunting and fishing are not allowed on the OMC. A list of wildlife species expected to occur at the OMC is provided in Table 13. 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 toad (*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, red-shouldered hawk 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 (*Parus inorantus*), hermit thrush (*Catharus guttatus*), American robin (*Turdus migratorius*), and loggerhead shrike (*Lanius ludovicianus*). Southern alligator lizard (*Gerrhonotus multicarinatus*), Botta's pocket gopher, wild turkey (*Meleagris gallopavo*), 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*) are 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, 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*).

13.2.2 Special Status Fish and Wildlife Species

Special status wildlife species that have the potential to occur on the OMC land cover types include the California tiger salamander (*Ambystoma californiense*), a federally threatened species; loggerhead shrike (*Lanius ludovicaianus*), 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 state species of special concern; and Monterey ornate shrew (*Sorex ornatus salarius*), state species of special concern.

In December 2006, one isolated observation of a California tiger salamander was reported. The individual was discovered in a concrete maintenance bay in a structure located in a remote location on OMC adjacent to Fort Ord lands that were disposed. The salamander was approximately 1.9 kilometers from the nearest water source, Henneken's Ranch Wetland. It was relocated off-site by a qualified Army biologist to this breeding pond.

Special status animal species on the OMC are managed in accordance with the Installation-Wide Multispecies Habitat Management Plan (HMP), Fort Ord, California (US Army, 1997a). The HMP states that, "Lands designated as "Development" have no management restrictions placed upon them as a result of this HMP. The biological resources found on these parcels are not considered essential to the long-term preservation of sensitive species at former Fort Ord. The Biological Opinion (BO) allows for development of these parcels, but it also requires identification of sensitive biological resources within these parcels that may be salvaged for use in restoration activities within reserve areas." In accordance with the HMP and associated Biological Opinion, OMC lands are managed for development and special status animal species and habitat may be disturbed. All efforts will be made to relocate individuals during development projects. The federally threatened California tiger salamander, therefore, is not addressed in the POM and OMC Endangered Species Management Plan.

14.0 FISH AND WILDLIFE MANAGEMENT PROGRAM

14.1 Management Objectives

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

- Protect endangered and threatened and conserve SAR;
- Preserve wildlife corridors for migrating native species including black legless lizards and coast horned lizards traveling to and from habitat areas;
- Manage existing natural areas to maintain or enhance populations of native wildlife species;
- Discourage practices that promote the establishment of non-native species and the corresponding displacement of native species;
- Protect native ecosystems to enhance and maintain native plant and wildlife populations, communities and assemblages;
- 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

14.2 Wildlife Habitat Management and Maintenance

14.2.1 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 non-native species within habitats 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 non-native 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 non-native 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 is 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.

Contaminants rarely affect fish and wildlife resources on the POM. Pesticide use is limited to in and around structures and herbicide use generally targets non-native, invasive plant species. Herbicides are not used in sensitive habitats, including riparian areas and are applied by licensed applicators with strict adherence to label instructions and federal and state laws, regulations and guidelines. A spill containment plan is in place in the event of a hazardous material spill. When a spill occurred in 2004 in the upper POM along Highway 68, resources from DPW-E were dispatched to contain and clean up the spill. Revegetation efforts were conducted by the City of Monterey in the affected areas outside of the POM.

Construction activities pose short-term, localized impacts from contaminants to fish and wildlife by means of habitat alteration and soil disturbance creating indirect increased turbidity to wildlife water sources. These effects are reduced by employing Best Management Practices and site specific mitigations and generally occur only during the period of construction.

14.2.2 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 non-native plant removal or supplemental planting of native species;
- To the extent practicable, remove intrusive non-native 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.

There are no contaminant issues that have significant adverse affects on wildlife at OMC. The hazardous waste office is located within the developed area of OMC. Hazardous waste is processed with strict adherence to federal and state laws, regulations and guidelines. This operation has virtually no effect on wildlife located on OMC. Pesticide use at OMC is limited to in and around structures and herbicide use is limited to grounds maintenance in the housing areas. The military housing area on OMC is leased to and managed by the Clarke-Pinnacle Company. Although this housing area is "privatized," DPW-E ensures that all pesticide and herbicide use is approved and properly reported.

14.3 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 AND CULTURAL RESOURCES

15.0 GENERAL INFORMATION

15.1 Background

15.1.1 Objectives

This part of the INRMP provides guidelines for managing natural resources to enhance outdoor recreation opportunities and to preserve cultural resources (in particular cultural landscapes) at the POM and OMC. Outdoor recreation and cultural resource protection, although typically considered under social sciences and cultural resource management, should be integrated with the management of natural resources, and should be compatible with the military mission. The following provides recommendations for integrating outdoor recreation and historic preservation with the management of natural resources in order to promote and enhance opportunities for current and future users of the Installation to enjoy the resources on the POM and OMC.

15.1.2 Outdoor Recreation and Cultural Values

Natural resources can provide opportunities for leisure activities. Natural 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. Natural resources may also be associated with cultural sites of archeological and/or historical significance that have special or unique cultural importance: ethnobotanical sites, traditional cultural properties or cultural landscapes. The POM and OMC objectives for managing natural resources to promote outdoor recreation and preserve cultural sites include:

- Enhance outdoor recreation opportunities to achieve physical, cultural, and spiritual benefits associated with being in a natural environment within the principles of multiple land use and consistent with the military mission;
- Manage natural resources in 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 social and cultural resources.

15.2 Outdoor Recreation and Cultural Resource Management Planning

15.2.1 Federal Outdoor Recreation Planning

Under the Department of the Interior (DOI), the former Heritage Conservation and Recreation Service (HCRS), abolished in 1981 with responsibilities transferred to the National Park Service (NPS), was challenged with developing information concerning national recreation needs and plans and cultural resources preservation (US 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 (US 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.

15.2.2 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 (US 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 (Section 16.3.1.2), 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.

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.

15.2.2.1 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.

15.2.2.2 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). Public access policies for each military installation are determined by the Installation's military mission and the overall status of national defense readiness.

15.2.3 Coordination of Cultural Resources

While conducting natural resource management activities, Installation personnel are required 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.

15.3 Public Access, Safety, and Security

The POM and OMC were open installations up until September 11, 2001, with unrestricted access for military and civilian personnel. By providing access to all persons, the outdoor recreation resources at the POM and OMC were consistent with California's SCORP. Since September 11, 2001, force protection procedures have been put into place and access to the POM is limited and entry is through guarded entrance gates.

Cultural Resources on the POM are managed in accordance with the 2004 Integrated Cultural Resource Management Plan. Native Americans are allowed access to sacred cultural resource sites and traditional cultural properties per the American Indian Religious Freedom Act (AIRFA), enacted in 1978. This act proclaims the protection and preservation of traditional American Indian religions a federal policy. AIRFA specifically addresses that Native Americans are allowed access to sacred sites, in addition to the use of plants, animal and other resources. 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. There are no federally-recognized tribal groups in the Monterey area. 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. Rumsen members numbered about 800 in 1970, occupying the lower Carmel, Sur, and lower Salinas rivers (Levy, 1970).

16.0 CLASSIFICATION OF OUTDOOR RECREATION AND CULTURAL AREAS CONTAINING NATURAL RESOURCES

Based on the Heritage Conservation Resource Service (HCRS) and Army classification systems, outdoor recreation and cultural values at the POM and OMC are categorized as follows and depicted on Figure 23.

16.1 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.

16.2 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 used for these purposes or 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 81 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 (US Army, 1984a; US Army, 1995d)

16.3 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.

16.3.1 POM Historic Districts

16.3.1.1 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 is still standing and is unmodified (Jackson Research Associates, 1985a; US Army, 1994a).

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 are approximately 7 acres in size and serve 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 officer's quarters (Jackson Research Associates, 1985a).

The historic district also includes World War II-era contributing properties and landscape features that contribute to its significance (US Army, 1994a).

16.3.1.2 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 (US Army, 1994a). 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 within 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 (US Army, 1994a).

16.3.2 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 Huckleberry Hill Preserve, which is leased to the City of Monterey.

17.0 MANAGEMENT OF NATURAL RESOURCES FOR OUTDOOR RECREATION AND CULTURAL VALUES

This Section provides guidelines for managing natural resources in outdoor recreation areas and cultural resource sites 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.

17.1 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 lower POM. The Master Plan will encourage these annual activities and allow for access to the historic district and Sloat Monument (Pike, 1998).

17.2 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.

17.3 Class III Special Interest Areas

17.3.1 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-15and 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.

17.3.2 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.

LIST OF ABBREVIATIONS AND ACRONYMS

311TRS	Air Force 311th Training Squadron
AAFES	Army and Air Force Exchange Service
ACHP	Advisory Council on Historic Preservation
ACOE	Army Community of Excellence
AEC	Army Environmental Command
AIRFA	American Indian Religious Freedom Act
aka	Also Known As
ALS	Army Language School
ANSI	American National Standard Institute
AR	Army Regulation
ARPA	Archaeological Resource and Protection Act
AT2P-MIB	US Army 229 Military Intelligence Battalion
BCC	Birds of Conservation Concern
BMP	Best Management Practices
BO	Biological Opinion
BRAC	Base Realignment and Closure
CA	California
CalEPA	California Environmental Protection Agency
CalEPA-DPR	California Environmental Protection Agency, Department of Pesticide Regulation
CDF	California Department of Forestry and Fire Protection
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CNPS	California Native Plant Society

DBH	Diameter at Breast Height
DES	Directorate of Emergency Services
DFA	California Department of Food and Agriculture
DFLP	Defense Foreign Language Program
DLI	Defense Language Institute
DLIFLC	Defense Language Institute Foreign Language Center
DOD	Department of Defense
DOI	Department of the Interior
DPW	Directorate of Public Works
DPW-E	Directorate of Public Works, Environmental Division
EO	Executive Order
EPA	US Environmental Protection Agency
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
ET_L	Relative to Normal Evapotranspiration Rate
ETo	Normal Year Evapotranspiration Rate
F or °F	Degrees Farenheit
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide and Rotenticide Act
FWS	US Fish and Wildlife Service
HCRS	Heritage Conservation and Recreation Service
HMP	Habitat Management Plan
HSC	Health Services Command
ICRMP	Integrated Cultural Resource Management Plan
IMCOM	Installation Management Command

IMCOM-W	Installation Management Command, West Region
INRMP	Integrated Natural Resource Management Plan
IPM	Integrated Pest Management
ISA	International Society of Arboriculture
J&SA	Jones and Stokes Associates
K	Potassium
K_2O	Potash
K_L	Landscape Coefficient: Method to Calculate Irrigation Requirements
MBTA	Migratory Bird Treaty Act
MCD	Marine Corps Detachment
MCWD	Marine Coast Water District
MISLS	Military Intelligence Service Language School
MNBMC	Migratory Nongame Bird of Management Concern
MOU	Memorandum of Understanding
msl	Mean Sea Level
N	Nitrogen
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMCWL	New Mexico Center for Wildlife Law
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPK	Nitrogen, Phosphorus, Potassium Ratio
NPS	US National Park Service
NRHP	National Register of Historic Places

NSAMB	Naval Support Activity Monterey Bay
NSGD	Naval Security Group Detachment Monterey
OMC	Ord Military Community
P	Phosphorus
PA	Programmatic Agreement
P_2O_5	Phosphoric Acid
IPMP	Integrated Pest Management Plan
POM	Presidio of Monterey
PVNTMED	Preventative Maintenance
RCP	Reinforced Concrete Pipe
RWQCB	Regional Water Quality Control Board
SAIA	Sikes Act Improvement Act
SCORP	State Comprehensive Outdoor Recreation Plan
SHPO	State Historic Preservation Officer
SOP	Standard Operating Procedure
SPCA	Society for the Prevention of Cruelty to Animals
SR	State Route
SWRCB	State Water Resources Control Board
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	US Department of Agriculture

GLOSSARY OF TERMS

Term	Definition
arborist	A specialist who cares and maintains trees. Everything from planting, to pruning and also diagnosing and treating diseases.
adaptive management	A systematic process for continually improving management policies and practices by learning from the outcomes of implementation and monitoring.
aeration	Any process whereby a substance becomes permeated with air or other gas. This term refers to the formation and renewal of soil air.
alkalinity	The concentration of alkali (soluble mineral salts that are typically basic in chemical reactions) in a substance
allelopathy	The production and release of chemical substances by one species that inhibit the growth of other species of plants
anti-desiccant	A chemical used to increase moisture retention
archeology	The scientific study of past human cultures by analyzing the material remains or artifacts left behind.
Best Management Practices	Policies, practices, procedures or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from a project such as road or building construction, timber harvesting, or agriculture.
biodegradable	A substance capable of being broken down by living things like microorganisms and bacteria
biological control agent	Natural enemy, antagonist, competitor, or other biological entity capable of reproduction used to control pests and intended to function as a pesticide against another organism declared to be a pest
Biological Opinion	A document which states the opinion of the US Fish and Wildlife Service (USFWS) as to whether a federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat.
biota	All of the organisms, including animals, plants, fungi, and microorganisms, found in a given area.

Term	Definition
broom thicket	A dense growth of bushes (French broom or Scotch broom)
brushy fuel	Combustible plant material composed of dense bushes or shrubs that can ignite and feed a fire.
buffer zone	An area of land specifically designed to separate one zoning or land use from another; the region near the border of a protected area; a transition zone between areas managed for different objectives
candidate species	Any species being considered by the Secretary of the Interior for listing as an endangered or threatened species but is undergoing a status review.
canopy	The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees.
coniferous	Trees that bear cones.
cultural landscape	A landscape created by people and their culture that strongly reflects the past and present land uses of the people who lived in it; usually includes cultivated land with patches of natural or managed land.
dead wooding	The act of removing dead limbs from live trees
deer-resistant	A type of plant that is either not palatable to deer or can withstand the effects of deer browsing with little adverse effects.
depredation	The act of killing, damaging or consuming domestic animals or animals that a predator would not normally have encountered or killed in natural habitat.
developed grounds	An area of land that has been modified by humans usually containing structures and landscaping
disturbed ground	Alteration of the ground by natural or human-induced actions
drought-tolerant	Able to withstand environmental conditions or physiological stress induced by the lack of water
duff	The layer of partially and fully decomposed organic materials lying below the litter and immediately above the mineral soil on the forest floor

Term	Definition
ecosystem	A complex ecological community and environment forming a functional whole in nature
endangered species	Any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary of the Interior to constitute a pest whose protection under the provisions of the Endangered Species Act would present an overwhelming and overriding risk to man.
erodible	Soils that are likely to have high soil loss when exposed to water runoff; soils that wash away easily
erosion hazard	A measure of the susceptibility of an area of land to prevailing agents of erosion
ethnobotanical	A plant used by humans that usually has cultural significance
evapo-transpiration	A collective term that includes water discharged to the atmosphere as a result of evaporation from the soil and surface-water bodies and as a result of plant transpiration.
fertilizer	Any organic or inorganic material of natural or synthetic origin that is added to the soil to supply certain nutrients essential to the growth of plants
firebreak	Any natural or constructed discontinuity in a fuelbed used to segregate, stop, or control the spread of fire or to provide a control line from which to suppress a fire.
flocculation	Process by which clumps of solids in water or sewage aggregate through biological or chemical action so they can be separated from water or sewage.
force protection	Any measure or combination of measures used to reduce the risk of injury to our security forces, or damage to their assets.
forb	A broad-leaved, flowering, herbaceous plant which is not a grass.
forest debris	Scattered remains of forest plants that include downed branches, rotting logs, and fallen leaves found on the forest floor

Term	Definition
fumitoxin	Fumitoxin is a pesticide that comes in a pellet form and is used to exterminate rodents from within their burrows by releasing a toxic gas (phosphine) when exposed to moist air or water.
granitic rock	Plutonic igneous rock having a visibly crystalline texture
gully	A deep ditch or trench worn in the earth by running water; an eroded channel
habitat	The locality in which a plant or animal naturally lives.
historic property	Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places.
horticulture	The science of cultivating plants
Integrated Pest Management	The use of different techniques in combination to control pests, with an emphasis on methods that are least injurious to the environment and most specific to the particular pest.
improved grounds	The developed portions of the Installation. Improved grounds include roads, structures, buildings, fields, parking lots, horticultural plantings and other fully maintained areas.
infiltration rate	The quantity of water that can enter the soil in a specified time interval.
intermittent stream	A stream that flows only periodically throughout the year.
invasive species	Species, usually non-native, that enter into new ecosystems and spread, causing adverse impacts to existing native species and their habitats.
irrigation	The controlled application of water to lands to supply water requirements not satisfied by rainfall.
landform	Any physical feature of the earth's surface having a characteristic, recognizable shape and produced by natural causes.
lithic	A stone artifact, usually in the form of a stone tool.
loam	A soil containing a mixture of clay, silt and sand.

Term	Definition
management prescription	A course of management action or strategy prescribed for a particular area after specific assessments and evaluations have been made.
manual removal	Doing or requiring physical work to pull, hoe, dig up, or cut down a plant without the use of mechanical equipment
maritime chaparral	A plant community dominated by shrubs and small trees found primarily near the ocean in California, USA, that is shaped by a Mediterranean climate (mild, wet winters and hot dry summers) and wildfire.
mature forest	The stage at which most forest components have attained full development, particularly in height and seed production.
mechanical removal	Using mechanized equipment such as a mower, weed whacker, electronic sheers, or tractor to remove undesirable vegetation.
mesic	Neither wet (hydric) nor dry (xeric); intermediate in moisture, without extremes.
microclimate	The climate within a small, defined area or microhabitat
midden	A rubbish or trash heap of remains
migratory bird	A bird that flies from one region to another during particular seasons of the year
monocot	A type of flowering plant whose seed has one embryonic leaf (cotyledon)
mulch	Any loose, usually organic material placed over the soil as a protective covering, to reduce water loss or weed growth, or for decorative purposes
multi-aged stand	Stands of trees which are intermediate between even and uneven aged stands. Two or more age or species groups can be distinguished within the stand, although the boundaries may not be clearly defined. Examples of multi-aged stands include stands where regeneration is occurring in patches opened in the stand (due to timber harvesting or death of over mature trees), and two-tiered or two-storied forests.
nitrogen-starved plant	A plant that lacks sufficient amounts of nitrogen

Term Definition

non-native species	Also called introduced species or exotic species; refers to plants and animals that originate elsewhere and are brought into a new area, where they may dominate the local species or in some way negatively impact the environment for native species
noxious weed	A plant that is a declared weed under the Noxious Weeds Act of 1993 and is invasive, displacing indigenous species.
nursery stock	All botanically classified hardy perennial or biennial trees shrubs, vines, and plants, either domesticated or wild, cuttings, grafts, scions, bulbs, buds, rhizomes, or roots thereof, fruit pits; also other such plants and plant parts for, or capable of, propagation, excepting seeds of field crops, vegetables, or flowers, corms and tubers.
off-road vehicle	Any motor vehicle which can be operated cross-country without benefit of a road or trail over land, snow, and other natural terrain, and includes all of the following: Multi-track and multi-wheeled vehicles, all-terrain vehicles (ATV), motorcycles and related 2, 3, and 4-wheeled vehicles, amphibious machines (water to land, and back), hovercraft, and any other vehicles that use mechanical power, including 2 and 4-wheel drive (4WD) vehicles that are highway registered, when operated off highways and roads.
pathogen	Anything capable of causing disease; usually a pathogen is a bug, like a virus or bacteria. Any disease-producing agent (especially a virus or bacterium or other microorganism.
peat moss	Partly decomposed moss, rich in nutrients and with a high water retention. Commonly used as a soil amendment.
permeability	The ease of movement of water and/or gases through a soil material.
pine pitch canker	A fungal disease that infects many species of pine trees. The disease causes resinous or pitchy cankers on all woody parts of the tree.
potable water	Water that is safe for human consumption.
potash	A loosely composed mixture of various potassium compounds, chiefly crude potassium carbonate, obtained by washing wood ashes with water and evaporating the resulting solution to dryness.
Term	Definition

prescribed fire, prescribed burn	The controlled application of fire to naturally occurring vegetative fuels, under specified environmental conditions and following appropriate precautionary measures, to achieve specific objectives.
preservation	The act of sustaining and maintaining cultural and natural resources that have been identified as significant and/or threatened and that warrant protection
privatized housing	The transfer of ownership of government housing from the public sector (government) to the private sector (business)
propagules	Any plant material used for the purpose of plant propagation. In asexual reproduction, a propagule may be a woody, semi-hardwood, or softwood cutting, leaf section, or any number of other plant parts. In sexual reproduction, a propagule is a seed. In micropropagation, a type of asexual reproduction, any part of the plant may be used, though it is usually a highly meristematic part such as root and stem ends or buds.
recreation	Any physical or psychological revitalization through the voluntary pursuit of leisure time
repatriation	The act of returning artifacts or human remains to the associated Native American Tribe.
riparian	Pertaining to anything connected with or immediately adjacent to the banks of a stream.
root zone	The area and volume of soil around the tree in which roots are normally found.
ruderal species	A plant species that is first to colonize disturbed lands. The disturbance may be natural (e.g., wildfires or avalanches), or due to human influence - constructional (e.g., road construction, building construction or mining), or agricultural (e.g., abandoned farming fields or abandoned irrigation ditches). A plant that grows in wasteland, trash, or disturbed ground.
quick coupler	A type of fitting with two connections. The two connections are inline with each other. This fitting is used to extend or repair damage in a run of pipe or tube.

Term	Definition
scarification	Loosening top soil or breaking up the forest floor to improve conditions for seed germination or tree planting. Also refers to nicking or abrading the hard seed coat of some species to aid germination.
schistose rock	A group of medium-grade metamorphic rocks, chiefly notable for the preponderance of lamellar minerals such as micas, chlorite, talc, hornblende, graphite, and others
semi-improved grounds	Semi-improved grounds on the POM are located in the urban forest area adjacent to and north of Kit Carson Road. Semi-improved grounds include areas on which periodic maintenance is performed at a lower frequency and intensity than on improved grounds. 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.
serpentine outcrop	Interesting geologic formation, often home to unique assemblages of plant species.
slurry	A watery mixture or suspension of insoluble (not dissolved) matter; a thin watery mud or any substance resembling it (such as a grit slurry or a lime slurry).
snag	A standing dead tree trunk and any attached branches.
special status species	Any species of fish, wildlife, or plant that is officially listed as rare, threatened, endangered, or candidate for rare, threatened, or endangered species listing under the state or federal Endangered Species Acts.
species of concern	An informal term for a plant or animal with declining populations and believed in need of concentrated conservation actions such as research, monitoring, or removal of threats, and given legal classification as threatened or endangered
stormwater	That portion of rainfall that does not infiltrate into the soil.
subtype	A subtype of a type characterizes a subset of the values of the type.

Term	Definition
superphosphate	Superphosphate is a fertilizer produced by the action of concentrated sulfuric acid on ground phosphate rock.
"take"	The term "take" as defined in the Endangered Species Act means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a federally listed species, or attempt to engage in any such conduct.
threatened species	Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
traditional cultural property	A site or resource that is eligible for inclusion in the National Register Historic Places because of its association with cultural practices or beliefs of a living community.
tussock-like	Similar to a plant-form that is tufted, bearing many stems arising as a large dense cluster from the crown.
turfgrass	Grasses that, when regularly mowed, form a dense growth of leaf blades and roots.
understory	Any plants, particularly shrubs, growing under a tree canopy.
unimproved grounds	Primarily the undeveloped open space areas on the POM. Unimproved lands are located in the upper POM in the area located between Building 630 and Hilltop Field in a Monterey pine forest, and the Huckleberry Hill Nature Preserve.
vegetative feature	A feature is any part of the landscape, whether natural (such as a stream or ridge) or artificial (such as a road or power line). In geographic context, features are any part of the landscape portrayed on a map, including nonvisible boundaries of legal entities, such as city limits and county lines. A vegetative feature refers to a particular plant or plant population usually trees or shrubs that can be seen on an aerial map.
waterbar	A low barrier, sometimes accompanied by a ditch, designed to divert water off a route surface.

Term	Definition
wetland	Lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface
wildfire	Fire that burns quickly and uncontrollably in a forest area or area of thick brush.
xeriscaping	Method of landscaping that uses plants that are well adapted to the local area and are drought-resistant

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TABLES

Table 1. Monthly Climate Data for Monterey 1949-2006

Integrated Natural Resources Plan
POM and OMC
Monterey County, California

	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Maximum Temperature (F)	59.8	61.5	61.9	63.5	64.6	66.7	67.9	69.1	71.7	70.3	65.2	60.5	65.2
Average Minimum Temperature (F)	43.4	44.5	45.1	45.8	48.0	50.3	51.9	52.9	52.9	50.9	47.1	43.8	48.1
Average Total Precipitation (in.)	4.17	3.29	3.22	1.56	0.50	0.20	0.07	0.10	0.25	0.84	2.33	3.27	19.80
Average Total Snowfall (in.)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

Source: Western Regional Climate Center 2007

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Abelia grandiflora	Glossy abelia	I	S	DL, H
Acacia baileyana	Bailey acacia	I	T	H
Acacia longifolia	Sydney golden wattle	I	S	H
Acacia melanoxylon	Black wood acacia	I	T	H
Acer macrophyllum	Big leaf maple	I	T	DL
Achillea millefolium	Common yarrow	N	F	MPF, RF, H
Adenostoma fasciculatum	Chamise	N	S	MPF, MC
Agapanthus africanus	Lily-of-the-nile	I	F	DL, MC, H
Agave sp.	Agave	I	U	DL
Agrostis pallens	Bentgrass	N	G	GL,OW, MC
Aira caryophyllea	Silver European hairgrass	I	G	ALL
Allium tribracteatum	Three-cornered onion	I	M	RF
Amelanchier sp.	Service-berry	I	S/T	MPF
Anagallis arvensis	Scarlet pimpernel	I	F	ALL
Anthricus caucalis	Bur-chervil	I	F	DG, OW, H
Arbutus menziesii	Madrone	N	T	MPF
Arbutus unedo	Strawberry tree	I	T	H
Arceuthobium campylopodum	Dwarf mistletoe	I	P	MPF, DL
Arctostaphylos hookeri	Hooker's manzanita	N	S	MPF
Arctostaphylos pumila	Sandmat manzanita	N	S	MC
Arctostaphylos tomentosa	Shaggy-barked manzanita	N	S	MPF, MC, OW
Arctotis stoechadifolia	Arctotis daisy	I	F	DL, H
Artemisia californica	California sagebrush	N	S	CS
Athysanus pusillus	Dwarf athysanus	N	F	MC, GL, CS

Table 2. Plant Species Expected at the POM and OMC, Monterey County, California				
Scientific Name	**Common Name**	**Native / Introduced**	**Life Form**	**Plant Community**
Avena barbata	Slender wild oat	I	G	MPF, RF, DG, GL, DG, OW
Avena fatua	Wild oat	I	G	MPF, RF, DG, GL, OW
Baccharis pilularis	Coyote brush	N	S	MPF, CS, SD, OW, MC
Bambusa glaucescens 'golden goddess'	Golden goddess bamboo	I	G	DG
Bellis perennis	English daisy	I	F	GL, H
Betula pendula	Weeping birch	I	T	H
Brassica nigra	Black mustard	I	F	GL, DG
Briza maxima	Rattlesnake grass	I	G	MPF, RF, DG, GL, DG, OW
Briza minor	Quaking grass	I	G	MPF, RF, DG, GL, OW
Bromus carinatus	California brome	N	G	RF, MPF, GL, DG, OW
Bromus diandrus	Ripgut grass	I	G	ALL
Bromus hordeaceus	Soft chess	I	G	ALL
Bromus madritensis rubens	Red brome	I	G	GL, DG, OW, MC
Bromus tectorum	Cheat grass	I	G	MPF
Calamagrostis nutkaensis	Pacific reedgrass	N	G	MPF, RF
Calochortus albus	Globe lily	N	M	MPF, RF
Calyptridium monandrum	Common calyptridium	N	F	MC
Calystegia subacaulis	Hill morning-glory	N	F	GL
Camassonia micrantha	Minature evening primrose	N	F	CS, MC, GL

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Camassonia ovata	Sun cup	N	F	MPF, RF, CS, MC, GL
Cardamine californica	Toothwort, milkmaids	N	F	MPF, RF, OW
Cardionema ramosissimum	Sand mat	N	F	CS, MC
Carduus pycnocephalus	Italian thistle	I	F	GL, OW
Carex densa	Dense sedge	N	M	MPF, RF
Carex globosa	Round-fruited sedge	N	M	MC
Carex harfordii	Monterey sedge	N	M	MPF, RF
Carpobrotus chilensis	Chilean iceplant, sea-fig	I	U	ALL
Carpobrotus edulis	African iceplant, hottentot fig	I	U	ALL
Castilleja affinis	Coastal paintbrush	N	F	MPF, RF
Castilleja densiflorus	Owl's clover	N	F	GL
Castilleja exserta	Purple owl's clover	N	F	GL, MC
Ceanothus sp.	Creeping ceanothus	I	S	DL
Ceanothus cuneatus rigidus	Monterey ceanothus	N	S	MC
Ceanothus dentatus	Dwarf or tooth-leaved ceanothus	N	S	MPF, MC
Ceanothus thyrsiflorus	Blue blossom	N	S	MPF
Cedrus atlantica	Atlas cedar	I	T	H
Centurea melitensis	Tocalote	I	F	GL
Centurea sostitialis	Yellow starthistle	I	F	GL, OW, RF
Cerastium glomeratum	Mouse-ear chickweed	I	F	ALL
Chlorogalum pomeridianum	Soap plant	N	M	MPF, RF, OW
Chorizanthe p. Pungens	Monterey spine-flower	N	F	MC, CS, OW, GL

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Cirsium occidentale	Cobwebby or Western thistle	N	F	RF, MPF, DG, DL, OW
Cirsium vulgare	Bull thistle	I	F	DL, DG, RF, GL, OW, CS
Cistus sp.	Rock rose	I	S	DL
Claytonia perfoliata	Miner's lettuce	N	F	MPF, RF, OW
Conium maculatum	Poison hemlock	I	F	RF, DL, OW, DG
Conyza bonariensis	South American conyza	I	F	ALL
Conyza canadensis	Western horseweed	N	F	GL
Cordyline australis	Dracaena	I	M	DL
Cortaderia jubata	Andean pampas grass, Jubata grass	I	G	DG, RF, MPF
Cortaderia selloana	Uruguayan pampas grass	I	G	DG, RF, MPF
Cotoneaster sp.	Cotoneaster	I	S	DG, H
Cotula australis	Australian brass-buttons	I	F	GL, H
Crassula argentea	Jade plant	I	F	DL
Crassula erecta	Sand pygmy-stonecrop	N	F	MC, CS
Croton californicus	California croton	N	F	OW, CS
Cupressus macrocarpa	Monterey cypress	I	T	H, GL, DL
Cytisus scoparius	Scotch broom*	I	S	DG, MPF, RF
Danthonia californica	California oatgrass	N	G	OW, GL
Daucus pusillus	Rattlesnake weed	N	F	OW, DG, GL, MPF
Deschampsia cespitosa	Pacific tufted hairgrass	N	G	RF, MPF
Dichelostemma capitatum	Blue dicks	N	M	MPF, RF, OW
Dodonaea viscosa	Hopseed bush	I	S	DL, H

Table 2. Plant Species Expected at the POM and OMC, Monterey County, California				
Scientific Name	**Common Name**	**Native / Introduced**	**Life Form**	**Plant Community**
Dryopteris arguta	Wood fern	N	F	MPF, RF, OW
Dudleya sp.	Dudleya	N	F	MPF
Echium fatuosum	Pride of madiera	I	S	DL
Elymus glaucus	Blue wildrye	N	G	RF, MPF, OW
Erechtites glomerata	Australian fireweed	I	F	MPF, RF, DG, OW
Eremocarpus setigerus	Turkey mullein	N	F	GL
Ericameria ericoidies	Mock heather	N	F	CS
Eriobotrya japonica	Loquat	I	T	H
Erigonum nudum	Naked buckwheat	N	F	CS, MC
Eriophyllum confertiflorum	Golden yarrow	N	S	MPF, CS, MC
Erodium botrys	Broadleaf filaree	I	F	ALL
Erodium cicutarium	Redstem filaree	I	F	ALL
Escallonia sp.	Escallonia	I	S	H
Eschscholzia californica	California poppy	N	F	RF, MPF, DG, OW, GL
Eucalyptus camodulensis	Red gum	I	T	H
Eucalyptus ficifolia	Red flowering gum	I	T	H
Eucalyptus globulus	Bluegum eucalyptus	I	T	H
Eucalyptus lehmanii	Bushy yate	I	T	H
Eucalyptus potheyanthemos	Silver dollar eucalyptus	I	T	H
Eugenia sp.	Brush cherry	I	S	DL
Euryops pectinatus	African daisy	I	S	DL
Festuca sp.	Fescue	I	G	GL, H
Festuca arundinacea	Tall fescue	I	G	GL
Festuca rubia	Red fescue	I	G	GL
Festuca rubra commutate	Chewings fesue	I	G	GL

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Filago californica	California filago	N	F	MPF, RF, OW
Filago gallica	Wooly filago	I	F	MC, CS, GL
Foeniculum vulgare	Fennel	I	F	DG, DL
Fragaria vesca	Wood strawberry	N	F	MPF
Fritillaria affinis	Checker lily	N	M	MPF
Galium aparine	Goose grass, bedstraw	N	F	RF, MPF, OW,
Galium califomicum	California bedstraw	N	F	RF, MPF, OW, CS, MC
Gastridium ventricosum	Nit grass	I	G	GL, DL
Gaultheria shouldon	Salal	N	S	MPF
Gazania linearis	Gazania	I	F	DL, H
Genista monspessulana	French broom*	I	S	DG, MPF, RF CS, GL, MC, DL
Geranium dissectum	Cutleaf geranium	I	F	GL, OW
Geranium molle	Annual cranesbill, Dovefoot geranium	I	F	ALL
Gnaphalium luteo-album	Cudweed everlasting	I	F	ALL
Gnaphalium purpureum	Purple cudweed	N	F	CS, MC, OW
Gnaphalium ramosissimum	Pink everlasting	N	F	OW
Hedera helix	English ivy	I	V	RF, DL
Helianthemum scoparium	Peak rush-rose	N	F	MPF, MC
Heliotropium curassavicum	Heliotrope	N	F	GL
Hemizonia corymbosa	Coast tarplant	N	F	GL
Hemizonia fasciculata	Fasciculed tarplant	N	F	GL
Heteromeles arbutifolia	Toyon	N	S	MPF, RP, MC, OW

Table 2. Plant Species Expected at the POM and OMC, Monterey County, California				
Scientific Name	**Common Name**	**Native / Introduced**	**Life Form**	**Plant Community**
Heterotheca grandiflora	Telegraph weed	N	F	OW, GL, CS, MC
Hirschfeldia incana	Summer mustard	I	F	GL, DL
Holcus lanatus	Common velvet grass	I	G	ALL
Hordeum brachyantherum	Meadow barley	I	G	GL
Hordeum murinum leporinum	Hare barley	I	G	ALL
Horkelia cuneata	Wedge-leaf horkelia	N	F	MC, GL, CS
Hypochaeris glabra	Smooth catears	I	F	ALL
Hypochoeris radicata	Hairy catsears	I	F	OW
Ilex aquifolium	English holly	I	S	DL, *H*
Iris douglasiana	Douglas iris*	N	M	RF, MPF
Juncus bufonius	Toad rush	N	M	RF, MPF, DG
Juncus effusus	Soft rush	N	M	RF, MPF
Juncus falcatus	Sickle-leaf rush	N	M	RF, MPF
Juncus patens	Spreading rush	N	M	RF, MPF
Juncus tenuis	Slender rush	N	M	RF, MPF
Juniperus chinensis 'Torulosa'	Hollywood juniper	I	S	DL, H
Lathyrus vestitus	Pacific peavine	N	F	RF, MPF, OW
Layia hieracioides	Tall layia	N	F	CS, MC
Layia platylglossa	Tidy tips	N	F	GL
Lepidium nitidum	Common peppergrass	N	F	GL
Lessingia filaginifolia californica	California aster	N	F	RF, MPF
Lessingia plandulifera pectinata	Valley lessingia	N	F	MC, CS
Leymus triticoides	Creeping ryegrass	N	F	GL, OW
Linaria canadensis	Toadflax	N	F	GL
Liquidambar stryraciflua	American sweet gum	I	T	H

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Lolium multiflorum	Italian ryegrass	I	G	ALL
Lomatium califomicum	California lomatium	N	F	MPF
Lomatium parvifolium	Small-leaved lomatium	N	F	MPF
Lonicera hispidula	California honeysuckle	N	V	MPF, OW, RF
Lonicera involucrata	Twinberry	N	S	MPF
Lotus formosissimus	Seaside trefoil	N	F	RF, MPF, DG
Lotus heermannii	Heerman's lotus	N	F	GL
Lotus humistratus	Short-podded lotus	N	F	RF, MPF, DG, GL
Lotus indica	Sourclover	I	F	RF, MPF, DG
Lotus micranthus	Tiny lotus	N	F	GL
Lotus purshianus	Pursh's lotus	N	F	GL
Lotus scoparius	Deerweed	N	S	MC, CS
Lotus wrangelianus	Trefoil	N	F	RF, MPF, DG, GL
Lupinus arboreus	Tree lupine, bush lupine	I	F	RF, MPF, DG, CS
Lupinus bicolor	Bicolor lupine	N	F	GL
Lupinus nanus	Sky lupine	N	F	GL
Luzula subsessilis	Woodrush	N	S	GL, OW
Lyanothamnus floribundus	Catalina ironwood	I	T	H
Madia exigua	Little tarplant	N	F	GL, MC, CS
Madia gracilis	Slender madia	N	F	GL, MC, CS
Madia madioides	Woodland tarplant	N	F	GL
Malva parviflora	Cheeseweed mallow	I	F	GL, DL
Malacothrix californica	California malacothxix	N	F	MPF
Marah fabaceous	California manroot	N	V	RF, MPF, OW

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Medicago polymorpha	California burclover	I	F	ALL
Melica californica	California melic grass	N	G	GL, MC, CS
Melica imperfecta	Coast melic grass	N	G	GL, MC, CS
Melilotus indica	Sourclover	I	F	OW, CS
Melilotus officinalis	Yellow sweetclover	I	F	DG
Micropus californicus	Slender cottonseed	N	F	MC, CS
Microseris lindleyi	Uropappus	N	F	GL
Mimulus aurantiacus	Bush monkeyflower	N	S	MPF, CS, MC, OW, RF
Myoporum laetum	Ngaio myoporum	I	S/T	H
Myrtus communis	Myrtle	I	S	DL
Nandina domestica	Heavenly bamboo	I	S	DL
Nasella cernua	Nodding needlegrass	N	G	MPF
Nasella lepida	Foothill needlegrass	N	G	GL
Nasella pulchra	Purple needlegrass	N	G	GL
Navarretia atractyloides	Rough navarretia	N	F	MC
Navarretia intertexta	Needle-leaved navarretia	N	F	CS, MC
Nemophila menziesii	Baby blue-eyes	N	M	OW
Nerium oleander	Oleander	I	S	DL, H
Oxalis pes-caprae	Bermuda buttercup	I	F	DG, GL, DL, RF, H
Pectocarya linearis	Slender pectocarya	N	F	GL, OW
Pedicularis densiflora	Indian warrior	N	F	MPF
Pelargonium sp.	Garden geranium	I	F	DG
Pelargonium domesticum	Regal geranium	I	F	H
Pelargonium hortorum	Common geranium	I	F	H

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Pennisetum clandestinum	Kikuyu grass*	I	G	ALL
Phalaris aquatica	Harding grass	I	G	GL
Phalaris californica	California canarygrass	I	G	RF, DG, MPF
Phormium tenax	New zealand flax	I	M	DL
Pinus densiflora 'Umbraculifera'	Tanyosho pine	I	T	H
Pinus muricata	Bishop pine	N	T	MPF
Pinus pinea	Italian stone pine	I	T	H
Pinus radiata	Monterey pine	N	T	MPF, HT
Piperia yadonii	Yadon's piperia (rein orchid)	N	F	MPF
Pittosporum spp.	Tobira, pittosporum	I	S	DG
Pittosporum crassifolium	White pittosporum	I	S	H
Pentagramma triangularis	Goldenback fern	N	F	OW
Plagiobothrys tenellus	Slender popcornflower	N	F	GL, MC
Plantago coronopus	Cut-leaf plantain	I	F	ALL
Plantago erecta	California plantain	N	F	GL, DG
Plantago lanceolata	English plantain	I	F	DL, GL, DG
Poa annua	Annual bluegrass	I	G	DL, GL, DG, H
Podocarpus macrophyllus	Yew pine	I	S	H, DG
Polycarpon tetraphyllum	Four-leaved polycarp	I	F	H, DG
Polygala californica	California milkwort	N	F	MC, OW
Polypodium scouleri	Leather-leaf fem	N	F	MPF
Potentilla glandulosa	Cinquefoil	N	F	MPF
Prunus sp.	Plum	I	T	DG, H
Pteridium aquilinum pubescens	Bracken fern	N	F	MPF, CS, OW, MC

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Pterostegia drymarioides	Fairy mist	N	F	GL, OW, MC, CS
Pyracantha fortuneana	Firethorn	I	S	H
Quercus agrifolia	Coast live oak	N	T	MPF, RF, OW, H
Quercus ilex	Holly oak	I	T	H
Ranunculus californica	California buttercup	N	F	MPF, OW, GL
Raphanus sativus	Radish	I	F	DG
Raphiolepis indica	Indian hawthorn	I	T/ S	DL, H
Rhamnus californica	California coffeeberry	N	S	MPF, MC, OW, CS
Rhus integrifolia	Lemonadeberry	I	S	MPF
Rosa californica	California rose	N	S	MPF, OW, CS, RF
Rosa gymnocarpa	Woodrose	N	S	MPF
Rosmarinus officinalis	Rosemary	I	S	DL, H
Rubus discolor	Himalaya berry	I	V	RF, OW
Rubus ursinus	California blackberry, Pacific blackberry	N	V	MPF, RF, OW
Rumex acetosella	Sheep sorrel	I	F	MPF, RF, DG, GL, OW, CS, MC
Rumex crispus	Curly dock	I	F	RF
Sagina apetala	Dwarf pearlwort	I	F	DG
Salix laevigata	Red willow	N	S/T	DG
Salix lasiolepis	Arroyo willow	N	S/T	RF, DG
Salix scouleriana	Scouler's willow	N	S/T	RF
Salvia mellifera	Black sage	N	S	MC, CS
Sanicula crassicaulis	Pacific sanicle	N	F	MPF, OW

Table 2. Plant Species Expected at the POM and OMC, Monterey County, California				
Scientific Name	**Common Name**	**Native / Introduced**	**Life Form**	**Plant Community**
Sanicula lacinata	Coast sanicle	N	F	MPF
Satureja douglasii	Yerba buena	N	F	RF, MPF, OW
Senecio mikanioides	German ivy, Cape ivy	I	V	RF
Senecio sylvaticus	Ragwort	I	F	DG
Senecio vulgaris	Common groundsel	I	F	ALL
Sequoia sempervirens	Coast redwood	I	T	H
Sidalcea malviflora	Checkerbloom	N	F	MPF, OW, GL
Silene gallica	Catchfly	I	F	RF, MPF, OW
Silybum marianum	Blessed milk thistle	I	F	GL, OW
Sisyrinchium bellum	Blue-eyed grass	N	M, F	MPF, GL
Solanum umbelliferum	Blue witch	N	S	MPF, MC
Solidago californica	California goldenrod	N	F	RF
Soliva sessilis	Common soliva	I	F	DG
Sonchus asper	Prickly or Spiny sow thistle	I	F	ALL
Sonchus oleraceus	Common sow thistle	I	F	DG, GL, CS
Spergula arvensis	Spurrey	I	F	DG
Spergularia macrotheca	Beach sandspurry	N	F	MC, DG
Spergularia rubra	Purple sandspurry	I	F	DG, MC, CS
Spiranthes romanzoffiana	Hooded ladies-tresses	N	F	MPF, DG
Stachys bullata	California hedge nettle	N	F	MPF, RF, GL, OW
Stellaria media	Common chickweed	I	U	MPF, RF, DG, H, OW
Symphoricarpos mollis	Creeping snowberry	N	S	MPF, RF, OW
Taraxacum officinale	Dandelion	I	F	GL, DG, MPF, H
Thuja sp.	Arborvitae	I	S	H

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Toxicodendron diversilobum	Poison-oak	N	S	MPF, RP, CS, MC, OW
Trachelospermum jasminoides	Star jasmine	I	V	H
Trifolium barbigenum	Bearded clover	N	F	GL
Trifolium campestre	Hop clover	I	F	GL
Trifolium hirtum	Rose clover	I	F	ALL
Trifolium incarnatum	Crimson clover	I	F	DG, DL
Trifolium repens	White clover	I	F	H
Trifolium variegatum	White tip clover	N	F	GL
Trifolium willdenovii	Tomcat clover	N	F	GL, OW
Triphysaria pusilla	Dwarf owl's clover	N	F	GL
Triteleia ixioides	Golden brodiaea, Pretty face	N	M	MPF
Triticum aestivum	Sterile wheatgrass	I	G	DG, DL
Tropaeolum majus	Garden nasturtium	I	F	RF
Typha latifolia	Broad-leaved cattail	N	M	RF
Vaccinium ovatum	California huckleberry	N	S	MPF
Veronica persicaria	Persian speedwell	I	F	RF
Vicia americna	American vetch	N	F	GL, OW
Vicia sativa	Spring vetch	I	F	MPF, RF, DG, GL, OW
Vicia villosa	Hairy vetch	I	F	MPF, RF, DG, GL, OW
Vinca major	Big periwinkle	I	F	RF, H
Vitis californica	California wild grape	N	V	RF
Vulpia megalura	Foxtail fescue	I	G	GL
Vulpia microstachys	Pacific fescue	I	G	DL, DG
Vulpia myuros	Rattail fescue	I	G	ALL

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

Scientific Name	Common Name	Native / Introduced	Life Form	Plant Community
Vulpia octoflora	Six-weeks fescue	I	G	GL
Vulpia pacifica	Pacific fescue	N	G	GL
Washingtonia robusta	Mexican fan palm	I	T	DL
Wyethia angustifolia	Narrow-leaf mules ears	N	F	MPF
Xylosma congestum	Shiny green xylosma	I	S	DG, H
Yucca sp.	Yucca	I	M	DL, H
Zantedeschia aethiopica	Calla lily	I	M	DL
Zigadenus fremontii	Death camas	N	M	MPF

KEY		
T = TREE	N =NATIVE	H = Horticultural Planting
S = SHRUB	I = INTRODUCED	DL = Developed Lands
G = GRASS		MPF = Monterey Pine Forest
F = FORB (Dicot or Fern)		GL = Grassland or Lawn
V = VINE	* = CALIFORNIA NOXIOUS WEED	RF = Riparian Forest
M = MONOCOT (not a grass)		DG = Disturbed Ground
U = SUCCULENT		OW = Coast live oak woodland
P = PARASITIC		CS = Coastal shrub
		MC = Maritime chaparral

Table 3. Normal Year Evapotranspiration Rate (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

Table 4. 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 5. Turfgrass 3-Day Water Requirements POM and OMC, Monterey County, California		
	Water Requirements (minutes)	
Month	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 6. Estimated Values for Species, Density and Microclimate Factors at the 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
Groundcover	0.7	0.5	0.2	1.1	1	0.5	1.2	1	0.5
Mixed: Trees, Shrubs, Groundcover	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 7. Native Species Suitable for Planting in Monterey Pine and Riparian Forest at the POM and OMC, Monterey County, California

Scientific Name	Common Name	Riparian or Monterey Pine Forest
Grasses		
Agrostis pallens	Bentgrass	R or MPF
Bromus carinatus	California brome	R or MPF
Calamagrostis nutkaensis	Pacific reedgrass	R or MPF
Danthonia californica	California oatgrass	R or MPF
Deschampsia cespitosa holciformis	Pacific tufted hairgrass	R or MPF
Elymus glaucus	Blue wildrye	R or MPF
Festuca rubra	Red fescue	R or MPF
Nasella cernua	Nodding needlegrass	MPF
Forbs		
Achillea millefolium	Yarrow	R or MPF
Calochortus albus	Globe lily	R or MPF
Carex densa	Dense sedge	R
Carex harfordii	Monterey sedge	R
Chlorogalum pomeridianum	Soap plant	R or MPF
Diplacus sp.	Bush monkeyflower	R or MPF
Dryopteris arguta	Wood fem	R or MPF
Eriophyllum confertiflorum	Golden yarrow	MPF
Eschscholzia californica	California poppy	R or MPF
Fragaria vesca	Wood strawberry	R or MPF
Helianthemum scoparium	Peak rush-rose	MPF
Juncus bufonius	Toad rush	R or MPF
Juncus effusus	Soft rush	R or MPF
Juncus falcayus	Sickle-leaf rush	R or MPF
Juncus patens	Spreading rush	R or MPF
Juncus tenuis	Slender rush	R or MPF
Lessingia filaginifolia californica	California aster	R or MPF
Lupinus nanus or bicolor	Lupine	R or MPF
Polypodium scouleri	Leather-leaf fem	R or MPF

Table 7. Native Species Suitable for Planting in Monterey Pine and Riparian Forest at the POM and OMC, Monterey County, California

Scientific Name	Common Name	Riparian or Monterey Pine Forest
Satureja douglasii	Yerba buena	R or MPF
Sisyrinchium bellum	Blue-eyed grass	R or MPF
Stachys bullata	California hedge nettle	R or MPF
Shrubs		
Adenostoma fasciculatum	Chamise	MPF
Arctostaphylos hookeri	Hooker's manzanita	MPF
Arctostaphylos tomentosa	Shaggy-barked manzanita	MPF
Ceanothus dentatus	Dwarf ceanothus	R or MPF
Ceanothus thyrsiflorus	Blue blossom	R or MPF
Gaultheria shallon	Salal	R or MPF
Heteromeles arbutifolia	Toyon	R or MPF
Lonicera involucrata	Twinberry	MPF
Mimulus aurantiacus	Bush monkeyflower	R or MPF
Rhamnus californica	California coffeeberry	R or MPF
Rosa californica	California rose	R or MPF
Rosa gymnocarpa	Woodrose	R or MPF
Symphoricarpos mollis	Creeping snowberry	R or MPF
Vaccinium ovatum	California huckleberry	R or MPF
Vines		
Lonicera hispidula	California honeysuckle	R or MPF
Rubus ursinus	California blackberry	R or MPF
Vitis californica	California wild grape	R
Trees		
Arbutus menziesii	Madrone	MPF
Pinus radiata	Monterey pine	MPF
Quercus agrifolia	Coast live oak	R or MPF
Salix lasiolepis	Arroyo willow	R
Salix scouleriana	Scouler's willow	R

Table 8. Recommended Grass Varieties for Lawn Planting at the POM and OMC, Monterey County, California		
Use fescue varieties that do NOT include Tall fescue **Acceptable fescue types are: Hard, Chewings, Meadow, Red, Browntop Bent, Smooth-stalked, Slender creeping**	**Variety**	**Seeding Rate (pounds per 1,000 sq. ft.)**
Florentine creeping red 40%, Tiffany Chewing's fescue 40%, Shadow II fescue 10%, Little Bighorn hard fescue 10%	"Bonnie Dunes"	10
Hard Chewings and Creeping red fescue	"Fine Fescue"	10
Creeping Red	"Boreal, Flyer, or Florentine"	10
Hard fescue	"Little Bighorn or Predator"	10
Chewing's fescue	"Seven Seas or Shadow"	10
Ryegrass, Fine fescue and Kentucky bluegrass	"Polo Mix"	10

Table 9. Species Suitable for Planting in Improved Grounds at the POM and OMC, Monterey County, California		
Scientific Name	**Common Name**	**Native / Introduced**
The native plants listed in Table 7 should be considered first		
Perennials		
Achillea millefolium	Yarrow	N
Agapanthus africanus	Lily-of-the-Nile	I
Agave sp.	Agave	I
Aloe sp.	Aloe	I
Crassula sp.	Stonecrop	I
Dietes sp.	Fortnight iris	I
Echeveria sp.	Hens and chicks	I
Iris 'Pacific Coast Hybrids'	Iris	N/I
Lavandula sp.	Lavender	I
Leonotis leonurus	Lion's tail	I
Pelargonium domesticum	Regal geranium	I
Pelargonium hortorum	Common geranium	I
Perovskia atriplicifolia	Russian sage	I
Phlomis fruiticosa	Jerusalem sage	I
Phormium tenax	New Zealand flax	I
Romneya coulteri	Fried-egg flower	N
Salvia leucantha	Mexican bush sage	I
Santolina chamaecyparissus	Santolina	I
Verbena sp.	Verbena	I
Epilobium canum	California fuchsia	N
Groundcovers		
Fragaria chiloensis	Beach strawberry	N
Fragaria vesca	Wood strawberry	N
Rosmarinus officinalis 'prostratus'	Rosemary	I
Salvia sonomensis	Creeping sage	N/I

Table 9. Species Suitable for Planting in Improved Grounds at the POM and OMC, Monterey County, California		
Scientific Name	**Common Name**	**Native / Introduced**
Satureja douglasii	Yerba buena	N
Shrubs		
Abelia grandiflora	Glossy abelia	I
Arctostaphylos h. hookeri	Hooker's manzanita	N
Arctostaphylos pumila	Sandmat manzanita	N
Arctostaphylos tomentosa	Shaggy-bark manzanita	N
Ceanothus dentatus	Tooth-leaf ceanothus	N
Ceanothus thyrsiflorus	Blue blossom	N
Cistus sp.	Rockrose	I
Dodonea viscosa	Hopseed bush	I
Escallonia exoniensis 'Fradesii'	Frades' escallonia	I
Escallonia rubra	Red escallonia	I
Garrya elliptica	Silk tassel	N
Gaultheria shallon	Salal	N
Hakea laurina	Sweet hakea	I
Heteromeles arbutifolia	Toyon	N
Juniperus sp.	Juniper	I
Laurus nobilis	Grecian bay	I
Lavatera bicolor	Bicolor tree mallow	I
Lavatera thuringaceae	Tree mallow	I
Lonicera involucrata	Twinberry	N
Mimulus aurantiacus	Bush monkeyflower	N
Myrica californica	California wax myrtle	N
Nandina domestica	Heavenly bamboo	I
Nerium oleander	Oleander	I
Pittosporum crassifolium	White pittosporum	I
Podocarpus macrophyllus	Yew pine	I
Pyracantha fortuneana (this species only)	Firethorn	I

Table 9. Species Suitable for Planting in Improved Grounds at the POM and OMC, Monterey County, California

Scientific Name	Common Name	Native / Introduced
Raphiolepis indica	Indian hawthorn	I
Rhamnus alaternus	Italian buckthorn	I
Rhamnus californica	California coffeeberry	N
Rhus integrifolia	Lemonadeberry	N/I
Rosa californica	California rose	N
Rosa gymnocarpa	Woodrose	N
Rosamarinus officinalis	Rosemary	I
Salvia clevelandii	Cleveland's salvia	N
Salvia greggii	Mexican sage	I
Salvia mellifera	Black sage	N
Sollya heterophylla	Australian bluebell creeper	I
Taxus sp.	Yew	I
Trichostema lanatum	Woolly bluecurls	N/I
Vaccinium ovatum	California huckleberry	N
Westringia rosmariniformis	Westringia	I
Xylosma congestum.	Shiny green xylosma	I
Vines		
Bougainvillea sp.	Bougainvillea	I
Wisteria sinensis	Chinese wisteria	I
Tecomaria capensis	Cape honeysuckle	I
Trachelospermum jasminoides	Star jasmine	I
Vitis californica	California wild grape	N
Trees		
Aesculus califonica	Buckeye	N
Arbutus ' 'Marina'	Red-flowering madrone	I
Arbutus menziesii	Madrone	N
Arbutus unedo	Strawberry tree	I

Table 9. Species Suitable for Planting in Improved Grounds at the POM and OMC, Monterey County, California		
Scientific Name	**Common Name**	**Native / Introduced**
Cupressus macrocarpa	Monterey cypress	N/I
Lyonothamnus floribundus	Catalina ironwood	N/I
Pinus muricata.	Bishop pine	N
Pinus radiata	Monterey pine	N
Quercus agrifolia	Coast live oak	N
Quercus ilex	Holly oak	I
Schinus molle	California pepper	I
Schinus terebinthifolius	Brazilian pepper	I
Sequoia sempervirens	Coast redwood	N/I
N/I = Native to California but Introduced to the Installation		

Table 10. Invasive Plant Species that Should be Avoided and Controlled at the POM and OMC, Monterey County, California

Scientific Name	Common Name	2006 CA Priority	Available Treatment Methods
Grasses			
Avena barbata	Slender wild oat	Medium	Manual or chemical
Avena fatua	Wild oat	Medium	Manual or chemical
Briza maxima	Rattlesnake grass, Big quaking grass	Low	Manual, mechanical, chemical or fire
Bromus diandrus	Ripgut brome	Medium	Chemical or fire or biocontrol (sheep grazing) or manual for small infestations
Bromus hordeaceus	Soft chess	Low	Chemical or manual or biocontrol (grazing)
Bromus madritensis rubens	Red brome	High	Chemical or manual or biocontrol (grazing)
Bromus tectorum	Cheat grass, downy brome	High	Chemical or manual or biocontrol (grazing)
Cortaderia jubata	Andean pampas grass, jubata grass	High	Chemical or manual and mechanical
Cortaderia selloana	Uruguayan pampas grass	High	Chemical or manual and mechanical
Festuca arundinacea	Tall fescue	Medium	Manual or chemical
Gazania linearis	Gazania**	Low	Manual or chemical
Hirschfeldia incana	Summer mustard**	Low	Manual
Holcus lanatus	Velvet grass**	Low	Manual or chemical
Hordeum murinum or marinum	Hare, mediterranean or wall barley	Medium	Combination works best: Manual, mechanical, chemical, biocontrol (grazing) or fire
Lolium multiforum	Italian ryegrass	Medium	Chemical
Pennisetum clandestinum	Kikuyu grass*	Low	Chemical, optional follow-up with fire and revegetation with native species
Pennisetum setaceum	Fountain grass	Medium	Manual or chemical

Table 10. Invasive Plant Species that Should be Avoided and Controlled at the POM and OMC, Monterey County, California

Scientific Name	Common Name	2006 CA Priority	Available Treatment Methods
Phalaris aquatica	Harding grass	Medium	Mechanical (mowing), manual, chemical or fire
Poa annual	Annual bluegrass**	Low	Manual or chemical
Vulpia myuros	Rattail fescue	Medium	Manual or chemical
Forbs			
Allium triquetrum	Three square onion**	Low	Manual or chemical
Amarylis billadonna	Naked ladies	Low	Manual remove bulb
Arctotis stoechadifolia	Arctotis daisy**	Low	Chemical or manual
Brassica nigra	Black mustard	Medium	Manual or chemical
Carduus pycnocephalus	Italian thistle	Medium	Manual or biocontrol (sheep), temporary control with chemical, mechanical (regrowth)
Carpobrotus chiliensis	Chilean iceplant, sea-fig	Medium	Chemical or manual
Carpobrotus edulis	African iceplant, Hottentot fig	High	Chemical or manual
Centurea melitensis	Tocalote, malta starthistle	Medium	Mechanical (weedwhacker), manual or chemical
Centurea solstitialis	Yellow starthistle	High	Chemical, chemical with fire or manual (includes shading with mulch), or biocontrol (sheep)
Cirsium vulgare	Bull thistle	Medium	Mechanical (weedwhacker), manual, chemical or biocontrol (sheep)
Conium maculatum	Poison hemlock (toxic)	Medium	Manual, mechanical (mowing), fire or chemical
Erechtites glomerata	Australian fireweed	Medium	Manual
Erodium cicutarium	Redstem filaree	Low	Mechanical (tilling) or chemical
Foeniculum vulgare	Wild fennel**	Low	Manual (remove bulb) or chemical, (no fire)

Table 10. Invasive Plant Species that Should be Avoided and Controlled at the POM and OMC, Monterey County, California			
Scientific Name	**Common Name**	**2006 CA Priority**	**Available Treatment Methods**
Geranium dissectum	Cutleaf geranium	Low	Chemical
Hypchaeris glabra	Smooth catsear	Low	Chemical or manual (remove taproot)
Malva parviflora	Cheeseweed**	Low	Manual or biocontrol (sheep) or chemical
Medicago polymorpha	California burclover	Low	Fire (flaming) or chemical
Oxalis pes-caprae	Bermuda buttercup	Medium	Manual (remove bulb) (shade with mulch), mechanical or chemical
Plantago lanceolata	English plantain, buckhorn plantain	Low	Chemical or manual (roots)
Raphanus sativus	Radish	Low	Chemical
Rumex acetosella	Sheep sorrel**	Low	Manual or chemical
Silybum marianum	Blessed milk thistle	Low	Mechanical (weedwhacker, mowing), manual, chemical or biocontrol (sheep)
Sonchus oleraceus	Sow thistle**	Low	Manual (taproot) or chemical
Stellaria media	Chickweed**	Low	Manual or chemical
Trifolium hirtum	Rose clover	Medium	Chemical or biocontrol (sheep)
Tropaeolum majus	Garden nasturtium**	Low	Chemical
Vinca major	Big periwinkle	Medium	Manual and chemical together
Zantesdeschia aethiopica	Calla lily, Arum lily (toxic)	Low	Manual or chemical
Shrubs			
Cotoneaster franchetii, lacteus or pannosus	Cotoneaster	Medium	Manual or chemical
Cytisus scoparius	Scotch broom*	High	Manual, follow-up with chemical or fire (flaming) on seedlings

Table 10. Invasive Plant Species that Should be Avoided and Controlled at the POM and OMC, Monterey County, California

Scientific Name	Common Name	2006 CA Priority	Available Treatment Methods
Genista monspessulana	French broom*	High	Manual, follow-up with chemical or fire (flaming) on seedlings
Ilex aquifolium	English holly	Medium	Manual and chemical (cut stump)
Spartium junceum	Spanish broom	High	Manual, follow-up with chemical or fire (flaming) on seedlings
Ulex europaeus	Gorse	High	Manual and chemical, biocontrol (goats/weevil)
Trees			
Acacia decurrens	Green wattle**	Low	Mechanical
Acacia longifolia	Sydney golden wattle**	Low	Mechanical or biocontrol (weevil/wasp)
Acacia melonoxylon	Black wood acacia	Low	Manual/mechanical with chemical (cut stump) or with shading
Ailanthus altissima	Tree of heaven**	Low	Manual, mechanical or chemical
Albizia lophantha	Plume acacia**	Low	Mechanical, manual and chemical (cut stump)
Eucalyptus camodulensis	Red gum	Low	Mechanical, manual and chemical (cut stump)
Eucalyptus globulus	Bluegum eucalyptus	Medium	Mechanical, manual or chemical (on seedlings) or manual and chemical (cut stump)
Myoporum laetum	Myoporum	Medium	Manual (taproot), manual and chemical (cut stump)
Washingtonia robusta	Mexican fan palm	Medium	Manual or mechanical
Vines			
Hedera helix or canariensis	English ivy or Algerian ivy	High High	Manual or chemical

Table 10. Invasive Plant Species that Should be Avoided and Controlled at the POM and OMC, Monterey County, California			
Scientific Name	**Common Name**	**2006 CA Priority**	**Available Treatment Methods**
Muehlenbeckia complexa	Mattress vine**	Low	Manual
Rubus discolor or Rubus armeniacus	Himalayan blackberry	High	Manual (roots), chemical (riparian) or mechanical
Senecio mikanioides	German ivy or Cape ivy**	Low	Chemical or manual (carpet rolling)
Parasitic			
Arceuthobium campylopodum	Dwarf mistletoe**	Low	Manual (remove infected branches or trees)

* California noxious weed
** Not on the California-IPG Invasive Species List
Priority for removal ratings are from CA-IPG. Priority on localized sites should be assessed

Manual removal: use of hand tools including weed wrenches, shovels, Pulaskis, rakes, hand saws, etc.

Mechanical removal: use of mechanized equipment including chainsaws, bulldozers, weed eaters, mowers, etc.

Chemical: use of herbicides including foliar application, cut/stump treatments, aerial spray, etc.

Biological control: use of biological agents including host- specific insects, herbivorous livestock, nematodes, and pathogens.

Prescribed fire: use of fire to burn plants, flaming with torches. This is not recommended on the POM due to the close proximity of the urban area.

Table 11. 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	All	As needed
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	All	As needed
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 12. 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	Year round	As needed
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	Do not apply when wet	As appropriate
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 13. Wildlife Species Expected at the POM and OMC, Monterey County, California	
Scientific Name	**Common Name**
BIRDS (AVES)	
Hawks and Falcons (Falconiformes)	
Accipiter striatus	Sharp-shinned hawk
Buteo jamaicensis	Red-tailed hawk
Cathartes aura	Turkey vulture
Elanus caeruleus	White-tailed kite
Accipiter cooperii	Cooper's hawk
Buteo lineatus	Red-shouldered hawk
Falco sparverius	American kestrel
Circus cyaneus	Northern harrier
Shorebirds and Gulls (Charadriiformes)	
Charadrius vociferus	Killdeer
Larus argentatus	Herring gull
Larus delawarensis	Ring-billed gull
Larus californicus	California gull
Larus occidentalis	Western gull
Larus glaucescens	Glaucous-winged gull
Pigeons and Doves (Columbiformes)	
Columbia livia	Rock dove*
Zenaida macroura	Mourning dove
Columba fasciata	Band-tailed pigeon
Swifts and Hummingbirds (Apodiformes)	
Calypte anna	Anna's hummingbird
Aeronautes saxatalis	White-throated swift
Selasphorus sasin	Allen's hummingbird
Kingfishers, Woodpeckers and Relatives (Coraciiformes)	
Melanerpes formicivorus	Acorn woodpecker
Colaptes auratus	Northern flicker
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	Downy woodpecker
Piciodes villosus	Hairy woodpecker
Perching Birds (Passeriformes)	
Cyanocitta stelleri	Steller's jay
Aphelocoma coerulescens	Scrub jay
Corvus brachyrhynchos	American crow

Table 13. Wildlife Species Expected at the POM and OMC, Monterey County, California	
Scientific Name	**Common Name**
Sitta pygmaea	Pygmy nuthatch
Turdus migratorius	American robin
Sturnus vulgaris	European starling*
Dendroica townsendi	Townsend's warbler
Pipilo erythrophthalmus	Rufous-sided towhee
Junco hyemalis	Dark-eyed junco
Sturnella neglecta	Western meadowlark
Troglodytes aedon	House wren
Mimus polyglottos	Northern mockingbird
Contopus borealis	Olive-sided flycatcher
Tachycineta bicolor	Tree swallow
Hirundo pyrrhonota	Cliff swallow
Hirundo rustica	Barn swallow
Pica nuttalli	Yellow-billed magpie
Parus inornatus	Plain titmouse
Parus rufescens	Chestnut-backed chickadee
Psaltriparus minimus	Bushtit
Sialia mexicana	Western bluebird
Catharus ustulatus	Swainson's thrush
Catharus guttatus	Hermit thrush
Chamaea fasciata	Wrentit
Dendroica coronata	Yellow-rumped warbler
Passerculus sandwichensis	Savannah sparrow
Passerella iliaca	Fox sparrow
Melospiza melodia	Song sparrow
Agelaius phoeniceus	Red-winged blackbird
Pipilo crissalis	California towhee
Carpodacus purpureus	Purple finch
Carpodacus mexicanus	House finch
Passer domesticus	House sparrow*
Certhia americana	Brown creeper
Baeolophus inoranatus	Oak titmouse
Eremophila alpestris actia	California horned lark
Lanius ludovicaianus	Loggerhead shrike
Pheasants and Relatives (Galliformes)	
Phasianus colchicus	Ring-necked pheasant
Cillipepla californica	California quail
Meleagris gallopavo	Wild turkey

Table 13. Wildlife Species Expected at the POM and OMC, Monterey County, California	
Scientific Name	**Common Name**
Owls (Strigiformes)	
Tyto alba	Barn owl
Otus kennicottii	Western screech-owl
Bubo virginianus	Great horned owl
MAMMALS (MAMMALIA)	
Opossums (Marsupialia)	
Didelphis virginiana	Virginia opossum*
Rabbits and Hares (Lagomorpha)	
Lepus californicus	Black-tailed hare
Sylvilagus bachmani	Brush rabbit
Sylvilagus audubonii	Desert cottontail
Carnivores (Carnivora)	
Felis sylvestris	Domestic (feral) cat*
Procyon lotor	Raccoon
Taxidea taxus	American badger
Canis latrans	Coyote
Urocyon cinereoargenteus	Gray fox
Mephitis mephitis	Striped skunk
Spilogale gracilis	Western spotted skunk
Lynx rufus	Bobcat
Mustela frenata	Long-tailed weasel
Felis concolor	Mountain Lion
Pigs and Deer (Artiodactyla)	
Odocoileus hemionus columbianus	Black-tailed deer
Sus scrofa	Wild boar*
Squirrels, Rats, Mice, and Relatives (Rodentia)	
Sciurus griseus	Western gray squirrel
Thomomys bottae	Botta's pocket gopher
Peromyscus boylei	Brush mouse
Rattus norvegicus	Norway rat*
Spermophilus beecheyi	California ground squirrel
Perognathus californicus	California pocket mouse
Reithrodontomys megalotis	Western harvest mouse
Mus musculus	House mouse
Peromyscus maniculatus	Deer mouse

Table 13. Wildlife Species Expected at the POM and OMC, Monterey County, California	
Scientific Name	**Common Name**
Neotoma fuscipes luciana	Monterey dusky-footed woodrat
Sorex ornatus salarius	Monterey ornate shrew
REPTILES (REPTILIA)	
Lizards and Snakes (Squamata)	
Sceloporus occidentalis	Western fence lizard
Eumeces skiltonianus	Western skink
Gerrhonotus multicarinatus	Southern alligator lizard
Coluber consrictor	Racer
Pituophis melanoleucus	Gopher snake
Thamnophis sirtalis	Common garter snake
Crotalus viridis	Western rattlesnake
Anniella pulchra nigra	Black legless lizard
Phrynosoma coronatum	Coast horned lizard
AMPHIBIANS (AMPHIBIA)	
Salamanders (Caudata)	
Taricha torosa	California newt
Batrachoseps attenuatus	California slender salamander
Aneides lugubris	Arboreal salamander
Ambystoma calforniense	California tiger salamander
Toads and Frogs (Salientia)	
Bufo boreas	Western toad
Hyla regilla	Pacific treefrog
Scaphinopus hammondi	Western spadefoot toad
	* Introduced species

Table 14. Migratory Birds Expected to Occur on the POM and OMC, Monterey County, CA	
Scientific Name	**Common Name**
Accipiter cooperii	Cooper's hawk
Accipiter striatus	Sharp-shinned hawk
Aeronautes saxatalis	White-throated swift
Agelaius phoeniceus	Red-winged blackbird
Aimophila ruificeps	Rufous-crowned sparrow
Amphispiza belli	Sage sparrow
Aphelocoma coerulescens	Scrub jay
Athene funereus	Burrowing owl
Branta canadensis	Canada goose
Bubo virginianus	Great horned owl
Buteo jamaicensis	Red-tailed hawk
Buteo lineatus	Red-shouldered hawk
Carduelis lawrencei	Lawrence's goldfinch
Carduelis psaltria	Lesser goldfinch
Carduelis tristis	American goldfinch
Carpodacus mexicanus	House finch
Carpodacus purpureus	Purple finch
Cathartes aura	Turkey vulture
Catharus guttatus	Hermit thrush
Catharus ustulatus	Swainson's thrush
Certhia americana	Brown creeper
Charadrius vociferus	Killdeer
Chondestes grammacus	Lark sparrow
Circus cyaneus	Northern harrier
Colaptes auratus	Northern flicker
Columba fasciata	Band-tailed pigeon
Contopus borealis	Olive-sided flycatcher
Contopus sordidulus	Western wood-pewee
Corvus brachyrhynchos	American crow
Cyanocitta stelleri	Stellar's jay
Dendroica coronata	Yellow-rumped warbler
Dendroica occidentalis	Hermit warbler
Dendroica petechia	Yellow warbler
Dendroica townsendi	Townsend's warbler
Empidonax difficilis	Western flycatcher
Eremophila alpestris	Horned lark
Euphagus cyanocephalus	Brewer's blackbird
Falco sparverius	American kestrel

Table 14. Migratory Birds Expected to Occur on the POM and OMC, Monterey County, CA	
Scientific Name	**Common Name**
Geococcyx californianus	Greater roadrunner
Glaucidium gnoma	Northern pygmy-owl
Hirundo pyrrhonota	Cliff swallow
Hirundo rustica	Barn swallow
Icterus galbula	Northern oriole
Junco hyemalis	Dark-eyed junco
Lanius ludovicianus	Loggerhead shrike
Larus argentatus	Herring gull
Larus californicus	California gull
Larus delawarensis	Ring-billed gull
Larus glaucescens	Glaucous-winged gull
Larus occidentalis	Western gull
Larus thayeri	Thayer's gull
Loxia curvirostra	Red crossbill
Melanerpes formicivorus	Acorn woodpecker
Melospiza melodia	Song sparow
Mimus ployglottos	Northern mockingbird
Molothrus ater	Brown-headed cowbird
Myiarchus cinerascens	Ash-throated flycatcher
Otus kennicottii	Western screech-owl
Parus inornatus	Plain titmouse
Parus rufescens	Chestnut-backed chickadee
Passerculus sandwichensis	Savannah sparrow
Passerella iliaca	Fox sparrow
Passerina amoena	Lazuli bunting
Phalaenoptilus nuttallii	Common poorwill
Pheucticus melanocephalus	Black-headed grosbeak
Pica nuttalli	Yellow-billed magpie
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	Downy woodpecker
Picoides villosus	Hairy woodpecker
Pipilo erythrophthalmus	Rufous-sided towhee
Pipilo fuscus	Brown towhee
Piranga ludoviciana	Western tanager
Polioptila caerulea	Blue-gray gnatcatcher
Psaltriparus minimus	Bushtit
Regulus calendula	Ruby-crowned kinglet
Regulus satrapa	Golden-crowned kinglet
Sayornis nigricans	Black phoebe

Table 14. Migratory Birds Expected to Occur on the POM and OMC, Monterey County, CA	
Scientific Name	**Common Name**
Sayornis saya	Say's phoebe
Sialia mexicana	Western bluebird
Sitta canadensis	Red-breasted nuthatch
Sitta carolinensis	White-breasted nuthatch
Sitta pygmaea	Pygmy nuthatch
Spizella atrogularis	Black-chinned sparrow
Spizella passerina	Chipping sparrow
Stelgidopteryx serripennis	Rough-winged swallow
Sturnella neglecta	Western meadowlark
Tachycineta bicolor	Tree swallow
Tachycineta thalassina	Violet-green swallow
Thryomanes bewickii	Bewick's wren
Toxostoma redivivum	California thrasher
Troglodytes aedon	House wren
Troglodytes troglodytes	Winter wren
Turdus migratorius	American robin
Tyrannus verticalis	Western kingbird
Tyto alba	Barn owl
Vermivora celata	Orange-crowned warbler
Vireo gilvus	Warbling vireo
Vireo huttoni	Hutton's vireo
Wilsonia pusilla	Wilson's warbler
Zenaida macroura	Mourning dove
Zonotrichia atricapilla	Golden-crowned sparrow
Zonotrichia leucophrys	White-crowned sparrow

Code of Federal Regulations Title 50, Volume 1 Revised October 1, 2003, Reid 1987, US Army 1995d, US Army 2001, US Army 2005.

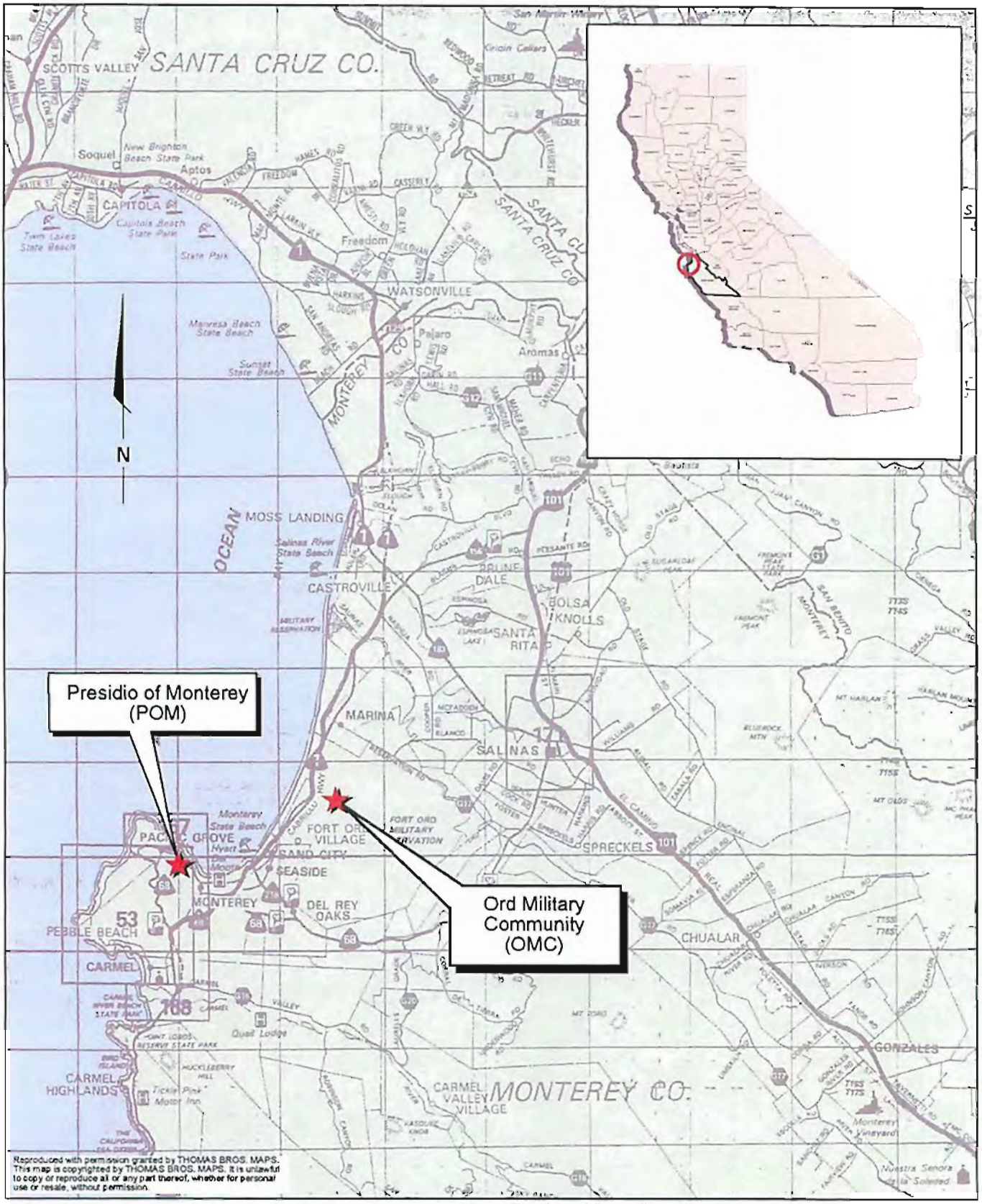
Table 15. Priority Project List Integrated Natural Resource Management Plan POM and OMC			
Project Name	*Description*	*Fiscal Year / Priority*	*Estimated Cost to DPW Environmental Division*
Complete Planning Level Surveys	*Contract to conduct planning level surveys for flora, fauna and biotic communities*	*FY09/ High*	*Contract with DPW Environmental funding*
Invasive Plant Location Identification	*Identify locations of non-native, invasive plant infestations. Map in GIS. Research control methods.*	*Each/ High*	*DPW Environmental Division labor (in-house)*
Invasive Plant Control	*Prioritize eradication of invasive weeds and treat, giving noxious weeds and weeds growing in endangered species habitat the highest priority for removal.*	*Each/ High*	*$4K-11K per year for contract labor, equipment, herbicides*
General Weed Control in Developed Areas	*Approve, monitor and track contractor use of herbicides for weed control in developed areas of the POM*	*Each/ High*	*Covered under DPW grounds maintenance contract (GMC)*
Master Plan EIS	*Provide natural resource and NEPA expertise throughout the EIS process. Conduct section 7 formal consultation with the FWS and prepare a Biological Assessment.*	*FY08, FY09/ High*	*Primarily DOD labor, possibly contract for BA cost of $20K*
Riparian Area Restoration	*Remove invasive weeds from riparian areas and revegetate with native plants.*	*FY07, FY08, FY09/ High*	*Arborist (DPW operations and maintenance [O&M] funds), GMC funds, minimal herbicide cost of $500, and cost of native plants $1K-2K*
Required Annual Reports	*Write, print and distribute annual INRMP and ESMP report*	*Each/ High*	*DPW Environmental Division labor (in-house)*
Annual Endangered Species Survey	*Perform annual survey for Yadon's piperia using monitoring protocols established in FY07. Map results in GIS.*	*Each/ High*	*DPW Environmental Division labor (in-house). If use contractor cost of $15K*

Table 15. Priority Project List Integrated Natural Resource Management Plan POM and OMC			
Project Name	*Description*	*Fiscal Year / Priority*	*Estimated Cost to DPW Environmental Division*
Cage Yadon's piperia	*To protect endangered plants from deer herbivory and trampling, construct wire cages over selected plants*	*Each as needed/ High*	*DPW Environmental Division labor (in-house), materials cost of $2K start up, then $500 annually as necessary*
Animal-proof Several Buildings on POM	*To reduce the incidence of fleas in temporary lodging at the POM, seal buildings to impede animal entry (raccoon, opossum, and feral cats).*	*FY08, FY09/ High*	*O&M funds, Health and Safety funds*
Integrated Pest Management to Control Insects	*To ensure human health and safety and protect facilities, employ integrated pest management techniques including the use of Army-approved pesticides to control insect pests.*	*Each/ High*	*DPW Environmental Division labor (in-house), O&M funds and contractor*
Append Installation Pest Management Plan to Include SATCOM Facility	*Add SATCOM facility as an appendix to the IPMP. Address unique pest management issues and pesticides. Attach Biological Opinion*	*FY08 High*	*DPW Environmental Division labor (in-house)*
Maintain Existing Partnerships with Other Agencies	*Maintain and enhance relationships with other land management agencies including the City of Monterey, City of Seaside, Fish and Wildlife Service, California Department of Fish and Game, California Department of Forestry and Fire Protection, Bureau of Land Management, etc.*	*Each/ High*	*DPW Environmental Division labor (in-house)*
General Instruction Building FY08	*Provide input on the EA, ensure minimal damage to "leave" trees during construction, ensure "Best*	*FY07, FY08, FY09/*	*DPW Environmental Division labor (in-house)*

Table 15. Priority Project List Integrated Natural Resource Management Plan POM and OMC			
Project Name	*Description*	*Fiscal Year / Priority*	*Estimated Cost to DPW Environmental Division*
	Management Practices (BMPs)" for erosion control are employed, and assist in selection of post-construction plantings.	*High*	
Kit Fox Surveys	*Ensure that kit fox surveys are performed before projects are undertaken at SATCOM.*	*Each/ High*	*Contract biologist SATCOM funded*
Identify species at risk (SAR)	*Identify all SAR on the installation. Develop management strategies to reduce impacts to these species*	*FY08/ High to Medium*	*DPW Environmental Division labor (in-house)*
Tree Disease and Hazard Control	*Continue to contract arborist to monitor trees on the POM for disease and potential hazards. Arborist will provide the natural resource manager with a copy of his quarterly report of actions: tree removal, dead wooding, planting, treatment for disease, etc.*	*Each/ High (hazard) to Medium (disease)*	*O&M funds and contractor*
Education/ Outreach	*As needed, natural resource specialist will conduct lectures and provide instructional materials to educate POM personnel and the public about natural resource issues including mountain lion safety, protection of Yadon's piperia, etc.*	*Each as needed/ High to Medium*	*DPW Environmental Division labor (in-house)*
Maintain Storm Drainage System	*Storm drainage systems on POM and OMC will be maintained to ensure that surface storm water properly drains off the properties and does not cause soil erosion.*	*Each/ High to Medium*	*O&M funds and labor*
Natural Resource Manager Training	*Allow the Natural Resource Manager to obtain new skills and knowledge through training opportunities.*	*Each/ High to Medium*	*DPW Environmental Division labor (in-house)*

Table 15. Priority Project List Integrated Natural Resource Management Plan POM and OMC			
Project Name	*Description*	*Fiscal Year / Priority*	*Estimated Cost to DPW Environmental Division*
Landscape Maintenance	*Ensure landscape maintenance, including irrigation, mowing, fertilizing, pruning, and planting, is consistent with guidelines provided in the INRMP*	*Each/ Medium*	*DPW Environmental Division labor (in-house) and GMC funds and labor*
Forest Management of Huckleberry Hill Preserve	*Ensure forest management activities conducted within the Preserve by the City of Monterey are monitored and consistent with the INRMP and Huckleberry Hill Management Plan. Actions include debris removal, invasive species removal, erosion control on roads, etc. Conduct special status species surveys on Huckleberry Hill.*	*Each/ Medium*	*DPW Environmental Division labor (in-house)*
Erosion control and soil stabilization on trails through endangered species habitat	*Re-contour and stabilize soil on dirt pathways and remove gullies, bury exposed roots, reroute overland water flow off of trails. Possibly pave main trail with asphalt cement. Conduct informal section 7 consultation with FWS*	*FY08, FY10/ Medium*	*DPW Environmental Division labor (in-house) and contractor with O&M or DLI funds*
Develop Partnerships	*Develop partnerships with neighboring land owners to address issues such as invasive plant encroachment, wildlife habitat and corridor retention, watershed management, herbicide use, conflicting uses, etc.*	*Each/ Medium*	*DPW Environmental Division labor (in-house)*
Explore Deer and Raccoon Control Measures	*Address over population of deer and raccoon on the POM. Determine ways to reduce impacts from deer and raccoon on native natural resources and health and safety of POM personnel.*	*FY08/ Medium*	*DPW Environmental Division labor (in-house) and DPW labor*

FIGURES



Regional Location Map

POM and OMC
Presidio of Monterey
Monterey County, California

Figure

1

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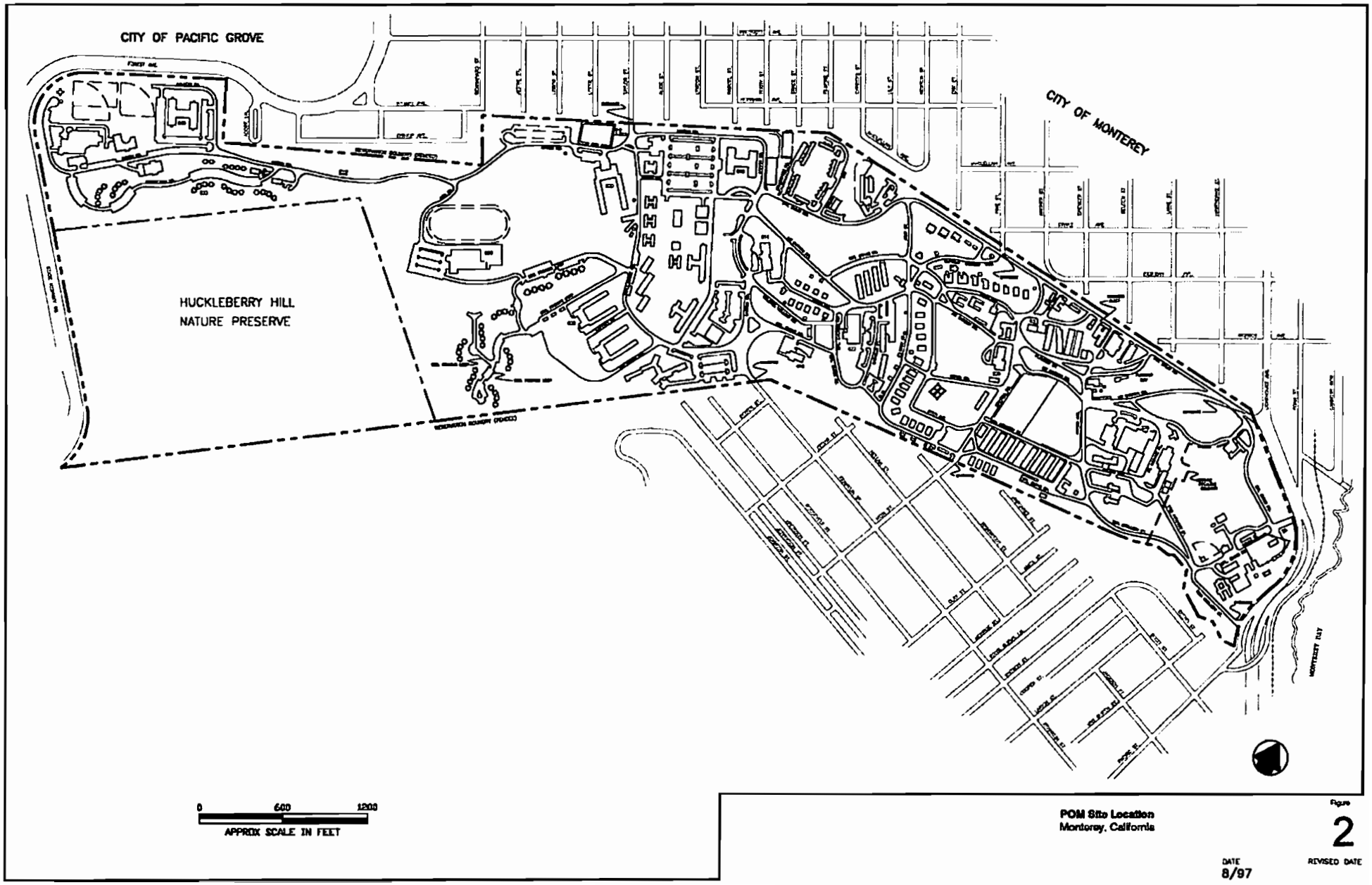

POM Site Location
Monterey, California

Figure
2

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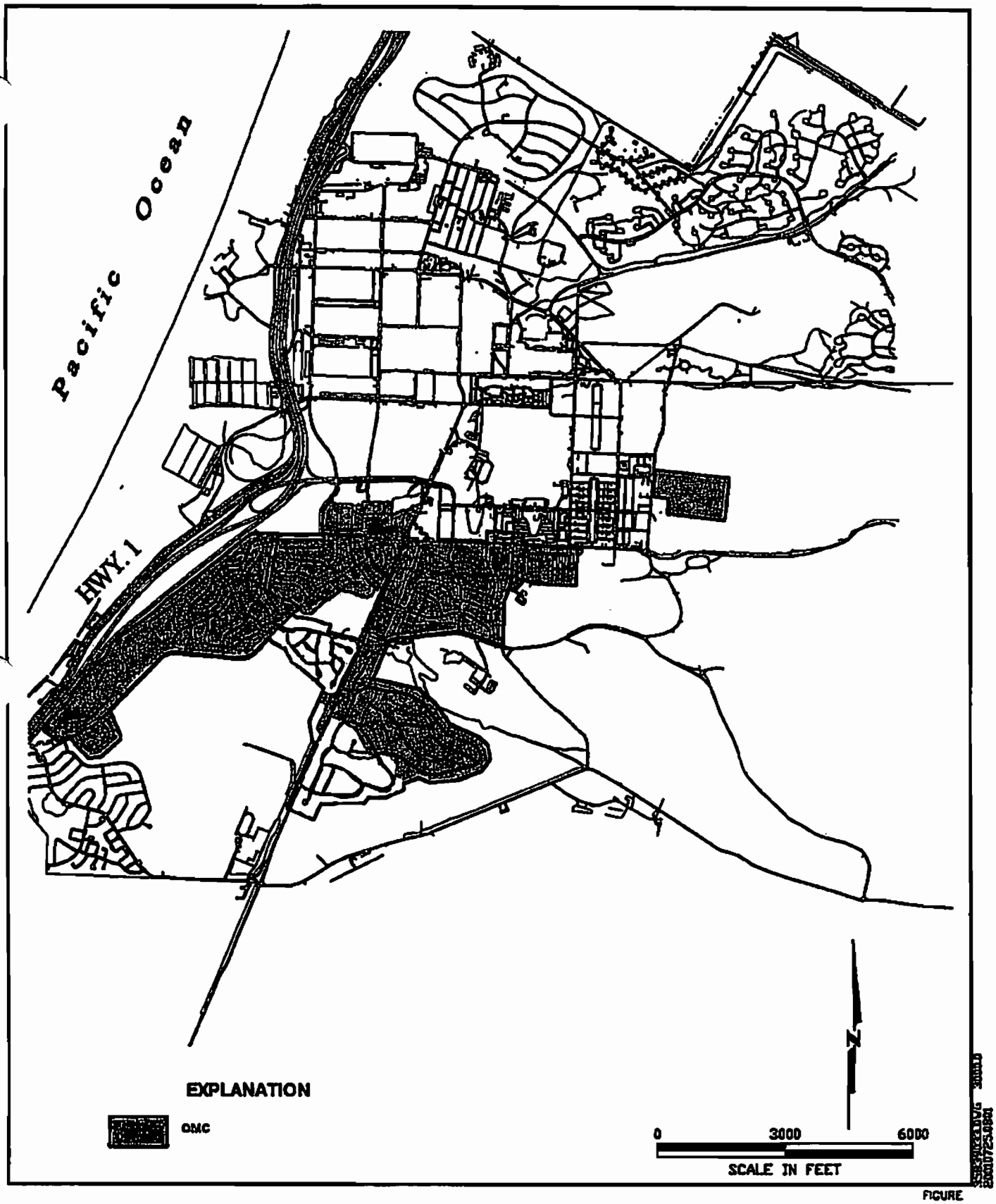

FIGURE

OMC Site Location
Monterey County, California

3

DATE
01/01

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10/07

POM Site Land Use
Integrated Natural Resources Management Plan
Presidio of Monterey
Monterey, California

FIGURE
4

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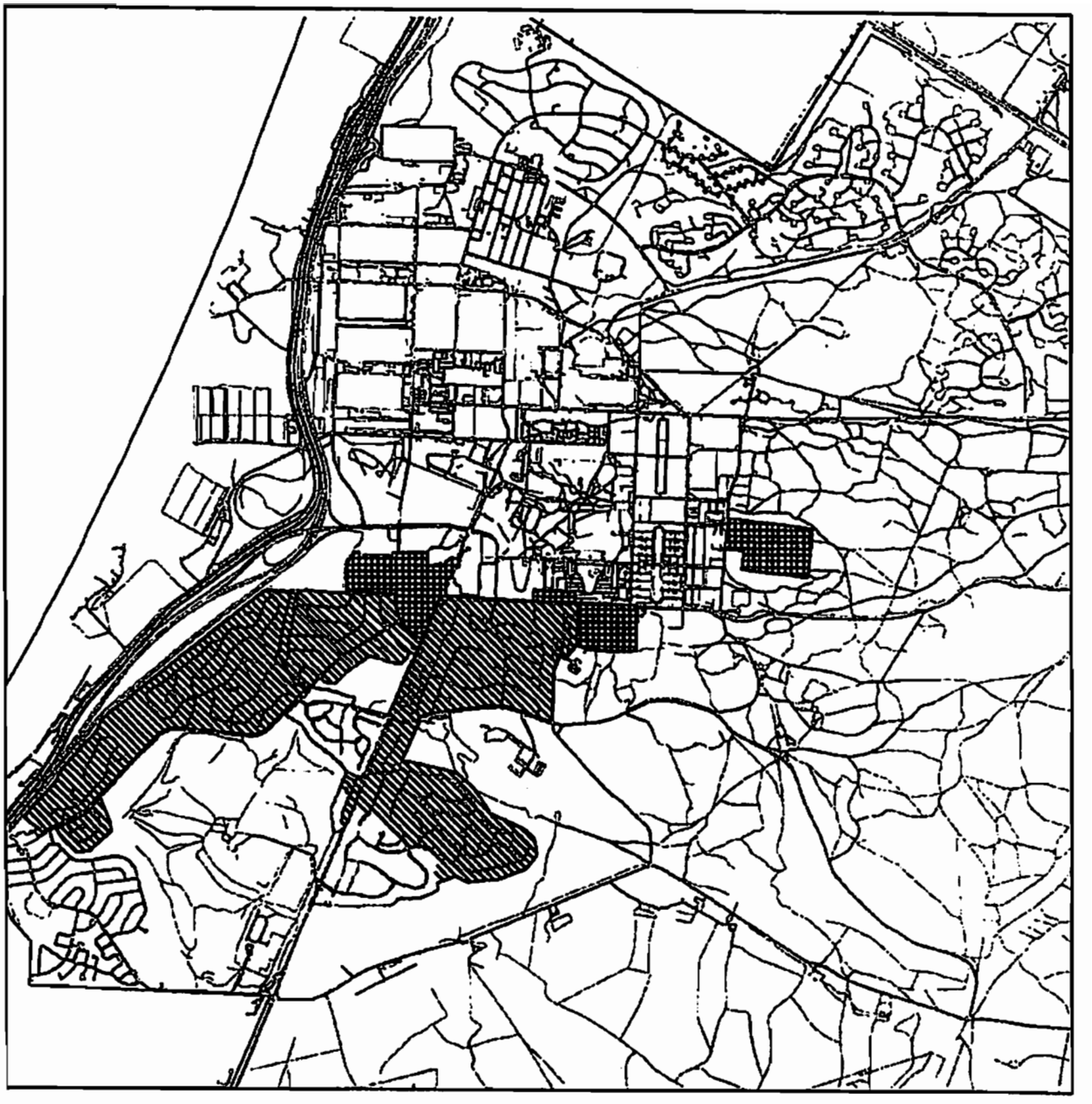

EXPLANATION

HOUSING

ARMY ADMIN/SUPPORT

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Figure

5

OMC Land Use Map
Monterey County, California

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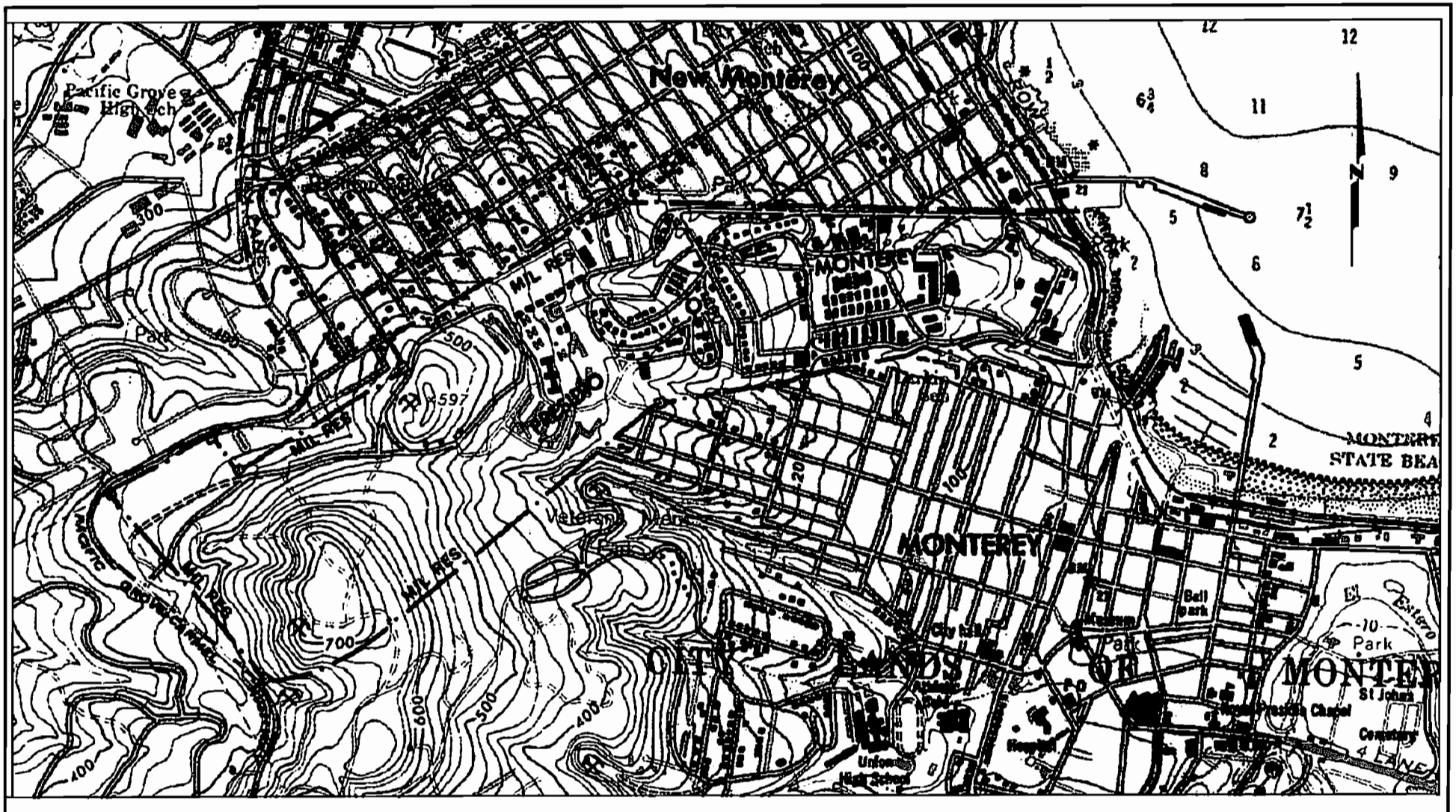

POM Topography
Integrated Natural Resources Management Plan
POM and OMC
Monterey, California

Figure
6

DATE
9/97

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EXPLANATION

OMC LANDS

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SCALE IN FEET

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OMC Topography
INRMP
POM and OMC
Monterey, California

Figure
7

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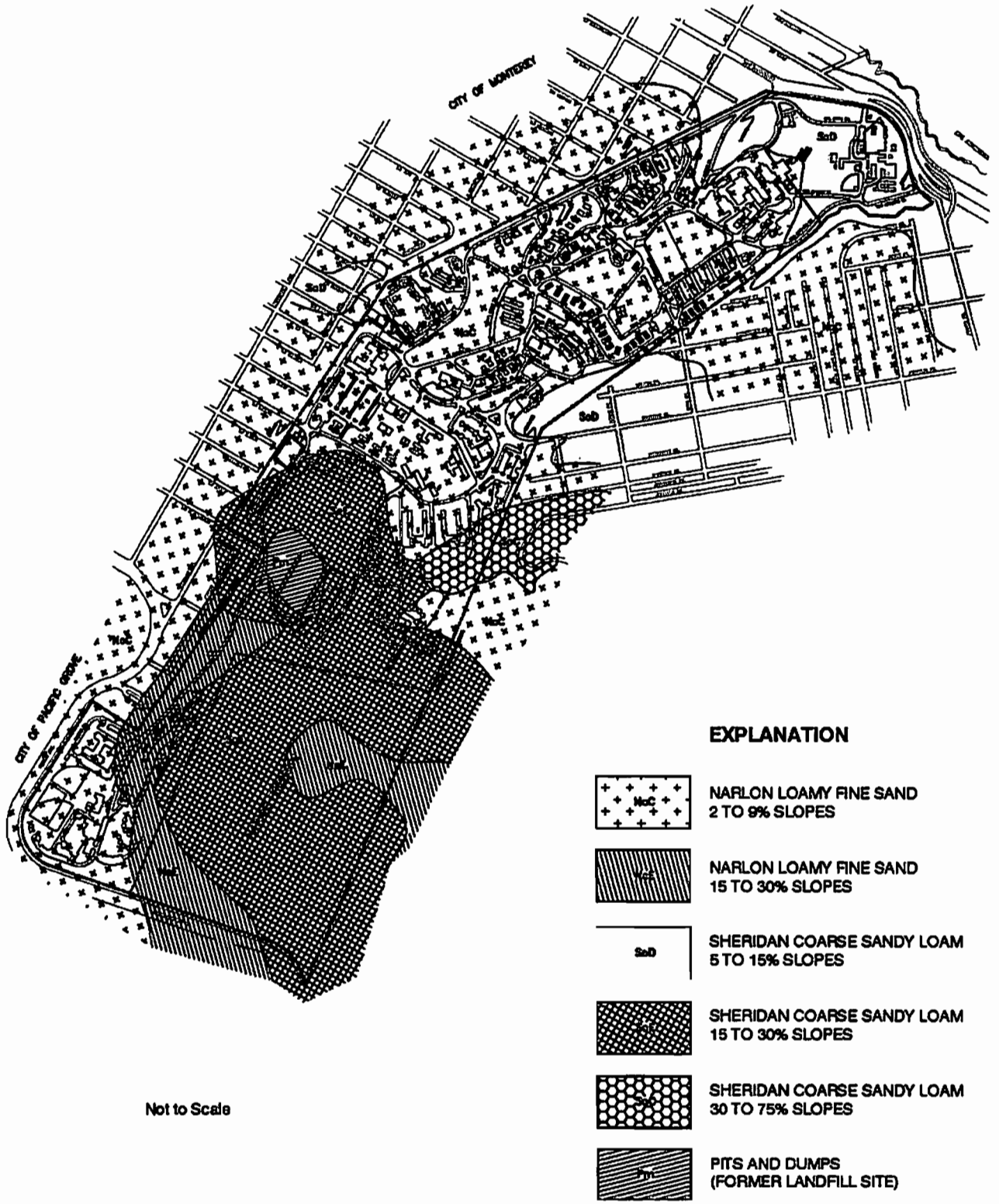

Figure

8

POM Soils Map
Monterey, California

DATE
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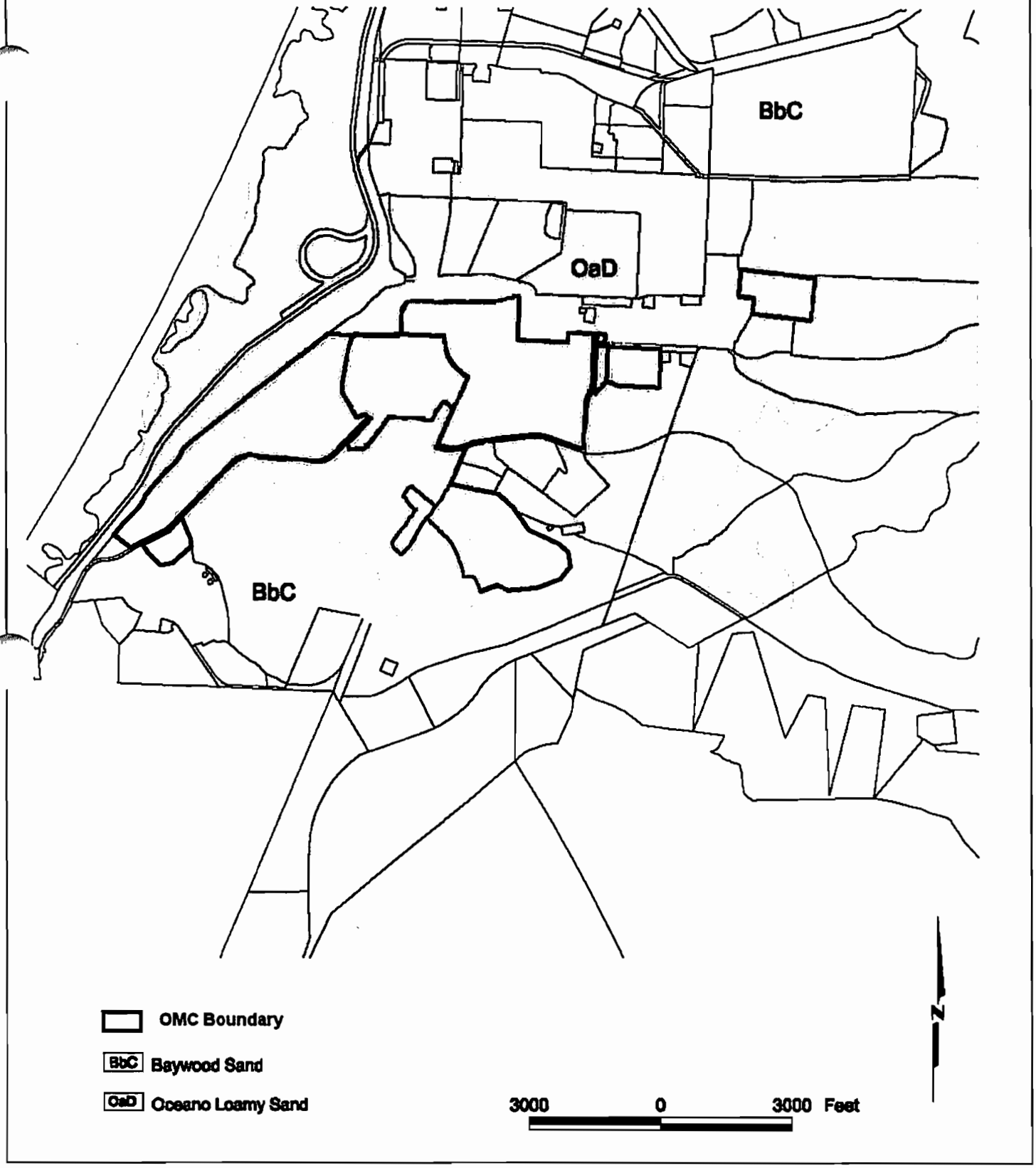

FIGURE

9

OMC Soils Map

Monterey, California

DATE
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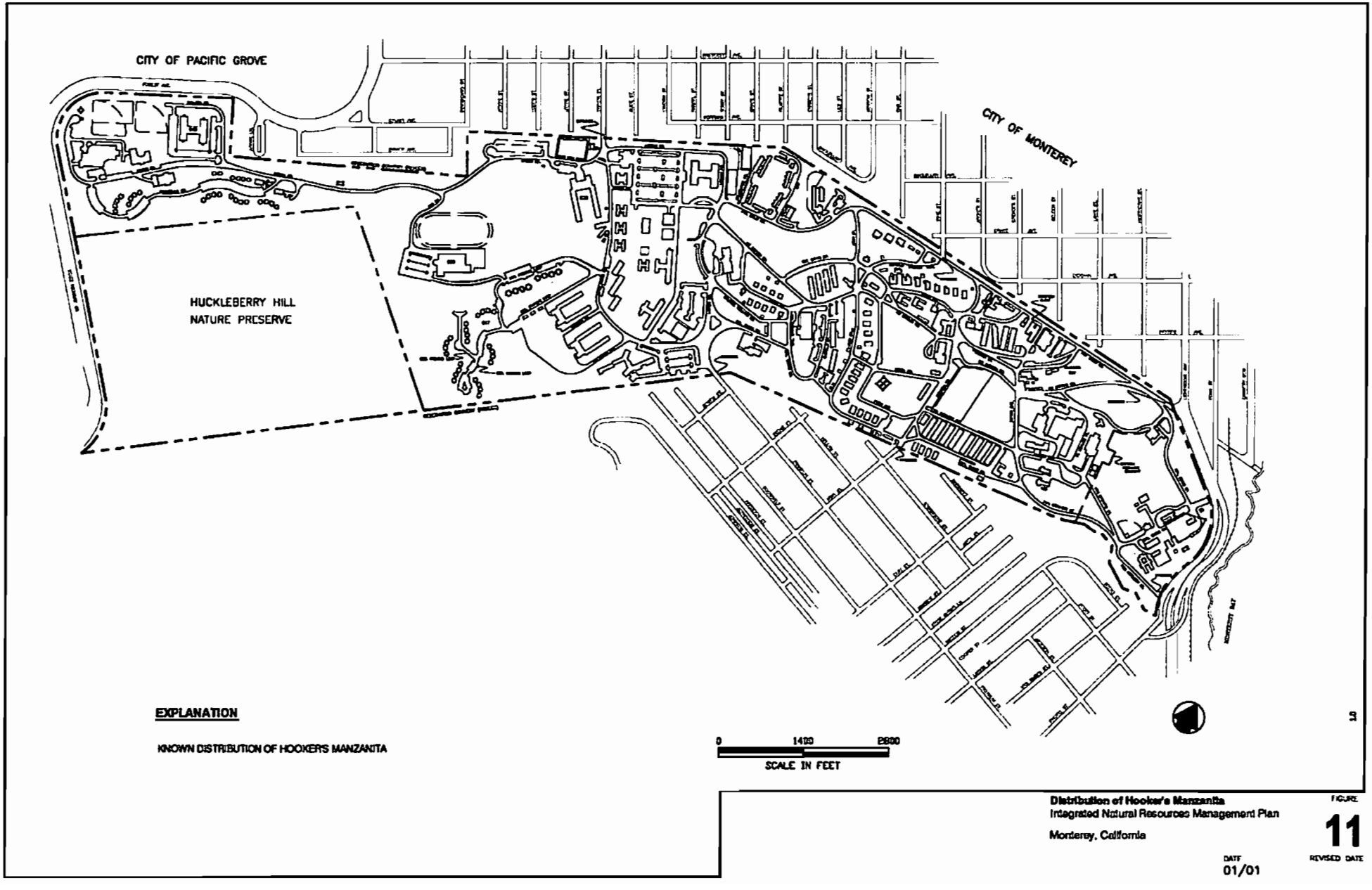
Known Distribution of Monterey Pine Forest
Presidio of Monterey
Monterey, California

FIGURE
10

DATE
10/98

REVISED DATE
11/07

Note: Cover types based on Flora and Fauna Baseline Study of the Presidio of Monterey, California - Jones and Stokes Associates.



Distribution of Hooker's Manzanita
Integrated Natural Resources Management Plan
Monterey, California

FIGURE
11

DATE
01/01

REVISED DATE

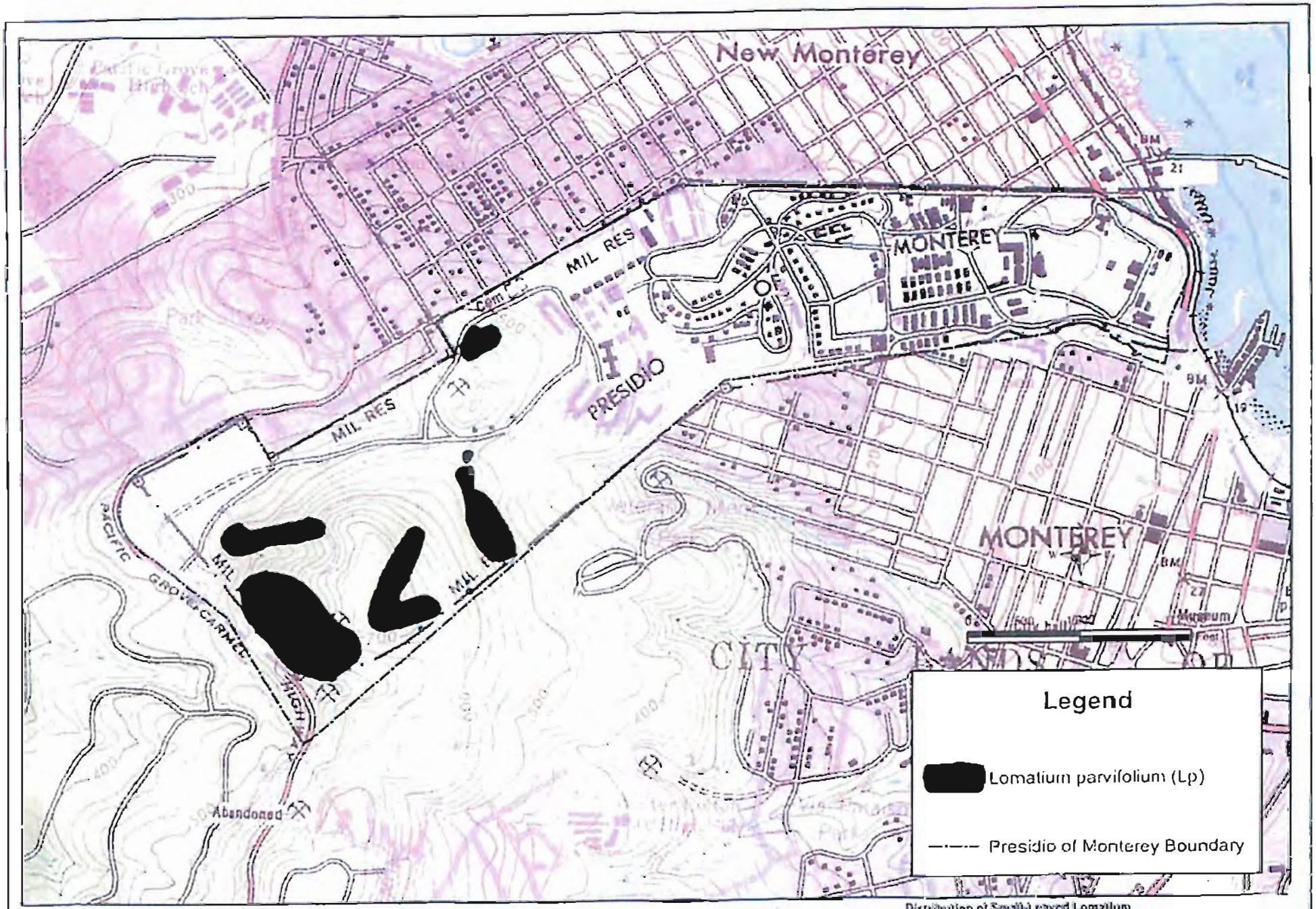


FIGURE 12

Distribution of Small-Leaved Lomatium
at the Presidio of Monterey

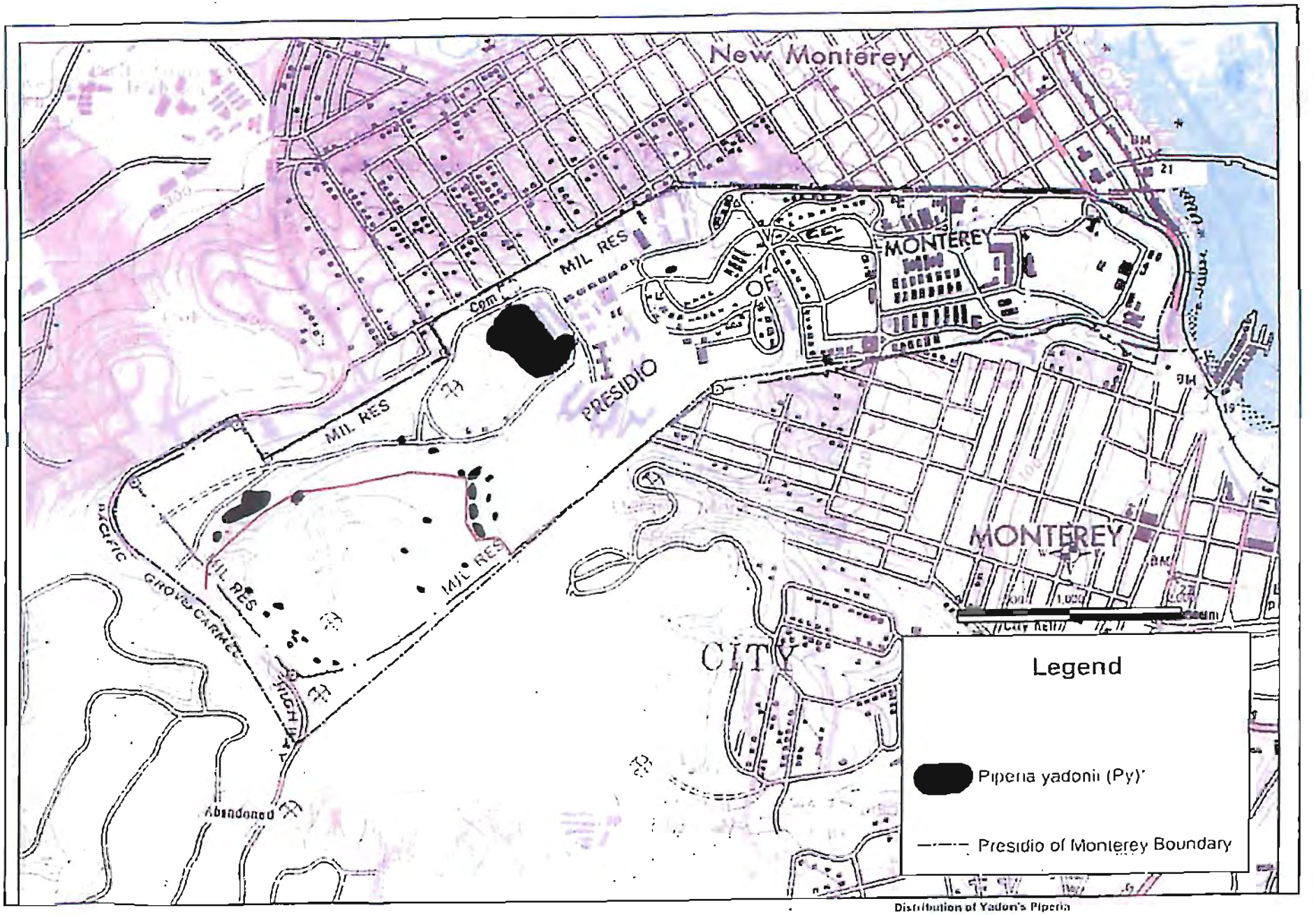


FIGURE 13

Distribution of Yadon's Piperia
at the Presidio of Monterey

EXPLANATION

OMC LANDS

MONTEREY SPINEFLOWER DISTRIBUTION
(Distribution information taken from Flora and Fauna Baseline Study of Fort Ord, U.S. Army Corps of Engineers, 1992)

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SCALE IN FEET

Known Distribution of Monterey Spineflower
(Chorizanthe p. pungens)
on OMC Lands
Monterey County, California

Figure
14

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01/01

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EXPLANATION

OMC LANDS

Sandmat Manzanita Distribution
(Distribution information taken from Flora and Fauna Baseline Study of Fort Ord, U.S. Army Corps of Engineers, 1992)

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SCALE IN FEET

Known Distribution of Sandmat Manzanita *(Arctostaphylos pumila)*
on OMC Lands
Monterey County, California

Figure
15

DATE
01/01

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11/07

EXPLANATION

OMC LANDS

Monterey Ceanothus Distribution
(Distribution information taken from Flora and Fauna Baseline Study of Fort Ord, U.S. Army Corps of Engineers, 1992)

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SCALE IN FEET

Known Distribution of Monterey Ceanothus
(Ceanothus cuneatus rigidias)
on OMC Lands
Monterey County, California

Figure
16

DATE
01/01

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11/07

EXPLANATION

OMC LANDS

Verigate Erlastrum Distribution
(Distribution information taken from Flora and Fauna Baseline Study of Fort Ord, U.S. Army Corps of Engineers, 1992)

N

0 3000 6000

SCALE IN FEET

Known Distribution of Virgate Erlastrum
(Erlastrum Virgatum)
on OMC Lands
Monterey County, California

Figure
17

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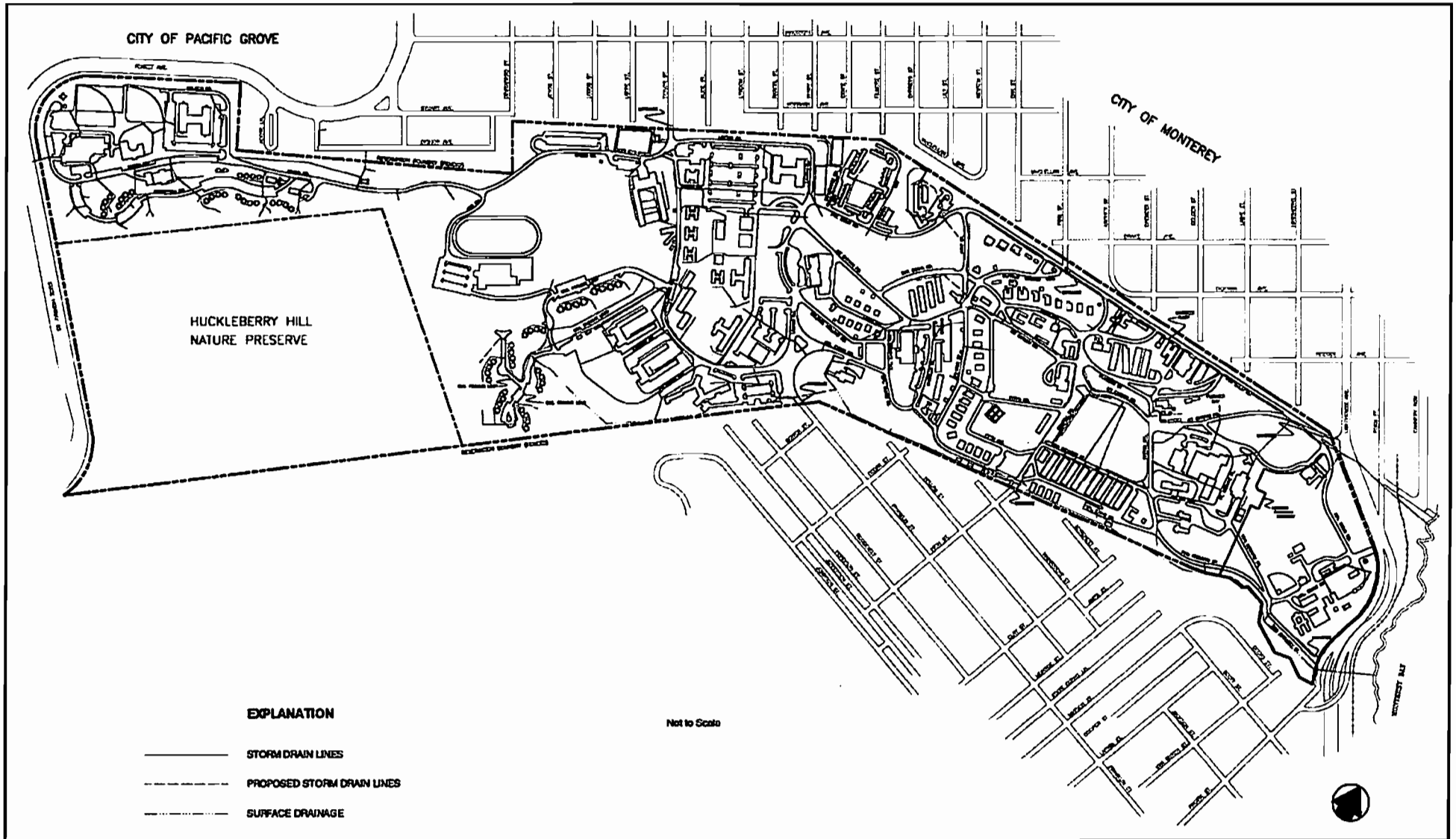

Storm Drain System
Integrated Natural Resources Management Plan
POM
Monterey, California

PLATE
18

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8/97

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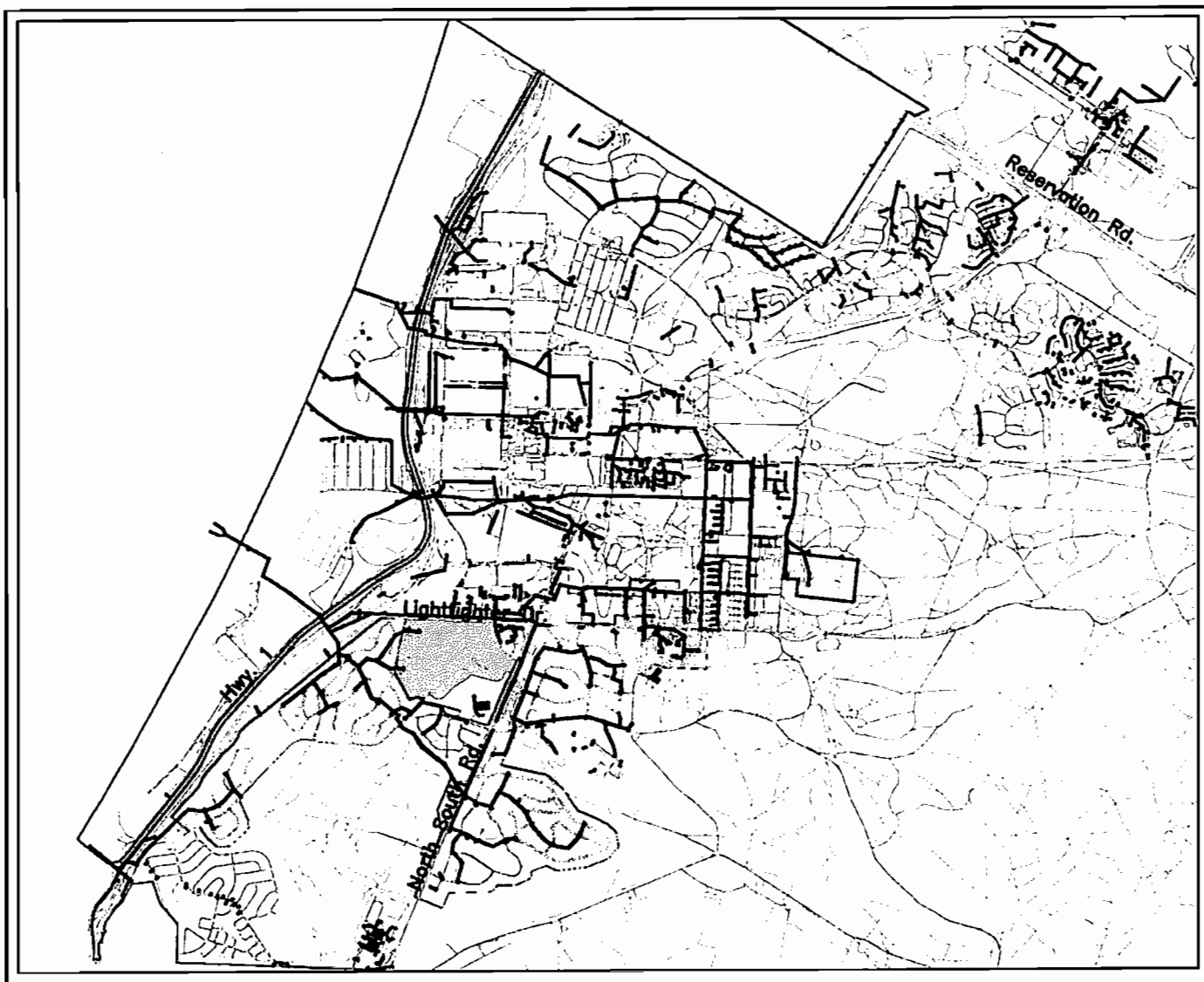

EXPLANATION

OMC

STORM DRAIN LINES

OUTFALL

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SCALE IN FEET

OMC Storm Drain System
Monterey County, California

Figure
19

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U.S. Army Garrison, Presidio of Monterey

Current Organization

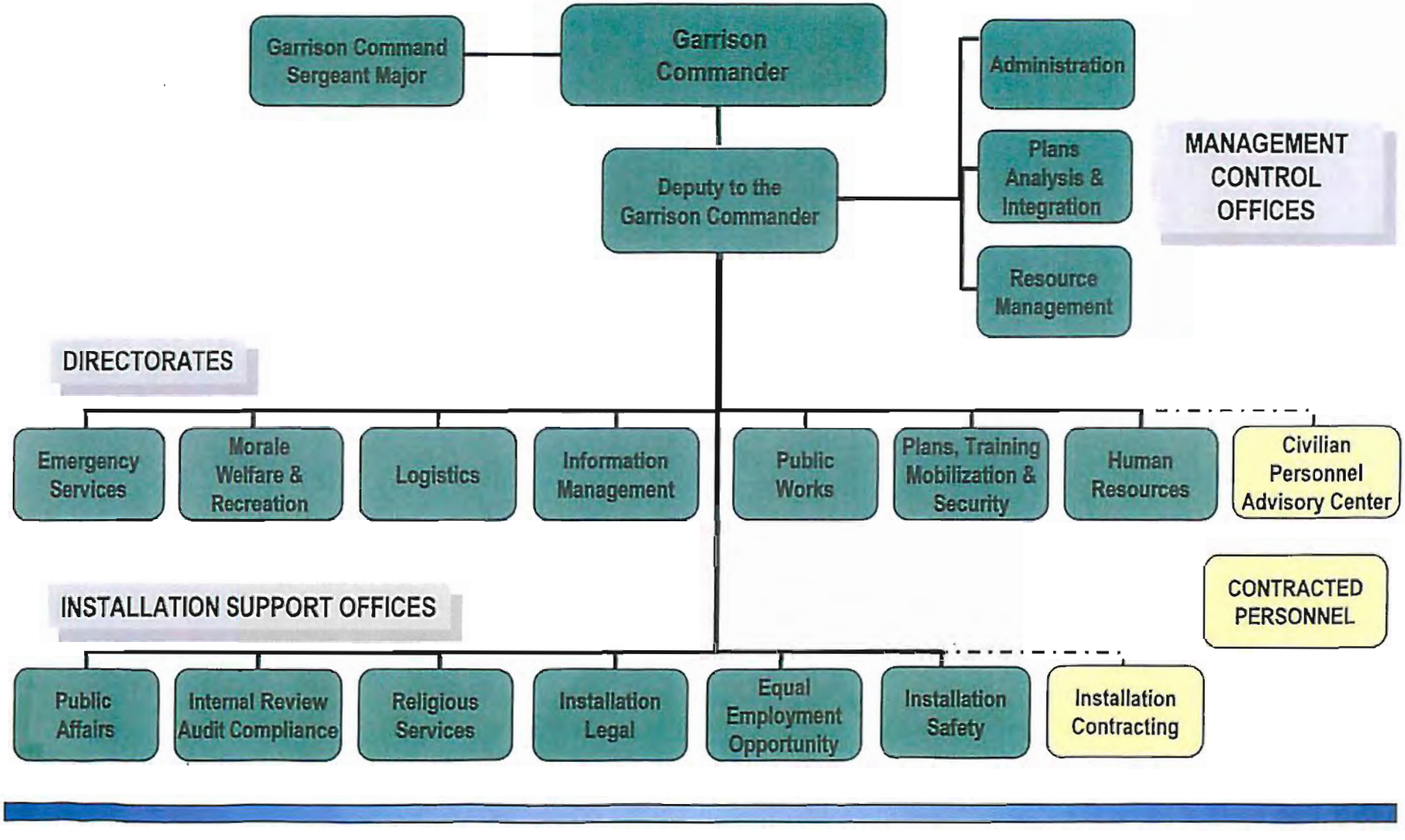
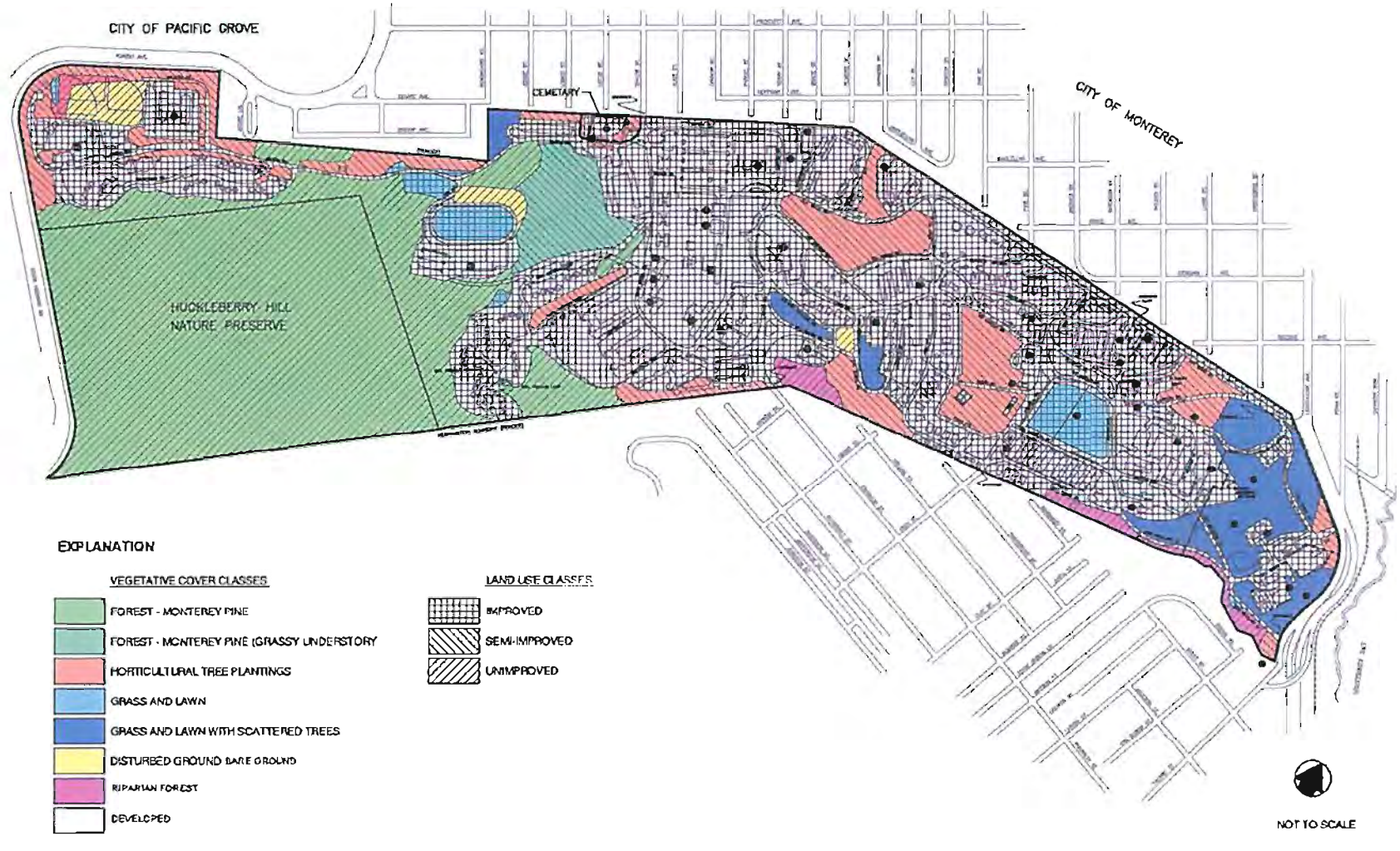


FIGURE 20



Note: Cover types based on Flora and Fauna Baseline Study of the Presidio of Monterey, California - Jones and Stokes Associates

Vegetative Cover Classifications
Integrated Natural Resources Management Plan
POM
Monterey, California

Figure
21

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EXPLANATION

- Ord Military Community (OMC) Parcels
- Unimproved
- Improved
- Coastal Scrub
- Developed
- Annual Grasslands
- Maritime Chaparral
- Coast Live Oak Savanna
- Coastal Coast Live Oak Woodland
- Inland Coast Live Oak Woodland

N

1500 0 1500 Feet

Vegetative Cover Classifications

OMC
Monterey County, California

DATE
8/97

FIGURE
22

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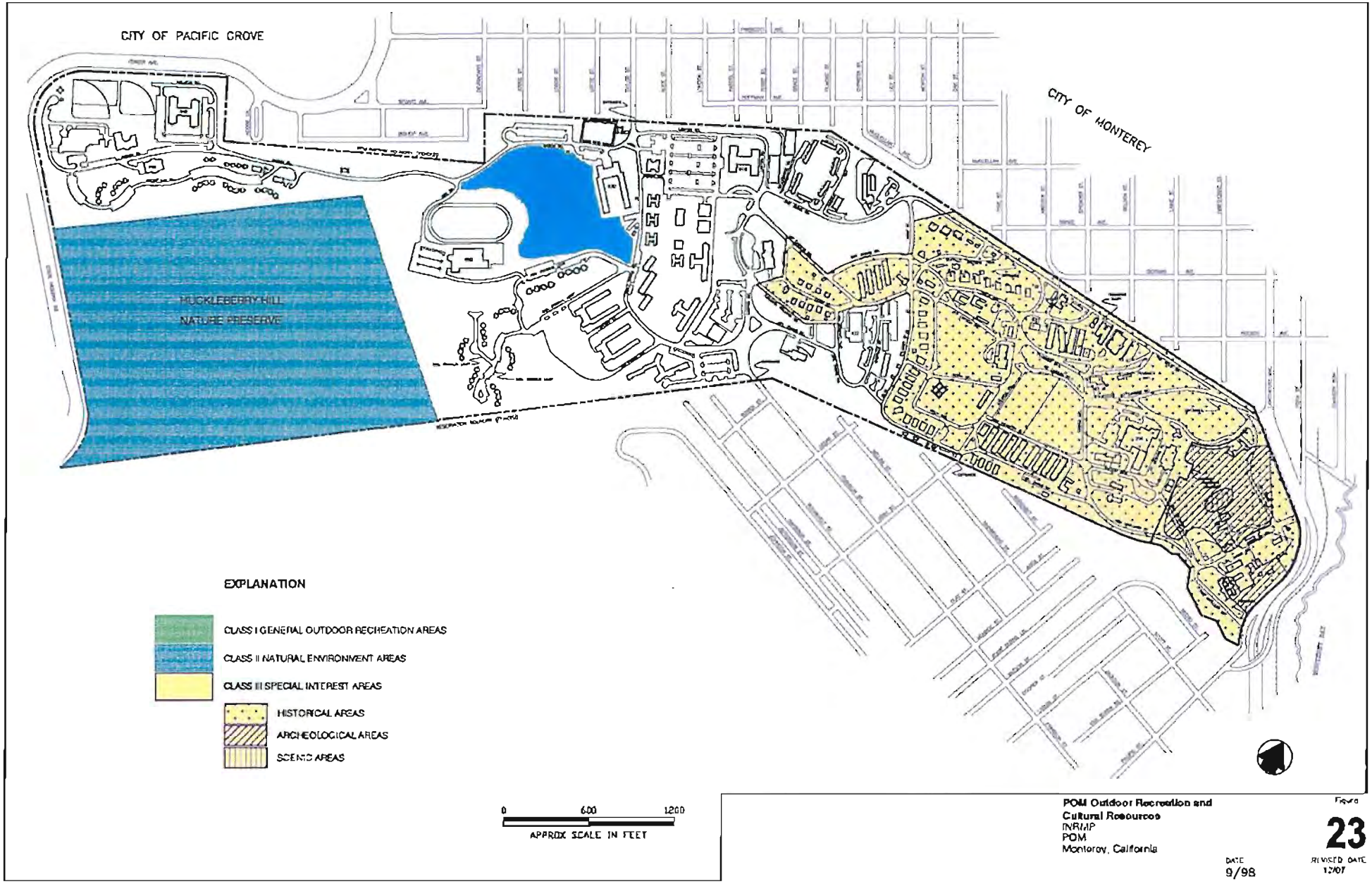

POM Outdoor Recreation and Cultural Resources
INRMP
POM
Monterey, California

Figure
23

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12/07

Appendix A
Environmental Assessment

APPENDIX A

EXECUTIVE SUMMARY

Overview

This Environmental Assessment (EA) was prepared in compliance with the:

- National Environmental Policy Act (NEPA) of 1969;
- Council on Environmental Quality (CEQ) Regulations; 40 Code of Federal Regulations (CFR) Parts 1500-1508;
- Army Regulation (AR) 200-2, Environmental Effects of Army Actions;
- AR 200-3, Natural Resources – Land, Forest and Wildlife Management; and
- Resource-specific regulatory guidelines.

NEPA requires consideration of environmental concerns in the decision-making process for major federal actions. CEQ regulations implement the "action forcing" provision of NEPA to ensure that federal agencies comply with the letter and spirit of the Act.

Purpose and Need

The purpose and need for the Proposed Action is to comply with the regulatory requirements governing the development and implementation of natural resources management plans, in order to protect and enhance the Army's land at the Presidio of Monterey (POM) and Ord Military Community (OMC).

Alternatives Analysis

The ultimate selection of an alternative must reasonably achieve the purpose and need of the project. For purposes of this EA, the proposed action and no action alternative were evaluated. The proposed action involves implementation of the Integrated Natural Resources Management Plan (INRMP) for the POM and OMC. The No Action alternative assumes the installation would continue to operate without a natural resources management plan. The No Action alternative, while it does not meet the purpose and need of the project, was carried forward for detailed evaluation in this EA as required by AR 200-2.

Proposed Action

The preferred alternative is the Proposed Action, which includes the development and implementation of an INRMP for the POM and OMC. Under the Proposed Action, it is assumed that all parts of the INRMP would be implemented including land management and grounds maintenance, fish and wildlife resources, outdoor recreation, and cultural values. Specific actions to be undertaken under each of these

parts are described in detail in the INRMP (*HLA, 2001*). These actions are summarized by topic as they relate to environmental consequences of the proposed action.

Summary of Impacts and Mitigation Measures

For both the Proposed Action and No Action alternatives, potential environmental impacts to the following resources are evaluated in this EA: geology and soils, land use, biological resources, cultural resources, and outdoor recreation. No significant impacts from implementation of the INRMP were identified. A detailed discussion of the environmental impacts and associated mitigation measures is provided in Section 4 of this EA.

APPENDIX A

CONTENTS

FIGURE

A1.0 INTRODUCTION

This Environmental Assessment (EA) was prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) Regulations found at Title 40 Parts 1500-1508 of the Code of Federal Regulations (*40 CFR §1500-1508*), Army Regulation 200-2 which establishes procedures for implementing NEPA, and resource-specific regulatory guidelines presented herein.

NEPA requires consideration of environmental concerns in the decision-making process for major federal actions. CEQ regulations implement the "action forcing" provision of NEPA to ensure that federal agencies comply with the letter and spirit of the Act.

This EA was prepared to evaluate the potential environmental impacts from the proposed action and alternatives. If it is determined that implementation of the project could have significant unavoidable adverse environmental impacts, an Environmental Impact Statement (EIS) would be prepared and distributed for public comment in accordance with NEPA. If no significant unavoidable adverse impacts are identified, or if measures to avoid, reduce or offset identified impacts to less than significant levels are incorporated into the project, a Finding of No Significant Impact (FNSI) would be prepared.

A1.1 Project Location

POM

The Presidio of Monterey (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. Located southwest of the Ord Military Community (OMC), POM lies between Monterey Bay and the State Route (SR) 68. The downtown area of Pacific Grove is approximately 1 mile northwest of the installation with portions of the city abutting POM. The regional location of POM is shown on Figure 1.

OMC

OMC is located along the Pacific Ocean in northern Monterey County, California approximately 100 miles south of San Francisco. The installation occupies lands formerly under the jurisdiction of Fort Ord. The present 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, SR 1 (the Pacific Coast Highway), is located west of the OMC. West of SR 1, the Union Pacific Railroad Line is the primary passenger and freight rail connection between San Francisco and Los Angeles. Cities adjacent to OMC include Seaside, located approximately 1 mile south of the site, Monterey, located approximately 3 miles southwest of the site, and Marina, located approximately 2 miles north of the site. The Fritzsche 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 SR 218 (*U.S. Army, 1992a*).

A1.2 Project Background

The Integrated Natural Resources Management Plan (INRMP) was designed to protect and enhance the lands upon which the POM and OMC are dependent by providing a natural resources management program that is consistent with the Army's mission for each installation. The INRMP discusses the

relationship between each installation's mission and its natural resources. In addition, the plan addresses natural resources 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 was prepared to comply with existing Army regulations, including Army Regulation 200-2 and 200-3. The plan addresses stewardship of natural resources on an ecosystem scale and provides a means for the Army to both protect biodiversity and to provide high quality military readiness consistent with the mission. The plan demonstrates that the Army's mission and natural resource management goals on the POM and OMC are compatible. The missions of the POM and OMC are discussed in detail in the INRMP.

A1.3 Regulatory Requirements

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

- Sikes Act of 1962 (as amended through 1988);
- NEPA (*1969*);
- Endangered Species Act of 1973;
- AR 200-1, Environmental Protection and Enhancement;
- AR 200-2, Environmental Analysis of Army Actions;
- AR 200-3, Natural Resources– Land, Forest and Wildlife Management;
- AR 200-4, Cultural Resources Management;
- Presidio of Monterey Regulation 870-2 (Cultural Resources);
- National Historic Preservation Act (NHPA) of 1966 (as amended through 1992);
- Archaeological Resources Protection Act (ARPA) of 1979;
- 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.

A2.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

As authorized under the Sikes Act by Congress, the Army is required to develop and maintain an INRMP for each Army installation to provide for the protection and management of natural, cultural, and outdoor recreation resources. Army Regulation (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.

The purpose of and need for the proposed action is to comply with regulatory requirements governing the development and implementation of natural resources management plans, in order to protect and enhance the Army's land at the POM and OMC.

This EA is intended to be consistent with Army Regulation 200-2 (Environmental Effects of Army Actions), which incorporates the NEPA regulations. The purpose of this EA is to determine whether or not the adoption and implementation of the INRMP would adversely affect the environment. If it is determined that the project will result in a significant adverse impact, then an Environmental Impact Statement (EIS) will be prepared, pursuant to NEPA. If no significant impacts are identified, then a Finding of No Significant Impact (FNSI) will serve as the final environmental document.

A3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

A3.1 Proposed Action

The INRMP was prepared to establish guidelines for the preservation and protection of the natural, cultural, and outdoor recreation resources of POM and the OMC. The INRMP includes general prescriptions for ongoing maintenance and management of POM and OMC resources, as well as recommendations for enhancement and management of specific resources. The INRMP includes information regarding:

General Recommendations

- Erosion control measures related to road grading, water bars and cutouts, vehicle access, vegetation removal, interim erosion control measures, and revegetation;
- Management of storm drain runoff; and
- Fire prevention, including firebreak maintenance.

Land Management and Grounds Maintenance

- Identification of landscaping opportunities at the POM and OMC;
- Rare and endangered species considered during development planning;
- Guidelines for maintenance and management of existing landscaping, including mowing; types, application, and storage of fertilizers and soil amendments; pruning; and, irrigation design and operation;
- Guidelines for installing new landscaping or expanding or enhancing existing landscaping, emphasizing use of drought tolerant species indigenous to the Monterey Peninsula area;
- Sources and standards for plant materials, planting seasons, and planting methods;
- Maintenance of lawns, horticultural trees and shrubs, and native species;
- Pest management, including animal pests, invasive plants, parasitic plants, and fungal infestations; and
- Coordination with other federal, state, or local agencies who have or could have an impact on the POM and OMC pest management plans.

Fish and Wildlife Management

- 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 subsequent displacement of native species;
- Encouragement of the development 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.

Management of Outdoor Recreation and Cultural Values

- Maximization of outdoor recreation opportunities to achieve physical, cultural, and spiritual benefits within the principles of multiple land use and consistent with the military mission;
- Management of special interest areas to reflect the archaeological, botanical, geological, historic, or scenic importance of the area;
- Consideration of natural resource values in the development of plans, projects, and programs that affect those resources;
- Preservation of access to and use of the POM historic district and Sloat Monument by the public and by avocational historic groups in reenactment activities, and ceremonies;
- Enhancement, maintenance, and promotion of the growth of native vegetation existing on the 81 acres leased from the Army, designated as the Huckleberry Hill Nature Preserve (Preserve);
- Control of erosion problems associated with existing roads, firebreaks, and trails on highly erosive soils of the Preserve;
- Reduction of fire hazards and maintenance of fire control standards associated with native Monterey pine forest at the Preserve;
- Maintenance of the Presidio of Monterey Historic District in compliance with the Programmatic Agreement (PA) and Preservation and Maintenance Manual;
- Management and protection of the National Register El Castillo archaeological district;
- Requirement that new construction projects located in the POM Historic District comply with Section 106 of the NHPA and that consultation with State Historic Preservation Office (SHPO) and Advisory Council on Historic Preservation (ACHP) is conducted prior to initiation of any proposed action;
- Provision for an archaeological and Native American monitor during projects with initial ground surface disturbance; and

- Development and implementation of mitigation measures when impacts to archaeological sites cannot be avoided.

A3.2 No-Action Alternative

In accordance with AR 200-2, the No-Action alternative was evaluated in this EA. The No-Action alternative would result in continuation of the existing condition. The INRMP would not be adopted, and management recommendations provided in the INRMP would not be implemented.

A4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes existing conditions of the POM and OMC and identifies impacts of the Proposed Action and the No Action alternative. Issue areas addressed in this section include Geology and Soils, Land Use, Biological Resources, Cultural Resources, and Outdoor Recreation Resources. Detailed setting information is provided in the INRMP (*HLA, 2001*).

A4.1 Geology and Soils

A4.1.1 Affected Environment

POM

The following two major soil series are found on the POM (*Jones & Stokes Associates [J&SA], 1984; U.S. Department of Agriculture, 1978*):

- **Narlon Series** - a poorly drained soil with moderate erosion hazard potential, prevalent on the eastern two-thirds of 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 upper 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 (*J&SA, 1984; U.S. Department of Agriculture, 1978*).

The lower portion of the POM is underlain by Sheridan coarse sandy loam. The soils are moderately sloping to steeply sloping. These soils are also found on the lower side slopes of granitic uplands or on small rounded ridgetops. 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 this area 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*).

Landslides have historically occurred on the Monterey peninsula on steep slopes. 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 (*J&SA, 1984*).

Severe erosion has historically occurred on existing dirt 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 the Sheridan soils. The erosion hazard of this soil is moderate, and runoff is rapid. Existing erosion is concentrated in the 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 Preserve located in the Presidio Knoll area (*J&SA, 1984*). The City of Monterey, which manages the Preserve, has been successful in controlling landsliding and erosion within the Huckleberry Hill area.

OMC

The following two major soil series underlay OMC:

- **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; and
- **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, 1992c; U.S. Department of Agriculture, 1978*).

The Baywood series is similar to the Oceano series, with the exception that the Baywood series soils drain less 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, found 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. Roots penetrate to a depth of more than 60 inches. Runoff is slow to medium, and the erosion hazard is slight to moderate. If vegetation or soil structure is compromised, the soil is subject to wind and water erosion (*U.S. Army, 1992c; U.S Department of Agriculture, 1978*).

The OMC is highly susceptible to wind erosion in areas where vegetation has been removed. Vegetation or the development of soil structure in the surface horizons of the Oceano and Baywood soils, which comprise the majority of 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 replanted vegetation. This erosion continues until source areas are stabilized or revegetated (*U.S. Army, 1992a*).

A4.1.2 Environmental Consequences

Proposed Action

The INRMP identifies erosion control measures to be implemented at the Preserve currently practiced by the City of Monterey, the manager of the preserve. Erosion occurring at the middle and lower POM and the OMC would be controlled through interim measures to cover bare ground areas and long-term measures to restore vegetative cover. No adverse impacts associated with INRMP erosion control recommendations have been identified. Implementation of the INRMP would result in beneficial impacts to the POM and OMC by minimizing soil loss, disturbance of vegetative cover, and other adverse effects associated with erosion.

Accordingly, as referenced in the INRMP, the following recommendations concerning erosion control measures and proper drainage for the middle and lower POM are provided:

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

No Action Alternative

Under the No Action alternative, erosion control measures currently practiced at the Huckleberry Preserve would continue. Failure to implement INRMP erosion control recommendations in other areas of the POM and OMC could result in adverse erosion-related impacts.

A4.2 Land Use

A4.2.1 Affected Environment

Land at the POM and OMC is divided in the INRMP into three general land 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. A summary of land uses for both the POM and OMC is presented below.

POM

Land at the POM is primarily categorized as improved and semi-improved in the lower portion of POM and unimproved in the 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 Preserve. The City of Monterey manages the Preserve under an existing lease with the POM. Land uses on the POM are institutional and include education, administration, housing, recreation, and health care facilities. The central and western 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 Defense Language Institute (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 (*J&SA, 1994*).

The unimproved upper portion of the POM, known as the Preserve, has been designated as open space. Monterey pine forest dominates the land cover of 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, 1995a; City of Monterey, 1987*). In addition, Soldier Field, located in the lower POM, is also leased to the City of Monterey for recreational use.

OMC

The majority of OMC is residential housing, commercial and administrative support services for Department of Defense (DOD) personnel. The housing areas are all located south of Lightfighter Road, the main entrance to the former Fort Ord. Army administration and support facilities are located throughout the OMC. Youth services center, the main chapel, and library are located east of the North-South Road and west of the Marshall Park Housing area.

A4.2.2 Environmental Consequences

Proposed Action

No changes in land uses are proposed by the INRMP. Recreation resources and cultural resource sites would continue to be maintained and accessible to the public (see Cultural Resource and Outdoor Recreation sections below). The INRMP provides recommendations for management of improved, semi-improved, and unimproved grounds at the POM and OMC. The intensity, frequency, and types of

proposed maintenance activities are dependent upon the land use category and are protective of native California habitats and potentially occurring plants and animals with special-status. In addition, the INRMP provides guidelines for design and species composition of replacement plantings and new landscaping, emphasizing use of species indigenous to the Monterey Peninsula area. No adverse land use impacts from implementation of the INRMP were identified. Implementation of the INRMP would result in beneficial impacts to the POM and OMC grounds by improving landscape design and management practices and protecting native habitats and species.

As referenced in the INRMP, the following grounds maintenance recommendations to decrease the potential for wildfires and protect existing base land resources are as follows:

- Periodic removal of dead and decaying forest debris;
- Vegetation removal should be conducted on OMC lands such that buffer areas of at least 100 feet are established between existing buildings and adjacent native plant communities; and
- Vegetation management should be coordinated such that buffer areas (low vegetation) are periodically disced or mowed, as necessary between developed areas and natural resource management areas.

Moreover, the following landscaping measures have been recommended:

- Pruning or other maintenance activities performed on planted Hooker's manzanita should be avoided;
- Activities that may disturb nesting birds in these areas should be cleared in advance with DENR;
- During hot weather, lawn areas should be cut to 3 or 4 inches; and
- Lawn areas should only be irrigated at a frequency and duration sufficient to maintain uniform growth and appearance and not to exceed water conservation measures.

No Action Alternative

Failure to implement the INRMP may result in changes to land uses on the POM or OMC. Although existing landscape practices would continue, no guidelines would exist that provide (1) a coordinated approach to landscape design, species composition, and landscape maintenance, (2) emphasis on drought tolerant, native plantings, or (3) measures to minimize or avoid impacts to native habitats and special-status plant and animal species. The No Action alternative could also result in adverse impacts to grounds or natural resources of the POM and OMC from implementation of inappropriate landscape practices.

A4.3 Biological Resources

A4.3.1 Affected Environment

POM

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; horticultural plants; 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. Horticultural plantings,

including ornamental shrubs and herbs, are maintained adjacent to many of the POM buildings. Mixed assemblages of exotic and native trees and shrubs are found at several locations on the POM, including the Preserve. Some of these stands also contain planted or naturally established Monterey pines. 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 (*J&SA, 1984*). Vegetation in the undeveloped Preserve area consists of a dominant Monterey pine forest. Most of the Monterey pines are mature individuals in open to dense stands, with a crown height from 30 to 80 feet (*J&SA, 1984*). The southernmost corner of POM, along the western slope of the Preserve, supports a central maritime chaparral plant community dominated by broad mounds of manzanita interspersed with Monterey pine and coast live oak (*J&SA, 1984*). A more complete description of vegetation is contained in Part II of the INRMP.

Special-Status Species. Four special-status plant species occur at the POM: Monterey pine (California Native Plant Society [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 (*Piperia yadoni*; federally endangered, CNPS List 1B; *U.S. Army, 1995b*). Monterey pine occurs naturally in coast areas with winter rainfall and frequent summer fogs. Historically, Monterey pine forest was the dominant vegetation at the POM. At present, Monterey pine forest dominates the cover of POM above the 450-foot elevation contour. With the development 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 horticultural plantings (*U.S. Army, 1995b*).

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 the Monterey Bay area, populations are known to exist in the Larkin Valley, Prunedale Hills, Former Fort Ord, OMC, Monterey Peninsula, and the northern end of the Santa Lucia Range. Former Fort Ord supports the largest population. At the POM, Hooker's manzanita is located in the understory of Monterey pine forest located on Huckleberry Hill. Hooker's manzanita is also planted in median strips and other landscaped areas throughout the POM.

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 the 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 at the Preserve.

Yadon's piperia, a perennial herb in the orchid family, inhabits only coastal areas in Monterey County from Elkhorn Slough to the Monterey Peninsula. Yadon's piperia, a federally listed endangered plant and listed by the CNPS (List 1B), occurs in maritime chaparral and closed-cone conifer forests including Monterey pine forests. At POM, Yadon's piperia is located in the Monterey pine forest. In addition, a small population occurs in the open grassy understory of pine forest near the cemetery and dormitories. Two other individuals occur in the Preserve in pine forest with a hard shrub understory.

An Endangered Species Management Plan (*U.S. Army, 1998*) was 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 Preserve by the City of Monterey. Small-leaved lomatium has no federal status and existing populations will be preserved in already protected Monterey pine forest areas.

During special-status wildlife species surveys conducted at the POM, a sharp-shinned hawk (*Accipiter striatus*) was observed at the 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 was 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) was likely to use the POM for foraging. The Monterey pine forest at the POM is considered potential nesting habitat. No nests, pellets, guano, or other evidence of breeding or frequent use were observed at the POM (*J&SA, 1995*).

OMC

General Habitat Types. OMC lands consist primarily of disturbed vegetation associated with developed areas of the former Fort Ord (*U.S. Army, 1992b*). These lands lie in an area once dominated by maritime chaparral. Maritime chaparral is characterized by a wide variety of sclerophyllus shrubs occurring in moderate to high density. This 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 the mixed chaparral east of the OMC (*U.S. Army, 1992d*). A more complete description of the vegetation is contained in Part II of the INRMP.

Special-Status Species. Four special-status plant species have the potential to occur on 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 caneatus rigidus*; federal species of concern, CNPS List 4); and virgate eriastrum (*Eriastrum virgatum*; CNPS List 4; *U.S. Army, 1992d*).

Monterey spineflower colonizes recently disturbed sandy sites in coastal dune, coastal scrub, grassland, and maritime chaparral habitats. The former Fort Ord supports the largest known population of Monterey spineflower (*U.S. Army, 1997*). At OMC, Monterey spineflower occurs east of North-South Road which runs through OMC lands (*U.S. Army, 1992d*).

Sandmat manzanita occurs in sand hills of maritime chaparral and coast live oak woodland. Sandmat manzanita occurs east of North-South Road which runs through OMC lands (*U.S. Army, 1992d*).

Monterey ceonothus occurs in sandy hills and flats of maritime chaparral, closed-cone coniferous forests, and coastal scrub. The largest population is found on the former Fort Ord (*U.S. Army, 1997*). The land east and southeast of Fitch Park Housing Area east of North-South Road and east of OMC has the highest density of Monterey ceonothus (*U.S. Army, 1992d*).

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

Special-status wildlife species that have the potential to occur on OMC land cover types include the loggerhead shrike (*Lanius ludovicaianus*), 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 special concern; California horned lark (*Eremophila alpestris actia*), a state species of special concern; California black legless lizard (*Anniella pulchra nigra*), a state protected species of special concern; burrowing owl (*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.

A4.3.2 Environmental Consequences

Proposed Action

The INRMP was developed, in part, to preserve and protect the natural resources of the POM and OMC including sensitive species and habitat. Proper implementation of the INRMP recommendations would not be expected to result in any adverse impacts to natural resources. However, implementation of the INRMP could result in adverse impacts if management recommendations are not properly implemented. Potential impacts include:

- Damage to native vegetation, including special-status plants, during herbicide or pesticide application or removal of weeds; and
- Damage to native vegetation, including special-status plants, from overwatering of nearby landscape vegetation.

Mitigation measures to avoid these impacts at POM and OMC include:

- In areas occupied by Yadon's piperia or other sensitive plants, conduct all weed removal work during the non-growing season;
- Apply herbicides only when wind conditions are such that spray will not drift to non-target plants;
- Use only herbicides with no soil activity (e.g., glyphosate); and
- Train landscape maintenance personnel in the recognition of native vegetation.

In addition to the INRMP, the City of Monterey has developed a management plan for the Preserve. Under each objective, the Huckleberry Hill Preserve Forest Management Plan contains guidelines for achieving habitat preservation 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.

In addition to mitigation for sensitive species, and general habitat preservation at the Preserve, 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 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, such as 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 with 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.

To assist the POM Directorate of Environmental and National Resources (DENR) in management of on-base resources, 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.

No Action Alternative

Under the no action alternative, landscape practices would continue that may not be protective of native habitats or species. Potential impacts include:

- Expansion and/or planting of invasive exotic plant species in native habitats and those occupied by special-status plants;
- Failure to control pests that threaten native habitats and species;
- Damage to native habitats or special-status plants from improper weed control, mowing, pruning, irrigation, or application of herbicide;
- Clearing of native habitats and replacement with non-native landscape vegetation; and
- Spread of pitch pine canker as a result of inappropriate management of the Monterey pine forest.

In addition, INRMP recommendations that may not be implemented under this alternative include (1) support of research efforts and cooperation with other agencies to slow the spread of pitch pine canker and (2) enhancement of educational and recreational opportunities in natural areas of the POM and OMC. These potential impacts would be considered adverse.

A4.4 Cultural Resources

A4.4.1 Affected Environment

In 1967, the Central California Archaeological Foundation initiated archaeological work at El Castillo and CA-MNT-101, located in the southeast portion of the POM. In 1971, archaeological and historic resources sites were nominated to the National Register of Historic Places (NRHP) as an historic 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 archaeological 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*).

The amended historic district, identified in 1992, does not address properties included in the 1971 El Castillo Historic District. Page and Turnbull propose additional amendment in the district in the updated *Presidio of Monterey Historic Preservation Plan and Maintenance Manual* (*Page and Turnbull, 1994*). However, much of the El Castillo Historic District is located within the boundaries of the amended 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 due to known and unidentified archaeological resources (*J&SA, 1994*).

Sloat Monument is located in the lower POM, providing one of the best on-base vantage points of Monterey Bay. Few on-base sites have clear views of the City of Monterey and Monterey Bay due to development in the lower POM. 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 archaeological district within the lease and provide for the protection of aesthetic assets.

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.

A4.4.2 Environmental Consequences

Proposed Action

The objectives of the INRMP are to preserve and enhance cultural resource areas for current and future users of the base and consider cultural resource values in the development of plans, projects, and programs that may affect those resources. Several documents have been prepared that establish guidelines for the preservation and management of the POM and OMC cultural resources, including:

- Preservation and Maintenance Manual for the Presidio of Monterey Historic District (*Jackson Research Associates, 1985*);
- *Presidio of Monterey Historic Preservation Plan and Maintenance Manual* (*Page and Turnbull, 1994*);
- Programmatic Agreement for routine maintenance on the POM, executed in 1993 between the Army, the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation (ACHP); and
- Presidio of Monterey Cultural Resources Report (*Jackson Research Group and Far Western Anthropological Group, 1985*).

The INRMP reiterates the guidelines provided in these documents and integrates cultural resource management and preservation practices with natural resources management. No impacts to cultural resources from implementation of the INRMP were identified.

As referenced in the INRMP, the following additional management recommendations 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 Presidio of Monterey Historic District;

- New construction projects located in the POM Historic District will comply with Section 106 of the National Historic Preservation Act (NHPA);
- 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;
- Archaeological 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 deposits may include prehistoric midden soils, lithic or cobblestone or flaked tools, and/or tool flaking debris, all of which are significant in interpretation of 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 tools, leather buttons, or materials associated with local settlement and economic pursuits and transportation corridors; and
- When impacts to archaeological sites cannot be avoided, archaeological mitigations will be directed. This includes archival research and inventory, architectural or archaeological testing and evaluation, intensive documentation, and monitoring.

No Action Alternative

Guidelines for the preservation and management of POM and OMC cultural resources are established in several documents and agreements as listed above. These guidelines will be followed regardless of whether the INRMP is implemented. Consequently, no impacts to cultural resources from implementation of the INRMP were identified.

A4.5 Outdoor Recreation

A4.5.1 Affected Environment

Based on the HCRS and Army classification systems, outdoor recreation resources at the POM and OMC are categorized as Class I, Class II, or Class III resources. 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 a Sloat monument ceremony occur annually in the lower POM. These resources are discussed in the Cultural Resources section of this EA. There are no lands on the OMC that are suitable for classification as Class I Areas.

Class II Natural Environment Areas support dispersed recreation activities in conjunction with other uses such as hunting, fishing, bird watching, pleasure driving, hiking, sight-seeing, tourist activities, climbing, and riding. No lands on the OMC are suitable for classification as Class II Areas. The POM contains Class II Natural Environmental Areas on lands associated with the Preserve. The Preserve, located in the upper POM, is managed by the City of Monterey under a lease with the POM. A trail system which provides access for bird watching, nature walking, biking, hiking, sight-seeing is present in the Preserve.

Class III Special Interest Areas contain features which are of archaeological, 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. Class III Special Interest Areas at the POM include the Presidio of Monterey Historic Districts and a scenic overlook at Sloat Monument. These resources are discussed in the Cultural Resources section of this EA.

A4.5.2 Environmental Consequences

Proposed Action

The Preserve is managed by the City of Monterey through a lease with the Army. The City has prepared a Huckleberry Hill Forest Management Plan to guide management of the Preserve. Under the INRMP, the City would continue to manage the Preserve according to the Forest Management Plan, and the Preserve would continue to be accessible to the public for recreation purposes. The existing condition would remain under the Proposed Action, and no adverse impacts to recreation resources from implementation of the INRMP would be expected.

No Action Alternative

If the INRMP were not implemented, the City of Monterey would continue to manage the Preserve according to guidelines in the Forest Management Plan. Under the No Action alternative, the existing condition would continue, and no adverse impacts would be expected.

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A6.0 LIST OF PREPARERS

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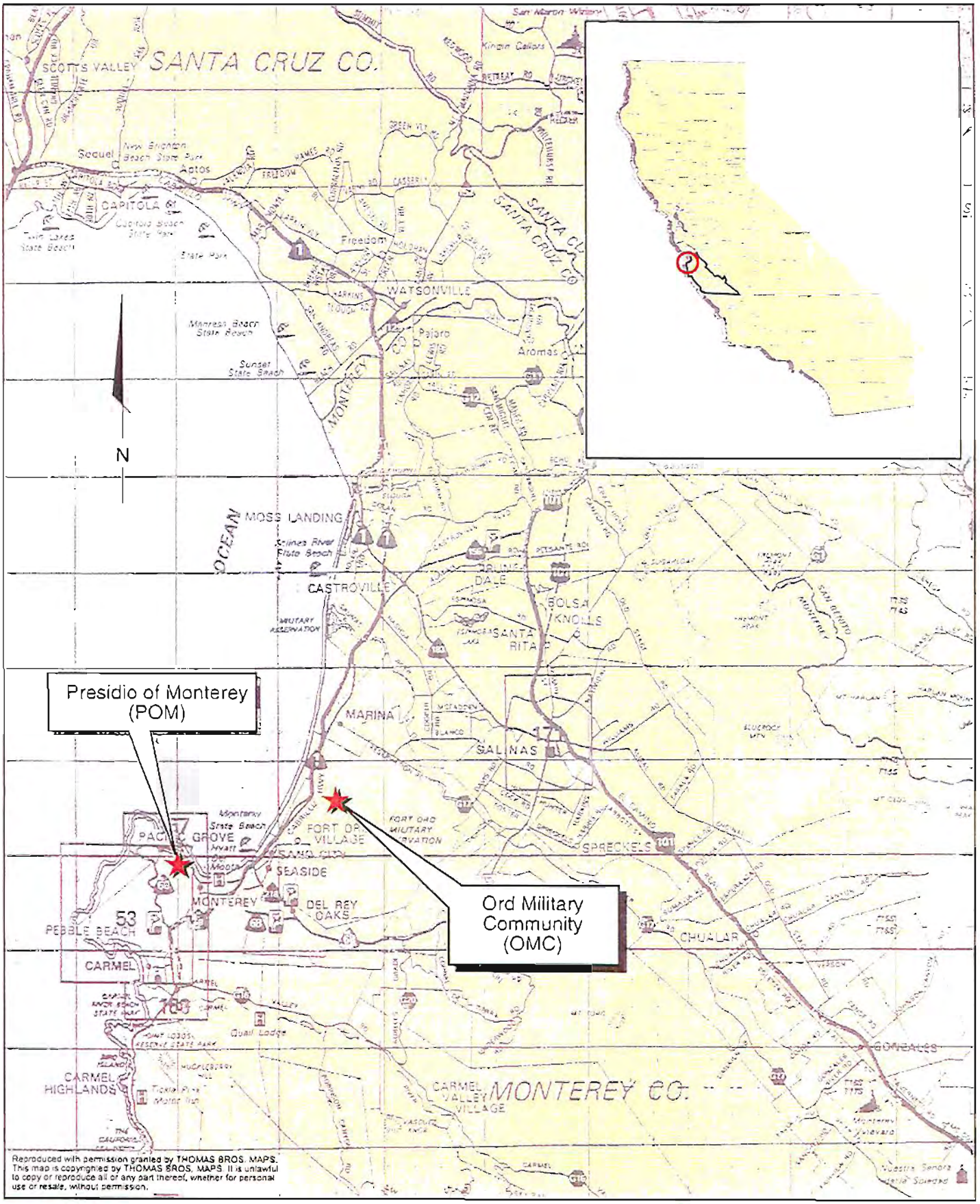

HLA

Harding Lawson Associates
Engineering and Environmental Services

Regional Location Map
Environmental Assessment
POM and OMC
Presidio of Monterey
Monterey County, California

PLATE **A1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	35839 003712		01/01	

Appendix B
Endangered Species Management Component
2008 Endangered Species Management Plan
with Annual ESMP Reports

Endangered Species Management Plan for Yadon's Piperia and Hooker's Manzanita 2008 Update

Presidio of Monterey and Ord Military Community Monterey County, California

Yadon's piperia

November 2008

Endangered Species Management Plan 2008 Update
for Yadon's Piperia and Hooker's Manzanita
Presidio of Monterey and
Ord Military Community
Monterey County, California

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ACRONYMS AND ABBREVIATIONS

AR	Army Regulation
USACE	Army Corps of Engineers
BLM	Bureau of Land Management
CEQA	California Environmental Quality Act
CNPS	California Native Plant Society
DENR	Directorate of Environmental and Natural Resources Management
DFG	California Department of Fish and Game
DPW-E	Directorate of Public Works, Environmental Division
cm	Centimeter
ESA	Endangered Species Act of 1973
ESMP	Endangered Species Management Plan
FWS	US Fish and Wildlife Service
HLA	Harding Lawson Associates
HMP	Habitat Management Plan
HMU	Habitat Management Unit
NEPA	National Environmental Policy Act
OMC	Ord Military Community (POM Annex)
POM	Presidio of Monterey

EXECUTIVE SUMMARY

Background

US Department of the Army (Army) Regulation (AR) 200-1, Chapter 4-3 requires that an Endangered Species Management Component (ESMC) to the Installation's Integrated Natural Resource Management Plan be prepared for installations containing federally listed species or critical habitat. This Endangered Species Management Plan (ESMP) satisfies the ESMC requirement. Compliance with Chapter 4-3 of AR 200-1 requires coordination with other federal agencies responsible for the protection of special status species. Failure to implement this ESMP can lead to violation of the Endangered Species Act of 1973, as amended (ESA) and possibly result in the costly disruption of military operations.

Two species of rare plants found on the Presidio of Monterey, Yadon's piperia (*Piperia yadonii*) and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), were identified by the Army for inclusion in this ESMP. Yadon's piperia is listed as endangered by the US Fish and Wildlife Service (FWS) (FWS 1998). Hooker's manzanita currently has no federal status. It was chosen for inclusion in this plan, because it is considered a species at risk (SAR) and may be considered for listing as threatened or endangered in the future. If federal status is proposed for Hooker's manzanita and funds become available, the recommendations provided in this ESMP should be implemented. At this time, the Army is not obligated to implement recommendations for Hooker's manzanita.

The Ord Military Community (OMC) lands, formally known as the POM Annex, contain no Yadon's piperia or Hooker's manzanita. Yadon's piperia and Hooker's manzanita are found on adjacent former Fort Ord lands slated for disposal and managed by the US Army Base Realignment and Closure staff and the Bureau of Land Management. The Installation-Wide Multispecies Habitat Management Plan (HMP) for Former Fort Ord, California, serves as an ESMP for 18 endangered, threatened, or rare plant and animal species (including Yadon's piperia and Hooker's manzanita) on former Fort Ord and also includes management of special status species on OMC (USACE 1997). Five HMP special status species are found on OMC: Monterey spineflower (*Chorizanthe pungens var. pungens*) federally listed as threatened, sandmat manzanita (*Arctostaphylos pumila*) federal species of concern, Monterey ceanothus (*Ceanothus cuneatus var. rigidus)* federal species of concern, California tiger salamander *(Ambystoma californiense*) federally listed as threatened, and California black legless lizard (*Anniella pulchra nigra*) state species of concern. These species are managed in accordance with the HMP, as amended, and the accompanying Biological and Conference Opinion (BO) and BO amendments. The HMP states that, "Lands designated as "Development" (including OMC) have no management restrictions placed upon them. The biological resources found on these parcels are not considered essential to the long-term preservation of sensitive species at former Ft. Ord." The Biological Opinion allows for development of these parcels, but it also requires identification of sensitive biological resources within these parcels that may be salvaged for use in restoration activities within reserve areas. The two threatened species found on OMC, therefore, are not addressed further in this ESMP.

Yadon's Piperia

<u>Current Species Status.</u> Yadon's piperia is endemic to California. It is found within closed-cone coniferous forest and maritime chaparral communities in northern coastal Monterey County. Two main populations of Yadon's piperia have been identified at the Presidio of Monterey (POM): one across from the cemetery and adjacent to the dormitory at building 630, and one near the Huckleberry Hill Preserve and behind buildings 832 and 833 (Jones & Stokes 1995, MACTEC 2005, Grover-Bullington 2008). Several other small groupings of plants are scattered around the upper POM including several along the Huckleberry Hill fence across from the Post Exchange (PX) and behind buildings 649 and 650, and one in the Pvt. Bolio gulley near the Asian building 450 in the historic district (Figure 6a). Because it is a protected species, efforts are made to reduce impacts to the plants and their habitat through education, signage, brochures, habitat delineation, and a monitoring program. Threats to the populations on the installation include: human disturbance such as trampling, weed whacking, or burying plants under debris

piles; deer browsing and trampling; competition from non-native, invasive plant species; fire suppression; and pressure to use open space for facility and parking lot construction.

Habitat Requirements and Limiting Factors. The primary limiting factor for Yadon's piperia is the availability of suitable habitat.

Management Objectives. Management objectives for Yadon's piperia are to protect and enhance existing populations on the installation.

Conservation Goals. The goals to conserve Yadon's piperia are to do the following:

1. Protect and maintain the existing POM Yadon's piperia populations. These populations occupy approximately 12 acres; however, 121 acres of potentially suitable habitat is found on the POM (Jones & Stokes 1995, FWS 2006). No population density goal has been established. On October 18, 2006, the FWS proposed to designate 2,306 acres of land as critical habitat for Yadon's piperia. Presidio of Monterey lands were excluded from designation under Section 4 (a) (3) of the ESA as amended, because "conservation efforts identified in the ESMP and INRMP provide benefits to *Piperia yadonii* occurring in habitats within the POM" (FWS 2006). The Final Rule published on October 24, 2007 retained the exemption (FWS 2007).

2. Avoid impacts to the population near the former obstacle/orienteering course during training and recreation, ingress and egress to and from the barracks at building 630 and Hilltop field, and future construction activities. No known installation or tenant unit mission requirements occur within the occupied habitat. However, the former obstacle/orienteering course and two volleyball courts are located immediately adjacent to one Yadon's piperia population in suitable habitat.

3. Avoid impacts to the single plants in the lower POM and the populations behind the 832 and 833 barracks and along the Huckleberry Hill fence across from the PX and behind buildings 649 and 650, especially along the trails and fire access roads. No known installation or tenant unit mission requirements occur within the occupied habitat.

Actions Needed. The major steps needed to satisfy management objectives and achieve conservation goals are to perform the following:

1. Institute an annual monitoring program to record changes in population over time and to facilitate development of corrective measures, if required.
2. Protect existing populations from foot traffic by installing warning signs, instituting an awareness training program, and possibly installing fencing.
3. Hand remove non-native species from documented habitat and from potential habitat areas.
4. Monitor deer browsing and trampling. Cage individual plants to protect them from impacts if necessary or fence the habitat area.
5. Establish a propagation and planting program to enhance marginal or buffer habitat (optional).

Hooker's Manzanita

Current Species Status. Hooker's manzanita is endemic to the Monterey Bay area and is found within maritime chaparral and closed-cone coniferous forests. Hooker's manzanita is randomly distributed on the west side of POM, west of Rifle Range Road and east of State Route 68. The number of individual plants occurring on base has not been established, but the estimated area of distribution is 57 acres (most occurring within the Huckleberry Hill Nature Preserve, which is managed by the City of Monterey). Threats to populations on the installation include habitat fragmentation, disease, development in the form of facility and parking lot construction, invasive species, trampling by people, browsing by deer and lack of fire to scarify (abrade or cut open) seeds for germination.

Habitat Requirements and Limiting Factors. The primary limiting factor for Hooker's manzanita is the availability of suitable habitat.

Management Objectives. Management options for Hooker's manzanita should be to protect and enhance existing populations on the installation.

Conservation Goals. The goals to conserve Hooker's manzanita are to do the following:

1. Maintain existing Hooker's manzanita populations on POM. Nine areas (approximately 57 acres) of Monterey pine forest habitat on the POM support populations of Hooker's manzanita. Approximately 120 acres of potentially suitable Hooker's manzanita habitat exists on the installation. A population density goal has not been established.

2. Avoid impacts to the populations near the former obstacle/orienteering course during training and the volleyball courts during recreational activities. In addition, reduce adverse effects of ingress and egress to and from the barracks at building 630 and Hilltop field, and from future construction activities. Monitor effects of recreation on populations along the Huckleberry Hill fence and within the Preserve. No known installation or tenant unit mission requirements, with the exception of the former obstacle/ orienteering training, occur within the occupied habitat.

3. If Hooker's manzanita is impacted during development, landscaping should include planting of Hooker's manzanita.

Actions Needed. The major steps needed to satisfy management objectives and achieve conservation goals are:

1. Hand-remove non-native species from habitat areas.

2. In the event the species becomes listed, institute an awareness training program and install "endangered species" warning sites.

3. Establish a propagation and planting program to augment existing populations (optional).

4. Establish a finite number of monitoring sites on the upper POM to determine population trends: to assess if plants are healthy and thriving, and if propagation and germination is occurring in the absence of fire. Measurements, at a minimum, will include percent cover and age class of stands taken every five years.

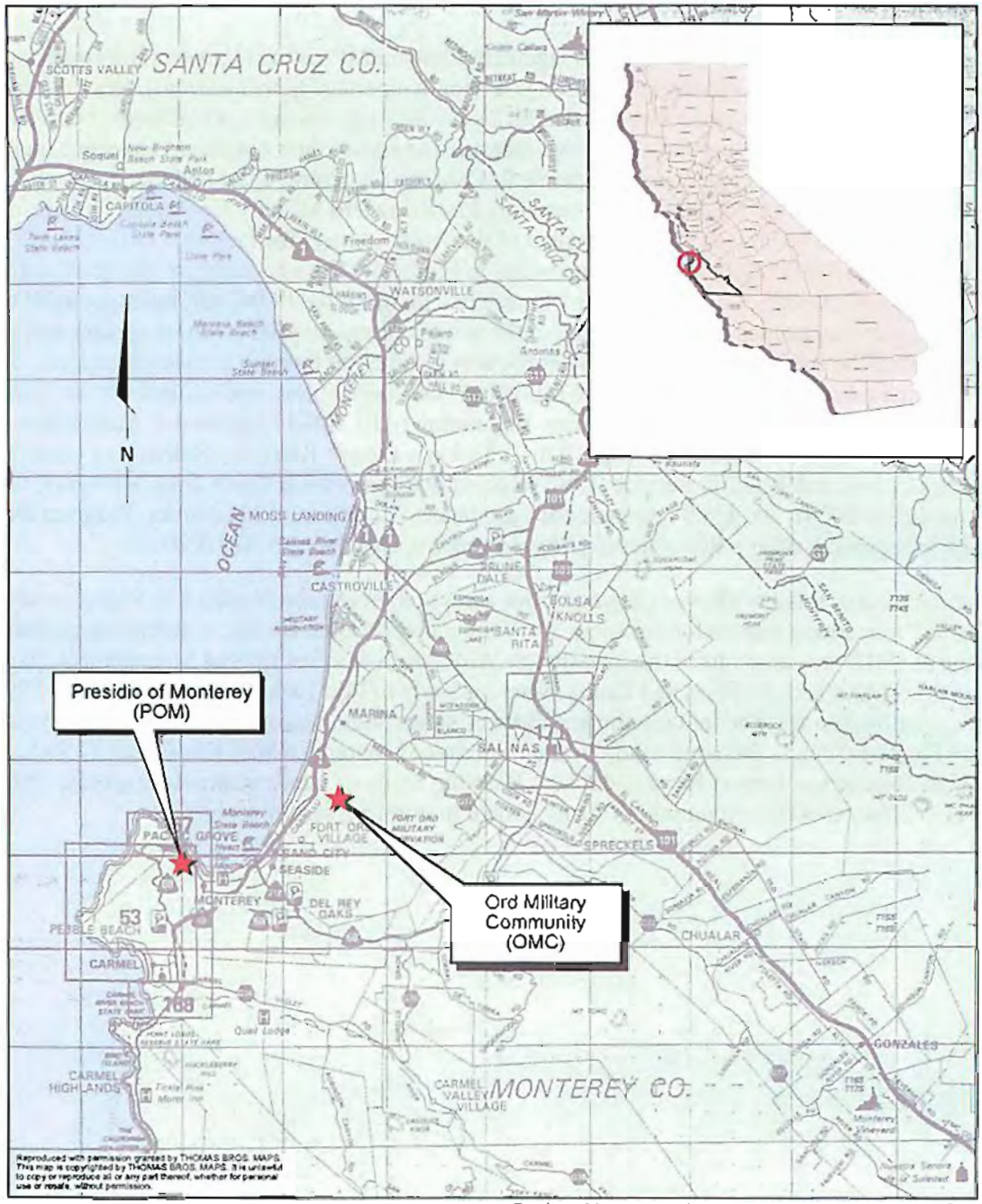
Total Estimated Cost of Conservation Actions. Projected costs for the first 6 years of the 1999 plan (Table 2) were as follows:

Year (1) 1999 $7,560; Year (2) 2000 $4,280; Year (3) 2001 $4,280; Year (4) 2002 $4,280; Year (5) 2003 $4,280; Year (6) 2004 $2,060. Table 2 provides a breakdown of estimated annual implementation costs and Table 3 describes these costs by activity. As part of the 2008 update, estimated costs have been projected out to 2010.

1.0 INTRODUCTION

The purpose of this Endangered Species Management Plan (ESMP) is to (1) present information on two plant species at the Presidio of Monterey (POM): Yadon's piperia (*Piperia yadonii*), federally listed as endangered, and Hooker's manzanita (*Arctostaphylos hookeri ssp. hookeri*), a California Native Plant Society (CNPS) List 1B species and (2) outline measures to ensure their continued existence on the POM. These two species of rare plants that are endemic to California's central coast and that occur on the POM or potentially occur on POM Annex lands (currently known as Ord Military Community and referred to as OMC), were identified by the US Department of the Army (Army) for inclusion in this ESMP. The regional location of the POM and OMC is provided in Figure 1. The site maps are provided as Figures 2 and 3. This ESMP describes the occurrence of these two plants at the POM, addresses potential threats to these plants, provides conservation goals, and outlines a management plan for these species and their habitat. Cost of the conservation efforts and impacts to installation training are also discussed. This ESMP is based on and is consistent with the following laws, regulations, and guidelines: the Endangered Species Act (ESA) of 1973, as amended; Army Regulation (AR) 200-1 Chapter 4-3, Land Resources; the California Department of Fish and Game (CDFG) Yadon's Piperia Recovery Strategies (Jones & Stokes 1996); the US Fish and Wildlife Service (FWS) Recovery Plan for Five Plants from Monterey, County California (FWS 2004); and FWS recommended guidance: A Long-term Monitoring Program for the Federal Endangered Yadon's Rein Orchid (*Piperia yadonii*, Ordidaceae) (Graff 2006).

Information used in this ESMP was obtained from various sources (see Section 8.0, References). Information concerning population locations for Yadon's piperia and Hooker's manzanita potentially occurring at OMC was taken from the Installation-Wide Multi-Species Habitat Management Plan (HMP) for former Fort Ord and the Flora and Fauna Baseline Study of Fort Ord, California (USACE 1992, 1997). Location data for Yadon's piperia and Hooker's manzanita occurring on the POM were taken from the Flora and Fauna Baseline Study of the Presidio of Monterey, California (Jones & Stokes 1995), the Habitat Assessment Report Flora and Fauna Baseline Study of the Presidio of Monterey, California (MACTEC 2005) as well as internal US Army annual monitoring survey reports.



Regional Location Map

POM and OMC
Presidio of Monterey
Monterey County, California

Figure 1

DATE 01/01

REVISED DATE

Figure 1. Regional Location Map

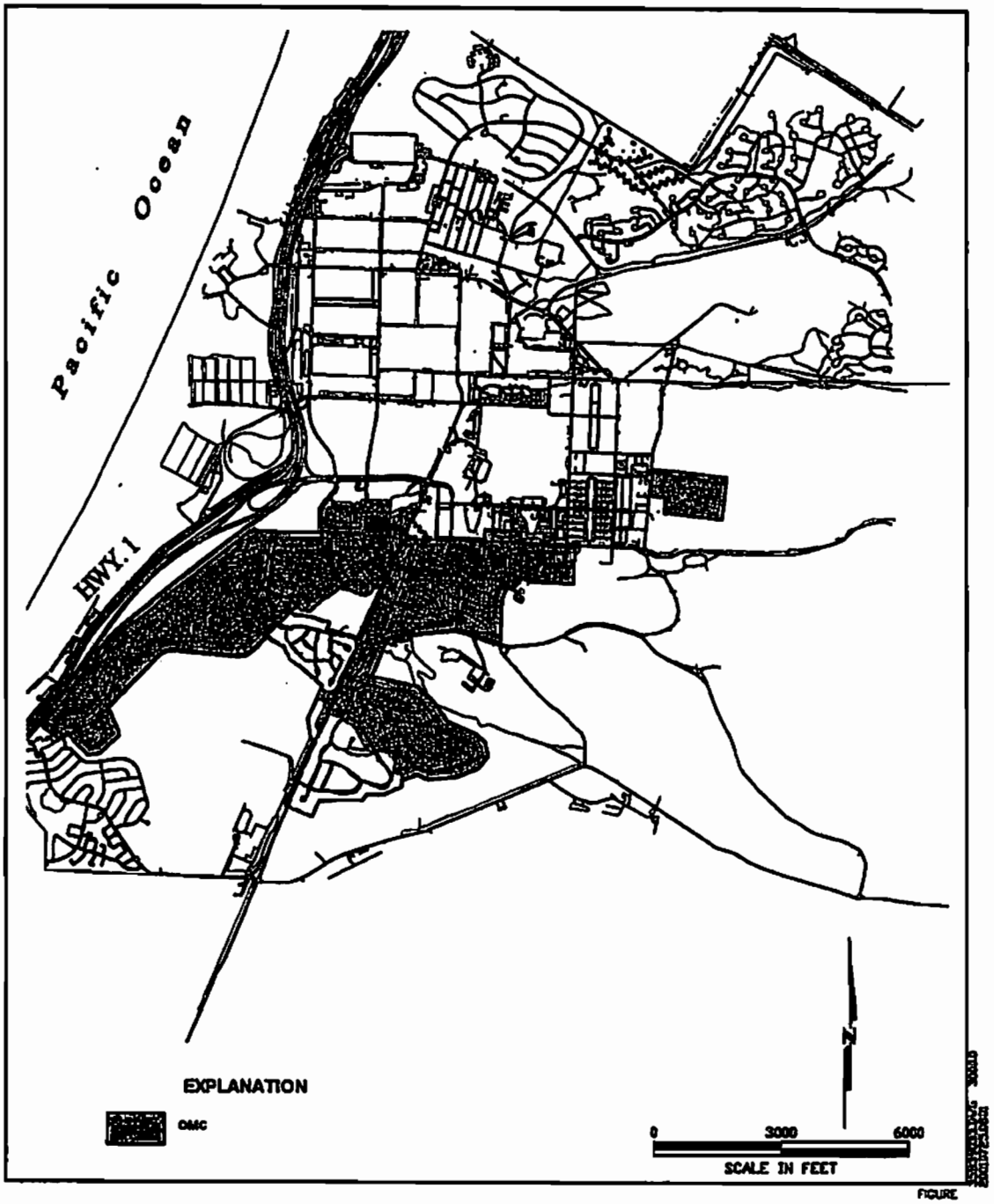


Figure 2. Ord Military Community (OMC) Lands

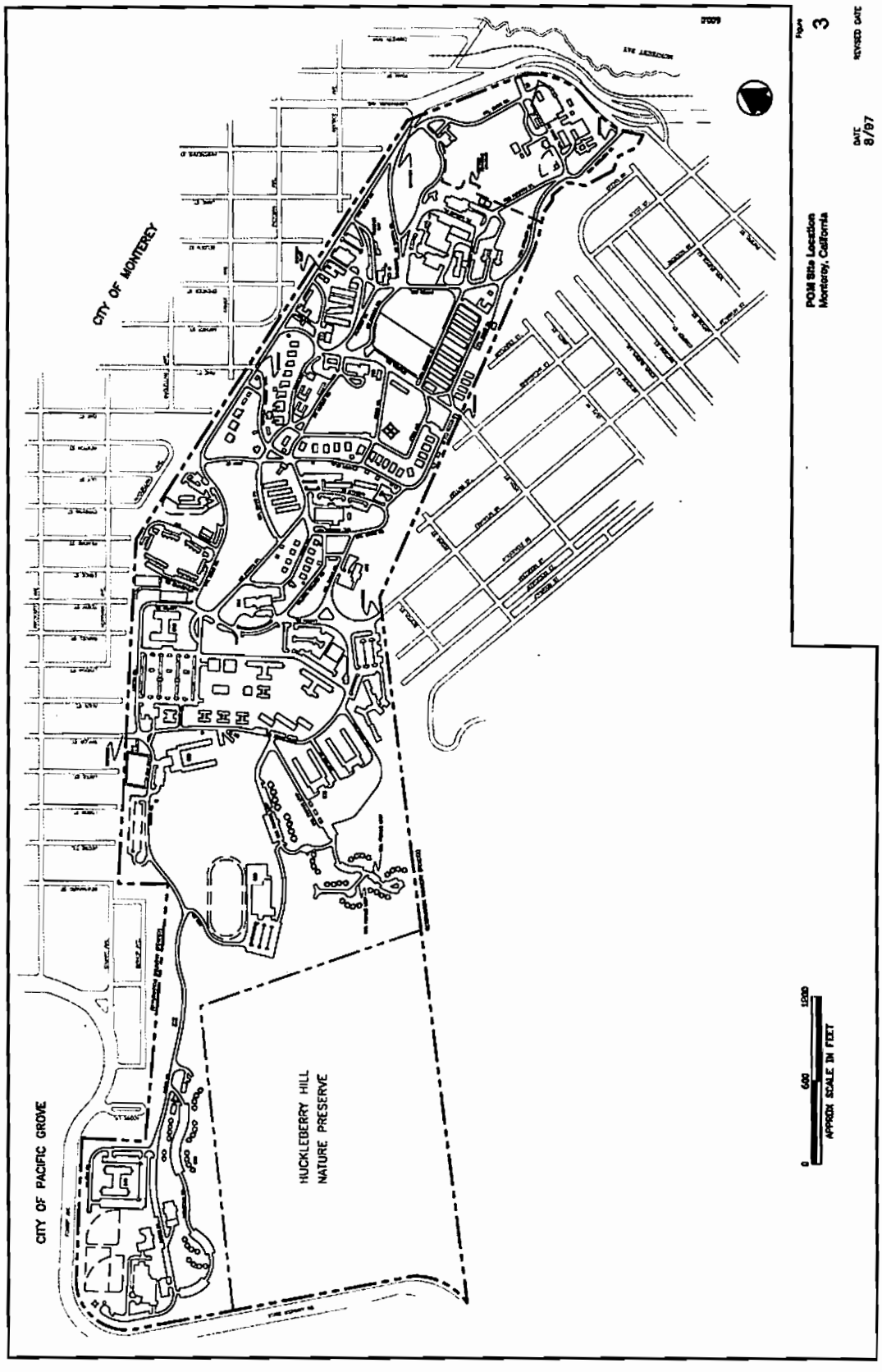


Figure 3. Presidio of Monterey (POM) Site Map

2.0 SPECIES INFORMATION

This section provides descriptions of the species, their distribution, habitat, life histories, reasons for listing, and existing conservation measures.

2.1 Yadon's Piperia

Description. Yadon's piperia is a slender perennial herb in the orchid family (Orchidaceae) that emerges during the winter from an underground bulb-like stem. Photographs of Yadon's piperia are provided in Figures 4 and 5. The plant is 10 to 50 centimeters high, with elongated basal leaves that are 10 to 15 centimeters long and 2 to 3 centimeters wide. Yadon's piperia flowers in summer (May through August). Many small flowers appear on a stalk that is 5 to 50 centimeters high. Each flower consists of six petal-like parts that are white with green margins or midveins. The lower petal forms a narrowly triangular lip that is 3 to 5 millimeters long and curved back toward a short, white spur. The spur is pointed downward and is 2.5 to 4 millimeters long (Hickman 1993).

Yadon's piperia is similar to elegant piperia (*Piperia elegans*), elongate piperia (*P. elongata*), Michael's piperia (*P. michaelii*), and transverse piperia (*P. transversa*), but is distinguished from them by the shorter spur length, the particular pattern of green and white floral markings, and the earlier flowering time (FWS 1995). Further information concerning technical descriptions of Yadon's piperia can be found in *The Jepson Manual: Higher Plants of California* (Hickman 1993) and in *Two New Piperias (Orchidaceae) from Western North America* (Morgan and Ackerman 1990). The FWS proposed endangered status, pursuant to the ESA, for Yadon's piperia on August 2, 1995 (FWS 1995) and subsequently determined endangered status on August 12, 1998 (FWS 1998).

Distribution. Yadon's piperia is found in northern Monterey County from the Monterey Peninsula north to the Prunedale-Elkhorn Slough area. The density of Yadon's piperia has declined dramatically within its range, and populations are fragmented due to development. It is sparsely distributed throughout its historic range, except for the Pacific Grove area, which has totally lost its population due to urbanization. It is likely that the plant was previously more abundant in the Prunedale-Elkhorn Slough area (FWS 1995). Due to more intensive monitoring throughout its range, current estimates put the total of all individuals at 195,300 (Graff 2006). Approximately 96 percent of these plants occur on the Monterey Peninsula (Jones & Stokes 1996).

Jones & Stokes Associates conducted surveys for Yadon's piperia on the POM during December 1994 and April and June 1995 (Jones & Stokes 1995, 1996). Botanists conducted surveys by walking zigzag transects thorough potential habitat. Approximately 50 individual plants were identified in open grassy understory of Monterey pine forest near the cemetery and dormitories. Two additional individual plants were located in the vicinity of the Huckleberry Hill Preserve in Monterey pine forest with chaparral understory (Jones & Stokes 1995). Additional surveys done in 1998 by the Directorate of Environmental and Natural Resources Management (DENR), renamed the Directorate of Public Works, Environmental Division (DPW-E), found the population by the cemetery and dormitories extended into a hard-packed embankment that connected the pine forest with adjacent dormitories. The embankment showed obvious signs of previous ground disturbance. The number of individual plants in 1998 along the embankment and in the original forest location was estimated to be 150 plants; most of these plants were found along the embankment. Known population locations occurring on the POM in 1995 are shown on Figure 6. Figure 6a shows location data for *Piperia yadonii* on the POM, including winter 2008 data showing the expanded habitat near building 630, near buildings 832 and 833, along the Huckleberry Hill fence across from the PX and behind buildings 649 and 650, as well as the two single plants near building 450.

Figures 4 and 5. Photos of Yadon's piperia

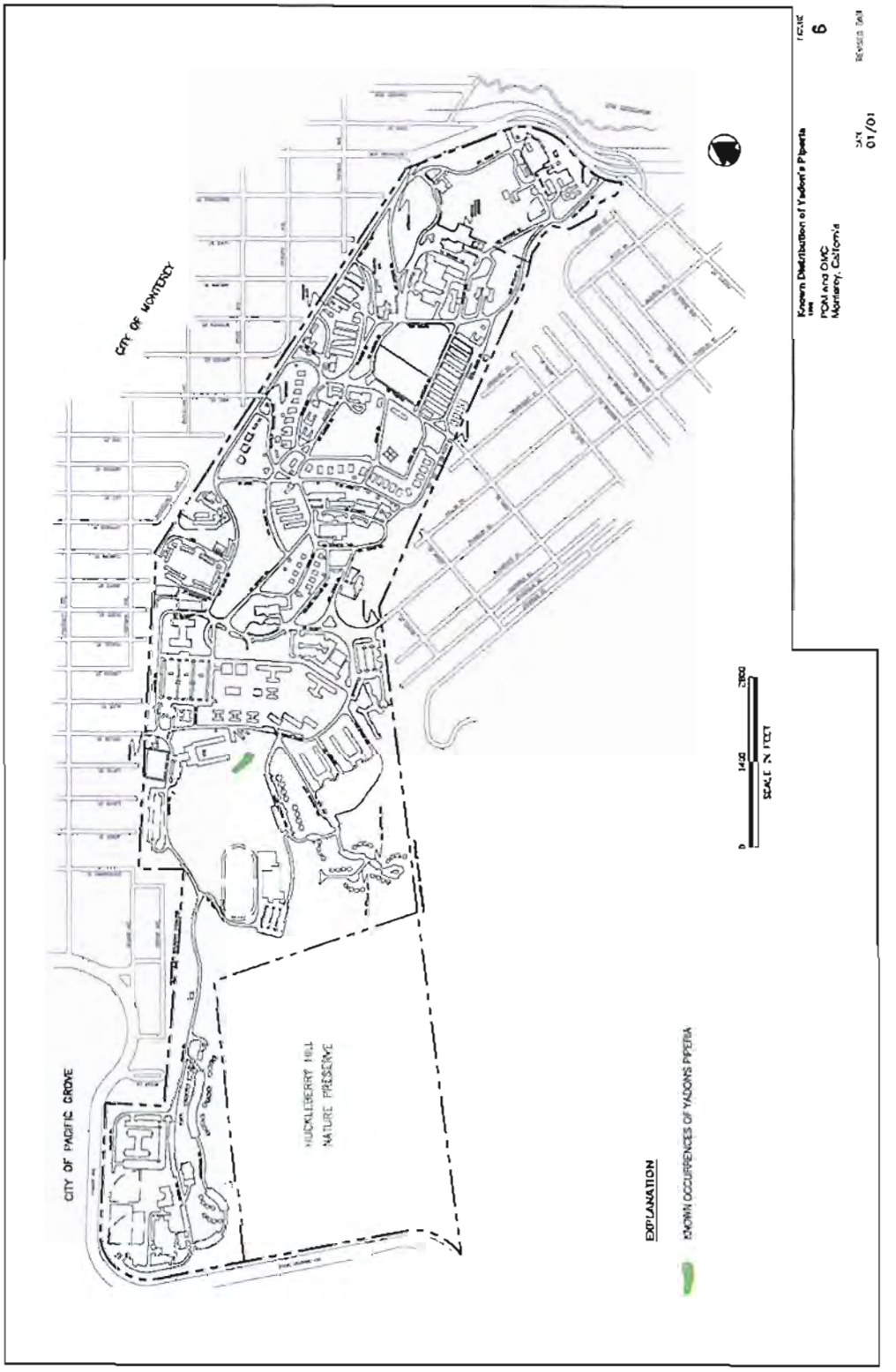


Figure 6. Yadon's piperia Locations 1995

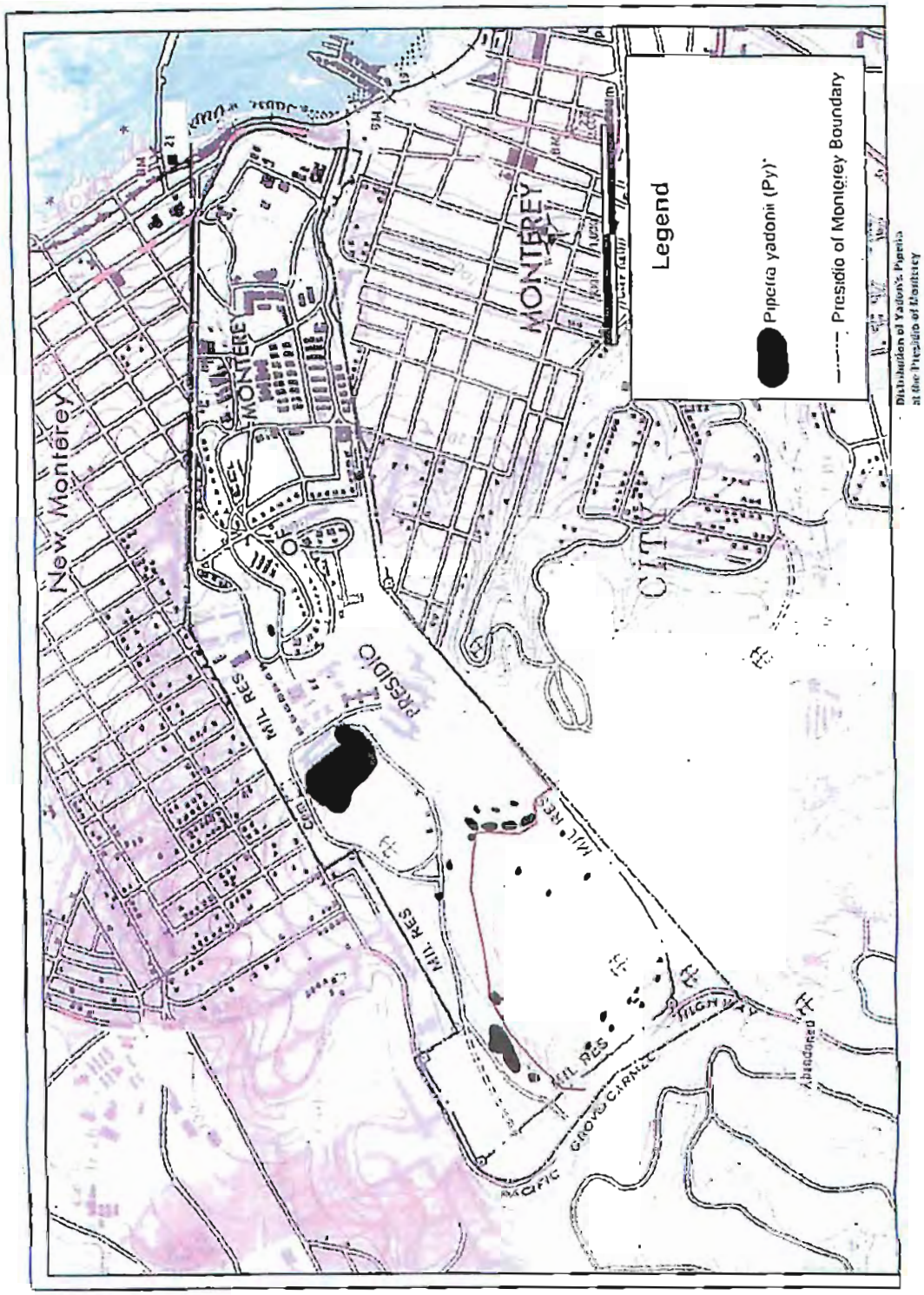


FIGURE 6a

Figure 6a. Yadon's Piperia Locations 2008

Based on the 1994 and 1995 surveys, the POM had approximately 0.16 acres of occupied habitat and 120 acres of potentially suitable habitat for Yadon's piperia (Jones & Stokes, 1995). The population at the POM was less than 1 percent of the total plant population estimated in the *Flora and Fauna Baseline Study of the Presidio of Monterey* (Jones & Stokes 1995). Surveys for Yadon's piperia were conducted in 2001, 2002, 2003, 2004, 2005, 2007 and 2008. Total plant counts for the area behind building 630 are listed in Table 1 and results of annual summer surveys are described in the ESMP annual report for each year (Appendix B). In 2005, MACTEC Engineering and Consulting, Inc. discovered single plants in three new locations. During the 2008 winter survey, 2,615 plants were counted near building 630 and individuals were documented as far as the parking area on Mason Road (Figure 6b).

Figure 6b. Yadon's Piperia Plants Near Mason Road Parking Area at Building 630

In addition, the small population discovered in 2005 adjacent to the Huckleberry Hill fence was found to have expanded down onto the slopes behind buildings 832 and 833 and across from building 838 (Figures 6c and 6d). The total number of plants counted in this area during the winter survey was 733 where previously only two plants had been observed. This area was immediately signed, flagged and some of the plants that were more vulnerable to impacts along the boundary fence trail and the fire access roads were caged. French broom was very dense within this habitat, so manual removal became a high priority. Invasive plant control, including manual removal of French broom and pampas grass was performed in the summer of 2008. Individual pampas grass plants adjacent to the habitat were also treated with Roundup® herbicide to prevent re-growth.

Figures 6c and 6d. Yadon's piperia Located Behind Building 832 and 833

Several small grouping of plants were also discovered along the Huckleberry Hill fence across from the PX and behind buildings 649 and 650. These areas were flagged, signed and plant locations were recorded using a Global Positioning System (GPS). The two plants in the Pvt Bolio gulley by building 450 were also signed and recorded.

Habitat/Ecosystem. Yadon's piperia is found in maritime chaparral and closed-cone coniferous forests. It is found primarily on sandstone and sandy soil that is often poorly drained and dries in summer when the plants are flowering (FWS 1995). Yadon's piperia prefers soils that retain moisture during the rainy season but are not subject to inundation (Allen 1996). Most occurrences of Yadon's piperia appear to be on Narlon and Huckleberry soils (Jones & Stokes 1996). Plant associations in maritime chaparral include shaggy-barked manzanita (*Arctostaphylos tomentosa*), chamise (*Adenostoma fasciculata*), toyon (*Heteromeles arbutifolia*), sticky monkey flower (*Mimulus aurantiacus*), California broom (*Lotus scoparius*), and rush lotus (*L. junceus*). Plant associations in closed-cone coniferous forests include Monterey pine (*Pinus radiata*), Bishop pine (*Pinus muricata*), Hooker's manzanita, western poison-oak (*Toxicodendron diversilobum*), blue wildrye (*Elymus glaucus*), bedstraw (*Galium* sp.), and California huckleberry (*Vaccinium ovatum*). Yadon's piperia occurs at elevations ranging from 30 to 150 meters on topography that ranges from relatively level to slopes that are moderate (Morgan, 1997).

Elements of the ecosystem inhabited by Yadon's piperia include symbiotic relationships, soil disturbance, light availability, cover, non-native species competition, and deer browsing. Yadon's piperia is symbiotic with mycorrhizal fungi. Although the specific fungus is poorly understood, its presence is required for germination and establishment of Yadon's piperia. Observations made by David Allen indicate that it takes 10 to 15 years from a disturbance before the plant can become established (Allen 1996), although observations at the POM indicate more like five years. Yadon's piperia is usually found with other orchid species in the surrounding area such as hooded ladies tresses (Spiranthes romanzoffiana) or other species in the genus Piperia (Morgan 1997). In 2007, several hooded ladies-tresses (Spiranthes romanzoffiana) plants were discovered growing along the abandoned obstacle course near the Yadon's piperia habitat by building 630.

Graff notes, "The orchids grow through a thin to moderate layer of pine needle duff in filtered or indirect sun and appear to prefer areas with a fairly open canopy and open, grassy understory," (Graff 2006). Dense cover from non-native species appears to impede germination and establishment of Yadon's piperia. However, cover provided by native grasses and Hooker's manzanita appears to enhance

reproductive success by reducing browsing by deer and other herbivores (Morgan 1997). In addition, the shrubs may provide protection from herbivores and possibly contribute to a more favorable moisture regime (Allen 1996). *Piperia yadonii* grows in filtered sun on soils with shallow clay hard pan that becomes very dry during the flowering season; however, these soils include cracks and tubes derived from root penetration that fill with clay and remain moist for long periods of time (FWS 2004). During the 2007 survey, DPW-E personnel noted that some of the more robust individuals were growing adjacent to invasive pampas grass. The pampas grass may provide protection from herbivores, partial shade and increased soil moisture.

Life History/Ecology. Plants typically are found in groups numbering between 5 and 50; however, groups of 100 or more are found infrequently (Allen 1996). During the first few years of growth, the plant produces one or two basal leaves that die back each summer. After several years of vegetative growth, the plant sends up a single stem to 50 centimeters tall with flowers arranged in a dense narrow-cylindrical raceme (FWS 1995). Plants typically flower from May through August (Skinner and Pavlik 1994). Moths in the noctuid (Noctuidae) and geometer (Geometridae) families have been observed pollinating other species of piperia. Mosquitoes have also been observed pollinating piperia species (Morgan 1997). Possibly other nocturnal insects may pollinate the plant as well. The fruit is a capsule that matures in the fall. Tiny seeds are dropped and wind-dispersed from the capsule annually to create a seed bank in the surrounding soil. Strong winds are likely to carry the millions of dust-like seeds produced by a population over a large area. Typical of orchids, the roots of Yadon's piperia form a close symbiotic association with mycorrhizal fungi. For the seed to germinate and become established, fungus must be present. In turn, the fungus may not be able to persist without the orchid (Jones & Stokes 1996).

The plant sprouts from roots after fire. While short-lived perennial taxa like Yadon's piperia may be able to persist through a few climatically unfavorable years, maintaining critical seed production levels and appropriate habitat is essential (FWS 1995). Not much information is available concerning the species or local populations' tolerance to loss of individuals, but it is suspected that the effects of loss will be delayed because stocked seedbanks could potentially support new populations for some time (Steeck 1997).

Reasons for Listing. Yadon's piperia was once more abundant on the Monterey peninsula. Habitat for the species has been altered, destroyed, and fragmented by the subdivision of residential lots and conversion of land to golf courses and other recreational facilities. Continued alteration and destruction of habitat due to urban, road, and golf course developments is currently the greatest threat to Yadon's piperia. Other threats include competition with non-native species, roadside and golf course mowing, and unlawful collection of plants and flowers. The small numbers of individuals and populations and the limited range also make Yadon's piperia vulnerable to stochastic extinction (i.e., extinction brought about by random environmental changes).

Conservation Measures. A recovery plan for Yadon's piperia has been prepared for CDFG, and a FWS recovery plan for five plants from Monterey County including Yadon's piperia was published in 2004. Several entities are participating in ongoing conservation efforts for the species. These include the Nature Conservancy and the Pebble Beach Company. Pebble Beach Company has been conducting transplanting trials, although the success of its efforts has not yet been documented. In 2006, protocols for long-term monitoring of Yadon's piperia were described in A Long-term Monitoring Program for the Federal Endangered Yadon's Rein Orchid (*Piperia yadonii*, Orchidacea) (Graff 2006).

2.2 Hooker's Manzanita

Description. Hooker's manzanita is a perennial shrub in the heath family (Ericaceae). The plant grows as a mat or a mound-like evergreen shrub to heights of generally less than 1 meter. Photographs of Hooker's manzanita are provided on Figures 7 and 8. It does not produce an underground burl. Its stems may grow decumbent (less than 1 meter) or erect (1 to 3 meters). Leaves are erect, 2 to 3 centimeters long by 1 to 1.5 centimeters wide, and elliptic in shape. The upper and lower surfaces of the leaves are

alike. The flowers appear in late winter to early spring (February to May). The flowers are white or pink, somewhat spherical, and in a dense raceme. Small fruits that resemble miniature apples (4 to 6 millimeters wide) appear after flowering (Hickman 1993). Further information concerning technical descriptions can be found in *A California Flora (*Munz 1959). Hooker's manzanita is similar to the other subspecies in the species *hookeri,* but can be distinguished from them by its location. Hooker's manzanita is also similar to *A. pumila*, *A. t. tomentosa*, and *A. montereyensis,* but can be distinguished from them by stomates on both surfaces, the absence of a burl, and the scale-like bracts.

Distribution. Hooker's manzanita occurs from Carmel in Monterey County to the Santa Cruz Mountains in Santa Cruz County. Density of the Hooker's manzanita within this range has declined dramatically, and populations are more fragmented. It is currently found distributed throughout its historic range, except for populations in the Pacific Grove area, which were extirpated when the area became urbanized. Jones & Stokes Associates conducted surveys on the POM for Hooker's manzanita during December 1994 and April and June 1995 (Jones & Stokes 1995). Known population locations occurring on the POM in 1995 are shown on Figure 9.

Habitat/Ecosystem. Hooker's manzanita is found in maritime chaparral, coastal scrub, closed-cone coniferous forest, and cismontane woodland habitats. It is found primarily on sandy soils, sandy shales, and sandstone outcrops. Plant associations in maritime chaparral include shaggy-barked manzanita, chamise, toyon, sticky monkey flower, deer brush, and rush lotus. Plant associations in coastal scrub may include California sage (*Artemisia californica*), coyote brush, mock heather (*Ericameria ericoides*), coast buckwheat (*Eriogonum latifolium*), and Chamisso's bush lupine (*Lupinus chamissonis*). Plant associations in closed-cone coniferous forests include Monterey pine, Bishop pine, coast live oak (*Quercus agrifolia*), bracken fern (*Pteridium aquilinum* var. *pubescens*), California huckleberry, shaggy-barked manzanita, toyon, and western poison-oak. Hooker's manzanita is found at elevations ranging between 85 and 300 meters.

Life History/Ecology. Hooker's manzanita flowers in late winter to early spring. Flowers are pollinated by hummingbirds and insects such as bees, flies, and moths. Small fruits appear after flowering. The fruits are eaten and dispersed by mammals and birds whose typical travel distance is generally greater than the range in which the species is found. Seed is produced annually but needs fire to scarify or crack the hard seed coat. New seedlings colonize the surrounding area after fire.

Reasons for Listing. Hooker's manzanita has not been federally listed as endangered or threatened and is not proposed for listing. However, CNPS considers Hooker's manzanita to have a limited distribution and to be endangered in a portion of its range. The CNPS proposed List 1B status for Hooker's manzanita in 1994. List 1B species may be subject to protection pursuant to the California Environmental Quality Act (CEQA). Threats to Hooker's manzanita populations include development (CDFG, 1997) and the lack of fire to sustain existing communities.

Conservation Measures. On former Fort Ord, the HMP requires that the Army and Bureau of Land Management implement a prescribed burn plan in maritime chaparral habitat areas, which support approximately 4,800 acres of Hooker's manzanita (USACE, 1997). Although managers may create and set fire to "burn piles" at OMC to reduce wildfire hazards, prescribed burning will not likely be performed on the POM, since it is located in close proximity to urban areas and there would be health and safety issues to consider.

Figure 7. Close-up View of Hooker's Manzanita at Former Fort Ord

Figure 8. Hooker's Manzanita In Habitat at Former Fort Ord

Figures 7 and 8. Photos of Hooker's Manzanita

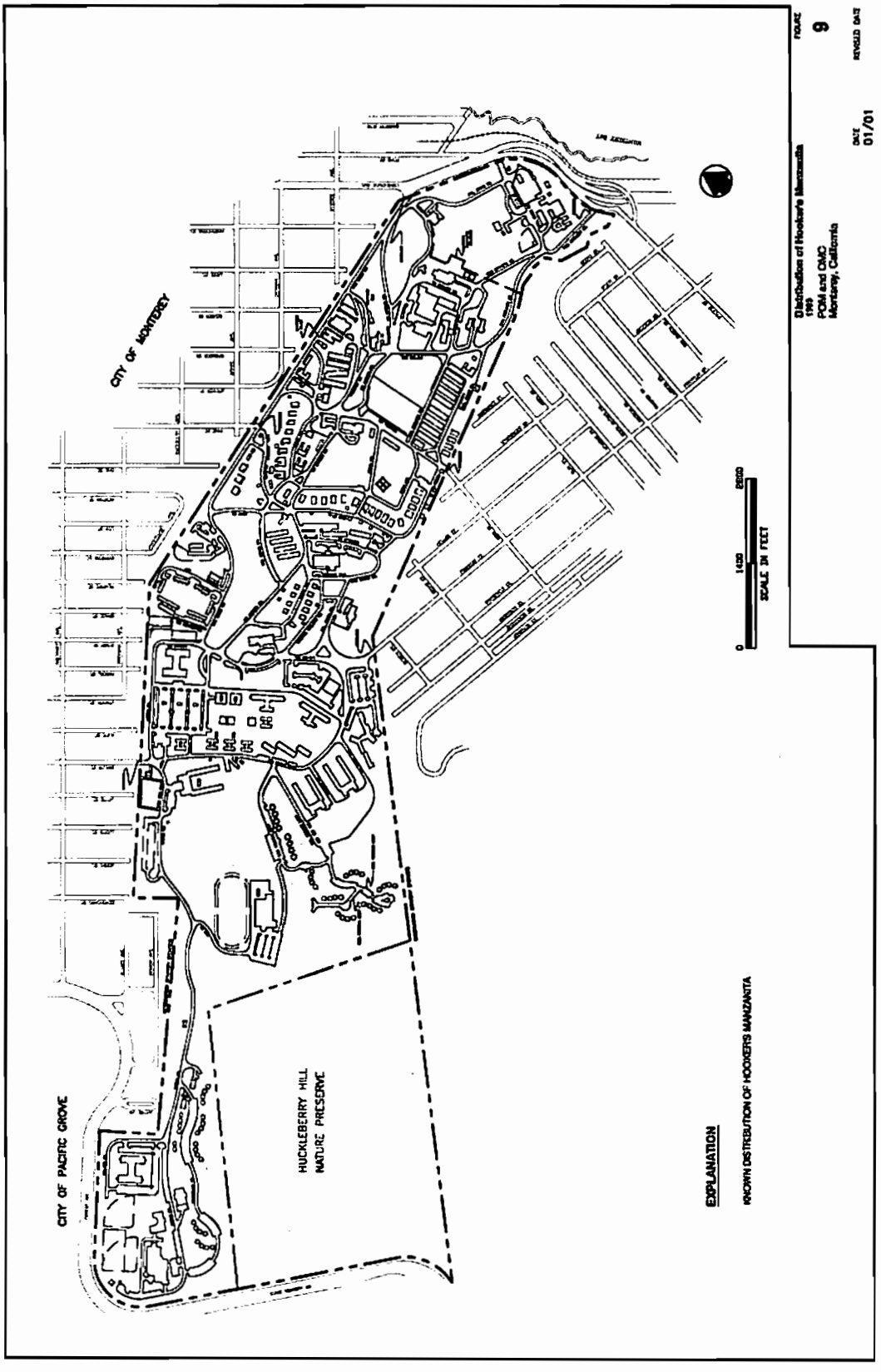


Figure 9. Hooker's Manzanita Population Locations In 1995

3.0 CONSERVATION GOALS

This section states measurable criteria to meet the installation's conservation goals for each of the two species.

Surveys of the POM and the OMC were conducted on base in 1994 and 1995 to document habitats and determine locations of sensitive species (Jones & Stokes, 1995, 1996). Occupied habitats and known populations of these species were mapped as part of flora and fauna baseline studies (Jones & Stokes, 1996). HLA conducted additional surveys at POM and OMC on July 30, 1997. Annual surveys for Yadon's piperia have been conducted from 2001-2008 with the exception of 2006. In 2005, MACTEC performed a POM-wide flora and fauna baseline survey that included special status species.

Both Yadon's piperia habitat and most Hooker's manzanita habitat occur on lands designated as open space or lands that are used for recreational purposes. Conservation goals for these species involve maintaining existing population levels and areas of occupied habitat. Optional activities to enhance populations and habitat for these species could involve providing protection in the form of caging or fencing, reducing competition from exotic plant species by weeding, and reconstruction of disturbed or marginal habitat (if feasible). It may be necessary to explore other methods of seed scarification to retain current population levels of Hookers manzanita in the absence of fire.

3.1 Yadon's Piperia

Although none of the populations on the POM are included in the CDFG recovery strategies goals and objectives (Jones & Stokes 1996), this resource was used as a guideline. POM populations are being managed in accordance with the *2004 FWS Recovery Plan for Five Plants from Monterey County*.

The number of Yadon's piperia plants on the POM represents a small percentage of the existing population on the Monterey Peninsula. The occurrences of this species on the POM are geographically separated and up until 2008 have appeared to consist of relatively few individuals in comparison to other sites on the Peninsula. The POM site located near building 630 and across from the cemetery has expanded over the years and the population now contains over 2,600 plants total. The population near the Huckleberry Hill Preserve boundary fence and behind buildings 832 and 833 consists of over 700 plants. In relation to other sites, the small size of these populations makes them more prone to local extinction. Populations should be preserved by maintaining existing habitat as open space, excluding development, removing invasive weed species, and protecting individuals from trampling and herbivory.

3.2 Hooker's Manzanita

Currently, no recovery strategies have been developed for this species. The baseline flora and fauna studies (Jones & Stokes, 1996) identified habitat areas occupied by Hooker's manzanita on the POM (Figure 9). The total area has been determined to be approximately 57 acres. Based on the 1994 and 1995 surveys, the POM has approximately 120 acres of potentially suitable habitat, including natural areas vegetated by Monterey pine forest.

The area of land that supports populations of Hooker's manzanita on the POM is small in proportion to the total occupied lands in the range of this species. The occurrence of the species in the Huckleberry Hill area is of special significance, because this area is already a nature preserve. This species should be managed at the community level and management prescriptions should preserve the Monterey pine forest habitat as a whole system. Priority for preservation of individual plants should be given to areas of intact Monterey pine forest. The 57 acres of habitat on the POM should be maintained as open space. If possible, weed removal should be conducted in habitat areas.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The management prescriptions and actions incorporated into this ESMP were developed in accordance with guidelines provided by the DPW-E, information obtained from recovery strategies in *Recovery Strategies for Six Coastal Plant Species on the Monterey Peninsula* (Jones & Stokes 1996), and the *FWS Recovery Plan for Five Plants from Monterey County, California* (FWS 2004).

4.1 Habitat Management Units

Habitat management units (HMUs) are defined as areas where Yadon's piperia and Hooker's manzanita have been currently documented. Figures 6 and 6a indicate the HMU for Yadon's piperia. Figure 9 indicates the HMU for Hooker's manzanita.

4.2 Habitat Management Practices

Habitat management practices to conserve the populations of Yadon's piperia and Hooker's manzanita are geared to maintaining existing numbers and habitat, monitoring known populations, and removing invasive plants. Much of this work could be performed by DPW-E employees, volunteers or contracted crews.

4.2.1 Yadon's Piperia

Loss of plants due to trampling can be avoided by instituting an awareness education program and posting signs. If necessary, fencing can be installed to provide additional protection from trampling. Non-native species removal, particularly of French broom (*Genista monspessulana*), Hottentot fig aka iceplant (*Carpobrotus edulis*), and pampas grass (*Cortaderia jubata*) should be conducted to preserve existing habitat and reduce competition. Other species found in the habitat and to consider for removal include rattlesnake grass (*Briza maxima*), smooth catsears (*Hypochaeris glabra*), hare barley (*Hordeum murinum leporium*), harding grass (*Phalaris aquatica*) and native, but noxious Douglas iris (*Iris douglasiana*). Non-native species may be removed manually by hand or weed wrench. Selective herbicides such as Garlon® may be applied to individual French broom and Roundup® to pampas grass plants outside of the habitat. Hand removal is preferable within the habitat as impacts to native species are less likely and volunteer labor may be utilized. The use of weed levers or weed wrenches will expedite removal of French broom. Because seed of French broom is thought to persist for decades in the soil, removal of plants will need to be maintained annually. If herbivory or trampling by deer proves to be a concern, individual plants can be caged using wire poultry mesh (Figure 9a).

Figure 9a Poultry Mesh Cages

Populations should be monitored to record changes in population number and extent over time. Results from monitoring will be useful in developing new management prescriptions or to enhance existing populations. The relatively small populations of Yadon's piperia at POM likely represent a small proportion of the genetic variability contained in other populations distributed over its range. Additionally, these plants are isolated from other populations due to surrounding development. The lack of exchange of genetic material among piperia plants at POM with other piperia populations at large could lead to reduced levels of variability and could leave the populations on the POM vulnerable to stochastic extinction. Master plans should include enhancement of marginal or buffer habitat areas.

Yadon's piperia forms a corm that is capable of remaining dormant for a number of years. It is possible that additional plants exist on the POM in natural areas that are undetectable under dense pine forest understory. Additionally, other special status species such as Pacific Grove clover (*Trifolium polyodon*), Monterey clover, (*Trifolium trichocalyx*), and Hickman's potentilla (*Potentilla hickmanii*) may have dormant seed in the soil seed bank. Surveys for Yadon's piperia and other special-status plant species will be conducted following any events that cause large-to moderate-scale ground disturbance such as landslides or fires.

Specific habitat management mitigation measures from the Environmental Assessment (Appendix A) include:

a) All weed removal work within occupied Yadon's piperia habitat will be conducted during the non-growing season (August-November).

b) Herbicides will be applied on adjacent land only when precipitation is not forecast and when the wind conditions are such that spray will not drift to non-target plants (less than 5 miles per hour).

c) Only herbicides with no soil activity (such as glyphosate) will be used and the application method will follow current strategies recommended by FWS.

d) An environmental awareness program will be instituted at the same time as the installation of the endangered species signs (Section 4.4). Military and civilian personnel who may be in the vicinity of the listed species will receive training. Training will include a review of the legal requirements of ESA and an overview of measures to protect the species.

e) To discourage the general public from illegal specimen collection, the signs for the smaller Yadon's piperia area within Huckleberry Hill Preserve will be placed in the general vicinity of the plants, rather than mark specific plant locations. The Yadon's piperia on the upper POM are closed to the general

public, so impacts from the general public are not anticipated.

4.2.2 Hooker's Manzanita

Measures to maintain existing populations of Hooker's manzanita include preserving open space and removing weeds. Loss of plants could be avoided by instituting an awareness education program and posting signs adjacent to habitat areas. Non-native species removal, particularly French broom, Hottentot fig (iceplant), and pampas grass, should be conducted to preserve existing habitat and prevent competition. Populations should be monitored to record changes in estimated population number and extent over time. Results from monitoring could be useful in developing new management prescriptions or to further maintain or enhance existing populations.

Huckleberry Hill Nature Preserve is managed by the City of Monterey. Although fire is a natural part of the Monterey pine forest system, it is not feasible to conduct controlled burns due to the proximity of developed areas. The lack of fire in this community may constitute a threat to plant populations. If monitoring results indicate decreasing numbers, brush pile burning, small scale clearing, or other actions to mimic the effects of fire may become options. Any burning must be coordinated with local governments, CDFG, California Department of Forestry, and regulatory agencies. In addition, the Installation would need to ensure compliance with the National Environmental Policy Act (NEPA).

4.3 Awareness Training Program

An awareness training program should be implemented for installation personnel who conduct activities in unimproved areas on base and could potentially have contact with Yadon's piperia and Hooker's manzanita. This program will help meet habitat management practices identified in Section 4.2 and will help avoid potential future ESA violations.

Training could involve periodic audiovisual presentations and/or distribution of an informational pamphlet. Information presented should include:

- Identification of Yadon's piperia and Hooker's manzanita
- An introduction to the natural history of these species and ecological significance of populations on the installation
- Known locations (general area) of populations of these species on the installation and locations of potential habitat
- Individual and installation responsibility and liability under federal law
- Methods to balance the installation mission requirements with conservation of habitat.

4.4 Signage Plan

Warning signs for listed, proposed, and candidate species and their habitat conform to the specifications found in AR 200-3 *Natural resources-land, forest and wildlife management* (Army 1995) that has been superseded by AR-200-1, Chapter 4 Land Resources (Army 2007). Recommendations for sign dimensions from AR 200-3 were: signs will be constructed of durable material, 10 inches square (oriented as a diamond), yellow or white in color, and of the design shown in Figure 10, below. The graphic depicting the species, the lettering "Endangered Species Site," and the species name will be printed in black. The warnings "Do Not Disturb" and "Restricted Activity" will be printed in red lettering. All lettering will be 3/8 inch high. In undeveloped, forested areas, signs may be smaller (IMCOM, 2008).

Endangered Species Warning Sign

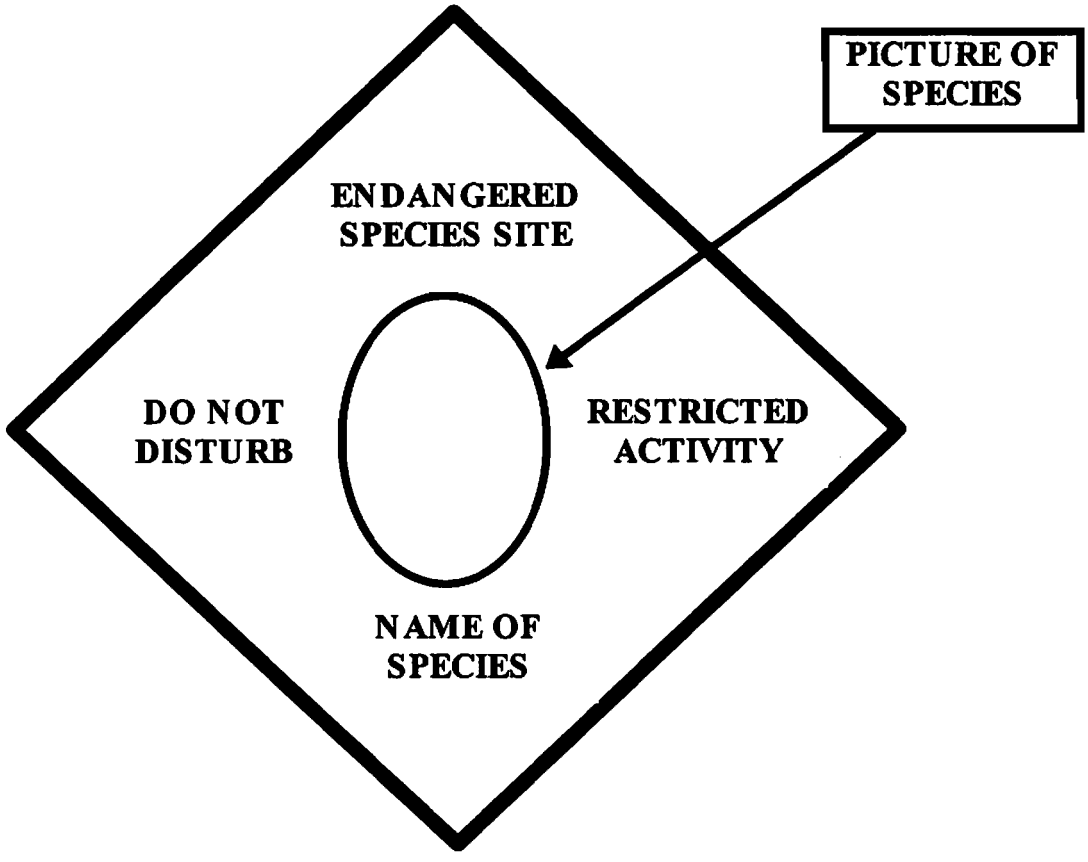


Figure 10. Endangered Species Sign

5.0 MONITORING PLAN

This section describes a monitoring plan to periodically estimate population size and status, habitat size and status, and potential threats to the two species and factors affecting reproductive success. This information is crucial to the installation's ability to determine if conservation goals are being achieved. The Army is under no obligation to perform monitoring of Hooker's manzanita populations at this time.

Monitoring of populations on Huckleberry Hill Nature Preserve should be coordinated between the DPW-E and the City of Monterey. Monitoring will most likely be performed by DPW-E, volunteers directed by DPW-E, or a contractor. If monitoring data document significant changes or threats to Yadon's piperia and Hooker's manzanita populations, corrective actions should be taken. If corrective actions are warranted (as determined by DPW-E), monitoring data could be used to provide guidance for success of corrective actions. Possible corrective actions are described in Sections 4.2.1 and 4.2.2. Corrective actions will be coordinated with the appropriate regulatory agencies including FWS.

Monitoring of Yadon's piperia and Hooker's manzanita may involve both surveying and sampling. When sampling is involved, sampling adequacy will be examined using established methods (e.g. cumulative mean curves, variance analysis, or species-area curves). Data may be gathered as number, density, or cover classes rather than absolute counts. If class information is gathered, classes will be defined to enable detecting significant population changes. The Yadon's piperia permanent plot monitoring program, established in 2007, uses a data sheet similar to that described in the 2006 Long-term Monitoring Program for the Federal Endangered Yadon's Rein Orchid (Graff 2006) to record pertinent information including number of plants, habitat type, GPS location, evidence of vegetation damage, invasive species present, etc. (Figure 11). In addition, threats to the species at these permanent plots will be documented and photographed (Figures 12-17).

Known populations of species should be visited annually for 3 years to establish baseline data. Additional surveys for Yadon's piperia will be conducted following large to moderate ground disturbing events such as landslides or fires to document newly colonized areas. Once a baseline is established, sampling may be reduced to every other year for Yadon's piperia and every 3 years for Hooker's manzanita if populations appear to be stable. Regardless of sampling interval, species should be visited at least yearly to access habitat conditions and possible threats to species. The information outlined in the following sections will be gathered and recorded during annual monitoring.

5.1 Yadon's Piperia

Information collected on Yadon's piperia may include the following:

- The number (or size class) of individual blooming plants (conducted May through August). As an option depending on funding, an additional survey during the winter will be conducted to monitor the species in a vegetative state. Table 1 shows the number of individuals counted during summer annual surveys from 1999 through 2007 and winter 2008.
- The density (or density class) of plants within occupied habitat (expressed as numbers of plants per square meters)
- Percent of blooming plants that set seed and the percent of vegetative plants that produce flowers when winter surveys are conducted.
- General habitat condition and possible threats to species (e.g. non-native, invasive plants, trampling, and evidence of herbivory).
- DPW-E personnel will establish permanent plots (Figure 11), collect GPS location data, establish

photo points (or retake photos on previously established sites) and use the modified FWS data form (Figure 18) to collect site information.

5.2 Hooker's Manzanita

Information collected on Hooker's manzanita will include the following:

- Percent species cover should be determined using fixed line transects within permanent plots. Transects should be placed to incorporate areas of varying slope, aspect, and species composition. Transects should be marked with a permanent marker and locations documented on aerial photographs or maps.
- Percent of species falling into the following age classes: non-reproductive seedlings, reproductive adults, senescent (dying) older plants.

Figure 11. Example: Yadon's Piperia Permanent Monitoring Plot

Figure 12. Deer trampling, bedding down in habitat

Figure 13. Non-native plant species encroachment

Figure 14. Multiple trailing; hiking off trail; deer trailing

Figure 15. Debris piles in habitat

Figure 16. Wood chips scattered in habitat

Figure 17. Logs dropped in habitat

2007 FWS Site Assessment Form for Yadon's piperia

Reporter: Lenore Grover-Bullington, Presidio of Monterey; Gary Ahlborn, MACTEC; Cosmo Lettich, MACTEC
Date of Visit: 07/26/07
Phone: 831-242-4829 Email: l.groverbullington@us.army.mil
Address: PO Box 5004, Monterey, CA 93944

Site Name: Site #9
Site Owner: US Army, Presidio of Monterey

Total # of Individuals: 1 (vegetative/flowering): flowering

Site Location Description: Behind building 630 on slope just east of stairs and down hill of narrow dirt trail; southeast facing; full sun. Plant is growing about 6 inches from small pampas grass.
County: Monterey

UTM Record Number: 07-26-2007 9A
Stake UTM: Plant location near stake
GPS Make & Model: Trimble Asset Surveyor
Horizontal Accuracy: Elevation:

Plant Location UTM: 597114.534Easting, 4051578.094Northing

Habitat Description: Monterey pine forest and huckleberry; litter comprised of pine needles, pine cones, twigs; floor has little to no rattlesnake grass but on small clump of pampas grass

Site Information:
Other Orchid Species Present: None

Other Rare or Threatened Species Present: None

Invasive Plant Species Present (with estimated % coverage): Pampas grass 10%

Current/Surrounding Land Use: Stairway, walkway, barracks

Visible Disturbances: Upper part of flower head appears to have been browsed.

Other Threats: Deer browsing and trampling; human disturbance; invasive plant encroachment; disbursal of wood chips

Overall Site Quality: good

Comments: Huckleberry is heavily grazed. Plot size is approximately 4sqft. Photos taken.

Figure 18. Example: Permanent Plot Monitoring Program Data Sheet

6.0 TIME, COSTS, AND PERSONNEL

Table 1 provides estimates of the time, costs, and personnel needed to carry out measures necessary to achieve the conservation goals described in Section 3.0. Personnel costs are provided as consultant fees if the Army chooses to contract the work. However, the Army is not obligated to use a consultant and may wish to conduct the work itself or utilize volunteer labor to reduce costs. The initial planning and funding period for the implementation of the ESMP was 6 years. Projected annual implementation costs through 2010 are shown in Table 2.

7.0 CHECKLIST

Schedule	Activity (*Activities marked with an asterisk are required. The remaining activities are optional.)	Implemented?
Winter 1999	Install warning signs.* Monitor Yadon's piperia in vegetative condition.	*No work began until after EA/FONSI was signed in Dec. 1999*
Spring 1999	Implement awareness training program.*	*No work began until after EA/FONSI was signed in Dec. 1999*
Summer 1999	Monitor Yadon's piperia populations while plants are in bloom.*	*No work began until after EA/FONSI was signed in Dec. 1999*
Fall 1999	Monitor Yadon's piperia populations for seed-set.*	*No work began until after EA/FONSI was signed in Dec. 1999*
Winter 1999/2000	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	*Brochure developed and signs installed*
Summer 2000	Monitor Yadon's piperia populations while plants are in bloom.*	*Yadon's piperia were surveyed in June 2000 (37 flowering plants located)*
Fall 2000	Monitor Yadon's piperia populations for seed-set.	*No seed set surveys conducted*
Winter 2000/2001	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	*No weed work, no winter vegetation surveys conducted.*
Summer 2001	Monitor Yadon's piperia populations while plants are in bloom.*	*Surveyed plants in July (60 flowering plants located). Brochures provided to 229th.*
Fall 2001	Monitor Yadon's piperia populations for seed-set.	*No seed-set surveys conducted.*
Winter 2001/2002	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	*January 02 weed infestations manually removed from 4 acres within the reserve.*
Summer 2002	Monitor Yadon's piperia populations while plants are in bloom.*	*83 flowering plants located during surveys on June 25 and 27. More signs posted around reserve. Brochures provided to 229th. Aug. 22, two outdoor bulletin boards installed with brochures.*
Fall 2002	Monitor Yadon's piperia populations for seed-set.	*No seed-set surveys conducted.*
Winter 2002/2003	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	*No weed control, no vegetative condition surveys conducted.*

Schedule	Activity (*Activities marked with an asterisk are required. The remaining activities are optional.)	Implemented?
Summer 2003	Monitor Yadon's piperia populations while plants are in bloom.*	*209 flowering piperia located in June. Brochures provided to 229th.*
Fall 2003	Monitor Yadon's piperia populations for seed-set.	*No seed-set surveys conducted. Aug. 03 several piles of pine needle, pine branches, and pine logs were removed from within the reserve. 4 acres of broom removed from areas adjacent to open space.*
Winter 2003	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	*No winter work conducted.*
Summer 2004	Monitor Yadon's piperia populations while plants are in bloom.*	*83 flowering plants located during survey*
Fall-Winter 2004/2005	(1) Perform weed removal for French broom and Hottentot fig in habitat areas. (2) Monitor Yadon's piperia in vegetative condition.	*French broom was removed from 7 acres of Monterey pine forest and grassland including areas adjacent to habitat*
Winter-Spring 2005	Monitor Yadon's piperia in vegetative condition.	*No surveys performed.*
Summer 2005	Monitor Yadon's piperia populations while plants are in bloom.*	*Thorough Presidio-wide threatened and endangered species survey was conducted. 428 plants were located, with 345 flowering. New locations of plants were discovered.*
Fall-Winter 2005/2006	Perform weed removal for French broom and Hottentot fig in habitat areas.	*French broom and Hottentot fig were removed from 6.5 acres of Monterey pine forest and grassland including areas adjacent to habitat*
Winter-Spring 2006	(1) Install additional signage. (2) Monitor Yadon's piperia in vegetative condition.	*Additional endangered species signs were installed. No surveys were conducted.*
Summer 2006	Monitor Yadon's piperia populations while plants are in bloom.	*No surveys were conducted.*
Fall-Winter 2006/2007	Perform weed removal for French broom, Hottentot fig and pampas grass in habitat areas.	*French broom, iceplant and pampas grass were manually removed from 4 acres of Monterey pine forest, including the area within and adjacent to the habitat*
Winter-Spring 2007	Monitor Yadon's piperia in vegetative condition.	*No surveys were conducted.*

Schedule	Activity (*Activities marked with an asterisk are required. The remaining activities are optional.)	Implemented?
Summer 2007	(1) Monitor Yadon's piperia populations while plants are in bloom. Establish permanent plots and photo points. Formalize data sheet. Create GIS maps.* (2) Remove threats to Yadon's piperia by treating invasive species in areas adjacent to habitat with Glyphosphate to impede invasive species encroachment and by removing human-made debris piles and downed logs.	***38 plants were located during a survey conducted in August. Permanent plots and photo points were established. Data were recorded on a data sheet similar to that provided by the FWS. GPS locations were recorded and a GIS map was created depicting plant locations. Glyphophate herbicide was applied to invasive pampas grass, French broom and iceplant growing adjacent to the habitat area. Debris piles and logs were removed from within the habitat area.***
Fall-Winter 2007/2008	Perform manual weed removal for French broom, Hottentot fig (iceplant) and pampas grass in habitat areas.	***Manual removal of French broom, iceplant and pampas grass from approximately 4 acres of Monterey pine forest within the habitat area.***
Winter-Spring 2008	(1) Monitor Yadon's piperia in vegetative condition. (2) Place wire cages around individual plants identified as vulnerable to deer impacts.	***2,615 plants were counted behind building 630, and 733 plants behind buildings 832 and 833. Several smaller groupings were discovered across from the PX and behind buildings 649 and 650. Two single plants were found in Pvt Bolio gulley near building 450. New areas were signed and GPS points recorded. Poultry wire cages were constructed and placed over plants deemed especially vulnerable to impacts. Manual invasive weed control performed in newly discovered locations.***
Summer 2008	(1) Monitor Yadon's piperia populations while plants are in bloom. Revisit established plots and establish new plots and photo points. Record information on data sheets. Determine if wire cages have a beneficial effect. (2) Establish permanent plots and photo points for Hooker's manzanita. Record pertinent stand information including percent cover and age class. Monitor every 5 years.	***Permanent plots established in 2007 were revisited. Number of flowering plants was extremely low due to dry conditions.***
Fall-Winter 2008/2009	Perform weed removal for various invasive species in habitat areas.	
Winter-Spring 2009	(1) Monitor Yadon's piperia in vegetative condition. (2) Cage individual plants as needed.	

Schedule	Activity (*Activities marked with an asterisk are required. The remaining activities are optional.)	Implemented?
Summer 2009	Monitor Yadon's piperia populations while plants are in bloom.* Revisit established plots and establish new plots and photo points. Record information on data sheets.	
Fall-Winter 2009/2010	Perform weed removal for various invasive species in habitat areas.	
Winter-Spring 2010	(1) Monitor Yadon's piperia in vegetative condition. (2) Cage individual plants as needed.	
Summer 2010	(1) Monitor Yadon's piperia populations while plants are in bloom.* Revisit established plots and establish new plots and photo points. Record information on data sheets. (2) Revisit Hooker's manzanita plots to ensure markers are still intact. Record any significant changes.	
Fall-Winter 2010	Perform weed removal for various invasive species in habitat areas.	

8. REFERENCES

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Tables

Table 1. Total Number of Yadon's Piperia 2000 to 2008

Survey Year	*Total Number of Plants*
2000	*37*
2001	*60*
2002	*83*
2003	*209*
2004	*83*
2005	*428*
2006	*N/A*
2007	*38*
Winter 2008	*Building 630: 2,615* *Building 832: 733* *PX and 650: ≅400*

Table 2. Projected Annual Implementation Costs
Endangered Species Management Plan
for Yadon's Piperia and Hooker's Manzanita
Presidio of Monterey and Ord Military Community
Monterey County, California

Fiscal Year	Estimated Annual Cost ($ thousands)
1999	7,560
2000	4,280
2001	4,280
2002	4,280
2003	4,280
2004	2,060
6-Year Total	26,740
2005	71,000
2006	9,800
2007	37,800
2008	16,000
2009	18,500
2010	20,500
6-Year Total	163,600

Table 3. Estimate of Required and Optional Resources by Activity by Year
Endangered Species Management Plan for
Yadon's Piperia and Hooker's Manzanita
Presidio of Monterey and Ord Military Community
Monterey County, California

Fiscal Year (FY)		Activities * Activities marked with an asterisk are required (beginning in 2003, summer surveys are required every other year). The remaining activities are optional.	Personnel Hours	Cost ($$$)			
				Personnel (cost of DOD labor not included)	Materials	Equipment	Estimated Total
FY 1999	Winter 1998/1999	Install warning signs.* Monitor Yadon's piperia in vegetative condition.	20	Consultant $64.00/hr	500	200	1,980
	Spring 1999	Implement awareness training program.*	40	Consultant $64.00/hr	200	100	2,860
	Summer 1999	Monitor Yadon's piperia populations while plants are in bloom.*	20	Consultant $64.00/hr		80	1,360
	Fall 1999	Monitor Yadon's piperia populations for seed-set.*	20	Consultant $64.00/hr		80	1,360
FY 2000	Winter 1999/2000	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	20	Consultant $64.00/hr	200	80	1,560
	Summer 2000	Monitor Yadon's piperia populations while plants are in bloom.*	20	Consultant $64.00/hr		80	1,360
	Fall 2000	Monitor Yadon's piperia populations for seed-set.	20	Consultant $64.00/hr		80	1,360
FY 2001	Winter 2000/2001	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	20	Consultant $64.00/hr	200	80	1,560
	Summer 2001	Monitor Yadon's piperia populations while plants are in bloom.*	20	Consultant $64.00/hr		80	1,360
	Fall 2001	Monitor Yadon's piperia populations for seed-set.	20	Consultant $64.00/hr		80	1,360
FY 2002	Winter 2001/2002	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	20	Consultant $64.00/hr	200	80	1,560
	Summer 2002	Monitor Yadon's piperia populations while plants are in bloom.*	20	Consultant $64.00/hr		80	1,360

Fiscal Year (FY)		Activities * Activities marked with an asterisk are required (beginning in 2003, summer surveys are required every other year). The remaining activities are optional.	Personnel Hours	Cost ($$$)			
				Personnel (cost of DOD labor not included)	Materials	Equipment	Estimated Total
	Fall 2002	Monitor Yadon's piperia populations for seed-set.	20	Consultant $64.00/hr		80	1,360
FY 2003	Winter 2002/2003	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	20	Consultant $64.00/hr	200	80	1,560
	Summer 2003	Monitor Yadon's piperia populations while plants are in bloom.*	20	Consultant $64.00/hr		80	1,360
	Fall 2003	Monitor Yadon's piperia populations for seed-set.	20	Consultant $64.00/hr		80	1,360
FY 2004	Winter 2003/2004	Perform weed removal for French broom and Hottentot fig in habitat areas. Monitor Yadon's piperia in vegetative condition.	20	Consultant $64.00/hr	200	80	1,560
	Summer 2004	*Monitor Yadon's piperia populations while plants are in bloom.**					*Performed by DOD*
FY 2005	*Fall-Winter 2004/2005*	*(1) Perform weed removal for French broom and Hottentot fig in habitat areas.*		*(1) Contractor 500 August*			*Estimated (1) 500 FY04*
	Winter-Spring 2005	*Monitor Yadon's piperia in vegetative condition.*					*N/A*
	Summer 2005	*Monitor Yadon's piperia populations while plants are in bloom.**		*Consultant 60,000*			*Actual 60,000 FY05*
FY 2006	*Fall-Winter 2005/2006*	*Perform weed removal for French broom and Hottentot fig in habitat areas.*					*Actual 11,000 FY05*
	Winter-Spring 2006	*(1) Install additional signage. (2) Monitor Yadon's piperia in vegetative condition.*		*(1) Contractor 800*			*Actual (1) 800 FY06 (2) N/A*
	Summer 2006	*Monitor Yadon's piperia populations while plants are in bloom.*					*N/A*
2007	*Fall-Winter 2006/2007*	*Perform weed removal for French broom, Hottentot fig and pampas grass in habitat*		*Contractor 9,000 August*			*Actual 9,000 FY06*

Fiscal Year (FY)		Activities * Activities marked with an asterisk are required (beginning in 2003, summer surveys are required every other year). The remaining activities are optional.	Personnel Hours	Cost ($$$)			
				Personnel (cost of DOD labor not included)	Materials	Equipment	Estimated Total
	Winter-Spring 2007	*Monitor Yadon's piperia in vegetative condition.*					*N/A*
	Summer 2007	*(1) Monitor Yadon's piperia populations while plants are in bloom. Establish permanent plots and photo points. Formalize data sheet. Create GIS maps.* (2) Remove threats to Yadon's piperia by treating invasive species in areas adjacent to habitat with Glyphosphate to impede invasive species encroachment and by removing human-made debris piles and downed logs.*		*(1) Consultant 32,000* *(2) Contractors 1,500*	*Stakes 119*		*Actual (1) 32,119 FY07 (2) 1,500 FY07*
FY 2008	*Fall-Winter 2007/2008*	*Perform manual weed removal for French broom, Hottentot fig (iceplant) and pampas grass in habitat areas.*		*Contractor 4,181 August*			*Actual 4,181FY07*
	Winter-Spring 2008	*(1) Monitor Yadon's piperia in vegetative condition. (2) Place wire cages around individual plants identified as vulnerable to deer impacts.*			*(2) Cages 300*		*(1) DOD and volunteers (2) 300 FY08*
	Summer 2008	*(1) Monitor Yadon's piperia populations while plants are in bloom. Revisit established plots and establish new plots and photo points. Record information on data sheets including GPS locations for GIS maps. Determine if wire cages have a beneficial effect. (2) Establish permanent plots and photo points for Hooker's manzanita. Record pertinent stand information including percent cover and age class. Monitor every 5 years. (3) Determine effectiveness of 2007 herbicide application. Reapply if necessary.*		*(1a) 0 or* *(1b) Contractor 12,000* *(3) Contractor 1,000*	*(4) Signs*		*Estimated (1a) DOD and volunteer OR (1b) 12,000 FY08 (2) DOD (3) 1,000 FY08 (4) 2,000*

Fiscal Year (FY)		Activities * Activities marked with an asterisk are required (beginning in 2003, summer surveys are required every other year). The remaining activities are optional.	Personnel Hours	Cost ($$$)			
				Personnel (cost of DOD labor not included)	Materials	Equipment	Estimated Total
FY 2009	*Fall-Winter 2008/2009*	*Perform weed removal for various invasive species in habitat areas.*		*Contractor 6,000 Winter*			*Estimated 6,000 FY09*
	Winter-Spring 2009	*(1) Monitor Yadon's piperia in vegetative condition. (2) Cage individual plants as needed.*			*(2) Cages 500*		*Estimated (1) DOD (2) 500 FY09*
	Summer 2009	*Monitor Yadon's piperia populations while plants are in bloom.* Revisit established plots and establish new plots and photo points. Record information on data sheets including GPS locations for GIS maps.*		*(1b) Consultant 12,000*			*Estimated (1a) DOD OR (1b) 12,000 FY09*
FY 2010	*Fall-Winter 2009/2010*	*Perform weed removal for various invasive species in habitat areas.*		*Contractor 5,000 Winter*			*Estimated 5,000 FY10*
	Winter-Spring 2010	*(1) Monitor Yadon's piperia in vegetative condition. (2) Cage individual plants as needed.*			*Cages 500*		*Estimated (1) DOD (2) 500 FY10*
	Summer 2010	*(1) Monitor Yadon's piperia populations while plants are in bloom.* Revisit established plots and establish new plots and photo points. Record information on data sheets including GPS locations for GIS maps. (2) Revisit Hooker's manzanita plots to ensure markers are still intact. Record any significant changes.*		*(1b) Contractor 15,000*			*Estimated (1a) DOD OR (1b) 15,000 FY10 (2) DOD*
FY 2011	*Fall-Winter 2010*	*Perform weed removal for various invasive species in habitat areas.*		*Contractor 5,000 Winter*			*Estimated 5,000 FY11*

EXHIBIT A

INDIVIDUALS AND ORGANIZATIONS CONTRIBUTING TO THE PLAN

EXHIBIT A

INDIVIDUALS AND ORGANIZATIONS CONTRIBUTING TO THE PLAN

1.0 Harding Lawson Associates Natural Resources Staff

Cheryl Mardesich, Project Botanist
Keenan Foster, Project Botanist
Tim Laughlin, Principal Biologist
Rebecca Lawton, Technical Editor

2.0 Individuals Contacted

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A special thanks to the following volunteers who helped count Yadon's piperia plants during the winter 2008 survey: Bruce Cowan, Lorrie Madison, Bill Carrell, Ross Bullington, Jessica Bullington, Al Washburn

EXHIBIT B

GLOSSARY

EXHIBIT B

GLOSSARY

bilateral	Divisible into mirror-image halves in only one way, having two symmetrical sides.
basal	Found at or near the base of a plant or plant part. Especially said of leaves clustered near the ground.
calyx (calyces)	Collective term for sepals' outermost or lowermost whorl of flower parts, generally green and enclosing remainder of flower in bud. Sometimes indistinguishable from corolla.
capsule	Dry, generally many-seeded fruit from compound pistil, nearly always dehiscent (irregularly or by pores, slits, or lines of separation).
corm	Short, thick, unbranched, underground stem often surrounded by dry (not fleshy) leaves or leaf bases.
corolla	Collective term for petals; whorl of flower parts immediately inside or above calyx, often large and brightly colored. Sometimes indistinguishable from calyx.
decumbent	Mostly lying flat on the ground but with tips curving up.
elliptic	In the shape of an ellipse (flattened circle).
foliage	Leaves of a plant.
herb	Plant with little or no wood above ground; aboveground parts are of less than 1 year or growing season duration.
inflorescence	An entire cluster of flowers and associated structures-e.g., axes, bracts, bractlets, pedicels. Often difficult to define as to type and boundaries but generally excluding full-sized foliage leaves.
isolateral	Poorly defined top and bottom.
lanceolate	Narrowly elongate, widest in the basal half, often tapered to an acute tip.
lip	Upper or lower of two parts in an unequally dived calyx or corolla. In *Orchidaceae*, generally the largest, lowest, most highly modified perianth part.
List 1B	CNPS lists these plants as rare, threatened, or endangered in California and elsewhere. These plants meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code and are eligible for state listing.
mesic	Characterized by moist conditions; neither too moist nor too dry.
midvein	The main vein of a plant leaf that bisects the leaf longitudinally.
oblanceolate	Narrowly elongate, broadest above the middle.
pedicel	Stalk of an individual flower or fruit.

perennial	Living more than 2 years or growing seasons.
perianth	Calyx and corolla collectively, whether or not they are distinguishable.
raceme	Unbranched inflorescence of pediceled flowers that open from bottom to top.
recurved	Gradually curved downward or backward.
scarifiy	To abrade or cut the outer coat of seeds in order to speed germination
scenecent	To grow old
sepal	Individual member of the calyx, whether fused or not, generally green (see petal).
species at risk	These are species found on the installations that are not federally listed, but should be afforded special considerations due to the fact that their populations are declining nationally or locally, they are state listed, or they are candidates for listing.
spur	Hollow, often conic projection or expansion, generally of a perianth part and containing nectar.
stochastic	Involving or containing a random variable.
stomate	A minute pore on a leaf or stem through which gasses such as carbon dioxide, oxygen, and water vapor pass by diffusion. Features of stomates help identify some plants.
symbiotic	Of or pertaining to a mode of life in which two organisms of different species live in intimate association with each other. Depending on the nature of the association, the relationship is designated mutualism, commensalism, parasitism, or phoresis.
tepal	A divisional of the perianth of a flower having petals and sepals that are virtually indistinguishable.
understory	The layer of shrubs and herbs below a canopy of trees.

Appendix A
ESMP Environmental Assessment

ENVIRONMENTAL ASSESSMENT FOR THE ENDANGERED SPECIES MANAGEMENT PLAN FOR YADON'S PIPERIA AND HOOKER'S MANZANITA

Presidio Of Monterey
Directorate Of Environmental And Natural Resources Management

September 1998

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1.0 NEED FOR AND PURPOSE OF ACTION

Army Regulation 200-3 (Natural Resources–Land, Forest and Wildlife Management) requires the preparation of Endangered Species Management Plans (ESMP) for listed and proposed threatened species, endangered species, or critical habitat present on installation. Compliance with Chapter 11 of AR 200-3 requires coordination with other federal agencies responsible for the protection of these species. Failure to implement this ESMP can lead to violation of the Endangered Species Act of 1973 (ESA) and could result in disruption of military training.

Two species of rare plants, Yadon's piperia (*Piperia yadonii*) and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), were identified by the Army for inclusion in the Presidio of Monterey (POM) ESMP. Yadon's piperia was listed endangered by the U.S. Fish and Wildlife Service (FWS) on August 12, 1998. Hooker's manzanita currently has no federal status, but is listed as rare or endangered by the California Native Plant Society (CNPS 1B list). Hooker's manzanita is included in this ESMP in the event it is proposed for Federal listing in the future. At this time, the Army is not obligated to implement recommendations for Hooker's manzanita; however, the Army may implement recommendations as time and funding allow.

This environmental assessment (EA) is consistent with Army Regulation 200-2 (Environmental Effects of Army Actions), which incorporates the National Environmental Policy Act (NEPA) regulations. The purpose of this EA is to determine whether the adoption and implementation of the POM ESMP would adversely affect the environment. If it is determined that the project will result in a significant adverse impact, then an Environmental Impact Statement (EIS) will be prepared, pursuant to NEPA. If no significant impacts are identified, then a Finding of No Significant Impact (FONSI) will serve as the final environmental document.

2.0 DESCRIPTION OF PROJECT

The POM ESMP provides information on the Yadon's piperia and Hooker's Manzanita, provides conservation goals, and outlines a management plan for these species and their habitat. These conservation goals and management actions are summarized below. Cost of the conservation efforts and impacts to installation training are also addressed in the ESMP.

2.1 Yadon's Piperia

Conservation goals for Yadon's piperia are to maintain the two existing POM populations and to protect these populations from impacts during use of nearby obstacle/orienteering course. Habitat management actions to meet conservation goals are as follows.

a) Protect existing populations from foot traffic by installing warning signs, instituting an awareness training program and fencing if necessary.
b) Remove non-native plant species from documented habitat and from potential habitat areas.
c) Monitor deer browsing. Cage individual plants to protect them from browsing if necessary.
d) Establish a propagation and planting program to augment existing populations (optional).

Non-native species (mainly French broom and Hottentot fig) will be removed by hand or herbicides such as glyphosate may be used. Hand removal is preferable as impacts to native

species are less likely and volunteer labor can be utilized. Since seed of French broom is thought to persist for decades in the soil, removal of plants will need to be conducted annually.

At this time, there are no known propagation methods for Yadon's piperia. If propagation techniques are developed and funds are available, plans to bring in additional local genetic stock (from the Monterey Peninsula) may be developed in coordination with USFWS. The propagated plant would be used to enhance marginal or buffer habitat.

2.2 Hooker's Manzanita

The conservation goals for Hooker's manzanita are to maintain existing populations on POM and to protect these populations from impacts during use of nearby obstacle/orienteering course. Habitat management actions to meet conservation goals are as follows.

a) Remove non-native species from habitat areas.
b) Institute an awareness training program and install endangered species warning signs.
c) Establish a propagation program to augment existing populations (optional - if needed).
d) Utilize Hooker's manzanita (from a local seed source) in landscape plans.

Implementation of habitat management actions for Hooker's manzanita will not be required unless the plant is proposed for listing; however, the Army may implement some of the management actions as time and funding allow. Non-native species removal will be conducted as described above for Yadon's piperia. Propagation program for Hooker's manzanita may include use of brush pile burns, small scale clearing, or other actions to mimic the effects of fire. This propagation program will not be addressed in this EA. Compliance with NEPA may require additional analysis when /if the Hooker's manzanita propagation program is implemented and specific details of this program are known.

2.3 MONITORING

A monitoring program will be established for Yadon's piperia to periodically estimate population size and status, status of habitat, potential threats to species and factors affecting reproductive success. A similar monitoring program for Hooker's manzanita will be implemented if habitat management actions become required.

If monitoring identify significant changes or threats to Yadon's piperia and Hooker's manzanita populations, corrective actions will be taken. If corrective actions are warranted, monitoring data will be used to monitor the success of corrective actions. Possible corrective actions are described in 4.2.1 and 4.2.2 of the ESMP. Corrective actions will be coordinated with the appropriate regulatory agencies.

3.0 ALTERNATIVES CONSIDERED

3.1 Implementation Of The ESMP

This alternative is the proposed ESMP as summarized in Section 2.

3.2 No Action Alternative

Under the no action alternative, conservation goals, habitat management actions or monitoring would not occur for Yadon's piperia or Hooker's manzanita (if it should become listed). This alternative would not comply with Army Regulation 200-3 and could lead to violation of the Endangered Species Act.

4.0 AFFECTED ENVIRONMENT/ ENVIRONMENTAL IMPACTS AND MITIGATIONS

This section discusses existing conditions in areas affected by implementation of this ESMP. Following each description, potential environmental consequences of the proposed alternatives are described. Mitigation measures to avoid impacts are presented for the proposed project. The proposed project and no action alternative are not expected to affect existing visual resources, cultural resources, air quality, transportation, surface or ground water, geology, or soils. No further consideration of these topics is contained in this EA.

4.1 Land Use

4.1.1 Existing Conditions

Yadon's piperia exist at two undeveloped areas on the POM (see figure 5 of the ESMP). Both of the areas containing Yadon's piperia are identified as Open Space/Recreation in the POM Master Plan EA (*Dept. of Army 1984*). The majority of Hooker's manzanita is found in lands designated as Open Space/Recreation with the exception of a small portion of occupied habitat within a housing area (see figure 7 of the ESMP). Currently, an area adjacent to the largest of the Yadon's piperia populations contains an obstacle/orienteering course which is used by the installation for physical training. This area also contains Hooker's manzanita.

4.1.2 Environmental Consequences and Mitigations

Proposed Project:

This alternative is consistent with the land use designation as described in the 1984 Master Plan for the POM. Implementation of the ESMP does not prohibit the use of the obstacle/orienteering course or affect training. This ESMP protects these species from potential impacts from adjacent training areas through the installation of endangered species warning signs and implementation of an awareness training program.

No Action Alternative:
Failure to implement this ESMP could result in adverse impacts to listed species, lead to potential violations of the Endangered Species Act, and disrupt military training.

4.2 Biological Resources

4.2.1 Existing Conditions

In 1995, approximately 50 individual Yadon's piperia plants were identified near the cemetery and dormitories in open, grassy understory of Monterey pine forest. Two additional individual plants were located in the Huckleberry Hill Preserve in chaparral understory of Monterey pine forest. Surveys done in 1998, found the population by the cemetery and dormitories extended into a hard packed embankment adjacent to dormitories. Associated plant species included: Monterey pine, Hooker's manzanita, shaggy-barked manzanita, toyon, sticky monkey flower, deer brush, western poison-oak, blue wildrye, California huckleberry.

Hooker's manzanita is randomly distributed on the west side of POM, west of Rifle Range Road and east of State Route 68. It is found within maritime chaparral and closed-cone coniferous forests. The associated plant species are the same as those listed for Yadon's piperia.

Invasive exotic plants (French broom, pampas grass and Hottentot fig) are found in and around occupied habitat for both Yadon's piperia and Hooker's manzanita.

4.2.2 Environmental Consequences and Mitigations

Proposed Project:
Possible impacts from the proposed project include damage to Yadon's piperia, Hooker's manzanita or native vegetation during herbicide applications or hand removal of weeds. Additionally, endangered species signs may attract persons into Yadon's piperia areas and result in trampling or possibly illegal collecting. Mitigation measures to avoid these impacts are as follows.

a) All weed removal work within occupied Yadon's piperia habitat will be conducted during the non-growing season.
b) Herbicides will be applied only when the wind conditions are such that spray will not drift to non-target plants.
c) Only herbicides with no soil activity (such as glyphosate) will be used.
d) An environmental awareness program will be instituted at the same time as the installation of the endangered species signs. Military and civilian personnel who may be in the vicinity of the listed species will receive training. Training will include a review of the legal requirements of ESA and an overview of measures to protect the species.
e) To discourage the general public from illegal specimen collection, the signs for the smaller Yadon's piperia area within the Huckleberry Hill Preserve will be placed in the general vicinity of the plants, rather than mark specific plant locations The Yadon's piperia area near the cemetery is closed to the general public, so impacts from the general public are not anticipated.

No Action Alternative:

Under the no action alternative, invasive exotic plant species would continue to expand into occupied habitat and threaten known populations of Yadon's piperia and Hooker's manzanita. The possibility of impacts to the species due to trampling would not be abated. Under this alternative no monitoring would be done and dangerous population trends due to deer browsing, disease or other factors could not be detected.

5.0 AGENCIES AND PERSONS CONSULTED

A complete list of agencies/persons consulted and citations can be found in the ESMP (appendix A).

6.0 CONCLUSION

Implementation of the project as described in the ESMP would protect existing endangered species through implementation of an awareness training program, installation of warning signs, exotic plant removal and monitoring. Although some adverse affects to biological resources are possible, implementation of mitigation measures listed in section 4.0 would avoid or reduce those impacts to less than significant.

Under the no action alternative, potentially significant impacts to biological resources, endangered species and potential land use conflicts would continue to exist.

Appendix A Distribution List

This EA, FNSI and attached Endangered Species Management Plan will be sent to the following agencies and entities:

State and Federal

California Coastal Commission
California Department of Fish and Game
U.S. Environmental Protection Agency, Region IX
U.S. Fish and Wildlife Service, Ventura

Local

Association of Monterey Bay Area Governments
California Native Plant Society, Monterey Chapter
City of Monterey
City of Pacific Grove
County of Monterey
The League of Women Voters of the Monterey Peninsula
Pacific Grove Pubic Library
Monterey Public Library
Pebble Beach Corporation
Sierra Club, Ventana Chapter

Randall Morgan
3500 Main Street
Soquel, CA 95073

15 March 1999

Department of the Army
Defense Language Institute
Presidio of Monterey, CA 93944-5006
Attn Directorate of Environmental and Natural Resources Management

Dear Ms Holte

Thank you for the opportunity to review your management plan For the most part the plan seems very well thought out I do have a few comments and corrections to Appendix A (attached) My apologies for the rough handwritten editing Time did not allow for a more polished reply

Sincerely,

R Morgan

2.0 SPECIES INFORMATION

This section provides descriptions of the species, their distribution, habitat, life histories, reasons for listing, and existing conservation measures.

2.1 Yadon's ~~Piperia~~ Rein-orchid

Description. Yadon's ~~piperia~~ rein-orchid is a slender perennial herb in the orchid family (Orchidaceae) that emerges during the winter from an underground bulb-like stem. Photographs of Yadon's ~~piperia~~ are provided on Figures 4 and 5. The plant is 10 to 50 centimeters high, with elongated basal leaves that are 10 to 15 centimeters long and 2 to 3 centimeters wide. Yadon's ~~piperia~~ flowers in summer (May through August). Many small flowers appear on a stalk that is 5 to 50 centimeters high. Each flower consists of six petal-like parts that are white with green margins or midveins. The lower petal forms a narrowly triangular lip that is 3 to 5 centimeters long and curved back toward a long white spur. The spur is pointed downward and is 2.5 to 4 centimeters long (*Hickman, 1993*).

Yadon's ~~piperia~~ rein-orchid is similar to elegant ~~piperia~~ (*Piperia elegans*), elongate ~~piperia~~ (*P. elongata*), Michael's ~~piperia~~ (*P. Michaelii*), and transverse ~~piperia~~ (*P. transversa*) but is distinguished from them by the shorter spur length, the particular pattern of green and white floral markings, and the earlier flowering time (*FWS, 1995*). Further information concerning technical descriptions of Yadon's ~~piperia~~ can be found in *The Jepson Manual: Higher Plants of California* (*Hickman, 1993*) and in *Two New Piperias (Orchidaceae) from Western North America* (*Morgan and Ackerman, 1990*). The U.S. Fish and Wildlife Service (FWS) proposed endangered status, pursuant to the ESA, for Yadon's ~~piperia~~ on August 2, 1995 (*FWS, 1995*) and subsequently determined endangered status on August 12, 1998 (*FWS, 1998*).

Distribution. Yadon's ~~piperia~~ is found in northern Monterey County from the Monterey Peninsula north to the Prunedale-Elkhorn Slough area. The density of Yadon's ~~piperia~~ has declined dramatically within its range, and populations are fragmented due to development. It is currently distributed throughout its historic range, except for the Pacific Grove area, which has since become urbanized. It is likely that the plant was previously more abundant in the Prunedale-Elkhorn Slough area (*FWS, 1995*). The total population of Yadon's ~~piperia~~ is estimated to be approximately 56,000 individuals. Approximately 96 percent of these plants occur on the Monterey Peninsula (*Jones & Stokes, 1996*). Total known occupied habitat of Yadon's ~~piperia~~ is estimated to be 355 acres. The area of potentially suitable habitat has not been determined (*Allen, 1996*).

Jones & Stokes Associates conducted surveys for Yadon's ~~piperia~~ on POM during December 1994 and April and June 1995 (*Jones & Stokes, 1995, 1996*). Botanists conducted surveys by walking zigzag transects thorough potential habitat. Approximately 50 individual plants were identified in open grassy understory of Monterey pine forest near the cemetery and dormitories. Two additional individual plants were located in the Huckleberry Hill Preserve in Monterey pine forest with chaparral understory (*Jones & Stokes, 1995*). Additional surveys done in 1998 by the Directorate of Environmental and Natural Resources Management (DENR) found the population by the cemetery and dormitories extended into a hard-packed embankment that connected the pine forest with adjacent dormitories. The embankment showed obvious signs of previous ground disturbance. The number of individual plants in 1998 along the embankment and in the original forest location was estimated to be 150 plants; most of these plants were found along the embankment. Known population locations occurring on the POM in 1995 are shown on Figure 6.

The vernacular name for this genus, and related genera like Habenaria, is REIN-ORCHID, not Piperia

Non-native species (mainly French broom and Hottentot fig) will be removed by hand or herbicides such as glyphosate may be used. Hand removal is preferable as impacts to native species are less likely and volunteer labor can be utilized. Since seed of French broom is thought to persist for decades in the soil, removal of plants will need to be conducted annually.

At this time, there are no known propagation methods for Yadon's piperia. If propagation techniques are developed and funds are available, plans to bring in additional local genetic stock (from the Monterey Peninsula) may be developed in coordination with USFWS. The propagated plant would be used to enhance marginal or buffer habitat. Please avoid introducing plants or soil from other populations, which may harbor fungus diseases or other pathogens.

2.2 Hooker's Manzanita

The conservation goals for Hooker's manzanita are to maintain existing populations on POM and to protect these populations from impacts during use of nearby obstacle/orienteering course. Habitat management actions to meet conservation goals are as follows.

a) Remove non-native species from habitat areas.
b) Institute an awareness training program and install endangered species warning signs.
c) Establish a propagation program to augment existing populations (optional - if needed).
d) Utilize Hooker's manzanita (from a local seed source) in landscape plans.

Implementation of habitat management actions for Hooker's manzanita will not be required unless the plant is proposed for listing; however, the Army may implement some of the management actions as time and funding allow. Non-native species removal will be conducted as described above for Yadon's ~~piperia~~ rein-orchid. Propagation program for Hooker's manzanita may include use of brush pile burns, small scale clearing, or other actions to mimic the effects of fire. This propagation program will not be addressed in this EA. Compliance with NEPA may require additional analysis when /if the Hooker's manzanita propagation program is implemented and specific details of this program are known.

2.3 MONITORING

A monitoring program will be established for Yadon's ~~piperia~~ rein-orchid to periodically estimate population size and status, status of habitat, potential threats to species and factors affecting reproductive success. A similar monitoring program for Hooker's manzanita will be implemented if habitat management actions become required.

If monitoring identify significant changes or threats to Yadon's ~~piperia~~ rein-orchid and Hooker's manzanita populations, corrective actions will be taken. If corrective actions are warranted, monitoring data will be used to monitor the success of corrective actions. Possible corrective actions are described in 4.2.1 and 4.2.2 of the ESMP. Corrective actions will be coordinated with the appropriate regulatory agencies.

Based on the 1994 and 1995 surveys, POM has approximately 0.16 acres of occupied habitat and 120 acres of potentially suitable habitat for Yadon's ~~piperia~~ (*Jones & Stokes, 1995*). The population at POM is less than 1 percent of the total population estimated in the *Flora and Fauna Baseline Study of the Presidio of Monterey* (*Jones & Stokes, 1995*).

Habitat/Ecosystem. Yadon's ~~piperia~~ is found in maritime chaparral and closed-cone coniferous forests. It is found primarily on sandstone and sandy soil that is often poorly drained and dries in summer when the plants are flowering (*FWS, 1995*). Yadon's ~~piperia~~ prefers soils that retain moisture during the rainy season but are not subject to inundation (*Allen, 1996*). Most occurrences of Yadon's ~~piperia~~ appear to be on Narlon and Huckleberry soils (*Jones & Stokes, 1996*). Plant associations in maritime chaparral include shaggy-barked manzanita (*Arctostaphylos tomentosa*), chamise (*Adenostoma fasciculata*), toyon (*Heteromeles arbutifolia*), sticky monkey flower (*Mimulus aurantiacus*), deer brush (*Lotus scoparius*), and rush lotus (*L. junceus*). Plant associations in closed-cone coniferous forests include Monterey pine (*Pinus radiata*), Bishop pine (*Pinus muricata*), Hooker's manzanita, western poison-oak (*Toxicodendron diversilobum*), blue wildrye (*Elymus glaucus*), bedstraw (*Galium* sp.), and California huckleberry (*Vaccinium ovatum*). Yadon's piperia occurs at elevations ranging from 30 to 150 meters on topography that ranges from relatively level to slopes that are moderate (*Morgan, 1997*).

Critical elements of the ecosystem inhabited by Yadon's ~~piperia~~ appear to be symbiotic relationships, disturbance, light availability, cover, non-native species competition, and deer browsing. Yadon's ~~piperia~~ is symbiotic with mycorrhizal fungi. Although the specific fungus is poorly understood, its presence is required for germination and establishment of Yadon's ~~piperia~~. Observations made by David Allen indicate that it takes 10 to 15 years from a disturbance before the plant can become established (*Allen, 1996*). Yadon's ~~piperia~~ is usually found with other orchid species in the surrounding area such as ladies tresses (*Spiranthes* ~~spp.~~) or other species in the genus *Piperia* (*Morgan, 1997*). It appears that light availability and not moisture is the more critical factor in the competitive challenge for Yadon's ~~piperia~~ (*Allen, 1996*). Dense cover from non-native species appears to impede germination and establishment of Yadon's ~~piperia~~. However, cover provided by native grasses and Hooker's manzanita appears to enhance reproductive success by reducing browsing by deer and other herbivores (*Morgan, 1997*). In addition, the shrubs may provide protection from herbivores and possibly contribute to a more favorable moisture regime (*Allen, 1996*).

Life History/Ecology. Plants typically are found in groups numbering between 5 and 50; however, groups of 100 or more are found infrequently (*Allen, 1996*). During the first few years of growth, the plant produces one or two basal leaves that die back each winter. After several years of vegetative growth, the plant sends up a single stem to 50 centimeters tall with flowers arranged in a dense narrow-cylindrical raceme (*FWS, 1995*). Plants typically flower from May through August (*Skinner and Pavlik, 1994*). Moths in the noctuid (Noctuidae) and geometer (Geometridae) families have been observed pollinating the plant. One individual has also observed mosquitoes to pollinate the plant (*Morgan, 1997*). Possibly other nocturnal insects may pollinate the plant as well. The fruit is a capsule that matures in the fall. Tiny seeds are dropped and wind-dispersed from the capsule annually to create a seed bank in the surrounding soil. Strong winds are likely to carry the millions of dust-like seeds produced by a large population over a large area. Typical of orchids, the roots of Yadon's ~~piperia~~ form a close symbiotic association with mycorrhizal fungi. For the seed to germinate and become established, the fungus must be present. In turn, the fungus cannot persist without the orchid (*Jones & Stokes, 1996*).

The plant sprouts from roots after fire. While short-lived perennial taxa like Yadon's ~~piperia~~ may be able to persist through a few climatically unfavorable years, maintaining critical seed production levels and appropriate habitat is essential (*FWS, 1995*). Not much information is available concerning the species or local populations tolerance to loss of individuals, but it is suspected that the effects of loss will be delayed because stocked seedbanks could potentially support new populations for some time (*Steeck, 1997*).

Reasons for Listing. Yadon's piperia was once more abundant on the Monterey peninsula. Habitat for the species has been altered, destroyed, and fragmented by the subdivision of residential lots and conversion to golf courses and other recreational facilities. Continued alteration and destruction of habitat due to urban, road, and golf course developments is currently the greatest threat to Yadon's piperia. Other threats include competition with non-native species, roadside and golf course mowing, and unlawful collection of plants and flowers. The small numbers of individuals and populations and the limited range also make Yadon's piperia vulnerable to stochastic extinction (i.e., extinction brought about by random environmental changes).

Conservation Measures. A recovery plan for Yadon's piperia has been prepared for DFG. Several entities are participating in ongoing conservation efforts for the species. These include the Nature Conservancy and the Pebble Beach Company. Pebble Beach Company has been conducting transplanting trials, although the success of its efforts has not yet been documented.

2.2 Hooker's Manzanita

Description. Hooker's manzanita is a perennial shrub in the heath family (Ericaceae). The plant grows as a mat or a mound-like evergreen shrub to heights of generally less than 1 meter. Photographs of Hooker's manzanita are provided on Figures 7 and 8. It does not produce an underground burl. Its stems may grow decumbent (less than 1 meter) or erect (1 to 3 meters). Leaves are erect, 2 to 3 centimeters long by 1 to 1.5 centimeters wide, and elliptic in shape. The upper and lower surfaces of the leaves are alike. The flowers appear in spring (February to May). The flowers are white or pink, somewhat spherical, and in a dense raceme. Small fruits that resemble miniature apples (4 to 6 millimeters wide) appear after flowering (*Hickman 1993*). Further information concerning technical descriptions can be found in *A California Flora* (*Munz, 1959*). Hooker's manzanita is similar to the other subspecies in the species *hookeri* but can be distinguished from them by its location. Hooker's manzanita is also similar to *A. pumila*, *A. t. tomentosa*, and *A. montereyensis* but can be distinguished from them by stomates on both surfaces, the absence of a burl, and the scale-like bracts.

Distribution. Hooker's manzanita occurs from Carmel in Monterey County to the Santa Cruz Mountains in Santa Cruz County. Density of the Hooker's manzanita within this range has declined dramatically, and populations are more fragmented. It is currently found distributed throughout its historic range, except for populations in the Pacific Grove area, which were extirpated when the area became urbanized. Jones & Stokes Associates conducted surveys on POM for Hooker's manzanita during December 1994 and April and June 1995 (*Jones & Stokes, 1995*). Known population locations occurring on the POM in 1995 are shown on Figure 9.

Habitat/Ecosystem. Hooker's manzanita is found in maritime chaparral, coastal scrub, closed-cone coniferous forest, and cismontane woodland habitats. It is found primarily on sandy soils, sandy shales, and sandstone outcrops. Plant associations in maritime chaparral include shaggy-barked manzanita, chamise, toyon, sticky monkey flower, deer brush, and rush lotus. Plant associations in coastal scrub may include California sage (*Artemisia californica*), coyote brush, mock heather (*Ericameria ericoides*), coast buckwheat (*Eriogonum latifolium*), and Chamisso's bush lupine (*Lupinus chamissonis*). Plant associations in closed-cone coniferous forests include Monterey pine, Bishop pine, coast live oak (*Quercus agrifolia*), bracken fern (*Pteridium aquilinum* var. *pubescens*), California huckleberry, shaggy-barked manzanita, toyon, and western poison-oak. Hooker's manzanita is found at elevations ranging between 85 and 300 meters.

Life History/Ecology. Hooker's manzanita flowers in spring. Flowers are pollinated by insects such as bees, flies, and moths. Small fruits appear after flowering. The fruits are eaten and dispersed by mammals and birds whose typical travel distance is generally greater than the range in which the species

5.0 MONITORING PLAN

This section describes a monitoring plan to periodically estimate population size and status, habitat size and status, and potential threats to species and factors affecting reproductive success. This information is crucial to the installation's ability to determine if conservation goals are being achieved. The Army is under no obligation to perform monitoring of Hooker's manzanita populations at this time.

Monitoring of populations on Huckleberry Hill Nature Preserve should be coordinated between the DENR and the City of Monterey. Monitoring will most likely be performed by DENR or volunteers directed by DENR. If monitoring data documents significant changes or threats to Yadon's ~~piperia~~ and Hooker's manzanita populations, corrective actions should be taken. If corrective actions are warranted (as determined by DENR), monitoring data could be used to provide guidance for success of corrective actions. Possible corrective actions are described in Sections 4.2.1 and 4.2.2. Corrective actions will be coordinated with the appropriate regulatory agencies and input from local interested parties or organizations sought.

Monitoring of Yadon's ~~piperia~~ and Hooker's manzanita may involve both surveying and sampling. When sampling is involved, sampling adequacy will be examined using established methods (e.g. cumulative mean curves, variance analysis, or species-area curves). Data may be gathered as number, density, or cover classes rather than absolute counts. If class information is gathered, classes will be defined to enable detecting significant population changes.

Known populations of species should be visited annually for 3 years to establish baseline data. Once a baseline is established, sampling may be reduced to every other year for Yadon's ~~piperia~~ and every 3 years for Hooker's manzanita if populations appear to be stable. Regardless of sampling interval, species should be visited at least yearly to access habitat conditions and possible threats to species. The information outlined in the following sections will be gathered and recorded during annual monitoring.

5.1 Yadon's ~~Piperia~~

Information collected on Yadon's ~~piperia~~ will include the following:

- The number (or size class) of individual blooming plants (conducted May through August)
- The density (or density class) of plants within occupied habitat (expressed as numbers of plants per square meters)
- Percent of blooming plants that set seed
- General habitat condition and possible threats to species (e.g. exotic plants, trampling, and evidence of herbivory).

5.2 Hooker's Manzanita

Information collected on Hooker's manzanita will include the following:

- Percent species cover should be determined using fixed line transects. Transects should be placed to incorporate areas of varying slope, aspect, and species composition. Transects should be marked with a permanent marker and locations documented on aerial photographs or maps.

DEPARTMENT OF THE ARMY
DEFENSE LANGUAGE INSTITUTE FOREIGN LANGUAGE CENTER
AND PRESIDIO OF MONTEREY
PRESIDIO OF MONTEREY, CA 93944-5006

REPLY TO
ATTENTION OF Directorate of Environmental and Natural
Resources Management

APR 2 9 1999

Mr. Randall Morgan
3500 Main Street
Soquel, California 95073

Dear Mr. Morgan:

Thank you taking the time to review the *Environmental Assessment for the Endangered Species Management (ESMP) for Yadon' Piperia and Hooker's Manzanita, Presidio of Monterey, Directorate of Environmental and Natural Resources Management, February 1999.* This letter outlines our responses to the comments listed in your March 4, 1999 letter on this management plan.

We recognize that species may have more than one common name. We chose the common name, Yadon's piperia, because it was used in the *Jepson Manual: Higher Plants of California.* Additionally, the U.S. Fish and Wildlife Yadon's piperia in the Final Rule listing the plant as federally endangered.

We have modified the Endangered Species Management Plan to included your comments related to technical aspects of Piperia including flower size and spur length, plant associates, season of leaf dieback as well as comments regarding Hooker's manzanita.

Your comment regarding the number of surveys required for population monitoring is very interesting and raises a good point. As you suggest, a March survey would doubtless lead to a better quantification of the different age classes in the population. But, we believe surveying for these plants when they are not in flower could lead to individuals being attributed to P. yadonii when they could be another species of Piperia. However, we have modified the Endangered Species Management Plan to consider March as an additional survey time. As such, we may conduct surveys in both late winter when vegetative portions of the plants are visible and also during spring and summer when the plants are flowering.

Both your letter and our response will be incorporated into the final Environmental Assessment. Again, thank you for taking the time to review and comment on this report. Please contact Mr. Mark Reese (831) 242-7925 if you have any further comments or concerns.

Sincerely,

James M. Willison
Director, Environmental and
Natural Resources Management

Pebble Beach Company

Real Estate Division
Post Office Box 1767
Pebble Beach, CA 93953
(408) 624-8900
FAX (408) 625-8412

March 18, 1999

Commander, DLIFLC & POM
ATZP-EP (Jane Holte)
Presidio of Monterey, California 93944

Re: The Environmental Assessment for the Endangered Species Management for Yadon's Piperia and Hooker's Manzanita, Presidio of Monterey, Directorate of Environmental and Natural Resources Management, February, 1999

Dear Commander:

Thank you for the opportunity to review the above referenced document. As you are no doubt aware, Pebble Beach Company has for some time now been processing environmental documents relative to the Company's Del Monte Forest Plan with the County of Monterey. Both Yadon's Piperia and Hooker's Manzanita are among the plant types that have received evaluation in our process.

We have two comments, both pertaining to Yadon's Piperia. First, under Section 2.1 of the Environmental Assessment, last paragraph, it is noted that "At this time, there are no known propagation methods for Yadon's Piperia." I was of the impression that Yadon's Piperia had been propagated by some, including Vern Yadon. Second, in the Endangered Species Management Plan (ESMP), again, in Section 2.1, under Distribution, it is noted that the total population of Yadon's Piperia is estimated to be approximately 56,000 individuals. David Allen, based on research completed in 1996, has noted that the total population of Yadon's Piperia now exceeds 80,000 individuals ranging from north Monterey County, southerly to Palo Colorado Canyon in Big Sur.

Please don't hesitate to contact us if you have questions regarding the above comments.

Very truly yours,

PEBBLE BEACH COMPANY

Edward Y. Brown
Vice President, Planning

DEPARTMENT OF THE ARMY
DEFENSE LANGUAGE INSTITUTE FOREIGN LANGUAGE CENTER
AND PRESIDIO OF MONTEREY
PRESIDIO OF MONTEREY, CA 93944-5006

April 21, 1999

REPLY TO ATTENTION OF
Directorate Environmental and Natural
Resources Management

Mr. Edward Y. Brown
Vice President, Planning
Pebble Beach Company
Real Estate Division
P.O. Box 1767
Pebble Beach, Califonria 93953-

Dear Mr. Brown:

Thank you for your comments dated March 18, 1999 on the *Environmental Assessment for the Endangered Species Management (ESMP) for Yadon's Piperia and Hooker's Manzanita, Presidio of Monterey, Directorate of Environmental and Natural Resources Management, February 1999.*

The following are responses to your comments regarding Yadon's piperia. First, regarding piperia propagation, it is our understanding that there are no methods for propagating plants from seed. Although plants may be propagated vegetatively, this would involve disturbing existing plants and would not be appropriate for enhancement of the small population found at the Presidio of Monterey. Second, the population numbers contained in section 2.1. of the Endangered Species Management Plan were based on estimates included in Recovery Strategies for Six Coastal Plant Species on the Monterey Peninsula, produced in 1996 for the California Department of Fish and Game. Reference section of the ESMP indicated the complete citation. Other surveys may provide different population estimates.

Both your letter and our response will be incorporated into the final Environmental Assessment. Again, thank you for taking the time to review and comment on this report. Please contact Mr. Mark Reese (831) 242-7925 if you have any further comments or concerns.

Sincerely,

James M. Willison
Director, Environmental and Natural
Resources Management

AMBAG ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

(408) 883-3750 FAX (408) 883-3755

Office Location: 445 Reservation Road, Suite G, Marina
P.O. Box 809, Marina, CA 93933-0809

March 19, 1999

Ms. Jane Holte
Attn: ATZP
Presidio of Monterey
Monterey, CA 93944-5006

RE: MCH # 039916 - Environmental Assessment for Endangered Species Management Plan for Yadon's Piperia and Hooker's Manzanita

Dear Ms. Holte:

AMBAG's Regional Clearinghouse circulated a summary notice of your environmental document to our member agencies and interested parties for review and comment.

The AMBAG Board of Directors considered the project on **March 12, 1999** and has no comments at this time.

Thank you for complying with the Clearinghouse process.

Sincerely,

Nicolas Papadakis
Executive Director

DEPARTMENT OF THE ARMY
DEFENSE LANGUAGE INSTITUTE FOREIGN LANGUAGE CENTER
AND PRESIDIO OF MONTEREY
PRESIDIO OF MONTEREY, CA 93944-5006

April 21, 1999

REPLY TO
ATTENTION OF
Directorate of Environmental and Natural
Resources Management

Mr. Nicolas Papadakis
Executive Director
Association of Monterey Bay
Area Governments
445 Reservation Road, Suite G
Marina, California 93933-0809

Dear Mr. Papadakis:

Thank you and the AMBAG Board of Director for reviewing and circulating the *Environmental Assessment for Endangered Species Management Plan for Yadon's Piperia and Hooker's Manzanita, Presidio of Monterey, Directorate of Environmental and Natural Resources Management, February, 1999.* We appreciate your time and consideration.

Your letter will be incorporated into the final Environmental Assessment. Again, thank you for taking the time to review and comment on this report. Please contact Mr. Mark Reese (831) 242-7925 if you have any further comments or concerns.

Sincerely,

James M. Willison
Director, Environmental and Natural
Resources Management

DEPARTMENT OF THE ARMY
DEFENSE LANGUAGE INSTITUTE FOREIGN LANGUAGE CENTER
AND PRESIDIO OF MONTEREY
PRESIDIO OF MONTEREY, CA 93944-5006

May 6, 1999

REPLY TO
ATTENTION OF
Directorate of Environmental and Natural
Resources Management

Ms. Mary Ann Matthews
Conservation Chair
California Native Plant Society
P.O. Box 381
Carmel Valley, California 93924

Dear Ms. Matthews:

Thank you and the Monterey Bay Chapter of the California Native Plant Society for taking the time to review the *Environmental Assessment for the Endangered Species Management (ESMP) for Yadon' Piperia and Hooker's Manzanita, Presidio of Monterey, Directorate of Environmental and Natural Resources Management, February 1999.* This letter outlines our responses to the comments in your March 25, 1999 letter on this management plan.

Since Yadon's piperia is a federally listed plant, any Army action which may adversely impact this species would require formal consultation with U.S. Fish and Wildlife Service. We recognize that the purpose of any propagation program would be to enhance existing populations. Is our current understanding that there are no methods for propagating plants from seed. Although plants may be propagated vegetatively, this would involve disturbing existing plants and would not be appropriate for enhancement of the small population found at the Presidio of Monterey. In summary, if a propagation program were to be implemented, the installation would be required to coordinate with the U.S. Fish and Wildlife Service.

We appreciate your concern regarding preservation of Huckleberry Hill and surrounding Open Space / Recreation areas. The City of Monterey and the Army recognize its importance as potential reservoirs for resistance to pitch canker. Mitigation efforts include a reforestation program that uses native seedlings. Additionally, the City of Monterey has an on-going invasive weed eradication program that targets removal of French broom. At a minimum, there is one month each year dedicated to weed eradication, especially French Broom, on the Huckleberry Hill Reserve. This effort is completed with assistance from the California Department of Forestry. Additional mitigation efforts include minimization of potential fire danger.

Regarding surveys, Jones and Stokes completed a flora and fauna study for the Presidio of Monterey in 1995. At such time, no *Arctostaphillos pumila* or *Allium hickmanii* were observed. The Endangered Species Management Plan (ESMP) does recognize that some special status species may have dormant seed in the soil, which may not be observed during regular botanical surveys. The ESMP recommends surveys for these species following natural disturbance events. Please see page 14 of the ESMP.

Both your letter and our response will be incorporated into the final Environmental Assessment. Again, thank you for taking the time to review and comment on this report. Please contact Mr. Mark Reese (831) 242-7925 if you have any further comments or concerns.

Sincerely,

James M. Willison
Director, Environmental and
Natural Resources Management

Copy Furnished:
R. Reid, City of Monterey

Monterey Bay Chapter
California Native Plant Society
P. O. Box 381
Carmel Valley, CA 93924
Mar. 25, 1999

Commander, DLIFLC & POM
ATZP (Jane Holte)
Presidio of Monterey, CA 93944-5006

Ladies and Gentlemen:

The Monterey Bay Chapter of CNPS appreciates receiving a copy of the Environmental Assessment and Endangered Species Management Plan for the Presidio of Monterey. We commend the Army for this effort and we would like to make the following comments.

We understand that this document complies with Army Regulation 200-3 regarding protection of listed and proposed threatened and endangered species. The only listed species known to occur in that area is Yadon's piperia (*Piperia yadonii*), which was Federally listed in August 1998. We support the monitoring and maintenance program which includes warning signs near the two small populations, awareness training; and fencing if necessary. We are glad to see the provision for removal of invasive non-native species, particularly French broom, which is rapidly infesting sensitive native plant communities.

Protection of existing habitat is by far the most important step in preserving this species. Propagation and outplanting is problematical at this time and therefore should not be considered a back-up plan if the existing populations are degraded. We urge inclusion of a provision that will curtail any Army activities if they are found to impact these populations adversely.

In addition to Hooker's manzanita (*Arctostaphylos hookeri*), there are several other plants considered endangered or threatened that should be considered in this document. Of particular concern is the native Monterey pine (*Pinus radiata*) which CNPS considers endangered because of loss of habitat and the shocking effects of the pitch canker fungus, a virulent introduced disease which experts predict will kill 85% of the native trees in the next one or two decades. While studies are underway to identify resistant trees for landscaping purposes, the only way to protect the priceless biological diversity of the *native* forest is to preserve the largest indigenous stands with their full complement of native understory plants. The Huckleberry Hill Preserve and the adjoining Open Space/Recreation areas are therefore very important as potential reservoirs for resistance to pitch canker, and we urge that it be the Army's policy to allow no further incursions in these areas. We emphasize the importance of making the removal of French broom in the native forest a priority in order to preserve this endangered plant community.

It is unclear from the document whether specific surveys at the right time of year were done for other endangered plants known to be in the vicinity, such as sandmat manzanita (*A. pumila*) and Hickman's onion (*Allium hickmanii*), formerly a C1 candidate that was dropped, we believe, in error because of misinformation that the species is widespread at Fort Hunter Liggett. We have never been able to find it at FHL and suspect that there was a misidentification. It is occasionally found in the Monterey pine forest in open areas of coastal terrace prairie, which is considered a rare native community because so much of its habitat has been lost.

Thank you for the opportunity to comment on this important preservation effort.

Sincerely yours,

Mary Ann Matthews
Conservation Chair

DISTRIBUTION

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

May 29, 2001

Copy No. 8

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

Copies11 - 17: Harding ESE, Inc. Files

Quality Control Reviewer

Donald Kane
Associate Environmental Scientist

JC/TG/MB57312.doc -EPP

Appendix B
ESMP Annual Reports

Annual Endangered Species Management Plan Review
Presidio of Monterey and Former Fort Ord, January 31, 2001

Status of Endangered Species Management Plans at Former Fort Ord

The Installation-Wide Multispecies Habitat Management Plan (HMP) prepared for the closure of former Fort Ord serves as the Endangered Species Management Plan (ESMP) for excess property at former Fort Ord. The HMP is equivalent to ESMP requirements identified in AR 200-3 chapter 11-6. The HMP pertains only to areas of former Fort Ord outside of the property being retained by the Presidio of Monterey (POM) as the Ord Military Community.

On 19 October 1993, the U.S. Army Presidio of Monterey (POM) received a Biological Opinion (BO) from the U.S. Fish and Wildlife Service (Service) for actions associated with Base Realignment and Closure real property transfers and reuse. The BO required the Army to develop and implement an Installation-Wide Habitat Management Plan (HMP). The goal as stated in the HMP is "to promote preservation, enhancement and restoration of habitat and populations of special status species while allowing implementation of a community-based reuse plan that promotes economic recovery after the closure of Fort Ord." This is being accomplished by transferring the larger contiguous and biologically diverse habitat parcels to natural resource management agencies such as the Bureau of Land Management (BLM) and the California State Parks. This allows numerous small, fragmented parcels within and adjacent to disturbed areas to be developed. The HMP was completed and signed February 1994.

In April 1996, representatives from the Army, Service, Fort Ord Reuse Authority (FORA), University of California and BLM agreed to prepare a detailed amendment to the HMP to reflect changes in species listings, to support changes to the reuse plan and Army pre-disposal activities. As a result, a revised HMP was prepared in cooperation with FORA, University of California, BLM, State Parks and others with resource conservation requirements. In April 1997, the Army and Service signed the revised HMP. The HMP has been submitted to other signatory agencies. To date, the Bureau of Land Management, California Department of Transportation, University of California @ Santa Cruz, City of Marina, Marina Coast Water District, Monterey Peninsula College, Monterey Peninsula Regional Park District, Fort Ord Reuse Authority and York School have signed the HMP. The California Department of Parks and Recreation and Monterey County haven't yet signed the HMP.

On 11 April 1997, a revised Biological/Conference Opinion (B/CO) was received. The revised B/CO reflected changes in the listing status of several species in addition to changes in the HMP and Army pre-disposal cleanup actions.

On 20 November 1998, the installation re-initiated consultation for two actions not addressed in the 1997 B/CO or HMP. The actions were: 1) impacts to federally listed Contra Costa goldfield (newly discovered on former Fort Ord) during Ordnance and

Explosives (OE) removal actions and 2) impacts to federally listed plants, during remediation of contaminated groundwater plumes within the UCSC Natural Reserve.

On 30 March 1999, the installation received a revised non-jeopardy B/CO that included a discussion of the impacts to Contra Costa goldfields from the OE removal project and impacts to other listed plants resulting from groundwater remediation activities.

On 19 November 1999, the installation requested technical assistance in evaluating vegetation monitoring results from the last 4 years. The installation provided the Service with the *Draft Evaluation of Observed Trends in Central Maritime Chaparral Habitat on Unexploded Ordnance Sites at the former Fort Ord.*

On April 24, 2000 the Service responded to the request for technical assistance and provided a list of comments regarding observed trends in the recovery of maritime chaparral following vegetation clearance and ordnance removal activities.

The 1999 B/CO requires the submission of an annual report to the Service. The following summary and enclosed report fulfill the requirement for 2000.

Summary of Land Transfers at Former Fort Ord

A total of 241.2 acres comprising of developed family housing areas and an administrative building complex and road right-of-ways were transferred in 2000. The transferred property is located in areas designated as development areas and requires no resource conservation requirements. To date, the Army has transferred 256 acres of maritime chaparral designated for future development and 2,719 acres of maritime chaparral designated as reserve areas.

Presidio of Monterey ESMP

An ESMP has been prepared for Yadon's piperia (*Piperia yadoni*), a federally Endangered orchid and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a California Native Society plant on list 1B found in undeveloped areas of the POM. Yadon's piperia was listed as an endangered species by the Service on August 12, 1998. Hooker's manzanita is considered rare, threatened or endangered by the California Native Plant Society and could be a candidate for future listing.

An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) have been completed including the 30-day public comment period. The ESMP was reviewed by TRADOC Environmental and signed by the Installation's Staff Judge Advocate and Installation Commander on December 1999.

Implementation of the HMP, Former Fort Ord

Status of the Army's HMP resource conservation and management requirements for 2000 as described in Chapter 3 of the HMP are as follows:

1. Contaminated Soil Excavation

No maritime chaparral in designated Natural Resource Management Areas (NRMA) was disturbed during the excavation of lead contaminated soils from the Multi-Range Area in 2000. Excavations occurred in areas identified as future development with no resource conservation requirements. The excavated areas have been hydro-seeded with a temporary seed mix to minimize erosion during winter rains. Water bars and rolling dips were also constructed to prevent dirt roads from eroding. Excavation of lead contaminated soils within the NRMA is expected to begin in 2001. No more than 75 acres of maritime chaparral in NRMA areas will be removed by the lead remediation project. The 75 acres will then be hydro-seeded with a temporary seed mix application to prevent erosion and the spread of invasive weeds. BLM has conducted exotic weed control within the excavated range areas and dirt roads to further minimize the spread of exotic weeds including pampas grass. NRMA ranges to be excavated in 2001 will be monitored for 5 consecutive years to ensure a healthy recovery in accordance with the HMP.

Biologists worked with remediation contractors to minimize impacts to habitat and avoided HMP species where possible during excavation and transportation activities.

2. Landfill Remediation Mitigations

Biologists worked with remediation crews to minimize impacts to habitat associated with construction of groundwater wells and pipelines. Several segments of dirt roads were scraped of topsoil prior to installing a pipeline through the landfill parcel. The topsoil was subsequently spread back over the roads to preserve the existing seedbank to the extent possible. The road segments will be monitored this year to prevent exotic weed infestations and document native species recovery. The landfill project is expected to be complete in late 2001. Following completion of the cap, an Operation and Monitoring Plan will be developed in accordance with the Record of Decision for the landfill site that will monitor the landfill closure.

3. Mitigations at Lead Remediation Site 3 (Beach Ranges)

In 1999 - 2000, 25,316 native plants from twenty-one species were planted in lead remediation and recontoured areas on the former beach ranges. Success rates for the perennial plant species were excellent, with an overall average of approximately 81.3%. Success rates for the two threatened and endangered annual plant species, Monterey spineflower and sand gilia differed greatly due to the success of the Monterey spineflower contrasting with the results of a very poor sand gilia season.

Dune slopes were stabilized in 1998 by the direct seeding with beach sagewort and revegetation with native plants and by application of sterile wheat straw. No slope failures occurred; however, high winds scoured out patches of the dune slopes at ranges 5-6, 8, and 15-16. Wind scour and sand deposition negatively impacted the revegetation effort at those sites.

Invasive exotic plants were controlled by hand pulling and by multiple applications of the herbicide glyphosate (Round-up Pro). The total amount of herbicide applied, as of mid-December, 2000 was 172.6 gallons.

The Army and State Parks have finalized a habitat restoration and monitoring plan for lead remediation and recontoured areas on the future Fort Ord Dunes State Park. This is the first year the plan was implemented. The Habitat Restoration and Monitoring Plan identifies that State Parks will plant an annual average of 10,000 native plants throughout the 150 acre remediation and recontoured area. The 1999 – 2000 plantings included 627 sand gilia, 1,800 Monterey spineflower, 957 coast wallflower, 1,480 coast buckwheat and 5,991 dune buckwheat. We anticipate an average survival rate of between 60%-95%, along with annual recruitment, these numbers should be more than adequate to create the self-sustaining populations within 5 years as required by the HMP.

4. Ordnance and Explosives (OE) Removal

Threatened and endangered species education classes for ordnance and explosive workers were conducted several times last year. In addition, tailgate briefings and site visits were conducted routinely to ensure habitat protection measures were in place.

Constructed and maintained erosion control measures such as rolling dips and water bars to control erosion within newly disturbed fire roads. Straw was also applied to large areas where mineral soils were exposed as a result of OE excavations and creation of firebreaks.

Constructed and maintained fencing and gates at access areas to impact range areas and other habitat areas to prevent unauthorized vehicle access.

Coordinated and funded BLM exotic plant control and erosion control on Army lands where OE work was conducted or planned.

A wildfire started in the summer of 1999 following a routine detonation of unexploded ordnance in an area that had previously been mechanically cleared of vegetation. The fire spread to the east consuming approximately 100 acres and threatened an adjacent residential area. The Army widened existing fire roads in an effort to extinguish the fire. Rolling dips were constructed within the newly disturbed firebreaks prior to the winter rains beginning. The exposed mineral soils were also straw crimped to further prevent erosion and to minimize the spread of the non-native pampas grass.

Although no burning occurred in 2000, a total of 637 acres of maritime chaparral reserve area have been burned since 1994 to support the OE program. Approximately 150 acres of maritime chaparral located in future development areas has also been burned to support the OE program.

To date a total of 1,979 acres of vegetation has been manually/mechanically cleared to support OE investigations and removals. Approximately 800 of these acres were located in maritime chaparral and identified for future development. Approximately 150 of the total acres were located in maritime chaparral areas designated as reserve areas.

5. Groundwater Remediation Project on University of California @ Santa Cruz Property

Biologists worked with remediation contractors to minimize impacts to listed species and habitat in the University of California Natural Reserve during investigations and monitoring of contaminated groundwater plumes. Nine groundwater wells were drilled within the UCSC Northern Reserve Area with minimal impacts to HMP species. Access roads and well areas impacted this year by the groundwater investigation program will be monitored this spring to determine impacts to sand gilia and Monterey spineflower populations within the UC Reserve. The baseline condition of the roads can be found on Plate 13 of the annual report.

6. Hardstand Removal Project

In 1999 California Department of Transportation in coordination with the Fort Ord Reuse Authority and the Army, removed asphalt and other compacted soil areas totaling 319,770 square feet (7.43 acres). Removal and restoration of these areas is required by the HMP (4-24). Once the hardstand was removed the areas were hydro-seeded with a temporary seed mix and erosion control structures were constructed. These areas will be evaluated to determine whether additional restoration activities are necessary.

INCIDENTAL TAKE AND SIGHTINGS

No take of Smith's blue butterflies or western snowy plovers occurred in 2000 as a result of the Army's ongoing pre-disposal actions. Although we participated in the Salinas River National Wildlife Refuge Predator Management Program, no red fox or feral cats were captured on the former beach ranges during the 2000 effort. Although Western snowy plovers successfully fledged chicks in the Monterey Bay area, no Western snowy plover nests were found on the beaches at former Fort Ord during surveys conducted in 2000.

Former Fort Ord HMP Monitoring Results

The 2000 annual monitoring reports are enclosed for your information. The results are summarized below:

Beach Ranges

A total of 25,316 native seedlings were planted on the beach ranges of former Fort Ord. Seedlings were planted from five-inch leach-tube containers. Survival test plots indicate an average success rate of 81.3% for perennial plant species.

Results of Monterey spineflower plantings indicate that seedlings planted in the 1999 - 2000 season had a survival rate of 98%.

Surveys of sand gilia restoration areas showed that gilia planted in the 1999 - 2000 season had an extremely poor survival rate. Only 31 of the 627 total survived to set seed. However, the sand gilia planted at Ranges 15 and 16 in the 1998 - 1999 planting season produced 410 seedlings.

Surveys at each coast wallflower planting area were conducted in the fall of 2000. A total count plus an estimate of plants missed (~10%) showed that approximately 400 coast wallflower had been added to the population since the first year of the restoration project.

OE Removal Sites

Monitoring activities conducted in 2000 include baseline and follow-up sampling at several terrestrial and wetland OE sites. Maritime chaparral data was collected from 6 OE sites and 6 lead remediation sites. HMP herbaceous species surveys were conducted at 4 OE sites, the Northern UC Reserve and two seasonally wet habitat areas supporting Contra Costa goldfields. Baseline wetland monitoring was conducted at 1 water-body and follow-up wetland monitoring was conducted at 2 wetland areas. Although baseline data has been collected at many other wetlands, follow-up visits will not occur until the wetlands are impacted by OE cleanup. Information from these monitoring events is included in the enclosed 2000 Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring.

Several differences between cut and burned grids were observed during monitoring activities. Monitoring results indicate trends associated with habitat recovery following the two methods of vegetation clearance:

- Seedlings of HMP shrubs were common in burned grids but rarely seen in cut grids.
- Herbaceous cover and diversity was higher in burned grids.
- Cut grids contained more unvegetated ground than burned grids.
- Both burning and cutting appear to increase colonization of iceplant and jubata grass.

Implementation of the POM ESMP

Implementation of the POM ESMP has started by developing an educational brochure containing pictures and descriptions of the endangered plant as well as ways to reduce impacts to the population. In addition, signs have been installed around the population located adjacent to Building 630 to prevent disturbance to the plants. The population was monitored in 1995, 1998 and 2000. The largest extent of the population totaled 150 plants in 1998. Monitoring of the population will continue in accordance with the POM ESMP.

Contacts with the USFWS

As required by the B/C Opinion and the HMP, the Installation submitted annual reports to the USFWS since 1994. The 2000 annual report was submitted in January 2001. The report describes measures taken in 2000 to implement the requirements identified in the HMP.

Frequent informal contacts have been made with the Service to discuss matters related to implementation of the HMP and other listed species issues.

Representatives from POM Directorate Environmental and Natural Resources and the Base Realignment and Closure office attend monthly Coordinated Resource Management Planning (CRMP) meetings. The CRMP is comprised of agency representatives that have or will receive former Fort Ord lands with HMP responsibilities. The Service and California Department of Fish and Game and the Bureau of Land Management also attend CRMP meetings. The purpose of the CRMP is to share information, resources, and assist agencies in the development of plans to facilitate implementation of the HMP.

Informal coordination was conducted with the Service to support infrastructure improvement projects conducted by FORA and others, to notify the Service of prescribed burn program issues, and to support work associated with cleanup of a contaminated areas including contaminated groundwater investigations.

There have been several recent meetings with the Service to discuss the future of the Army's prescribed burn program that supports the investigation and removal of unexploded ordnance. A recent agreement was reached with the Service during the December 14, 2000 SMART meeting. The Army and the Service agreed that in addition to the previously agreed-to pre-disposal projects, and the transfer of parcels contained within "Track 0" and FOSETs 1, 2 and 3, the Service would not object to the transfer of the Del Rey Oaks parcels. This agreement is based on the understanding that the Army would not transfer other undeveloped parcels containing maritime chaparral located along the western edge of the Multiple Range Area and within the Parker Flats area until the Service is satisfied that prescribed burns will continue in accordance with the HMP.

Another recent contact with the Service involved a letter and project description from the Installation to the Service requesting concurrence that no adverse affects to threatened Western snowy plover or to threatened Monterey spineflower populations will occur as the result of a demolition project on a portion of Stilwell Hall. We anticipate concurrence with the project by the week of February 5, 2001.

Conclusion

The Presidio of Monterey is meeting the required resource and conservation requirements set forth in the Installation-Wide Multispecies Habitat Management Plan and is in full compliance with the Federal Endangered Species Act.

The Final ESMP for the POM was signed in December 1999 and is being implemented to preserve and maintain the habitat for the endangered Yadon's piperia and rare Hooker's manzanita found in undeveloped areas of the POM.

Annual Endangered Species Management Plan (ESMP) Review
Presidio of Monterey (POM) and Former Fort Ord
January 30, 2002

Presidio of Monterey ESMP Review

The ESMP Review for the POM was prepared for populations of Yadon's piperia (*Piperia yadoni*), a federally Endangered orchid and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a California Native Society plant on list 1B (in what document ???) found in undeveloped areas of the POM. Yadon's piperia was listed as endangered by the U.S. Fish and Wildlife Service (Service) on August 12, 1998. Hooker's manzanita is considered rare, threatened or endangered by the California Native Plant Society and could be a candidate for future listing.

An Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were completed (What was the action; subject title) and no comments were received during the 30-day public comment period. The ESMP was approved by TRADOC Environmental and signed by the Installation's Staff Judge Advocate and Installation Commander ~~on~~ in December 1999.

Implementation of the ESMP began with the installation of signs identifying the endangered species site that is located adjacent to Building 630 on the POM. The signs were designed to prevent impacts to the plants. In addition to signs, color educational brochures were developed that contain pictures and descriptions of the endangered Yadon's piperia as well as ways to reduce impacts to the population (Tab A). The brochures were distributed in July 2001 to soldiers living adjacent to the protected Yadon's piperia population. The population was monitored in 1995, 1998, 2000 and 2001. The largest extent of the population totaled 150 plants in 1998. Sixty plants were identified during a survey on July 26 and 27 of 2001 (Tab B). No human impacts to the protected plants were observed as a result of monitoring conducted in 2001. Monitoring of the population will continue in accordance with the POM ESMP.

In addition to measures taken to protect endangered Yadon's piperia, the POM received $150,000 from TRADOC to implement a Pitch Canker Control Program at the POM and Ord Military Community (OMC). Two hundred and sixty-seven Monterey pine trees severely diseased or dying from Pitch Canker were removed from the POM and the OMC. Also, 192 Monterey pine trees were trimmed to reduce disease infections ~~and~~ to attempt to control~~ling~~ the spread of the disease. The trees trimmed and removed ranged in size from 6 inches to over 34 inches in diameter at breast height and, from 15 feet to over 85 feet in height. Once the trees were trimmed or removed, 277 Monterey pine seedlings from native Monterey pine stock were planted at the Presidio to replace most of the trees removed.

Former Fort Ord ESMP

The Installation-Wide Multispecies Habitat Management Plan (HMP) prepared for the closure of former Fort Ord serves as the ESMP for excess property at former Fort Ord. The HMP is equivalent to the ESMP requirements identified in AR 200-3, chapter 11-6. The HMP pertains only to areas of former Fort Ord not being retained by the Army. ~~outside of the property being retained by the POM as the Ord Military Community.~~

On 19 October 1993, the POM received a Non-Jeopardy Biological Opinion (BO) from the Service for actions associated with Base Realignment and Closure real property transfers and reuse. The BO required the Army to develop and implement an HMP. The HMP was completed and signed in February 1994. The goal as stated in the HMP is "to promote preservation, enhancement and restoration of habitat and populations of special status species while allowing implementation of a community-based reuse plan that promotes economic recovery after the closure of Fort Ord." This is being accomplished by transferring the larger contiguous and biologically diverse habitat parcels to natural resource management agencies such as the Bureau of Land Management (BLM) and the California Department of Parks and Recreation (CDPR). This allows other numerous small and fragmented parcels within and adjacent to disturbed areas to be developed for economic recovery.

In April 1996, representatives from the Army, Service, Fort Ord Reuse Authority (FORA), University of California and BLM agreed to prepare a detailed amendment to the HMP to reflect changes in species listings, to support changes to the FORA Reuse Plan and Army pre-disposal activities. As a result, a revised HMP was prepared with input from FORA, University of California, BLM, CDPR and other agencies with resource conservation requirements at former Fort Ord. In April 1997, the Army and Service signed the revised HMP. The HMP has been submitted to other signatory agencies. To date, the BLM, California Department of Transportation, University of California @ Santa Cruz, City of Marina, Marina Coast Water District, Monterey Peninsula College, Monterey Peninsula Regional Park District, FORA and York School have signed the HMP. The CDPR and Monterey County haven't signed the HMP.

On 11 April 1997, a revised Biological/Conference Opinion (B/CO) was received. The revised B/CO reflected changes in the listing status of several species in addition to changes in the HMP and Army pre-disposal cleanup actions. The B/CO identified mitigation measures to be implemented during the Army's pre-disposal activities.

On 20 November 1998, the installation re-initiated consultation for two actions not addressed in the 1997 B/CO or HMP. The actions were: 1) impacts to federally listed Contra Costa goldfields (newly discovered on former Fort Ord) during Ordnance and Explosives (OE) removal actions and, 2) impacts to federally listed plants, during remediation of contaminated groundwater plumes within the UCSC Natural Reserve.

On 30 March 1999, the installation received a revised non-jeopardy B/CO that included a discussion of the impacts to Contra Costa goldfields from the OE removal project and, impacts to other listed plants resulting from groundwater remediation activities. The B/CO identified mitigation measures to be implemented during pre-disposal

activities affecting ~~occurring within~~ Contra Costa goldfields and within the groundwater investigation and remediation areas.

On 19 November 1999, the installation requested technical assistance from the Service in evaluating monitoring results of central maritime chaparral areas that were disturbed as a result of unexploded ordnance cleanup activities over the last 4 years. The installation also provided the Service with a document entitled ~~the~~ *Draft Evaluation of Observed Trends in Central Maritime Chaparral Habitat on Unexploded Ordnance Sites at the former Fort Ord.*

On April 24, 2000, the Service responded to the request for technical assistance and provided a list of comments regarding observed trends in the recovery of maritime chaparral following vegetation clearance and ordnance removal activities. The Service's comments included statements emphasizing the importance of prescribed burning within habitat reserve areas that contain central maritime chaparral.

Implementation of the HMP, Former Fort Ord

Status of the Army's HMP resource conservation and management requirements for 2001 as described in Chapter 3 of the HMP are provided at Tab C and are summarized as follows:

1. Contaminated Soil Excavation

No maritime chaparral in designated Natural Resource Management Areas (NRMA) was disturbed as a result contaminated soil excavation in 2001. Excavation of lead contaminated soils from within the Multi-Range Area is expected to begin in 2002. Exotic weed control within the previously excavated range areas and dirt roads has been conducted through an agreement with BLM to minimize the spread of invasive weeds including pampas grass. Once the contaminated soils are remediated within the NRMA, the maritime chaparral within heavily disturbed areas will be restored and monitored to ensure a healthy recovery in accordance with the HMP.

2. Landfill Remediation Mitigations

No remediation work was conducted on the landfill site during 2001. However, several areas containing French broom and other invasive plants were treated with Roundup through an agreement with BLM in 2001. Two hundred and forty-five person hours and 87 gallons of Roundup Pro® was applied to areas of the Landfill Parcel that contained French broom, iceplant, Cape ivy, Kikuya grass, and Acacia. One Yellow star thistle was found and pulled. It did not appear to have set seed and the location will continue to be monitored.

3. Mitigations at Lead Remediation Site 3 (Beach Ranges)

During the 1999 – 2001 planting seasons, a total of 40,213 native plants from twenty-one species were planted in remediated and recontoured areas on the former beach ranges. Success rates for perennial plant species were excellent, with an overall average of approximately 80%. Survival rates for the two threatened and endangered annual plant species were excellent; Monterey spineflower was 98% and ~~82% for~~ sand gilia was 82%.

Invasive exotic plants were controlled by hand pulling and by applications of glyphosate (Round-up Pro®). The total amount of herbicide concentrate used on the dunes as of mid-December, 2001 was 18538.5 ounces.

In 1999 a Habitat Restoration and Monitoring Plan was completed by California Department of Parks and Recreation for the remediated and recontoured areas on the future Ord Dunes State Park. Implementation of the plan has resulted in exceeding the HMP restoration requirement for Monterey spineflower; sand gilia and coast wallflower within the lead remediated ranges. ~~Also~~In addition, monitoring of formerly occupied Smith's blue butterfly habitat impacted during the lead remediation activities resulted in the discovery of two re-occupied buckwheat areas. The Habitat Restoration and Monitoring Plan will continue to be implemented resulting in an annual planting average of 10,000 native plants throughout the 150-acre remediation and re-contoured area.

4. Ordnance and Explosives (OE) Removal

Threatened and endangered species education classes for ordnance and explosive workers were conducted several times last year. In addition, tailgate briefings and site visits were conducted routinely to ensure habitat protection measures were being implemented in accordance with the HMP.

Habitat Checklists were completed for each OE site including fuel-breaks prior to cleanup activities, to identify the existing HMP resources and, provide measures to minimize impacts during the cleanup activities. Straw was applied to large areas where mineral soils were exposed as a result of OE excavations.

The Army ~~R~~re-established a system of fuel-breaks within the MRA by widening existing 15-20 foot wide access roads to ~~where~~ a 50 foot ~~feet~~ clearance of vegetation ~~was cut from existing 15-20 foot wide access roads~~. The fuel-break system will be cleared of vegetation annually to serve as both a fuel-break~~s~~ and access route~~s~~ into the MRA.

Although no burning occurred in 2000 or 2001, a total of 637 acres of maritime chaparral reserve area have been burned since 1994 to support the OE program. Approximately 150 acres of maritime chaparral located in future development areas has also been burned to support the OE program.

To date over 2,000 acres of vegetation has been manually/mechanically cleared to support OE investigations and removals. Approximately 1,200 of these acres were located in maritime chaparral and identified for future development. Approximately 150 of the total acres were located in maritime chaparral areas designated as reserve areas.

5. Groundwater Remediation Project on University of California @ Santa Cruz Property

Remediation contractors were required to minimize impacts to federally endangered sand gilia and federally threatened Monterey spineflower and their habitat in the University of California Natureal Reserve during investigations and monitoring of contaminated groundwater plumes. Groundwater wells were drilled and monitored within the University of California @ Santa Cruz Northern Reserve Area with minimal impacts to HMP species. Access roads and well areas that were impacted were monitored to determine impacts to sand gilia and Monterey spineflower populations within the UC Reserve. The populations of both species within the access roads and well locations increased above the baseline conditions that were documented prior to the disturbance.

Incidental Take and Sighting

No take of Smith's blue butterflies or western snowy plovers occurred in 2001 as a result of the Army's ongoing pre-disposal actions.

Summary of Land Transfers at Former Fort Ord

A total of 86.4 acres of land on the former Fritzche Army Airfield designated for future development was transferred to the City of Marina in October 2001. Also In addition, another 241.2 acres comprised mostly of currently developed lands were leased in 2001. The transferred and leased properties are located in areas designated as development areas and require no resource conservation requirements. To date, the Army has transferred 10,631.3 acres of former Fort Ord. Over 7,800 of these acres were transferred to agencies responsible for managing the land as habitat reserves. The remaining 2,831.3 acres wereas transferred as development parcels to local agencies.

Contacts with the USFWS

As required by the B/CO and the HMP, the Installation has submitted annual reports to the Service since 1994. The 2001 annual report will be submitted in January 2002. The report describes measures taken in 2001 to implement the requirements of the HMP.

Frequent informal contacts have been made with the Service to discuss matters related to implementation of the HMP and other listed species issues.

Representatives from POM Directorate Environmental and Natural Resources and the Base Realignment and Closure office attend monthly Coordinated Resource Management Planning (CRMP) meetings. The CRMP is comprised of agency representatives that have or will receive former Fort Ord lands with HMP responsibilities. The Service and California Department of Fish and Game and the Bureau of Land Management also attend CRMP meetings. The purpose of the CRMP is to share

information, resources, and assist agencies in the development of plans to facilitate implementation of the HMP.

There have been several meetings with the Service since 2000 to discuss the future of the Army's prescribed burn program that supports the investigation and removal of unexploded ordnance. An agreement reached with the Service during the December 14, 2000 Strategic Management, Analysis, Requirements and Technology Team (SMART) meeting was that the Army would proceed with several pre-disposal projects, and the transfer of parcels contained within "Track 0" designations and Finding of Suitability for Early Transfer (FOSET) documents 1, 2 and 3, as well as ~~and the transfer of the~~ Del Rey Oaks parcels. This agreement is based on the understanding that the Army would not transfer other undeveloped parcels containing maritime chaparral located along the western edge of the Multiple Range Area and within the Parker Flats area until the Service is satisfied that prescribed burns will continue in accordance with the HMP.

In 2001 the Army coordinated several projects with the Service to ensure compliance with the HMP and the March 30, 1999 B/CO. These projects included re-establishing fuel-breaks within the Multiple Range Area, cutting central maritime chaparral from several development parcels to support the removal of unexploded ordnance (UXO), and the demolition of Stilwell Hall. The Service provided concurrence that these projects were consistent with the HMP and B/CO.

In addition to the projects discussed above, the Army provided comments to the Service's proposed rule on designation of critical habitat for the Monterey and robust spineflowers. Comments on the proposed critical habitat designation were provided to the Service on April 13, 2001. On September 18, 2001 the Army requested the Service confirm the March 30, 1999 B/CO as the BO for critical habitat recently designated for the federally threatened Western snowy plover, and requested conference with the Service on the proposed critical habitat for Monterey and robust spineflowers. Although the Service has not responded to our comments on the proposed rule, it is likely the final Rule will only identify critical habitat for the spineflower on lands designated as "Reserve" in the HMP.

The most recent contact with the Service involved a letter and project description from the Installation to the Service requesting concurrence that no adverse affects to the threatened Western snowy plover or to the threatened Monterey spineflower populations will occur as the result of demolition of Stilwell Hall. On September 13, 2001 the Service provided their concurrence with the demolition of Stilwell Hall, on condition that ~~as long as~~ the demolition occurred outside the Western snowy plover nesting season. The concurrence is valid through March 1, 2003 if the project can't be completed in 2002.

Conclusions

The ESMP for the POM is being implemented to preserve and maintain the habitat for the endangered Yadon's piperia and rare Hooker's manzanita found in undeveloped

areas of the POM. Pitch Canker infestations will continue to be monitored and trees will be removed or trimmed, as funding becomes available.

The Presidio of Monterey is meeting the required terms and conditions of the non-jeopardy biological and conference opinion and the resource and conservation requirements set forth in the HMP for the former Fort Ord.

Annual Endangered Species Management Plan (ESMP) Review
Former Fort Ord, Presidio of Monterey (POM) and Ord Military Community (OMC)
January 31, 2003

Former Fort Ord ESMP Background

The Installation-Wide Multispecies Habitat Management Plan (HMP) prepared for the closure of former Fort Ord serves as the ESMP for excess property at former Fort Ord. The HMP is equivalent to the ESMP requirements identified in AR 200-3, Chapter 11-6. The HMP pertains only to areas of former Fort Ord not being retained by the Army as the result of base closure in 1994.

On October 19, 1993, the POM received a Non-Jeopardy Biological Opinion (BO) from the Service for actions associated with Base Realignment and Closure real property transfers and reuse. The BO required the Army to develop and implement an HMP. The HMP was completed and signed in February 1994. The goal as stated in the HMP is "to promote preservation, enhancement and restoration of habitat and populations of special status species while allowing implementation of a community-based reuse plan that promotes economic recovery after the closure of Fort Ord." This is being accomplished by transferring the larger contiguous and biologically diverse habitat parcels to natural resource management agencies such as the Bureau of Land Management (BLM) and the California Department of Parks and Recreation (CDPR). This allows other numerous small and fragmented parcels within and adjacent to disturbed areas to be developed for economic recovery.

In April 1996, representatives from the Army, Service, Fort Ord Reuse Authority (FORA). University of California and BLM agreed to revise the HMP to reflect changes in species listings, to support changes to the FORA Reuse Plan and Army pre-disposal activities. As a result, a revised HMP was prepared in April 1997 with input from FORA, University of California, BLM, CDPR and other agencies with resource conservation requirements at former Fort Ord. The HMP has been signed by the Army, the U.S. Fish and Wildlife Service, Bureau of Land Management, California Department of Transportation, University of California @ Santa Cruz, City of Marina, Marina Coast Water District, Monterey Peninsula College, Monterey Peninsula Regional Park District, FORA and York School. The CDPR and Monterey County have not yet signed the 1997 HMP.

On April 11, 1997 a revised Biological/Conference Opinion (B/CO) was received. The revised B/CO reflected changes in the listing status of several species in addition to changes in the HMP and Army pre-disposal cleanup actions. The B/CO identified mitigation measures to be implemented during the Army's pre-disposal activities.

On November 20, 1998 the installation re-initiated consultation for two actions not addressed in the 1997 B/CO or HMP. The actions were: 1) impacts to federally listed Contra Costa goldfields (newly discovered on former Fort Ord) during Ordnance and Explosives (OE)

removal actions and, 2) impacts to federally listed plants, during remediation of contaminated groundwater plumes within the UCSC Natural Reserve.

On March 30, 1999 the installation received a revised non-jeopardy B/CO that included a discussion of the impacts to Contra Costa goldfields from the OE removal project, and impacts to other listed plants resulting from groundwater remediation activities. The B/CO identified additional mitigation measures to be implemented during pre-disposal activities affecting Contra Costa goldfields and within the groundwater investigation and remediation areas.

There have been several meetings between the Army and the Service since 2000 to discuss the future of the Army's prescribed burn program that supports the investigation and removal of unexploded ordnance. An agreement was reached between the Service and the Strategic Management, Analysis, Requirements and Technology Team (SMART) during the December 14, 2000 meeting. The agreement allows the Army to proceed with several pre-disposal projects, and the transfer of parcels contained within "Track 0" designations and Finding of Suitability for Early Transfer (FOSET) documents 1, 2 and 3, as well as the Del Rey Oaks parcels. This agreement is based on the understanding that the Army would not transfer other undeveloped parcels containing maritime chaparral located along the western edge of the Multiple Range Area and within the Parker Flats area until the Service is satisfied that prescribed burns will continue in accordance with the HMP.

In 2001 the Army coordinated several projects with the Service to ensure compliance with the HMP and the March 30, 1999 B/CO. These projects included re-establishing and enhancing fuel-breaks within the Multiple Range Area, cutting Central Maritime Chaparral from several development parcels to support the removal of unexploded ordnance (UXO) adjacent to the City of Seaside, proposed demolition of Stilwell Hall and continuation of groundwater remediation. The Service provided concurrence that these projects were consistent with the HMP and B/CO.

In addition to the projects discussed above, the Army provided comments to the Service's proposed rule on designation of critical habitat for the Monterey and robust spineflowers. Comments on the proposed critical habitat designation were provided to the Service on April 13, 2001. On September 18, 2001 the Army requested the Service confirm the March 30, 1999 B/CO as the BO for critical habitat recently designated for the federally threatened Western snowy plover, and requested conference with the Service on the proposed critical habitat for Monterey and robust spineflowers.

Implementation of the HMP, Former Fort Ord

As required by the B/CO and the HMP, the Installation has submitted annual reports to the Service since 1994. The enclosed annual reports describe measures taken in 2002 to implement the requirements identified in the HMP. The following is a summary of the Army's HMP resource conservation and management accomplishments for 2002 as required by Chapter 3 of the HMP. The Annual Habitat Restoration and Monitoring Report for Former Fort Ord, Site 3 and the Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring

report describing restoration and monitoring activities on former Fort Ord are provided at Tab A and are summarized below:

1. Contaminated Soil Excavation

No maritime chaparral in designated Natural Resource Management Areas (NRMA) was disturbed as a result contaminated soil excavation in 2002. Excavation of lead contaminated soils from the development portions of Ranges 18 and 19 were excavated and removed during the fall of 2002. The excavated areas were recontoured and temporary erosion control measures are being installed until the removal of unexploded ordnance is complete. Exotic weed control within the previously excavated range areas and dirt roads has been conducted through an agreement with BLM to minimize the spread of invasive weeds including pampas grass. Excavation and removal of contaminated soils from the remainder of ranges in the Multi-Range Area is not expected to begin until 2004 following completion of additional evaluations to determine the extent of the contamination. Maritime chaparral within heavily disturbed habitat reserve areas will be restored following remediation and monitored to ensure a healthy recovery in accordance with Chapter 3 of the HMP.

2. Landfill Remediation

Approximately 20,000 cubic yards of soil was excavated and transported to the former Fort Ord landfill as a result of contaminated soil remediation work on the development portions of Ranges 18 and 19 in 2002. The last portion of the landfill was covered and 2 feet of clean soil was placed on top of the cover to support vegetation. In addition, several areas containing French broom and other invasive plants were treated with Roundup through an agreement with BLM in 2002.

3. Lead Remediation Site 3 (Beach Ranges)

In 1999 a Habitat Restoration and Monitoring Plan was completed by California Department of Parks and Recreation for the remediated and recontoured areas on the future Fort Ord Dunes State Park. Implementation of the plan has resulted in exceeding the HMP restoration requirement for Monterey spineflower, sand gilia and coast wallflower within the remediated ranges. In addition, monitoring of formerly occupied Smith's blue butterfly habitat impacted during the lead remediation activities resulted in the discovery of two re-occupied buckwheat areas. The Habitat Restoration and Monitoring Plan will continue to be implemented resulting in an annual planting average of 20,000 native plants throughout the 150-acre remediation and re-contoured area.

During the 2001 – 2002 planting season, a total of 22,417 native plants from nineteen species were planted in remediated and recontoured areas on the former beach ranges. Success rates for perennial plant species were excellent, with an overall average survival rate of approximately 80%. Survival rates for the two threatened and endangered annual plant species were also excellent; Monterey spineflower was 98% and sand gilia was 65%.

Invasive exotic plants were controlled by hand pulling and by applications of glyphosate (Round-up Pro®). The total amount of herbicide concentrate used on the dunes during fiscal year 2002 was 68 gallons.

4. Ordnance and Explosives (OE) Removal

Threatened and endangered species education classes were provided to 40 ordnance and explosive workers during 2002. In addition, tailgate briefings and site visits were conducted routinely with remediation and vegetation clearance contractors to ensure habitat protection measures were implemented in accordance with the HMP.

Habitat Checklists were completed for each OE site including fuel-breaks prior to cleanup activities. The habitat checklists identified existing HMP resources and flagged or marked sensitive species locations and habitats and provided specific directions on how to avoid unnecessary impacts to chaparral vegetation, wetlands, HMP species, and soil stability during the cleanup activities. Straw was applied to large areas where mineral soils were exposed as a result of OE excavations.

The Army re-established a system of fuel-breaks within the MRA by widening existing 15-20 foot wide access roads to a 45 to 50-foot wide clearance of vegetation. The fuel-break system was further enhanced to provide temporary primary and secondary control lines around Ranges 43 – 48 to support the proposed burned in 2002. Vegetation within the 45 – 50 fuel-breaks will be mowed annually to serve as both a fuel-break and access route into the MRA.

Through an agreement with BLM approximately 830 acres of former Fort Ord were spot treated with glyphosate (Round-up Pro®) to remove invasive weeds from Natural Resource Management Areas and some adjacent development parcels. Fifty-two gallons of Roundup concentrate were applied during fiscal year 2002.

Although no burning occurred in 2002, a total of 637 acres of maritime chaparral reserve area have been burned since 1994 to support the OE program. Approximately 150 acres of maritime chaparral located in future development areas has also been burned to support the OE program. There have been many successes and accomplishments this past year that will allow prescribed burning to occur in the future. An Interim Action Remedial Investigation / Feasibility Study (IA RI/FS) for Ranges 43-48, OE Site 16 and Range 30A was successfully completed on March 7, 2002. The U.S. Army, U.S. Environmental Protection Agency (EPA) and California Department of Toxic Substances Control (DTSC) subsequently signed the Record of Decision (ROD) in September 2002. The ROD enables the Army to conduct prescribed burns to clear the vegetation from these ranges and remove the ordnance and explosives.

The IA RI/FS and ROD included the preparation and coordination of several supporting documents and outreach efforts including a Vegetation Clearance Technical Memorandum, Site Specific Work Plan, Prescribed Burn Plan for Ranges 43 – 48, Fuel Break Enhancements, Voluntary Relocation Plan, Community Bulletins 1 – 4, IA RI/FS Proposed Plan and five public meetings. The four Community Bulletins were mailed to 50,000 households in our community

and the five public meetings provided community members the opportunity to obtain information about all aspects of the prescribed burn and OE cleanup and the opportunity to meet key decision makers and technical experts. Our extensive community outreach effort resulted in strong support for the prescribed burns by the vast majority of community members, local media, elected officials and regulators.

In addition to the IA RI/FS we completed studies and documentation that will be used in support of the Ordnance and Explosives Remedial Investigation and Feasibility Study (OE RI/FS). The OE RI/FS will evaluate all unexploded ordnance sites on former Fort Ord. Studies included an evaluation of ordnance removal techniques and vegetation clearance alternatives to be used during the remediation of unexploded ordnance at former Fort Ord. A Draft Final Technical Memorandum, Evaluation of Vegetation Clearance Methods, Ordnance and Explosives Remedial Investigation and Feasibility Study was issued on October 25, 2002. This Technical Memorandum will support the future decision documents for the OE RI/FS. The Evaluation of Vegetation Clearance Methods has identified the use of prescribed burns as the only method suitable for vegetation clearance at ordnance and explosive sites within Central Maritime Chaparral areas designated as natural resource management areas other than the limited use of manual and mechanical methods.

Following signature of the ROD (IA RI/FS) in September 2002, the Army closely monitored the weather forecasts for conditions that would meet our burn prescription. The burn prescription was developed to effectively burn the vegetation while minimizing smoke impacts to the community. The mobilization decision for the burn was required to be made three days in advance of the planned burn day in order to obtain necessary equipment and personnel and to conduct site preparation work. On November 16, 2002 the Army mobilized for a prescribed burn at Ranges 43-48 that was planned to occur on November 19, 2002. Unfortunately, the burn was cancelled on November 18, 2002 after the California Air Resources Board determined that November 19 was designated as a "no burn day" for the air basin because forecast weather conditions would create adverse smoke impacts. The decision to cancel the burn was difficult and the cost was over $700,000.00. However, the Army had always been prepared to cancel the burn if weather conditions on the day of the burn would not enable the smoke to effectively disperse. Our decision to cancel the burn in spite of the significant mobilization costs demonstrated to the community and regulatory agencies that the Army was committed to conducting the prescribed burns in a responsible manner that will minimize smoke impacts to the community. The cancellation significantly increased our credibility with the community, media and regulatory agencies and has resulted in significantly increased support for future burns.

Unfortunately, after 19 November, weather and site conditions failed to meet our burn prescription and we were forced to postpone burn plans until the next burn season, which lasts from 1 July to 31 December 2003. We are confident that we will successfully burn Ranges 43-48 at the first opportunity during the 2003-burn season. In the interim, we are developing ways to reduce the mobilization cost and time needed to mobilize, continuing community and media outreach and strengthening support from our regulatory team.

To date approximately 2,500 acres of vegetation has been manually/mechanically cleared to support OE investigations and removals. Approximately 1,200 of these acres were located in maritime chaparral and identified for future development. Approximately 120 of the total acres were located in maritime chaparral areas designated as habitat reserve areas.

5. Groundwater Remediation Project on University of California @ Santa Cruz Property

Several groundwater remediation and monitoring wells were installed in 2002. Remediation contractors completed biological clearances and were required to minimize impacts to federally endangered sand gilia and federally threatened Monterey spineflower and their habitat in the University of California Nature Reserve during investigations and monitoring of contaminated groundwater plumes. Groundwater wells were drilled and monitored within the University of California @ Santa Cruz Northern Reserve Area with minimal impacts to HMP species. Access roads and well areas that were impacted were monitored to determine impacts to sand gilia and Monterey spineflower populations within the UC Reserve. Changes in population numbers for both species appear to be consistent with the adjacent population trends.

POM and OMC ESMP Background

The ESMP for the POM was prepared for populations of Yadon's piperia (*Piperia yadoni*), a federally endangered orchid and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a plant on the California Native Society List 1B, that are found in undeveloped areas of the POM. Yadon's piperia was listed as endangered by the U.S. Fish and Wildlife Service (Service) on August 12, 1998. Hooker's manzanita is considered rare, threatened or endangered by the California Native Plant Society and could be a candidate for future listing.

An Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were completed for the ESMP and no comments were received during the 30-day public comment period. The ESMP was approved and signed by TRADOC Environmental and by the Installation's Staff Judge Advocate and Installation Commander in December 1999.

Implementation of the POM and OMC ESMP

Implementation of the ESMP began with the installation of signs identifying the endangered species site that is located adjacent to Building 630 on the POM. The signs were designed to prevent impacts to the plants. In addition to signs, color educational brochures were developed that contain pictures and descriptions of the endangered Yadon's piperia as well as ways to reduce impacts to the population (Tab B1). The brochures were distributed in 2001 and 2002 to soldiers living adjacent to the protected Yadon's piperia population. The population has been monitored in 1995, 1998, 2000, 2001 and 2002. The largest extent of the population totaled 150 plants in 1998. Eighty-three plants were identified during surveys on June 25 and 27 of 2002 (Tab B2).

No human impacts or evidence of deer browsing on the protected plants were observed as a result of monitoring conducted in 2002. This is considered the third year of monitoring since

the ESMP was finalized in 1999 and the results serve as the baseline for the population adjacent to Building 630. Monitoring of the population will continue in accordance with the POM ESMP.

In January and August of 2002 a landscape contractor was hired to hand pull a population of French broom from within the endangered species site adjacent to Building 630. The work resulted in the removal of invasive French broom throughout approximately 4 acres of the endangered species site. French broom will continue to re-appear annually since the plant is very persistent and the seed can survive in the soil for more than 30 years. Removal of French broom will occur annually through implementation of the ESMP.

In addition to monitoring and weed control actions taken within the endangered plant site, several additional "Endangered Species Site" signs were posted to ensure the boundaries of the protected area remains clearly visible from adjacent trails to prevent unauthorized access. On August 22, 2002 two outdoor bulletin boards were constructed and installed and the educational brochures identifying the endangered species site were posted to provide more information to the soldiers and staff that utilize the network of trails that occur throughout the endangered species site. Monitoring of the population, control of French broom and the education program will continue in 2003.

Implementation of the POM and OMC Integrated Natural Resources Management Plan (INRMP)

The INRMP for the POM and OMC was signed by the Installation Commander, TRADOC Engineer, the U.S. Fish and Wildlife Service and California Department of Fish and Game in the fall of 2001.

In 2001 the POM received funding from TRADOC to implement a Pitch Canker Control Program at the POM and Ord Military Community (OMC). Two hundred and sixty-seven Monterey pine trees severely diseased or dying from Pitch Canker were removed from the POM and the OMC. In addition, 192 Monterey pine trees were trimmed to reduce disease infections to attempt to control the spread of the disease. This aggressive maintenance and removal program continued into 2002. There were three tangible results of this Pitch Canker Program: 1) No damage to buildings, cars or power lines occurred as a result of fallen trees or branches during the recent winter storms; 2) the health of diseased trees that were trimmed instead of removed appeared to be improving, and: 3) the spread of Pitch Canker Disease seems to have slowed. The trees trimmed and removed ranged in size from 6 inches to over 34 inches in diameter at breast height and, from 15 feet to over 85 feet in height.

Also, in 2001 two-hundred and seventy-seven Monterey pine seedlings from native Monterey pine stock were planted at the Presidio to replace most of the trees removed. Unfortunately the plantings had a high rate of mortality in 2002 due to a dry winter and damage caused during grounds maintenance. Approximately 80 seedlings have survived the first full year since planting. We will continue with the planting program as funds become available and future restoration will be modified to prevent unnecessary mortality as much as possible by

planting larger plants (5 gallon) rather than seedlings and the plants will be protected to ensure grounds maintenance crews recognize the trees.

INRMP guidelines to promote conservation of natural resources at the POM and OMC were implemented in 2002. Construction projects on the POM including the General Instruction Facility III, Barracks Addition and New Barracks, Video Teleconferencing Center and several parking lots initiated in 2002 incorporated conservation measures to reduce unnecessary impacts to natural resources from construction. Landscape recommendations were also incorporated to prevent introducing non-native invasive species and to use trees and shrubs adapted to the local climate to reduce the need for irrigation.

Incidental Take

No incidental take of federally listed species including the Smith's blue butterfly or western snowy plover occurred in 2002 as a result of the Army's ongoing pre-disposal actions.

Summary of Land Transfers at Former Fort Ord

A total of 772.3 acres of land on the former Fort Ord designated as development was transferred to the Cities of Marina and Seaside and to the California State University – Monterey Bay in 2002. The transferred properties are located in areas already developed and do not contain resource or conservation requirements. To date, the Army has transferred 11,512.9 acres of former Fort Ord. Seven thousand - nine hundred and fifteen acres were transferred to agencies responsible for managing the land as habitat reserves. The remaining 3,534.5 acres were transferred as development parcels to local agencies.

Representatives from POM Directorate Environmental and Natural Resources and the Base Realignment and Closure office attend monthly Coordinated Resource Management Planning (CRMP) meetings. The CRMP is comprised of agency representatives that have or will receive former Fort Ord lands with HMP responsibilities. The Service and California Department of Fish and Game also attend the monthly CRMP meetings. The purpose of the CRMP is to share information, resources, and assist agencies in the development of plans and monitoring protocols to facilitate implementation of the HMP.

Coordination with the Service in 2002

On April 18, 2002 the Army notified the Service of an incident that resulted in the removal of approximately 55 coast live oak trees and 130 shaggy bark manzanita shrubs during a survey project on a portion of former Fort Ord. Although the incident resulted in impacts that exceeded the constraints allowing early access, the Service agreed that the project could be completed to support the development of environmental documentation for the future golf course project (First Tee Project).

On May 30, 2002 the Army requested the Service consider the September 18, 2001 request for conference a request for formal consultation to address the Army's effects on Monterey spineflower critical habitat.

In June 2002 the Service concurred with a land use modification proposed by the Army, Fort Ord Reuse Authority, Monterey Peninsula College and Monterey County. The concurrence was based on the ability to achieve no net loss of HMP species through the implementation of several conditions outlined in the May 2002 Land Use Modification Assessment prepared by Zander Associates. The agreements required to support the land use modifications are being prepared and are to be finalized in 2003.

On August 13, 2002 the Army submitted a request for Service concurrence that fuel-breaks surrounding Ranges 43 – 48 and Fitch Park Housing Area could be widened beyond the existing 45-foot wide fuel break system. The widening was necessary in order to ensure a prescribed fire within the confines of these ranges could be contained. On August 28, 2002 the Service provided their concurrence that the proposed project was consistent with the HMP.

On October 22, 2002 the Service issued the Biological Opinion on the Closure and Reuse of Fort Ord, Monterey County, California, as it affects Monterey Spineflower Critical Habitat. (1-8-01-F-70R). The opinion allows the Army to continue to implement the HMP including predisposal actions that may affect designated Monterey spineflower critical habitat. The BO also confirms the adoption of the March 30, 1999 BiCO as the biological opinion for western snowy plover critical habitat.

On November 25, 2002 the Army submitted comments to the proposed designation of critical habitat for the endangered Contra Costa goldfields. Although the rule has not been finalized we believe the final rule will designate critical habitat only in areas of former Fort Ord that have been identified as future development parcels consistent with the approved HMP.

Conclusions

The HMP for former Fort Ord and the ESMP for the POM and OMC are being fully implemented. Several ordnance and explosive removal sites have been monitored for five years following remediation. Results of the monitoring indicate that the habitat and HMP species are recovering consistent with normal plant succession. Although habitat monitoring will continue at several sites, habitat monitoring at OE Sites 10A, 10B, 19 are complete and no further monitoring is required.

The Army continues to implement the terms and conditions of the biological opinions as well as the resource and conservation management requirements set forth in the HMP for the former Fort Ord.

Annual Endangered Species Management Plan (ESMP) Review
Presidio of Monterey and Ord Military Community
February 17, 2004

ESMP Background

Army Regulation 200-3 (Natural Resources – Land, Forest and Wildlife Management) requires the development and implementation of an ESMP that addresses listed and proposed, threatened and endangered species, or critical habitat present on the installation.

The Presidio of Monterey ESMP was prepared to address populations of Yadon's piperia (*Piperia yadoni*), a federally endangered orchid and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a rare shrub listed by the California Native Society, both of which are found in undeveloped areas of the Presidio of Monterey. The U.S. Fish and Wildlife Service (Service) listed Yadon's piperia as an endangered species on August 12, 1998. Critical habitat has not been designated. Hooker's manzanita is considered rare, threatened or endangered by the California Native Plant Society and may be a candidate for future federal or State listing. Although Hooker's manzanita is not federally listed, it is included in the ESMP in the event the Service lists it in the future. At this time, the Army is not obligated to implement management or conservation recommendations for Hooker's manzanita.

An Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were completed and the ESMP was approved and signed by TRADOC Environmental, the Installation Staff Judge Advocate, and Installation Commander in December 1999.

ESMP Implementation

Implementation of the ESMP began with the posting of signs around an endangered species site located adjacent to Building 630. The signs state, "ENDANGERED SPECIES SITE", "DO NOT DISTURB," and "RESTRICTED ACTIVITY." The signs are posted to ensure the boundaries of the protected area remains clearly visible from adjacent trails and to prevent unauthorized access into the habitat area supporting the endangered plants. In addition to signs, color educational brochures were developed that contain pictures and descriptions of the endangered Yadon's piperia as well as describing ways to reduce impacts to the population (Tab A). The brochures were distributed in 2001, 2002, and 2003 to soldiers living adjacent to the protected Yadon's piperia population. The population has been monitored in 1995, 1998, 2000, 2001, 2002 and 2003. The largest extent of the population totaled 209 flowering plants in June 2003 (Tab B).

No human impacts or evidence of deer browsing on the protected plants were observed as a result of monitoring conducted in 2003. This is considered the fourth year of monitoring since the ESMP was finalized in 1999 and the results serve to further define the

population baseline. Monitoring of the population will continue in accordance with the POM ESMP.

In August of 2003 a landscape contractor was hired to remove several piles of fallen pine branches and several large Monterey pine trees that were cut down due to safety reasons. The removal of the debris will further enhance the potential habitat surrounding the endangered plant population adjacent to Building 630. In 2002 invasive French broom was removed throughout approximately 4 acres of the endangered species site. French broom will continue to re-appear annually since the plant is very persistent and the seed can survive in the soil for more than 30 years. Removal of French broom will continue to occur through implementation of the ESMP.

In addition to posting signs, plant monitoring, and weed control actions on August 22, 2002 two outdoor bulletin boards were constructed and installed. Educational brochures identifying the endangered species site are displayed on the bulletin boards to provide more information to the soldiers and staff that utilize the network of trails that occur throughout the endangered species site. Monitoring of the population, control of French broom, and the education program will continue in 2004.

Integrated Natural Resources Management Plan (INRMP) Background

As authorized by Congress in the Sikes Act (16 U.S.C. 670a *et. Seq.*) as amended, and by Army Regulation 200-3 (Natural Resources – Land, Forest and Wildlife Management) the Army is required to develop and maintain an INRMP that provides for the protection and management of natural resources. The INRMP is prepared, implemented, and monitored by natural resources management professionals. The plan is intended to be a component and supporting element of the Installation Master Plan.

The INRMP is designed to guide the management of natural resources at the Presidio of Monterey and the Ord Military Community. The INRMP was coordinated with the City of Monterey, TRADOC, Service, and California Department of Fish and Game.

On March 3, 2001 an Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were published in the Monterey County Herald. In the fall of 2001 the plan was approved by the Installation Commander, TRADOC Engineer, Service, and California Department of Fish and Game.

Implementation of the INRMP

In 2001 the POM received funding from TRADOC to implement a Pitch Canker Control Program at the POM and OMC. Two hundred and sixty-seven Monterey pine trees severely diseased or dying from Pitch Canker were removed from the POM and the OMC. In addition, 192 Monterey pine trees were trimmed to reduce disease infections in an to attempt to control the spread of the disease. This aggressive maintenance and removal program has continued with services provided by the City of Monterey Parks Division. There are three tangible results of this Pitch Canker Program: 1) No damage to

buildings, cars or power lines occurred as a result of fallen trees or branches during the recent winter storms; 2) the health of diseased trees that were trimmed instead of removed appeared to be improving, and; 3) the spread of Pitch Canker Disease seems to have slowed. The trees trimmed and removed range in size from 6 inches to over 34 inches in diameter at breast height and, from 15 feet to over 85 feet in height.

Also, in 2001 the City of Monterey Parks Division planted two hundred and seventy-seven Monterey pine seedlings from native Monterey pine stock to replace most of the trees removed from the POM. Unfortunately the plantings had a high rate of mortality in 2002 due to a dry winter and damage caused during grounds maintenance. Approximately 80 seedlings have survived since the planting. We will continue with the planting program as funds become available. Future plantings will be modified to prevent unnecessary mortality as much as possible by planting larger plants (5 gallon) rather than seedlings and the plants will be protected to ensure grounds maintenance crews and casuals recognize the saplings.

INRMP guidelines to promote conservation of natural resources at the POM and OMC were implemented in 2003. Although construction several projects initiated on the POM including the new barracks resulted in the removal of undeveloped Monterey pine forest, the loss was mitigated through the previous establishment of Huckleberry Hill Nature Preserve and other conservation measures described in the Military Construction Environmental Assessment. These measures include reducing unnecessary impacts to natural resources during the construction and the use of native species in the landscape plan to prevent the introduction of non-native invasive species and to encourage the use of trees and shrubs adapted to the local climate and reduce the need for irrigation. The City of Monterey continues to trim and remove trees as necessary using certified arborists to ensure the urban forestry work occurs using the best management practices identified in the INRMP.

Conclusions

The INRMP / ESMP for the POM and OMC are being fully implemented. The Army continues to implement the management and conservation recommendations identified in the INRMP / ESMP.

Annual Endangered Species Management Plan (ESMP) Review
Presidio of Monterey (POM) and Ord Military Community (OMC)
January 21, 2005

POM and OMC ESMP Background

The ESMP for the POM was prepared for populations of Yadon's piperia (*Piperia yadoni*), a federally endangered orchid and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a plant on the California Native Society List 1B, that are found in undeveloped areas of the POM. Yadon's piperia was listed as endangered by the U.S. Fish & Wildlife Service on August 12, 1998. Hooker's manzanita is considered rare, threatened or endangered by the California Native Plant Society and could be a candidate for future listing.

An Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were completed for the ESMP and no comments were received during the 30-day public comment period. The ESMP was approved and signed by TRADOC Environmental, the Installation's Staff Judge Advocate, and Installation Commander in December 1999.

Implementation of the POM and OMC ESMP

Implementation of the ESMP began with the installation of interpretive signs identifying the endangered species site that is located adjacent to Building 630 on the POM. The signs were designed to prevent impacts to the plants. In addition to the posting of endangered species site signs, color educational brochures were developed that contain pictures and descriptions of the endangered Yadon's piperia as well as ways to reduce impacts to the population (Tab A). The brochures have been distributed to soldiers living adjacent to the protected Yadon's piperia population since 2001. The population has been monitored in 1995, 1998, 2000, 2001, 2002, 2003 and 2004. The largest extent of the population totaled 209 flowering plants in June 2003. Results of the 2004 survey identified 83 flowering Yadon's piperia in (Tab B).

No human impacts were observed within the endangered species site. However, three flowering Yabdon's piperia were observed to show evidence of deer browsing in 2004. This is considered the fifth year of monitoring since the ESMP was finalized in 1999 and the results serve to further define the area where the plants occur adjacent to Building 630. Monitoring of the population will continue in accordance with the POM ESMP.

In addition to monitoring of the endangered plant population, "Endangered Species Site" signs are posted to ensure the boundaries of the protected area remains clearly visible from adjacent trails to prevent unauthorized access. On August 22, 2002 two outdoor bulletin boards were constructed and installed. Educational brochures identifying the

endangered species site are posted on these outdoor bulletin boards to provide more information to the soldiers and staff that utilize the network of trails that occur throughout the endangered species site. Monitoring of the endangered species population, control of French broom and continuation of the awareness program will continue in 2005.

Implementation of the POM and OMC Integrated Natural Resources Management Plan (INRMP)

The Installation Commander, TRADOC Engineer, the Service, and CDFG signed the POM/OMC INRMP in the fall of 2001.

In 2001 the POM received funding from TRADOC to implement a Pitch Canker Control Program at the POM and OMC. Two hundred and sixty-seven Monterey pine trees severely diseased or dying from Pitch Canker were removed from the POM and the OMC. In addition, 192 Monterey pine trees were trimmed to reduce disease infections in a attempt to control the spread of the disease. This aggressive maintenance and removal program continued into 2002. There were three tangible results of this Pitch Canker Program: 1) No damage to buildings, cars or power lines occurred as a result of fallen trees or branches during the recent winter storms; 2) the health of diseased trees that were trimmed instead of removed appeared to be improving, and; 3) the spread of Pitch Canker Disease seems to have slowed. The trees trimmed and removed ranged in size from 6 inches to over 34 inches in diameter at breast height and, from 15 feet to over 85 feet in height.

Also, in 2001 the City of Monterey Parks Division planted two hundred and seventy-seven Monterey pine seedlings from native Monterey pine stock to replace most of the trees removed from the POM. Unfortunately the plantings had a high rate of mortality in 2002 due to a dry winter and damage caused during grounds maintenance. Approximately 80 seedlings have survived the first full year since planting. We will continue with the planting program as funds become available. Future plantings will be modified to prevent unnecessary mortality as much as possible by planting larger plants (5 gallon) rather than seedlings and the plants will be protected to ensure grounds maintenance crews and soldiers recognize the saplings.

INRMP guidelines to promote conservation of natural resources at the POM and OMC were implemented in 2003. Construction projects initiated on the POM including the General Instruction Facility III, Barracks Addition and New Barracks, Video Teleconferencing Center and several parking lots incorporated conservation measures to reduce unnecessary impacts to natural resources from construction.

Landscape recommendations continue to be provided and incorporated into MILCON and Installation projects to prevent the introduction of non-native invasive species and to encourage the use of trees and shrubs adapted to the local climate and reduce the need for irrigation. The City of Monterey continues to trim and remove trees as necessary using certified arborists to ensure the urban forestry work occurs using the best management practices identified in the INRMP.

In August of 2004 a landscape contractor was hired to remove infestations of French broom (*Genista monspessulana*). The invasive weed control project resulted in habitat improvement of approximately 7 acres of Monterey pine forest and grassland habitat. French broom will continue to re-appear annually since the plant is very persistent. The seed can survive in the soil for more than 30 years. Removal of French broom will continue to occur annually through implementation of the ESMP and the INRMP.

Coordination with the U.S. Fish and Wildlife Service in 2004

On July 29, 2004 the Presidio of Monterey forwarded a request for concurrence to the U.S. Fish and Wildlife Service. The Installation requested concurrence with the Presidio of Monterey's determination that repair of a failed storm water outfall located on west of State Highway 1 would not likely result in adverse affects to federally threatened Monterey spineflower (*Chorizanthe pungens* var. *pungens*) or to the federally threatened Western snowy plover (*Charadrius alexandrius nivosus*) or their respective critical habitats. Repairs to the outfalls were completed before the onset of significant winter rains in 2004. The storm water outfall that discharges run-off from the OMC is functioning as designed.

Conclusions

The Army continues to implement the best management and conservation measures described in the approved INRMP/ESMP. The INRMP/ESMP are scheduled to be revised in November 2006.

Annual Endangered Species Management Plan (ESMP) Review
2005
Presidio of Monterey (POM) and Ord Military Community (OMC)
January 30, 2006

POM and OMC ESMP Background

The ESMP for the POM was prepared for populations of Yadon's piperia (*Piperia yadoni*), a federally endangered orchid and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a plant on the California Native Plant Society List 1B, that are found in undeveloped areas of the POM. Yadon's piperia was listed as endangered by the Service on August 12, 1998. Hooker's manzanita is considered rare and endangered in California by the Native Plant Society and could be a candidate for future listing.

An Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were completed for the ESMP and no comments were received during the 30-day public comment period. The ESMP was approved and signed by TRADOC Environmental, the Installation's Staff Judge Advocate, and Installation Commander in December 1999.

Implementation of the POM and OMC ESMP

Implementation of the ESMP began with the installation of interpretive signs identifying the endangered species site that is located adjacent to Building 630 on the POM. The signs were designed to prevent impacts to the plants. In addition to the posting of endangered species site signs, color educational brochures were developed that contain pictures and descriptions of the endangered Yadon's piperia as well as ways to reduce impacts to the population (Tab A). The brochures have been distributed to soldiers living adjacent to the protected Yadon's piperia population since 2001.

The population has been monitored in 1995, 1998, and each year from 2000 through 2005. In 2005, the POM contracted services for a flora and fauna baseline survey of the POM. The final report entitled "*Habitat Assessment Report – Flora and Fauna Baseline Study of the Presidio of Monterey, California (MACTEC Engineering and Consulting, Inc. 2005)*" provides a qualitative and quantitative analysis with emphasis on special-status species that are considered threatened, endangered or rare. The survey provides an update of baseline data documented in the "*Flora and Fauna Baseline Study of the Presidio of Monterey, California (Jones & Stokes, Inc. 1995).*" Survey observations found the greatest concentration of the Yadon's piperia population continue to occur in the southern and south-central regions (see Plate 4, Area 1) of the POM (362 plants). In addition, the survey documented this species' presence (65 plants) in locations farther to the southwest than where populations were previously detected (see Plate 4, Area 3). Results of the 2005 survey observed a total of 428 Yadon's piperia plants with 345 flowering.

The 2005 survey noted some trampling of the Yadon's piperia in Area 1 apparently from hikers venturing off the marked trail, despite the existence of multiple informational signs posted advising hikers of the plant's presence and use restriction. This is considered the sixth year of monitoring since the ESMP was finalized in 1999 and the results serve to further define the area where the plants occur. Monitoring of the population will continue in accordance with the POM ESMP.

In addition to monitoring of the endangered plant population, "Endangered Species Site" signs are posted to ensure the boundaries of the protected area remains clearly visible from adjacent trails to prevent unauthorized access. On August 22, 2002 two outdoor bulletin boards were constructed and installed. Educational brochures identifying the endangered species site are posted and maintained on these outdoor bulletin boards to provide more information to the soldiers and staff that utilize the network of trails that occur throughout the endangered species site. Monitoring of the endangered species population, control of French broom and continuation of the awareness program will continue in 2006.

Implementation of the POM and OMC Integrated Natural Resources Management Plan (INRMP)

The Installation Commander, TRADOC Engineer, the Service, and CDFG signed the POM/OMC INRMP in the fall of 2001.

In 2001 the POM received funding from TRADOC to implement a Pitch Canker Control Program at the POM and OMC. Two hundred and sixty-seven Monterey pine trees severely diseased or dying from Pitch Canker were removed from the POM and the OMC. In addition, 192 Monterey pine trees were trimmed to reduce disease infections in a to attempt to control the spread of the disease. This aggressive maintenance and removal program continued into 2002. There were three tangible results of this Pitch Canker Program: 1) No damage to buildings, cars or power lines occurred as a result of fallen trees or branches during the recent winter storms; 2) the health of diseased trees that were trimmed instead of removed appeared to be improving, and; 3) the spread of Pitch Canker Disease seems to have slowed. The trees trimmed and removed ranged in size from 6 inches to over 34 inches in diameter at breast height and, from 15 feet to over 85 feet in height.

Also, in 2001 the City of Monterey Parks Division planted two hundred and seventy-seven Monterey pine seedlings from native Monterey pine stock to replace most of the trees removed from the POM. Unfortunately the plantings had a high rate of mortality in 2002 due to a dry winter and damage caused during grounds maintenance. Approximately 80 seedlings have survived. We will continue with the planting program as funds become available. Future plantings will be modified to prevent unnecessary mortality as much as possible by planting larger plants (5 gallon) rather than seedlings and the plants will be protected to ensure grounds maintenance crews and soldiers recognize the saplings.

INRMP guidelines to promote conservation of natural resources at the POM and OMC were implemented in 2003. Construction projects initiated on the POM including the General Instruction Facility III, Barracks Addition and New Barracks, Video Teleconferencing Center and several parking lots incorporated conservation measures to reduce unnecessary impacts to natural resources from construction.

Landscape recommendations continue to be provided and incorporated into MILCON and Installation projects to prevent the introduction of non-native invasive species and to encourage the use of trees and shrubs adapted to the local climate and reduce the need for irrigation. The City of Monterey continues to trim and remove trees as necessary using certified arborists to ensure the urban forestry work occurs using the best management practices identified in the INRMP.

In August of 2004 and 2005, a landscape contractor was hired to remove infestations of French broom (*Genista monspessulana*) from the POM. The invasive weed control project resulted in habitat improvement of approximately 7 acres of Monterey pine forest and grassland habitat in 2004 and an additional 6.4 acres in 2005. French broom will continue to re-appear annually since the plant is very persistent. The seed can survive in the soil for more than 30 years. Removal of French broom will continue to occur annually through implementation of the ESMP and the INRMP as funds are made available.

In August 2005 the installation Natural Resources Specialist position in the Environmental Division was vacated. It is expected that the vacant position will be filled in 2006. Environmental staff will continue to oversee INRMP implementation while efforts to fill the vacant position continue.

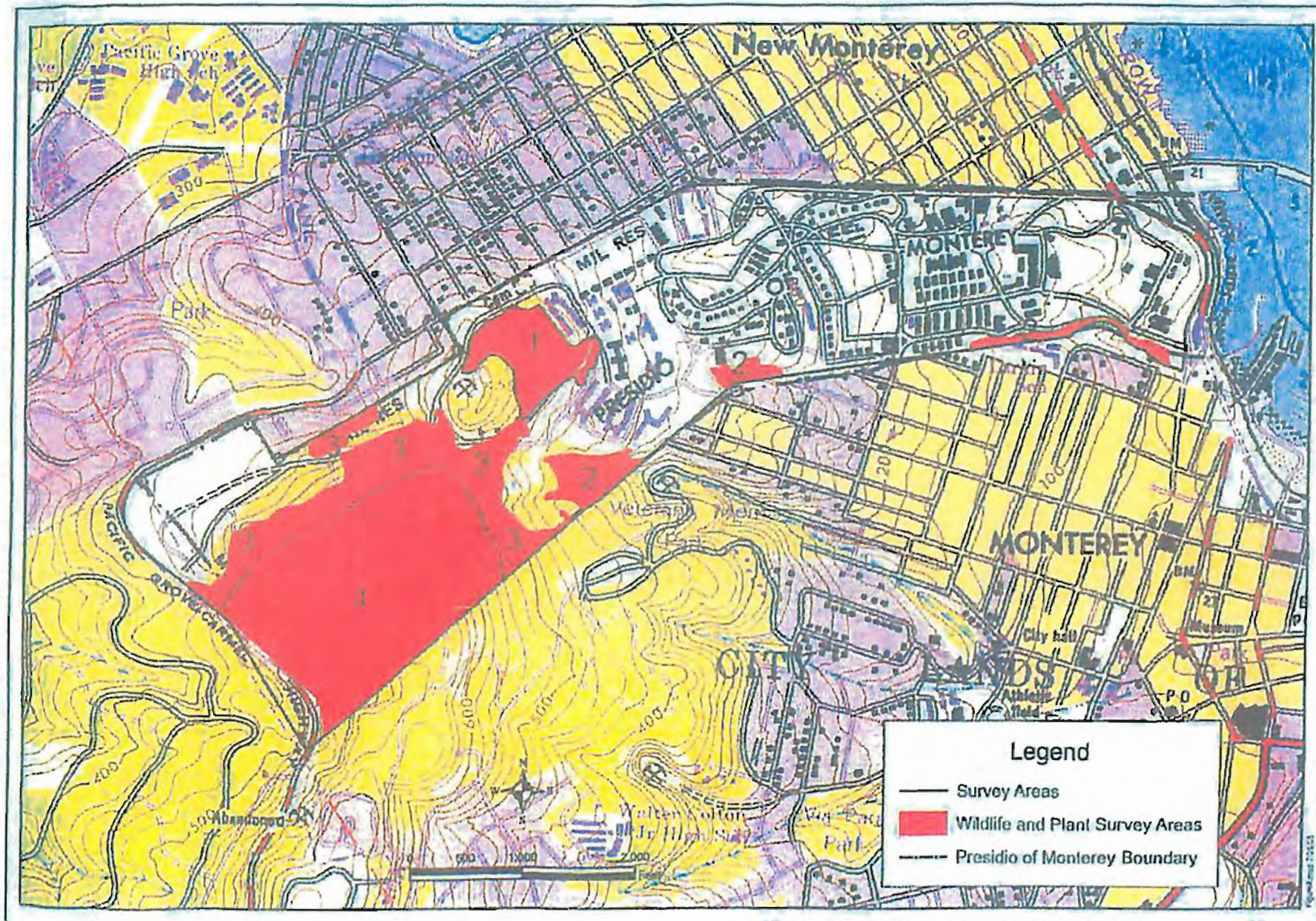
Coordination with the U.S. Fish and Wildlife Service

On July 29, 2004 the Presidio of Monterey forwarded a request for concurrence to the U.S. Fish and Wildlife Service. The Installation requested concurrence with the Presidio of Monterey's determination that repair of a failed storm water outfall owned by the POM that traverses across BRAC lands of the former Fort Ord, would not likely result in adverse affects to federally threatened Monterey spineflower (*Chorizanthe pungens* var. *pungens*) or to the federally threatened Western snowy plover (*Charadrius alexandrius nivosus*) or their respective critical habitats. Repairs to the outfalls were completed before the onset of significant winter rains in 2004. The storm water outfall that discharges run-off from the OMC is functioning as designed.

Rainfall in 2005 again caused damage to the storm water outfall located on the west of State Highway 1. Damage occurred to the area previously repaired in 2004 under the July 29, 2004 installation determination. Outfall repair scope of work and area of potential effect was unchanged from the initial 2004 coordination with USFWS and no further written consultation was necessary. Repair work is scheduled for completion in January 2006.

Conclusions

The Army continues to implement the best management and conservation measures described in the approved INRMP/ESMP. The INRMP/ESMP are scheduled to be revised in November 2006.



MACTEC Survey Areas at the Presidio of Monterey
Monterey, California

4

Annual Endangered Species Management Plan (ESMP) Review
2006
Presidio of Monterey (POM) and Ord Military Community (OMC)
February 13, 2007

POM and OMC ESMP Background

The ESMP for the POM was prepared for populations of Yadon's piperia (*Piperia yadoni*), a federally endangered orchid and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a plant on the California Native Society List 1B, that are found in undeveloped areas of the POM. Yadon's piperia was listed as endangered by the US Fish and Wildlife Service on August 12, 1998. Hooker's manzanita is considered rare, threatened or endangered by the California Native Plant Society and could be a candidate for future listing.

An Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were completed for the ESMP and no comments were received during the 30-day public comment period. The ESMP was approved and signed by TRADOC Environmental, the Installation's Staff Judge Advocate. and Installation Commander in December 1999.

Implementation of the POM and OMC ESMP

Conservation goals for Yadon's piperia are "to maintain the two existing POM populations and to protect these populations from impacts during use of nearby obstacle/orienteering course." Habitat management actions to meet the conservation goals are as follows:

a) Institute an annual monitoring program to record changes in population over time and to facilitate development of corrective measures, if required.
b) Protect existing populations for foot traffic by installing warning signs, instituting an awareness program and fencing if necessary.
c) Remove non-native plant species from documented habitat and from potential habitat areas.
d) Monitoring deer browsing. Cage individual plants to protect them from browsing, if necessary.
e) Establish a propagation and planting program to augment existing populations (optional).

Implementation of the ESMP began with the installation of interpretive signs identifying the endangered species site that is located adjacent to Building 630 on the POM. The signs were designed to prevent foot traffic impacts to the plants and provide a visual aid to communicate significance of the site. In addition to the posting of endangered species site signs, color educational brochures were developed that contain pictures and descriptions of the endangered Yadon's piperia as well as ways to reduce impacts to the

population (Enclosure 1). The brochures have been distributed to soldiers living adjacent to the protected Yadon's piperia population since 2001. In addition to brochures, "Endangered Species Site" signs are posted to ensure the boundaries of the protected area remains clearly visible from adjacent trails to prevent unauthorized access. On August 22, 2002 two outdoor kiosk/bulletin boards were constructed and installed (Enclosure 2). Educational brochures identifying the endangered species site are posted and maintained on these outdoor bulletin boards to provide more information to the soldiers and staff that utilize the network of trails that occur throughout the endangered species site.

The population has been monitored in 1995, 1998, and each year from 2000 through 2005. In 2005, the POM contracted services for a flora and fauna baseline survey of the POM. The final report entitled "*Habitat Assessment Report – Flora and Fauna Baseline Study of the Presidio of Monterey, California (MACTEC Engineering and Consulting, Inc. 2005)*" provides a qualitative and quantitative analysis with emphasis on special-status species that are considered threatened, endangered or rare. The survey provides an update of baseline data documented in the "*Flora and Fauna Baseline Study of the Presidio of Monterey, California (Jones & Stokes, Inc. 1995).*" Survey observations found the greatest concentration of the Yadon's piperia population continue to occur in the southern and south-central regions of the POM (362 plants). In addition, the survey documented this species' presence (65 plants) in locations farther to the southwest than where populations were previously detected. Results of the 2005 survey observed a total of 428 Yadon's piperia plants with 345 flowering. Monitoring of the endangered species population, control of invasive plant species, and continuation of the awareness program will continue in 2007.

The 2005 survey noted some trampling of the Yadon's piperia in Area 1 apparently from hikers venturing off the marked trail, despite the existence of multiple informational signs posted advising hikers of the plant's presence and use restriction. This survey represented the sixth year of monitoring since the ESMP was finalized in 1999 and the results serve to further define the area where the plants occur.

A conservation goal of this ESMP is to avoid impacts to the Yadon's piperia populations near the obstacle/orienteering course during training. In November 2006, all obstacle course structures were removed from the site for safety related reasons. Prior to removal of the wood constructed obstacles (Photos #1-7). the area was delineated with ribbons to establish worker/equipment boundaries (Photos #8-10) and minimize ground disturbance. Both hand tools and mechanical equipment methods were employed in removing the heavy timber structures. An existing road parallel to the project site was utilized as the equipment staging area (Photo #11). The obstacle course removal project resulted in the removal of structures from within the Monterey pine forest, partial restoration of the open space area, and will benefit from reduction of foot traffic in the immediate area associated with use of the course (Photos #12-14). No future plans currently exist for replacement of the course. The existing adjacent beach type volleyball court (Photo # 15) remains in use. Monitoring of the area where the obstacle course was removed and the volleyball court activities will continue to minimize foot traffic.

Implementation of the POM and OMC Integrated Natural Resources Management Plan (INRMP)

The Installation Commander, TRADOC Engineer, the Service, and CDFG signed the POM/OMC INRMP in the fall of 2001.

In 2001 the POM received funding from TRADOC to implement a Pitch Canker Control Program at the POM and OMC. Two hundred and sixty-seven Monterey pine trees severely diseased or dying from Pitch Canker were removed from the POM and the OMC. In addition, 192 Monterey pine trees were trimmed to reduce disease infections in an attempt to control the spread of the disease. This aggressive maintenance and removal program continued into 2002. There were three tangible results of this Pitch Canker Program: 1) No damage to buildings, cars or power lines occurred as a result of fallen trees or branches during the recent winter storms; 2) the health of diseased trees that were trimmed instead of removed appeared to be improving, and; 3) the spread of Pitch Canker Disease seems to have slowed. The trees trimmed and removed ranged in size from 6 inches to over 34 inches in diameter at breast height and, from 15 feet to over 85 feet in height.

Also, in 2001 the City of Monterey Parks Division planted two hundred and seventy-seven Monterey pine seedlings from native Monterey pine stock to replace most of the trees removed from the POM. Unfortunately the plantings had a high rate of mortality in 2002 due to a dry winter and damage caused during grounds maintenance. Approximately 80 seedlings have survived. We will continue with the planting program if required and as funds become available. Future plantings will be modified to prevent unnecessary mortality as much as possible by planting larger plants (5 gallon) rather than seedlings and the plants will be protected to ensure grounds maintenance crews and soldiers recognize the saplings.

INRMP guidelines to promote conservation of natural resources at the POM and OMC were implemented in 2003. Construction projects initiated on the POM in 2006 included expansion of the Dental Clinic (building number 422), while at the OMC the long-term Military Housing Privatization Initiative (also known as the Residential Communities Initiative) project that began in 2005 continues on the development parcels leased to the private sector for improving and constructing military family housing. The project includes demolition of and replacement of approximately 1580 housing units over a ten (10) year period and incorporates conservation measures to reduce unnecessary impacts to natural resources from construction.

Landscape recommendations continue to be provided and incorporated into Military Construction (MILCON) and installation projects to prevent the introduction of non-native invasive species, to encourage the use of trees and shrubs adapted to the local climate, and reduce the need for irrigation. The City of Monterey continues to trim and remove trees as necessary using certified arborists to ensure the urban forestry work occurs using the best management practices identified in the INRMP.

In August 2005 the installation Natural Resources Specialist position in the Environmental Division was vacated. Recruitment for the position was delayed in 2006 due to an Army-wide hiring freeze as a result of a funding shortfall in the Department of Defense budget. A hiring exception was approved in September 2006 by our headquarters at the Installation Management Agency and in the Fall of 2006 the recruitment process was reinitiated. It is expected that the installation will be successful at recruiting a replacement program manager in 2007. The Environmental Division will continue all natural resource management responsibilities to oversee INRMP and ESMP implementation in the interim.

In September 2006, a landscape contractor was hired to remove infestations of French broom (*Genista monspessulana*) and Pampas Grass (*Cortaderia jubata)* at the POM (Photo #16). The invasive weed control project resulted in habitat improvement of approximately 6.4 acres of Monterey pine forest and grassland habitat. French broom will continue to re-appear annually since the plant is very persistent. The seed can survive in the soil for more than 30 years. Removal of French broom will continue to occur annually through implementation of the ESMP and the INRMP as funds are made available.

Following the events of 11 September 2001 and the subsequent Global War on Terrorism there has been an increased requirement for foreign language proficient individuals in the military services. As a result, resident student enrollment projections for the next five years at the Defense Language Institute Foreign Language Center is anticipated to increase substantially with as many as 860 new faculty members and language instructors. Student population growth will exceed the capacity of the current facilities and as such, the Army proposes to construct three General Instruction Buildings over the next three years to overcome facility constraints. In fiscal year 2008 the POM proposes to construct one General Instruction Building (GIB) south of Cpl Evans Road and east of West Franklin Street in an area classified as semi-improved. Parking would be located just to the east of this facility with a second lot to the north. Proposed location of the two remaining GIBs, proposed for construction years FY09 and FY10, are on the developed footprint of the existing NCO barracks (buildings 550-553) east of Bellegarde Road (Enclosure 3). Prior to the Army making a final decision regarding the proposed action, the Army will prepare an Environmental Assessment (EA) in accordance with the National Environmental Policy Act to consider alternatives and environmental impacts associated with the action. The anticipated completion of the draft EA for this action is April 2007 with the 30-day public review period beginning in May 2007.

Coordination with the U.S. Fish and Wildlife Service

The Presidio of Monterey received a letter dated 18 October 2006 from the Department of Interior, regarding USFWS proposed designation of 2,306 acres as critical habitat for Yadon's piperia. The proposed rule exempts 121 acres at the Presidio of Monterey from designation pursuant to section 4 (a) (3) of the Endangered Species Act of 1973 as amended.

During 2006, the POM began preliminary work to conduct a five-year review of the Integrated Natural Resources Management Plan/Endangered Species Management Plan for the Presidio of Monterey and Ord Military Community. In accordance with the Sikes Act, the INRMP will be reviewed for operation and effect in contributing to the conservation and rehabilitation of natural resources at POM and OMC. A joint review of this INRMP with the Presidio of Monterey, Regional Director of the U.S. Fish and Wildlife Service, and Regional Manager of the California Department of Fish and Game will be solicited under a separate memorandum in 2007.

Conclusions

The Army continues to implement the best management and conservation measures described in the approved INRMP/ESMP.

Enclosure 1

Detail view of Yadon's Piperia

Detail view reprinted with permission: Hickman J.L., The Jepsen Manual©, University of California Press, 1993

Yadon's piperia in habitat at Presidio of Monterey

INFORMATION

For further information, call or write:

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Directorate of Environmental and Natural Resources Management
Presidio of Monterey
Building 4463 Gigling Road, Room 101
Seaside, California 93955

Telephone: 831-242-7920
Fax: 831-394-6816

THE ENDANGERED SPECIES

YADON'S PIPERIA

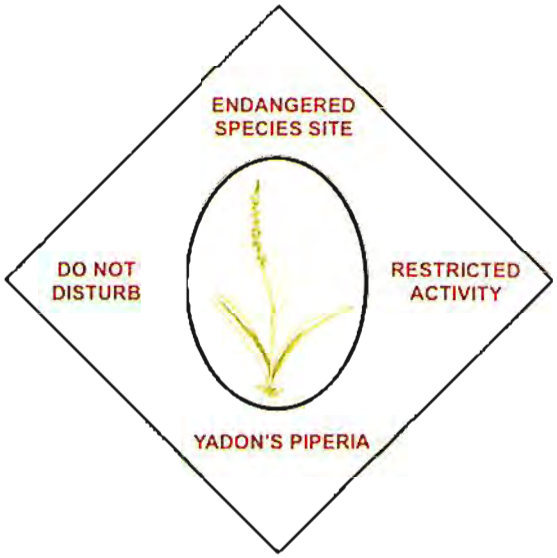
AT PRESIDIO OF MONTEREY

PROTECTION

Yadon's piperia *(Piperia yadonii)* is listed as endangered in August 1998 under the federal Endangered Species Act. The law protects the plant against acts of "taking," including removal, possession, and malicious destruction. Knowing violations of the Endangered Species Act are subject to civil fines of up to $25,000 for each offense and criminal penalties of up to $50,000 and 1-year term of imprisonment.

Visitors to the Presidio of Monterey can reduce impacts to Yadon's piperia by observing the following guidelines:

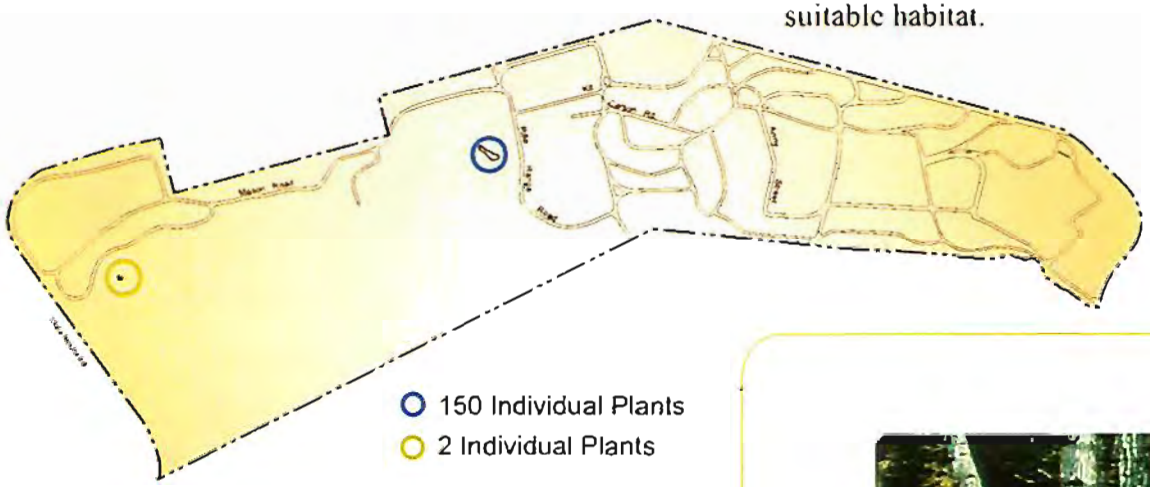
- Stay on trails
- Honor signs posted for closed areas
- Avoid populations of Yadon's piperia
- Do not collect any species of plants without permission from the Directorate of Environmental and Natural Resources Management.



DISTRIBUTION

Yadon's piperia is found only in northern Monterey County, California, from Big Sur north to the Prunedale-Elkhorn Slough area.

The plant's home is in Monterey pine forest and maritime chaparral communities. At the Presidio of Monterey, two small populations of Yadon's piperia have been found–one near the cemetery and dormitories and one in the Huckleberry Hill Nature Preserve. In recent population surveys, 150 individual plants were identified in the cemetery/dormitory area, and 2 were in the nature preserve. These two populations occupy less than 1 acre of Presidio property.



BACKGROUND

A slender perennial herb in the orchid family, Yadon's piperia grows from an underground bulb-like stem. In winter, the plant produces elongate leaves 4 to 6 inches long and 1 to 1½ inches wide. Following the emergence of the basal leaves, a ½- to 1½-foot stalk develops that in early summer bears small white flowers with green borders or midveins.

BACKGROUND

Urban and golf course development of much of its habitat has led to dramatic decreases in the density of Yadon's piperia populations. Other potential threats to the species are excessive collecting, deer browsing, and competition from non-native species. Surveys have estimated approximately 84,000 individuals overall on 350 acres, with about 59,000 or 70 percent of these plants inhabiting the Monterey Peninsula area. Yadon's piperia grows throughout its historic range (with the exception of the Pacific Grove area, where it has been eliminated by urban growth), but the plant was once more abundant within the known areas of its suitable habitat.

Presidio of Monterey pine forest, home to Yadon's piperia.

Enclosure 2

Photographs

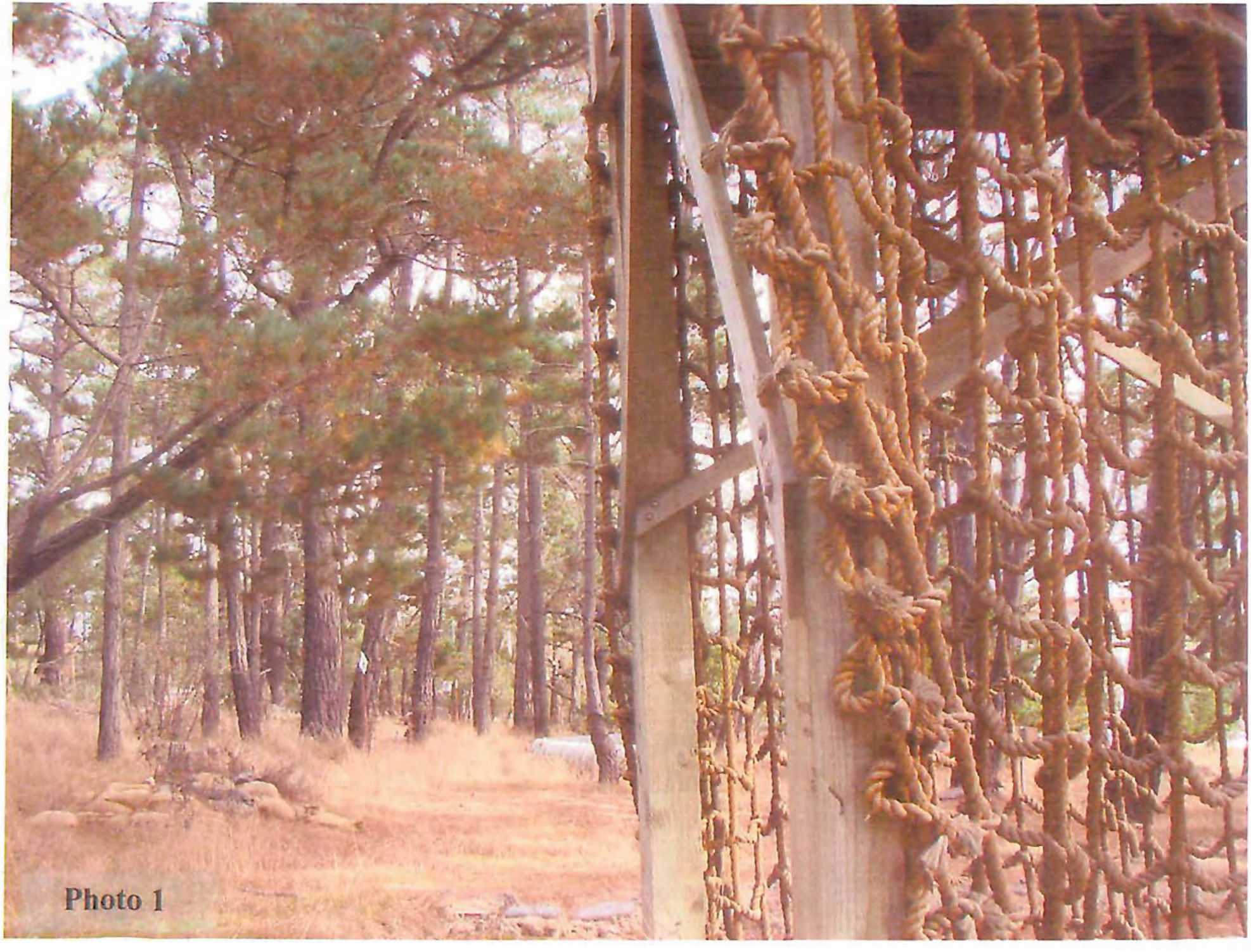


Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7


Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Obstacle Course Removal
November 24-26, 2006

Photo 13

Photo 14

Photo 15


2.3 acres
0.75 acres
1.0 acres
2.36 acres
French Broome Removal
CY2006

Photo 16

Enclosure 3

Installation Commander/Commandant	614
USMC Detachment	629
US Navy-CIDD	629
USAF 311th Training Squardon	627
229th MI Bn Hq	616
HHC DLIFLC&POM	834

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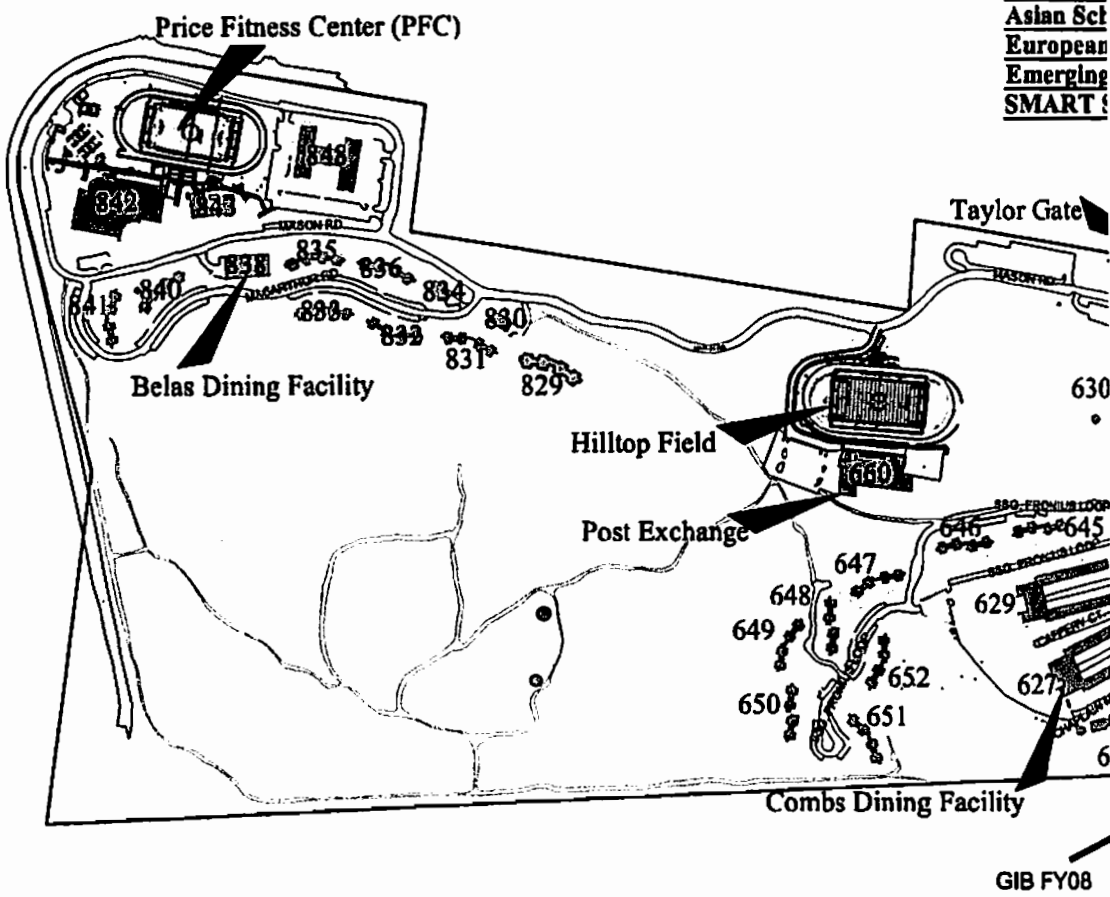


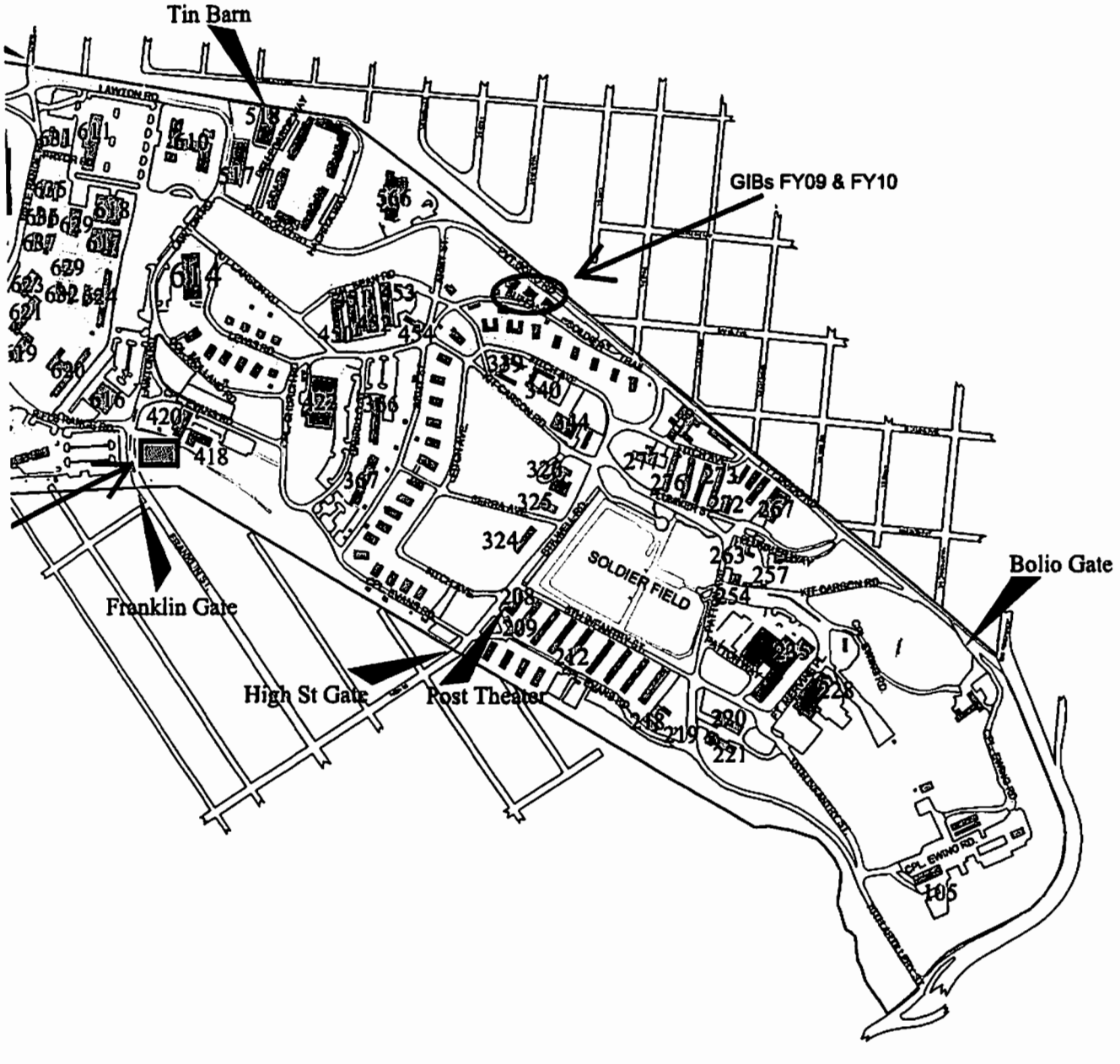
Presidio of Monterey

Jan 2006
(Supersedes DLIFLC Poster 22, 21 Sep 99

GIB FY08

Center	326
all	610
ll	624
	620
all	619
ll	848
	618
all	614
	617
ge School	848
School I	621
School II	620
School III	624
I	453
II	611
III	610
tin American School	212
nguages Program	636
ol	221

Garrison Commander	614
Staff Duty	614
Medical/Dental Clinic	422
Army Military Personnel Division	616
Combs Dining Facility	627
Belas Dining Facility	838
U.S. Army Finance	616
Post Chapel	325
Price Fitness Center	842
Post Exchange	660
U.S. Post Office	517
Logistics Warehouse	235
Hobson Activity Center/Cafe	843
Civilian Personnel Advisory Center	277
Lodging	366
Outdoor Recreation	228
Post Mail Room	272
Legal Office	276
Mid-POM Cafe	632
ATMs	660, 517



2007 Integrated Natural Resource Management Plan (INRMP) and Endangered Species Management Plan (ESMP) Annual Report

Presidio of Monterey (POM) and Ord Military Community (OMC)
February 2008

Implementation of the POM and OMC Integrated Natural Resources Management Plan

The Installation Commander, TRADOC Engineer, the Fish and Wildlife Service (FWS) California/Nevada Operations Manager, and California Department of Fish and Game (CDFG) Regional Manager signed the POM and OMC INRMP in the fall of 2001. In accordance with the Sikes Act Improvement Act and the 2006 US Army Guidelines for Implementing the Sikes Act Improvement Act, the INRMP will be reviewed every five years for operation and effect in contributing to the conservation and rehabilitation of natural resources at POM and OMC. A five-year review of the INRMP was conducted by Directorate of Public Works, Environmental Division staff in 2007 and the revised draft document is currently undergoing an internal administrative review. Sections of the INRMP that were added or updated include: the addition of plan objectives, management of special status species on OMC in accordance with the 1993 Biological Opinion as amended, Yadon's piperia critical habitat exemption, identification of "at risk" species, forest management in the Huckleberry Hill Nature Preserve, environmentally and economically beneficial landscape practices, noxious weed management control plan, migratory bird conservation measures and bird list, effects of contaminants on fish and wildlife, the revision of maps of Ord Military Community to reflect the 2007 land exchange, a priority project list, and the addition of several appendices including management of natural resources on the Satellite Communication Station at Camp Roberts, a sub-installation.

Army Regulation 200-1, Chapter 4-3 Land resources, requires installations to document specific INRMP action accomplishments undertaken each year. Table 1 summarizes the INRMP implementation activities reported for years 2001 to 2007.

TABLE 1

Year	INRMP Implementation
2001	Pitch Canker Control Program: 267 Monterey pine trees severely diseased or dying from Pitch Canker are removed and 192 are trimmed to reduce disease infections in an attempt to control the spread of the disease. City of Monterey Parks Division plants 277 Monterey pine seedlings from native Monterey pine stock to replace removed trees.
2002	Conservation measures and landscape recommendations to reduce unnecessary impacts to natural resources are incorporated into construction projects including the General Instruction Facility III, Barracks Addition and New Barracks, Video Teleconferencing Center and several parking lots.
2003	Pitch Canker Program continues. Landscape designs for construction projects use

TABLE 1	
Year	**INRMP Implementation**
	drought-resistant tree and shrub species adapted to local climate and no non-native, invasive species. Urban forestry work by arborist follows INRMP guidelines.
2004	Storm water outfall repair is determined to have no effect on Monterey spineflower or Western snowy plover. Construction projects continue to incorporate conservation measures to reduce impacts to natural resources. Landscape recommendations continue to include drought-resistant species that are not invasive. Arborist continues urban forestry work.
2005	RCI development parcels are leased to the private sector for improving and constructing military family housing. The project includes demolition of and replacement of approximately 1580 housing units over a ten (10) year period and incorporates conservation measures to reduce unnecessary impacts to natural resources from construction.
2006	Landscaping recommendations for the Expansion of the Dental Clinic (Building 422) include drought-resistant species that are not invasive. Arborist continues urban forestry work. Landscape contractor removes French broom and pampas grass from 6.4 acres around Fronius Loop barracks.
2007	Successful recruitment of Natural Resource Specialist. Five-year reviews of INRMP and ESMP are conducted and documents are revised and updated. POM website is updated with natural resource information and a mountain lion brochure is created. French broom, pampas grass, iceplant, poison hemlock, wild fennel, English ivy, and bull thistle are removed and controlled near barracks at Fronius Loop; in Monterey pine forest near Hilltop Field and near Yadon's habitat; along PX pathway, Upper POM barracks, and landfill riparian area; and in riparian area near Franklin Gate and along Ho Chi Min pathway behind Building 418. Approximately one acre of riparian area is restored. French broom, iceplant and pampas grass are manually removed from Yadon's piperia habitat. Invasive plant species are controlled on over 15 acres. Hazard trees are identified and removed. Raccoons carrying fleas are controlled. Light Brown Apple Moth information is disseminated. GIS software and GPS hardware and software are purchased and utilized to make natural resource maps.

In February 2007, the vacant Natural Resource Specialist (NRS) position was filled. In April, the Directorate of Public Works-Environmental Division (DPW-E) Chief and the NRS met with the City of Monterey Chief Forester and Arborist to discuss Forest Management in the Huckleberry Hill Preserve and to become more familiar with the Urban Forestry Program on the POM. The City of Monterey Arborist also began providing quarterly reports to the Army listing locations of hazard and diseased trees on the POM and planned actions to remove or trim these trees.

During the summer, a Bureau of Land Management botanist accompanied the NRS and walked the Presidio grounds to identify and locate invasive weed species. Several new invaders were targeted for future removal: poison hemlock (*Conium maculatum*), bull thistle (*Cirsium vulgare*), wild fennel (*Foeniculum vulgare*), English ivy (*Hedera helix*), cape ivy (*Senecio mikanioides*), smooth catsears (*Hypchaeris glabra*), naked ladies (*Amaryllis belladonna*), harding grass (*Phalaris aquatica*), big periwinkle (*Vinca major*), rattlesnake grass (*Briza maxima*), and an unknown species of palm tree (Plate 1). Over the

course of the summer and fall, several multi-acre invasive weed removal projects resulted in the restoration of approximately 15 acres of undeveloped and semi-developed lands as well as one acre of riparian forest (Plate 2). New treatments for French broom (*Genista monspessulana*), pampas grass (*Cortaderia jubata*) and iceplant (*Carpbrotus edulis* and *Carpobrotus chiliensis*), poison hemlock, bull thistle, and wild fennel control were implemented that included a single foliar herbicide application followed by manual removal upon mortality. This was performed at Hilltop Field and Fronius Loop (Plate 3). In other areas of the upper POM (near the landfill, along the PX pathway from Building 829, and behind Building 840) invasive plants were removed manually and are scheduled to be sprayed (one time) with an Army-approved, species-appropriate herbicide in spring 2008 when the seedlings sprout (Plate 4). The new control methods: coupling chemical and manual removal, will provide more effective noxious and invasive weed eradication and reduce the amount of future control efforts needed, saving the Army time and money.

The final weed removal project occurred near Franklin Gate along the stream behind Building 418. French broom had enveloped the Ho Chi Min trail and was impeding access to the stream running along one side of the trail and the boundary fence on the other side of the trail. On the opposite side of the stream, access from Building 418 down to the stream was nearly impossible. French broom and other invasive weeds were choking out the native riparian plants as well as blocking the view of the fence line for force protection, so the weeds were manually removed. Plate 5 shows before and after photos. Additional work to remove English ivy and big periwinkle is scheduled for spring 2008. The only herbicide application scheduled for this location will be to hand paint the cut vines with a small amount of an aquatic Garlon to ensure English ivy does not regenerate. Revegetation of this sensitive area with native plants may occur as a possible mitigation tied to the construction of the FY08 General Instruction Building located in the vicinity of the riparian area.

In addition, the NRS attended the Sustaining Military Readiness through Conservation, Compatible Land Use Planning and Encroachment Mitigation Conference in Orlando, Florida; updated the natural resource text on the POM website http://pom-ima.monterey.army.mil/sites/directorates/dpw/natural_resources.asp; and developed and distributed an educational brochure about mountain lion awareness and what to do if one were encountered (Plate 6). The NRS also acted as the Pest Management Coordinator for the POM and responded to over 900 pest control requests, recommending an integrated pest management control approach and often innovative treatment strategies. The NRS coordinated the dissemination of information on the Light Brown Apple Moth and the corresponding aerial pheromone treatments being performed by the California Department of Food and Agriculture to installation personnel. In addition, the flea problem was exceptionally challenging this year due to an increase in the population of raccoons inhabiting the sub-areas of the historic buildings on the POM. The NRS initiated an integrated approach by assembling a multi-functional team consisting of a pest controller, Directorate of Morale Welfare and Recreation personnel, City of Monterey maintenance workers, and the POM Cultural Resource Specialist (CRS) to develop a strategy for addressing the problem by controlling the fleas, removing the animals carrying the fleas and then sealing the entry holes in the buildings. The immediate treatment was to

place ammonia soaked rags in the crawl space to repel the raccoons and treat both the interior of the buildings and the sub-areas with the Army approved pesticide Precor. When the flea problem was abated, the CRS would then submit plans for approval to the State Historic Preservation Officer regarding the design of the screens to be installed to block entry holes. Once approved, the City of Monterey maintenance workers would install the screens (Plate 7). The latter part of the process is still in progress.

The Environmental Division purchased Geographic Information Systems (GIS) software and compatible Global Positioning System (GPS) hardware and software to enable the NRS to better track and map natural resources on the POM and OMC. Examples of use include mapping individual Yadon's piperia plant locations and changes to the populations over the years (Plate 8), locations of invasive plants and control results, riparian area locations and species composition, and wildlife sightings. The technology will also aid the NRS in the development of the required constraints and opportunities maps for the next INRMP revision.

Following the events of 11 September 2001 and the subsequent Global War on Terrorism there has been an increased requirement for foreign language proficient individuals in the military services. As a result, resident student enrollment projections for the next five years at the Defense Language Institute Foreign Language Center is anticipated to increase substantially with as many as 860 new faculty members and language instructors. Student population growth will exceed the capacity of the current facilities and as such, the Army proposes to construct three General Instruction Buildings over the next three years to overcome facility constraints. In fiscal year 2008 the POM proposes to construct one General Instruction Building (GIB) south of Cpl Evans Road and east of West Franklin Street in an area classified as semi-improved. The proposed location of the two remaining GIBs, proposed for construction years FY09 and FY10, are on the developed footprint of the existing NCO barracks (buildings 550-553) east of Bellegarde Road (Plate 9). The Army has prepared an Environmental Assessment (EA) in accordance with the National Environmental Policy Act to consider alternatives and environmental impacts associated with the action. The POM Natural Resource Specialist reviewed the EA and revised the language to better address expected levels of impacts to wildlife, migratory birds and native vegetation and to detail mitigation measures that would reduce impacts to less than significant levels. The draft EA was completed in November 2007 and the 30-day public review period ended January 18, 2008. The NRS also reviewed the building design and provided recommendations for (1) landscaping with approved, drought-tolerant, non-invasive plant species consistent with the species listed as approved in the INRMP and (2) tree protection procedures adopted from the *City of Monterey Tree Protection Standards During Construction Projects* manual for reducing injury to the Monterey pine trees that are being retained on the site.

POM and OMC Endangered Species Management Plan Background

The ESMP for the POM was prepared for populations of Yadon's piperia (*Piperia yadoni*), a federally endangered orchid, and Hooker's manzanita (*Arctostaphylos hookeri* ssp. *hookeri*), a plant on the California Native Society List 1B, found in undeveloped areas

of the POM. Yadon's piperia was listed as endangered by the FWS on August 12, 1998. Hooker's manzanita is considered rare, threatened or endangered by the California Native Plant Society, was identified by the Army as an "at risk" species, and could be a candidate for future listing.

Yadon's piperia Hooker's manzanita

An Environmental Assessment (EA) and a Finding of No Significant Impact (FONSI) were completed for the 1999 ESMP and four letters with minimal comments were received during the 30-day public comment period. The ESMP was approved and signed by TRADOC Environmental, the Installation's Staff Judge Advocate, and Installation Commander in December 1999. A 2008 update is in progress and the draft document is currently undergoing an internal administrative review. The 2008 update addresses the Presidio of Monterey's exemption from critical habitat designation, includes population count data from surveys conducted from 2000-2007, and discusses additional mitigation measures to be implemented to ameliorate impacts from deer and humans. The 2008 document also describes ESMP implementation actions that have been performed to date and projects future activities through 2010.

Implementation of the POM and OMC Endangered Species Management Plan

Conservation goals for Yadon's piperia are "to maintain the two existing POM populations and to protect these populations from impacts." Habitat management actions to meet the conservation goals are as follows:

a) Institute an annual monitoring program to record changes in population over time and to facilitate development of corrective measures, if required.
b) Protect existing populations from foot traffic by installing warning signs, instituting an awareness program and fencing if necessary.
c) Remove non-native plant species from documented habitat and from potential habitat areas.
d) Monitoring deer browsing. Cage individual plants to protect them from browsing, if necessary.
e) Establish a propagation and planting program to augment existing populations (optional).

Table 2 below lists ESMP implementation actions from 2000 to 2007.

TABLE 2		
Year	**Action**	**Conservation Goals**
2000	Installation of interpretive signs to prevent foot traffic impacts to Yadon's piperia near Building 630 and visually communicate significance of site. Populations are surveyed and monitored while plants are in bloom.	(a)(b)
2001	Creation of color educational brochures containing photos of Yadon's piperia and describing ways to reduce impacts. Brochure is distributed to soldiers living in Building 630. Endangered species signs are erected to ensure boundaries of protected area are visible. Populations are surveyed and monitored while plants are in bloom.	(a)(b)
2002	Two outdoor kiosk/bulletin boards are constructed and installed. Brochures are posted on the bulletin boards to educate trail users about avoiding impacts to Yadon's piperia. Populations are surveyed and monitored while plants are in bloom. French broom and Hottentot fig are removed from the habitat.	(a)(b)(c)
2003	Populations are surveyed and monitored while plants are in bloom. No human impacts or evidence of deer browsing are observed. Several piles of fallen pine branches and logs are removed to enhance potential habitat for endangered plant population at Bldg 630.	(a)(b)(d)
2004	Populations are surveyed and monitored while plants are in bloom. No human impacts are observed; however, three flowering Yadon's piperia show evidence of deer browsing. Additional endangered species signs are posted along trails. Awareness program continues. French broom and Hottentot fig are removed from habitat and adjacent pine forest.	(a)(b)(c)(d)
2005	Flora and fauna baseline survey of the POM is conducted while plants are in bloom. The final report entitled, "*Habitat Assessment Report – Flora and Fauna Baseline Study of the Presidio of Monterey, California (MACTEC Engineering and Consulting, Inc. 2005)*" provides a qualitative and quantitative analysis with emphasis on special status species. Largest Yadon's piperia population count and range is reported. Trampling impacts are noted. Awareness program continues. French broom and Hottentot fig are removed from habitat and adjacent pine forest.	(a)(b)
2006	Obstacle course structures are removed from area adjacent to Yadon's habitat. French broom, Hottentot fig and pampas grass are removed from the habitat and adjacent pine forest. No survey performed.	(b)(c)
2007	Permanent plots and photo points are established in Yadon's piperia habitat. GPS points are recorded and plant location maps are created. Data sheet is developed	(a)(b)(c)(d)

TABLE 2		
Year	**Action**	**Conservation Goals**
	and includes impact monitoring. Mitigations include caging individual plants in 2008 to protect them from deer trampling and browsing. Survey report is produced by contractor. French broom, iceplant (Hottentot fig) and pampas grass are manually removed from habitat and chemically controlled on adjacent pine forest. Debris piles and downed logs are removed from habitat. ESMP is updated. Section 7 consultation is initiated for the Pathway Resurfacing project.	

In July 2007, a Yadon's piperia survey was conducted by the POM Natural Resource Specialist (NRS) and scientists from MACTEC Engineering and Consulting firm. Seventeen permanent plots were established, as well as photo points. A site assessment form was created to collect data on plant GPS location, site description, habitat description, orchid species or other special status species present, invasive plant species present and percent coverage, surrounding land use, visible disturbances, other threats, site quality and other comments (Plate 10). This form was derived from the monitoring protocols established by Graff in 2006 and recommended by the FWS. Observations recorded during the survey included a high incidence of deer trampling indicating a need to cage or fence the plants; and human disturbance in the form of debris piles, cut logs dropped on site within the habitat, and disbursal of wood chips (Plate 11). Debris piles and cut logs were subsequently removed and contractors were educated on the necessity of carrying tree materials off-site. Another orchid species was discovered growing in the area near the site of the old obstacle course that was dismantled in 2006. Hooded ladies-tresses, *Spiranthes romanzoffiana,* were observed growing on the edge of the Yadon's piperia habitat (Plate 12). It is not uncommon for these two orchid species to be found in the same habitat, but *Spiranthes* prefers the more mesic or wetter sites.

The Yadon's piperia population near Building 630 was surveyed and monitored in 1995, 1998, and each year from 2000 through 2005 and 2007. Table 3 lists the total number of plants counted during surveys from 2000 to 2005 and 2007. Plate 7 shows the plant locations on a Geographic Information Systems (GIS) map.

TABLE 3	
Year	**Number of Plants**
2000	37
2001	60
2002	83
2003	209
2004	83
2005	428
2007	38

A contractor was hired in late August to manually remove (hand pull or cut) invasive French broom, pampas grass, and iceplant from four acres within the Yadon's

piperia habitat (Plate 13). Justification for removal of invasive species from the habitat is: invasive species compete with the endangered plant (and often times out-compete) for resources such as water and space, and French broom shrubs can shade Yadon's piperia reducing sunlight needed for photosynthesis. At the edge of the Monterey pine forest and outside the habitat area, these same invasive species were treated with a foliar application of Round-up herbicide (Plate 14). Ten large French broom shrubs were cut with a hand saw and the stumps were painted with Garlon 4 to impede re-sprouting (Plate 15). Effectiveness of the herbicide application will be assessed in 2008.

Coordination with the U.S. Fish and Wildlife Service

The Presidio of Monterey received a letter dated 18 October 2006 from the Department of Interior, regarding USFWS proposed designation of 2,306 acres as critical habitat for Yadon's piperia. The proposed rule exempts 121 acres at the Presidio of Monterey from designation pursuant to section 4 (a) (3) of the Endangered Species Act of 1973 as amended.

During 2006, the POM began preliminary work to conduct a five-year review of the Integrated Natural Resources Management Plan and Endangered Species Management Plan for the Presidio of Monterey and Ord Military Community. A thorough five-year review was conducted in 2007 and it resulted in minor revisions to the document. The draft document is currently undergoing an internal administrative review that will be followed by a review by the U.S. Army Installation Management Command (IMCOM-West), U.S. Army Environmental Command Center (AEC), FWS, and California Department of Fish and Game. The targeted completion date of the final document is March 2008.

In November 2007, a letter was sent to the FWS initiating informal consultation for the proposed pathway resurfacing project. The Army is proposing to improve the pathway surface on the 550 ft developed footpath that leads from Building 630 to Hilltop Field on the Presidio of Monterey (Plate 16). A dirt pathway was established in the late 1960's for access through the Monterey pine habitat and was later delineated with railroad ties and hardened with decomposed granite in the 1980's. Due to erosion control problems (Plate 17) and the fact that the current surface becomes wet and muddy in the rain, creating a situation where soldiers are getting their uniforms and shoes muddy when walking on the pathway, the Army is proposing to re-grade the current surface and install a new concrete surface within the existing pathway corridor. Specific avoidance measures have been incorporated into the project design to mitigate possible impacts to Yadon's piperia and the Army is awaiting concurrence from the FWS and funding.

Conclusions: The natural resource management program on the Presidio of Monterey continues to support the Army mission, to conserve and protect the native species on the installation and to utilize up-to-date technology and methodologies to manage natural resources for sustainability.

PLATES

Plate 1. Photos of Some Invasive Plants Newly Identified for Control

Wild fennel

Rattlesnake grass and Harding grass

Catsears

Cape ivy entangled in Huckleberry

English ivy choking riparian trees

Poison hemlock near landfill

Plate 1. continued

Bull thistle

Palm tree surrounded by English ivy

Naked ladies with bull thistle and French broom in background

Plate 2. Map of 2007 Weed Removal Project Areas

2007 Weed Control Project Areas on the POM

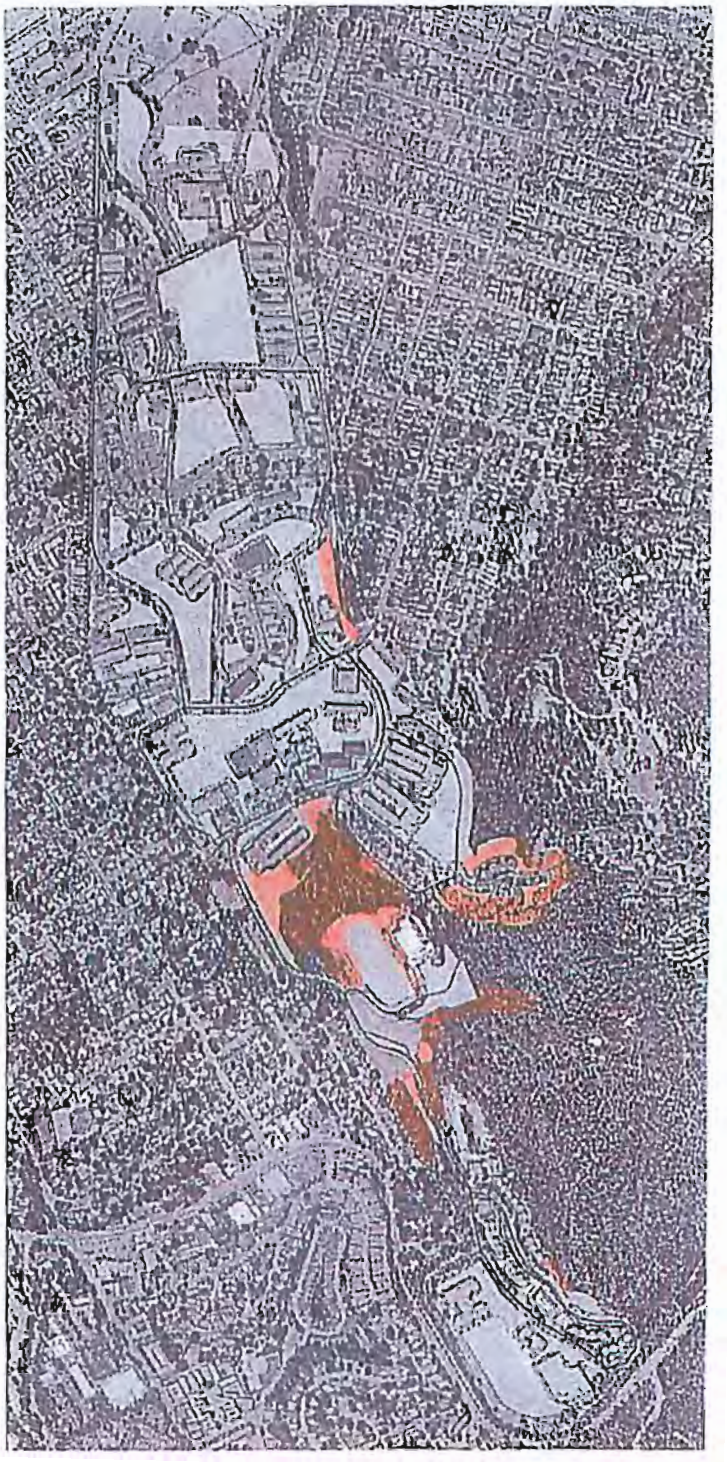


Plate 8

Plate 3. Fronius Loop Weed Control (Chemical and Manual)

Before control treatments

After herbicide application

After manual removal

One day after herbicide application

After manual removal

Plate 3. continued

One day after herbicide treatment

After manual removal

Some individual invasive plants were identified on the site and were sprayed and cut. These included wild fennel, bull thistle and large French broom shrubs. Poison hemlock was also treated, but no photo is available from this site.

Plate 4. Invasive Weed Control near Landfill, PX Pathway and MacArthur Road (Manual Removal with Post-emergent Herbicide Treatment Planned for Spring 2008)

Bull thistle in front of 829

French broom along pathway from 829 to PX

Bull thistle near landfill

Poison hemlock, bull thistle and French broom near landfill

French broom on MacArthur Rd behind Building 840

Pampas grass with plume behind Building 840

Plate 5. Weed Removal in Riparian Forest along Stream near Franklin Gate and behind Building 418

Ho Chi Min trail, intermittent stream, and boundary fence enveloped in French broom.

Stream located downhill on left is inaccessible due to French broom

Non-native palm, French broom and English ivy choke native plants and block access to stream, trail and boundary fence.

After weed removal, stream is accessible and native oaks are visible.

After weed removal, channel of stream is visible and accessible. Native vegetation is relieved of competition from French broom. English ivy remains, but will be controlled in 2008. Boundary fence is now visible for force protection.

Plate 6. Mountain Lion Brochure

Page 1

Plate 6. continued

FACTS

PHYSICAL APPEARANCE

- Tawny-colored with black-tipped ears and tail. Cubs have black spots.
- Males may be 8 feet long and weigh up to 150 pounds.
- Females can be 7 feet long and weigh up to 90 pounds.

HOME PROTECTION

- Don't feed wildlife. Bring pet food inside to avoid attracting raccoons, opossums and other potential prey.
- Install motion-sensitive outdoor lighting.
- Don't leave pets outside unattended and supervise children at all times.
- Don't allow children and pets outside when mountain lions are most active: dusk, dawn and at night.
- Educate children about wildlife and mountain lions in particular.
- Keep tall grasses and bushes trimmed in order to eliminate hiding places for lions.

ENCOUNTERS

- Don't hike alone.
- Keep children near, and closely supervised.
- Leave an escape route for the mountain lion, and don't approach them.
- Don't run or attempt to hide from a mountain lion; they will mistake you for prey.
- Talk in a loud deep voice.
- Try to appear larger by putting arms in the air, and pick up children to keep them from running but avoid bending over to do so.
- Fight back if attacked!!

Plate 7. Raccoon and Flea Problem in Historic District

Raccoons can easily access sub-areas of the historic POM lodging buildings

Raccoons carrying fleas inhabit building sub-areas. Fleas travel up into the living quarters and bite the occupants.

Ammonia soaked rags were placed in sub-areas to repel the raccoons, and exterior and interior of buildings were treated with Precor, an Army approved pesticide for treating fleas.

The Cultural Resource Specialist is working with the City of Monterey and the State Historic Preservation Officer to add screens and wood trim to seal the raccoon entry ways.

Plate 8 Redacted

Plate 9. General Instruction Building Construction Sites on the POM: GIB 08, GIB 09, GIB 10

Plate 10. Example: Permanent Plot Monitoring Program Data Sheet

2007 FWS Site Assessment Form for *Yadon's piperia*

Reporter: Lenore Grover-Bullington, Presidio of Monterey; Gary Ahlborn, MACTEC; Cosmo Lettich, MACTEC
Date of Visit: 07/26/07
Phone: 831-242-4829 Email: l.groverbullington@us.army.mil
Address: PO Box 5004, Monterey, CA 93944

Site Name: Site #9
Site Owner: US Army, Presidio of Monterey

Total # of Individuals: 1 (vegetative/flowering): flowering

Site Location Description: Behind building 630 on slope just east of stairs and down hill of narrow dirt trail; southeast facing; full sun. Plant is growing about 6 inches from small pampas grass.
County: Monterey

UTM Record Number: 07-26-2007 9A
Stake UTM: Plant location near stake
GPS Make & Model: Trimble Asset Surveyor
Horizontal Accuracy: Elevation:

Plant Location UTM: 597114.534Easting, 4051578.094Northing

Habitat Description: Monterey pine forest and huckleberry; litter comprised of pine needles, pine cones, twigs; floor has little to no rattlesnake grass but on small clump of pampas grass

Site Information:
Other Orchid Species Present: None

Other Rare or Threatened Species Present: None

Invasive Plant Species Present (with estimated % coverage): Pampas grass 10%

Current/Surrounding Land Use: Stairway, walkway, barracks

Visible Disturbances: Upper part of flower head appears to have been browsed.

Other Threats: Deer browsing and trampling; human disturbance; invasive plant encroachment; disbursal of wood chips

Overall Site Quality: good
Comments: Huckleberry is heavily grazed. Plot size is approximately 4sqft. Photos taken.

Plate 11. Photos of Threats to Yadon's piperia from 2007 Survey

Deer trampling, bedding down in invasive rattlesnake grass within habitat

Non-native plant species encroachment

Multiple trailing; hiking off trail; deer trailing

Debris piles in habitat

Wood chips scattered in habitat

Logs dropped in habitat

Plate 12. Hooded ladies-tresses, *Spiranthes romanzoffiana*

Plate 13. Invasive Plants (French broom, iceplant and pampas grass) Removed by Hand from Yadon's piperia Habitat

French broom Pampas grass

Iceplant

Plate 14. Herbicide Application to Control French Broom, Iceplant and Pampas Grass Adjacent to Yadon's piperia Habitat near Hilltop Field

July foliar herbicide application at Hilltop Field

Before treatment After treatment

Before treatment After treatment

Plate 15. Cut-Stump Garlon 4 Treatments to French Broom Shrubs

Cut French broom

Stumps painted with Garlon 4

Plate 16. Pathway Resurfacing Project through Yadon's piperia Habitat

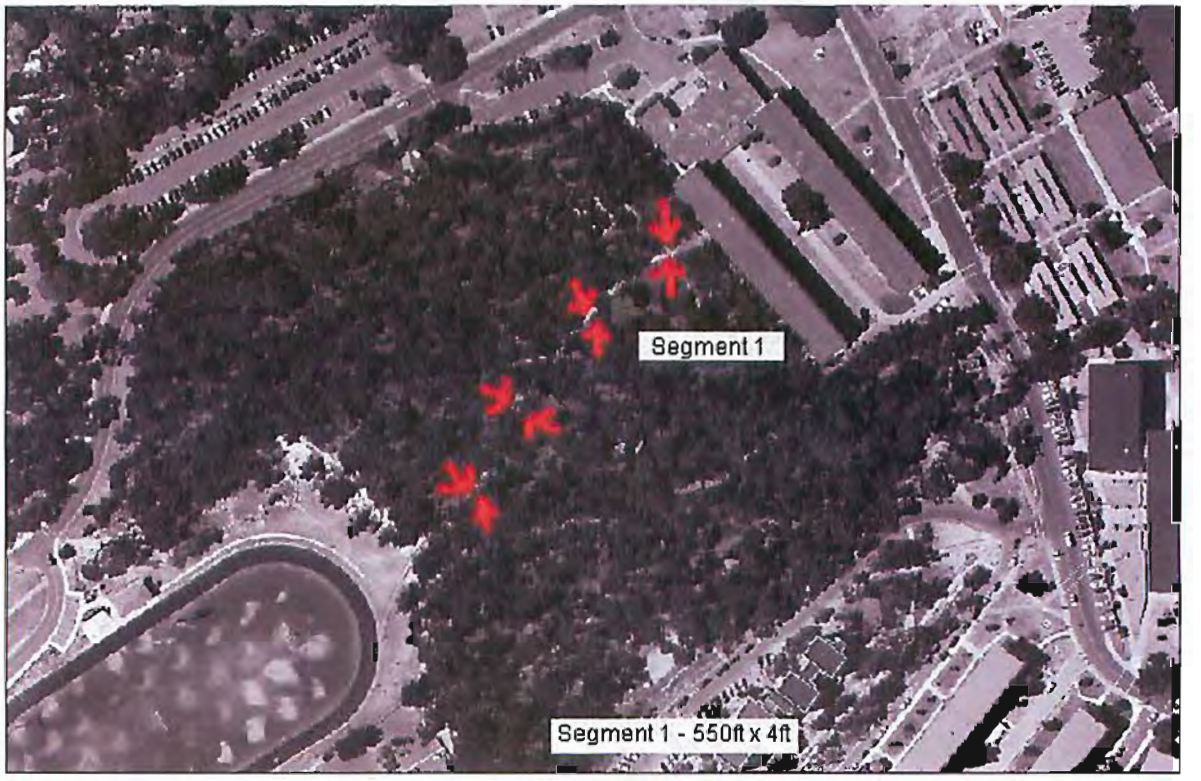


Plate 17. Photos of Pathway Problems

Water flows down the trail dislodging decomposed granite, and creating gullies and an uneven surface.

Person jogging off-trail into Yadon's piperia habitat due to uneven trail surface.

Appendix C
Huckleberry Hill Preserve Management Plan

HUCKLEBERRY HILL

FOREST MANAGEMENT PLAN

Prepared by Robert Reid
Urban Forester
City of Monterey

HUCKLEBERRY HILL

FOREST MANAGEMENT PLAN

Prepared by Robert Reid

Urban Forester

City of Monterey

rev. 4/27/87

FOREST MANAGEMENT PLAN

HUCKLEBERRY HILL

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b. Responsibilities

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INTRODUCTION

The following management plan attempts to recognize and recommend sound forestry methods for managing the native Monterey pine forest atop the 81+ acre Huckleberry Hill Nature Preserve (Map 1). The forest is comprised of mature stands characterized by a high windthrow potential and a lack of adequate regeneration. Competetion from introduced exotics, noxious weeds and overcrowding has put many trees under stress resulting in both insect and disease infestations.

Paramount within the management concerns will be the retention of an even forest canopy along the skyline while providing a recreation area for residents to enjoy for generations to come. These goals will be accomplished through wise management and an open ended plan that analyzes and implements measures to enhance the the aesthetic value of the nature preserve. The plan will be revised and updated each year to keep abreast of changes within the preserve while improving management techniques already outlined in this report.

Forest management is a long term continuing process and it has to be based on a good knowledge of the property. Decisions have to be made for current operations and also for a long time into the future. Therefore, it is advisable to have a working management plan which prescribes and controls the basic operation of a forest over a period of years. Just as a forest is multi-faceted, so must the plan to manage it be.

It shall be the responsibility of the City of Monterey to manage the Huckleberry Hill Nature Preserve in a manner consistent with wise forest management conducive with the following management objectives.

MANAGEMENT OBJECTIVES

1. To enhance, maintain and promote the growth of native vegetation existing on 81(+) acres leased from the Army, designated as a nature preserve called Huckleberry Hill.

2. To control erosion problems associated with existing roads, firebreaks, and trails on highly erosive soils.

3. To devise and implement a plan for reforestation, utilizing native seed to encourage an uneven age stand of Monterey pine to ensure their existence for years to come.

4. To minimize disturbance from man and reduce negative impacts associated with noxious weeds, destructuve forest insects and disease.

5. To reduce fire hazards and maintain fire control standards associated with overmature, even-aged native Monterey pine forest.

6. To provide for the protection and proliferation of all the wildlife within the nature preserve.

IIa. Management Objectives

EROSION CONTROL

Soil erosion is a potential problem throughout Huckleberry Hill due to the steep slopes and highly erosive soils. Care will be required during wood removal and reforestation to avoid unnecessary disturbance of the soil surface. The minimize soil disturbance, only rubber tired vehicles will be used. On steeper areas (over 30% slope), no vehicles will be permitted and all firewood removal must be done by hand. The use of overhead cable systems to extract logs should not be permitted due to the erosiveness of the sand granite soils. Water bars must be cut on all existing sloped firebreaks, roads, and trails approximately every 100 feet. This will eliminate runoff down steep roads and firebreaks, and channel more water back into the existing vegetation.

The existing roads and firebreaks should be graded and crowned, and an adequate system of open top culverts installed to prevent erosion of the road bed. Water currently runs down the roads and has cut gulleys which are a growing problem on the steeper portions of the road. In a few areas slumping has occurred. These areas should be cleaned up. Where unconsolidated material occurs on a cut slope above the road, stabilization can be achieved by planting manzanita (Aretostaphylos hookeri). Fill slopes below the road should be inspected for erosion problems. Eroded areas should be filled in to prevent undermining the roads. These filled areas can be planted with deerweed (Lotus scoparius), or Hooker manzanita. Proper road drainage should be created to prevent renewed erosion problems at these locations.

In areas where tree and vegetation removal occurs, the uniform spreading of chipped slash should suffice in protecting the soil surface. However, where stumps have been removed or where the movement of logs and equipment has disturbed the natural contour of the ground surface, it will be necessary to re-contour the ground to eliminate potential erosion channels before spreading the chipped slash.

All trees should be hand planted to avoid potential erosion problems which can result from machine planting on sloping ground. The use of annual inspections to evaluate cut over areas should include a review of the erosion status of each area. Corrective measures such as additional water bars and chipped mulch, or the re-contouring of the ground surface should be done to limit further erosion.

IIa. Management Objectives, Erosion Control (Continued)

On October 21, 1986, a meeting was held on Huckleberry Hill between Army representatives Jack Massera, Land Manager, and Rickson Rafter, Agricultural Engineer with the Soil Conservation Service, and Robert Reid, Urban Forester with the City of Monterey. The purpose of the meeting on site was to evaluate and discuss specific measures to control and correct potential erosion problems associated with Huckleberry Hill. Methods for controlling erosion on steep roads and firebreaks was the main focus with consideration given for the newly constructed barracks located at the bottom of Huckleberry Knoll.

Several preventative steps were recommended to control excessive water flows down steep vertical roads. On roads with steep slopes, over 30% water bars will be cut every 50 feet to detour water runoff into established vegetation eliminating erosion down bare soil. At intersections of roads and firebreaks, earth berms will be constructed to divert water runoff away from steep slopes reducing runoff towards the newly constructed barracks. In addition, ground vegetation is planned to go in on the slope above the new barracks thereby slowing runoff before it reaches bare ground.

IIb. Management Objectives

REFORESTATION

In general, the purpose of the reforestation and regeneration program will be to assess the general vigor of the Huckleberry Hill forest, thereby identifying the nature and location of existing diseased tree stands and implementing a program which will remedy the poor health of these stands. Factors considered include the nature and severity of existing tree diseases; how and when the trees should be removed; what problems will occur regarding their removal versus retaining them, and the effect of tree removal on the remaining forest. It is recognized that many of the trees within the area are of poor quality and therefore recommend that the density of the present stand of trees should be increased. This is the major reason for the reforestation plan. This reforestation would be not only for the purpose of filling the gaps in the forest where the tree population is below what it should be but also for the purpose of replacing those trees which because of poor health will die in the relatively near future.

The reforestation program will involve the planting of Monterey pine seedlings. The seeds will be collected, beginning on October 8, 1986, from the Huckleberry Hill preserve by City staff with technical assistance from Dave Soho, Forester III, with the California Department of Forestry. After collection, the native seeds will be turned over to CDF under contract to be grown in the State Forestry Nursery located in Davis, California. Depending on when the seeds are actually germinated, the City should receive trees for planting in one or two years. The actual seeds will be collected from three different locations including Huckleberry Hill, Jacks Peak, and the native pine forest area off Aguajito Road. All three of these locations are composed of mature stands of native Monterey Pine which have existed here since before the turn of the century. Depending on the seed viability from each location, approximately ten bags of cones shall be collected from each. Each bag will contain approximately 25 to 30 cones and cones normally contain 8 to 12 viable seeds. The best time of year to collect cones is from October through December. Each collection site will be noted and recorded for date and number of cones collected. See report of cone sample collection data sheet attached.

The intent of the reforestation program is to attempt to replace the over mature stands of native Monterey pine forest existing on Huckleberry Hill. Due to several factors, the forest is not successfully regenerating at a rate that will ensure its continuous existance in the years to come. Factors include disease, insects, and competition from introduced exotics such as genista and pampas grass which compete with young pines for water and nutrients. As

openings are created from trees falling, the undergrowth is taking over and not allowing the pines to successfully reproduce. In the past, fire served as an important tool to control the amount of ground vegetation. Periodic burns would reduce the vegetation to ash, thereby allowing pine seedlings to be successfully established in the bare mineral soils below. With the encroachment of civilization, forest fires have been suppressed and has therefore led to a situation where the understory has become too dense for young pines to grow. In order to create a situation in which trees can grow, the understory must be cleared by either mechanical or chemical methods so seedlings can become established and not be outcompeted by undesirable exotics.

As openings are created, trees will be planted during December and January to take advantage of the winter rains. Approximately 1 to 500 trees will be planted each year to ensure that an uneven age forest will be created. An uneven aged forest is one in which different age trees make up the canopy and therefore as old trees come down, they are replaced by co-dominant and intermediate class trees and the forest cycle is perpetuated. An even aged forest on the other hand allows little sunlight penetration underneath and therefore young trees cannot get started and as a result when over mature trees come down, there are no younger age classes to replace them. It is at this time that succession takes place and another plant community replaced the old one.

In a few locations throughout the forest preserve, pockets of young overcrowded pines grow naturally in fierce competition. Thinning or rogueing of these stands will take place to remove inferior trees and reduce competition between the remaining trees. As a result, an even spacing will be created which shall promote good health and balanced vertical growth.

Many problems are associated with dense, overcrowded stands of pines which are not thinned. Competition for limited water and nutrients results in trees being stressed and more vunerable to attack from disease and insects. In addition, trees surviving to maturity often develop severe leans towards sunlight in limited openings created by older aged trees falling within the existing forest canopy. These trees are often more susceptible to windthrow and uprooting during storms and strong winds.

The City of Monterey has entered into a program of utilizing CDF forestry crews to aid in removing genista, thinning trees and general forestry work, including tree planting. It is proposed that these crews participate in much of the forestry work needed on Huckleberry Hill. City staff is limited for such work at this time and CDF crews have been used successfully by the City for such duties. In this case technical supervision is provided by the Urban Forester and labor is provided through the CDF program on

IIb. Management Objectives, Reforestation (Continued)

loan from Soledad Prison. The crew size is normally 15 to 20 men and a substantial amount of work can be completed with good organization and planning. These crews will work mechanically to clear understory and create openings for young trees to be planted.

IIc. Management Objectives

PEST AND DISEASE CONTROL MEASURES

A. Insect Pests

The Huckleberry Hill is comprised of an even aged, overmature stand of native Monterey pines, including an oak woodland community. Due to the excessive age of most of the remaining pines, extensive patterns of bark beetle attacks are noticeable amongst several of the remaining trees throughout the forest.

Beetle attacks are normally concentrated on trees suffering from stress due to factors such as drought, poor soil, overcrowding, and diseases like Western Gall Rust which affects young pines. In the case of Huckleberry Hill, poor soils, overcrowding, and drought during the mid-70's have made the remaining forest extremely vulnerable to attack by two major bark beetle species.

The Red Turpentine bark beetle (Dendroctonus valens) is the most destructive insect pest of the Monterey pine in this area. The beetle is approximately 1/3 inch in length and is dark reddish brown. Attacks are usually restricted to the lower portion and/or exposed surface roots of mature pine trees. Immediate mechanical removal of this insect and spraying infested trees with Lindane is the only proven method of control.

The second major pest is the Monterey Pine Engraver beetle (Ips radiata). This beetle is approximately 1/16 to 1/8 inch in length and deep brown in color. It infests dead or dying limbs of mature trees, small seedlings or very young trees. Ips are also known to attack and kill mature trees that are experiencing moisture stress or other problems. This beetle has been listed as a primary killer of healthy Monterey pines planted out of their nature range. To arrest the advance of infestation, a sanitary and complete removal of all dead, dying, and infested living branches is essential. If more than 2/3 of the canopy has been killed, complete removal is usually recommended.

Considering the large scale of outbreaks of these two bark beetles on Huckleberry Hill, mechanical removal of the pest is unrealistic and a large scale spray program of this dimension would be environmentally dangerous as well as extremely expensive. The alternative is not to do anything.

B. Diseases

Disease is a major problem associated with the over mature stands of Monterey Pine existing on Huckleberry Hill. Overcrowding plus competition from introduced exotics such as wild broom, pampas grass and noxious weeds has weakened the remaining trees making them extremely vunerable to disease and infestation.

IIc. Management Objectives, Pest and Disease Control Measures (Continued)

The two most prominent diseases of pines in the forest include Western gall rust (Peridermium harknessii) and Dwarfmistletoe (Arceuthobium campylopodium f. typicum). Both these infestations are widespread and severe throughout the forest. Western gall rust attacks young trees before they reach the age of 20 years. It stimulates the formation of witches broom (Sphaerotheca lanestris) and both retard the growth of the infected stem; where infection of the main stem occurs, this can cause the death of a small tree. Infection is invariably confined to the gall and its immediate surroundings. The galls tend to become spherical and seldom show exfoliation of bark during or after sporulation. By contrast, the bark that overlays (P. harknessii) galls tend to break and scale off, showing underlying smooth, naked wood, well in advance of branch killing. The exfoliation of bark results in the formation of a collar of dead bark on (P. harknessii) galls that stands out most clearly at the end of the swelling.

Peak production of spores takes place in February and March. There are no known controls of this disease other than removal of infected branches or trees.

Dwarfmistletoe is a parasitic seed-bearing plant that attacks and damages Monterey Pines. This parasite, native to Monterey pine stands in California, finds a highly susceptible host in (Pinus radiata). In the Carmel area, dwarfmistletoe and the gall rust are the most prevalent and destructive pathogens of Monterey pine.

Dwarfmistletoe shoots are a characteristic olive green shade with large dense clusters of shoots characteristic of old infections. Seeds are born at the tips of each branchlet. Trees weakened by dwarfmistletoe is usually not prevalent on very young saplings. Larger trees in the 4 to 12 inch diameter class are more susceptible. All sizes of trees can be damaged, deformed, or in multiple heavy infections even killed by this parasite. The disease often causes swellings on twigs and branches. Older infections on the main stem may cause little or no swelling. On the trunk, dwarfmistletoe breaks out between cracks in the bark. Decayed and sunken faces of older branches or the trunk of Monterey pine may be associated with gall rust, dwarfmistletoe, or mechanical or animal damage.

Control of dwarfmistletoe in Monterey pine is through removal of infected branches or trees. Other than trimming or removal of infected trees of removal of the mistletoe itself, there are no known chemical cures.

IIc. Management Objectives, Pest and Disease Control Measures (Continued)

C. Weed Pests

Where necessary to restore and maintain natural plant associations, maintenance efforts shall be aimed at elimination and control of noxious, invading plant pests such as genista (Cytisus canariensis), pampas grass (Cortaderia selloana), and ice plant (Mesembryanthemum edule).

The removal and control of these exotics will be done primarily by hand grubbing and clearing utilizing basic mechanical tools. However, the use of non-persistent herbicides such as Roundup, known to be effective in eradicating these pests, will be considered in view of the large areas involved. It may be the only practical means of removing the unwanted plants. In areas where there is a possibility of rare or sensitive plant species occurring, application of Roundup will be deferred until the area can be cleared by the Urban Forester after consulting with a Native Plant Society representative.

IId. Management Objectives

FIRE PROTECTION

The responsibility for fire protection on Huckleberry Hill rests with the City of Monterey Fire Department. Even while under control of the U.S. Army, the Monterey Fire Department was under contract to respond and protect the area. In the case of an extensive ground fire on the hill, Monterey would call in CDF located on Carmel Hill, with additional units from Pebble Beach to help respond and fight the blaze.

The City of Monterey Fire Department has fifty full time fire protection employees. The department works out of three stations; 1) headquarters in the downtown area; 2) New Monterey, and 3) Del Monte Grove. There are two engine companies and one ladder company manned in the headquarters station. In addition, there is a rescue unit and one tank truck available for vegetation fires. Two engine companies and a rescue unit comprise the New Monterey and Del Monte Grove stations.

Currently, the City of Monterey has an automatic aid agreement with the cities of Seaside and Pacific Grove. "Automatic aid" means that these city's fire departments will respond automatically to fires within specified areas beyond each city's limits. Additionally, the City of Monterey has a mutual aid agreement with the cities of Seaside, Pacific Grove and Carmel, the California Department of Forestry, and the Salinas Rural Fire Department. "Mutual aid" means that if the City requests service of another fire department, it will respond to the call (Environmental Management Consultants, 1982).

Through personal communication with City Fire officials, it has been expressed that although a substantial amount of combustible fuel exists on the ground, the marine influence along with the high humidity in this area discourages explosive hot burns on the Huckleberry Hill. Periodic brush fires that do break out are usually contained with a reasonable organized response by Fire Department personnel.

The Huckleberry Hill Nature Preserve consisting of approximately 81(+) acres is in need of general debris clearing as well as scheduled maintenance for existing fire breaks and trails. Insect and disease problems in connection with natural mortality has resulted in a buildup of dead tree debris and litter throughout the nature preserve. A certain amount of organic litter is both necessary and beneficial to cycle nutrients back into the soil for living trees and shrubs. An excess amount can serve as breeding grounds for harmful forest insects as well as create a potential for fast moving ground fires. For this reason, it is recommended that much of the dead slash be removed to enhance the forest as well as reduce the possibility of fire.

IIe. Management Objectives

WILDLIFE

Animal Life on the Monterey Peninsula is abundant and diverse. Over 200 species of birds are known to inhabit its forests, coastline, and fields (Monterey Peninsula Audobon Society 1968 in Howitt 1972). A large number of mammals, as well as several species of reptiles and amphibians, also are found on the Peninsula.

The diversity of vegetation types found on Huckleberry Hill provides suitable habitat for many of these wildlife species. Presidio knoll, which consists mainly of Monterey pine forest, provides a most valuable habitat for wildlife. It is the area least disturbed by human activity and is interspersed with patches of central maritime chaparral, mixed exotic and native trees and shrubs, non-native grasses and forbs, and eucalyptus trees. This mix of habitat types make the area especially attractive to wildlife.

Birds inhabiting the pine forest include such year-round residents as the Steller's jay, pygymy nuthatch, and chestnut-backed chickadee. Summer residents include olive-sided, ash-throated, and western flycatchers; winter visitors include yellow-rumped and Townsend's warblers. A list of birds which may be found in the Monterey pine forest and surrounding habitat is included in Table 1.

Although islands of nonforested habitat exist on Huckleberry Hill, these areas are not large enough to sustain large populations of species typical of such habitat. For example, birds which typically inhabit chaparral may be observed in the patches of central maritime chaparral, but these areas probably would not sustain a breeding population of more than a few individuals. Chaparral species which may use the area include brown and rufous-sided towhees, California quail, and Bewick's wrens. Fox and golden-crowned sparrows may use this habitat type during the winter months.

Birds typically observed in the grassland areas of the northwestern corner of the knoll include lark sparrows, mourning doves, and western meadowlarks. Raptors such as red-tailed hawks, American kestrels, and turkey vultures forage in open grassland habitats. The non-native grasslands are, however, disturbed and are likely to receive only occasional use by these species.

Mammals found on Huckleberry Hill include black-tailed deer, raccoon, opossum, striped skunk, brush rabbits, gray and California ground squirrels, and black-tailed hare. Other mammals which inhabit the Del Monte Forest and other areas adjacent to the knoll may occasionally be observed include bobcat, gray fox, coyote, and mountain lion. These animals have large home ranges and may seek

refuge in the Monterey pine forest while moving through the area. A list of mammals likely to occur in the knoll area is provided in Table 1.

Reptiles which may be found include the western fence lizard, western skink, southern alligator lizard, gopher snake, common kingsnake, and common garter snake.

Amphibians found include the ensatina, arboreal salamander, California slender salamander, western toad, and Pacific treefrog. Only those amphibians which do not require a permanent water source are likely to be found on the site. Table 2 lists the reptiles and amphibians that may inhabit the Huckleberry Hill Nature Preserve.

Large numbers of Monarch butterflies use Monterey pine, eucalyptus, and other trees found in Pacific Grove during their annual southward migration. Several thousand butterflies may congregate at one time to roost for the night. Individual trees on the knoll may be used to a lesser extent by monarch butterflies, but no specific "butterfly trees" have been identified.

No endangered, threatened, or candidate animal species are known to occur at Huckleberry Hill (U.S. Department of the Interior 1983).

The retention of snags on Huckleberry Hill is one important aspect of wildlife management. Snags provide a portion of the life support system for many species of plants, invertebrates, birds, and mammals. It has been persuasively argued that the absence of suitable nest sites is the usual limiting factor for cavity nesting birds (U.S. Department of Agriculture 1979).

The common forestry definition of a snag is a standing dead tree from which the leaves and most of the limbs have fallen. If the dead tree is broken off and more than 6.1 meters (20 feet) tall, it is still properly called a snag. If shorter than that, it is called a stub (Ford-Robertson 1971, p. 246).

Snags can be classified as either hard or soft. There are two reasons for making this breakdown - a forestry reason and a wildlife reason. The forestry reason is that hard snags are frequently marketable but soft snags are usually without market value. Hard snags are essentially composed of sound wood, especially on the outside. Soft snags are in advanced stages of decay and deterioration and usually have broken tops and few limbs.

The wildlife reason for designating types of snags is that some species of birds can excavate only in soft wood. Soft snags also produce the substrate for invertebrates on which many wildlife species feed. Other birds excavate only in hard snags. Some authorities believe that woodpeckers test for the presence of heart

rot which usually makes snags easier to excavate.

There has been a recent surge of interest in retaining snags for wildlife habitat in managed forests. This interest has been brought about for two reasons: (1) the increased emphasis of recent Federal laws on management of publicly owned forest lands for wildlife, and (2) the recognition that birds may play a significant role in regulation of insect populations. This second factor is extremely important one considering the major insect problem being experienced on Huckleberry Hill. There is a direct connection between retaining cavity nesting sites for insect eating birds and controlling large scale insect populations in the forest. There are many instances in which birds may have reduced major outbreaks of populations of harmful forest insects. Evidence is accumulating that birds act as important components in natural biological regulation of insect population dynamics at epedemic levels.

As a result of current scientific evidence, a select number of snags will be retained on Huckleberry Hill to accommodate nesting sites for insect eating birds to help control populations of harmful forest insects.

IIIa. Property Description

LOCATION AND BOUNDARIES

Beginning at a point that is the intersection of easterly line of State Highway 68 and the common line that is the westerly line to the Military Reservation and the easterly line of Rancho El Pescadero, being S33° 44'10"E, 1482.45 feet from a granite monument marking the most westerly corner of said Military Reservation (referred to as Monument Number 6419, and as marking a corner common to the Military Reservation and Rancho Pescadero on "Licensed Surveyors Map of El Pescadero and Point Pinos Rancho" filed in Volume 3 of Surveys, Page 3 with the Records of Monterey County, California), thence running along the following 23 courses:

1) N33° 44'10"W, 246.40 ft; 2) N25° 40'40"E, 246.38 ft;
3) N42° 11'40"E, 259.43 ft; 4) N63° 07'10"E, 183.32 ft;
5) N75° 06'40"E, 185.67 ft; 6) N40° 29'35"E, 132.05 ft;
7) N42° 15'40"E, 185.63 ft; 8) N43° 18'20"E, 133.17 ft;
9) N59° 13'30"E, 118.30 ft; 10) N72° 47'20"E, 971.45 ft;
11) S84° 38'05"E, 204.75 ft; 12) S76° 18'05"E, 127.02 ft;
13) S12° 29'05"W, 98.60 ft; 14) S15° 04'50"E, 204.35 ft;
15) S29° 00'10"E, 167.58 ft; 16) S32° 46'30"E, 154.21 ft;
17) N82° 21'30"E, 109.47 ft; 18) S52° 00'20"E, 278.14 ft

to a point that is 20 feet northerly and at right angle from the southerly boundary of said Military Reservation, thence (19) running northeasterly parallel with said southerly boundary line N47° 49'10"E, 420.00 feet; 20) S42° 10'50"E, 20.00 feet to the southerly boundary of said Military Reservation, thence (21) running southwesterly along said southerly boundary line of said Military Reservation S47° 49'10"W (21.78 feet to the northwest corner of that parcel of land described as course number 20 in Volume 97 of Official Records on Page 227 filed in the Recorder's Office, Monterey County, California), 2831.03 feet to the intersection of the easterly right-of-way of State Highway 68 (Holman Highway), said point being a point of cusp, thence (22) following said easterly right-of-way of said highway, along a curve to the left 488.87 feet (radius bears N86° 06'18"W) having a radius of 500 feet, to a point of tangency; 23) and continuous along said right-of-way N52° 07'32"W, 893.21 feet to the Point of Beginning.

This description contains 3,478,756.550 square feet (79.861 acres) more or less.

IIIa. Property Description, Location and Boundaries (Continued)

EXHIBIT 1

DEANNEXING

A portion of State Highway 68 (Holman Highway) and a portion of Private Property from the City of Monterey.

Beginning at that certain monument numbered 5507, as said monument is shown on that certain map entitled "Licensed Surveyors Map of El Pescadero and Point Pinos Rancho," filed in Map Book 3 of Surveys at Page 3 in the Records of Monterey County, California, thence running along said rancho boundary

1. S33° 50'30"E, 140.69 feet to a point on the southerly line of State Highway 68 (Holman Highway), thence

2. N20° 55'53"E, 118.32 feet to a point of tangency, thence

3. along a curve to the left 148.21 feet having a radius of 500 feet (radius bears N69° 04'07"W) and whose angle is 16° 59'01" to the intersection of the southerly line of the U. S. Presidio Boundary line as said line is shown on that certain map entitled "Reservation Map of Presidio of Monterey, Cal." filed in Volume 2 of Maps (Outside Lands) Page 3 in the Records of Monterey County, California, thence running along and on said southerly Presidio Boundary

4. S47° 49'10"W, 205.52 feet to the Point of Beginning, containing 16,138.20 square feet (0.370 acres).

IIIa. Property Description, Location and Boundaries (Continued)

EXHIBIT 2

DEANNEXING

A portion of State Highway 68 (Holman Highway) and a portion of Private Property from the City of Monterey.

Beginning at that certain monument numbered 5507, as said monument is shown on that certain map entitled "Licensed Surveyors Map of El Pescadero and Point Pinos Rancho," filed in Map Book 3 of Surveys at Page 3 in the Records of Monterey County, California, thence running along said Rancho Boundary

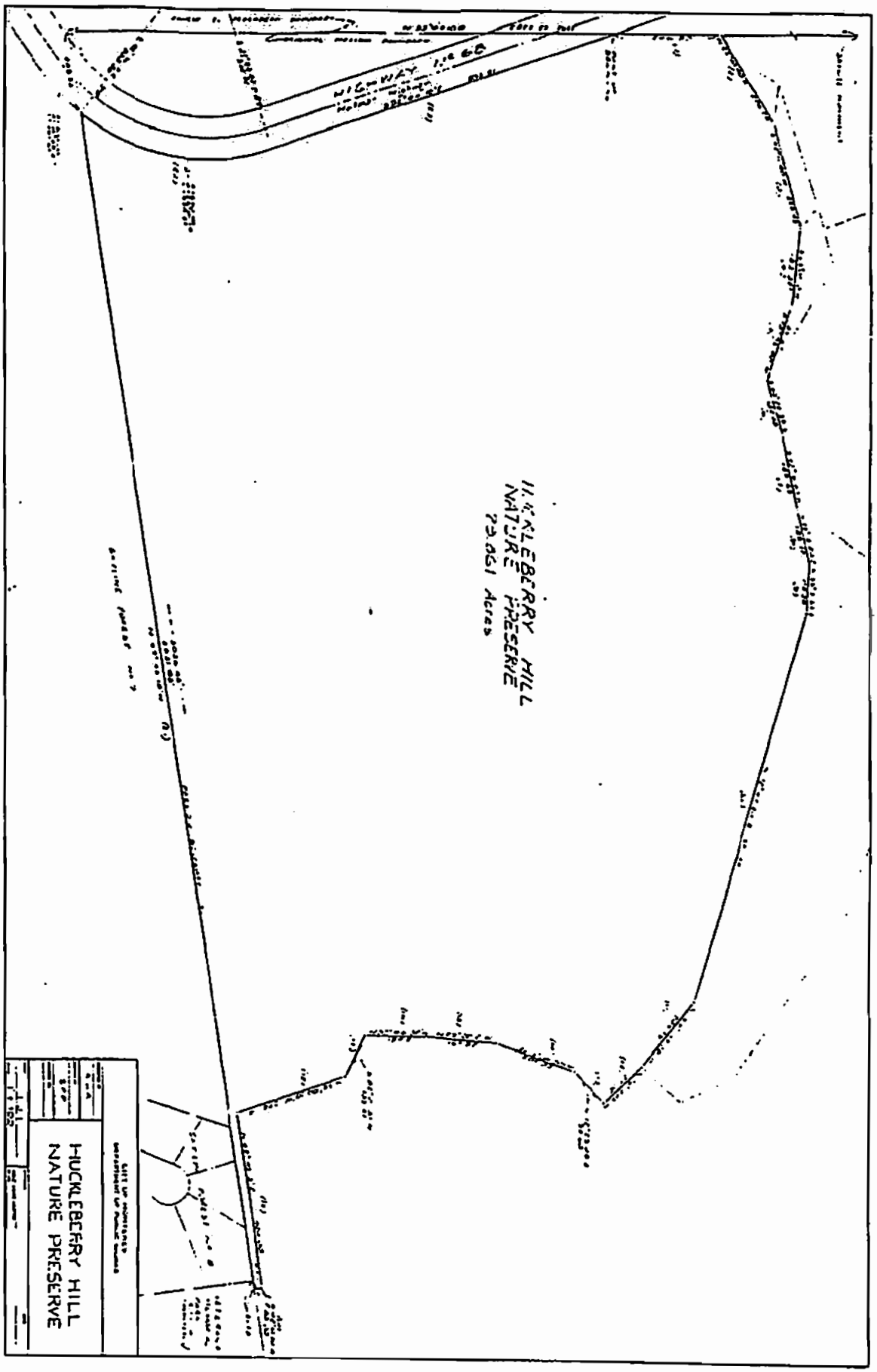
1. N33° 44'10"W, 1340.80 feet to the intersection of the northerly line of Highway 68 (Holman Highway), thence along the northerly line of said Highway 68

2. S52° 07'32"E, 893.21 feet to the beginning of a tangent curve to the right, thence

3. along a curve to the right 420.89 feet having a radius of 500 feet to the intersection of the southerly line of the U. S. Presidio Boundary line as said line is shown on that certain map entitled "Reservation Map of Presidio of Monterey, Cal." filed in Volume 2 of Maps (Outside Lands) Page 3 in the Records of Monterey County, California, thence running along and on said southerly Presidio Boundary

4. S47° 49'10"W, 205.52 feet to the Point of Beginning containing 236,358.268 square feet, 5.426 acres.

LOCATION AND BOUNDARIES MAP



IIIb. Property Description

NATURAL HISTORY

Overview

Huckleberry Hill is an 81+ acre parcel of land existing within the Presidio of Monterey and designated as a Nature Preserve by the California Natural Areas Coordinating Council (Hood 1982). It is located approximately 0.8 - 1.2 miles south of the Presidio Knoll, at the summit of the long ridge connecting the two hills. (See Map 1).

The natural area extends down the northwest slope of Huckleberry Hill into the Del Monte Forest and the Samuel F. B. Morse Botanical Reserve at Sawmill Gulch. The Presidio Knoll stands at the northern edge of Huckleberry Hill; therefore, a portion of the natural preserve lies on the slopes and summit of the Presidio Knoll. Native Monterey pine forest is the dominant plant community in the undisturbed areas of Huckleberry Hill. Most of the pines are mature individuals in open to dense stands with a crown height of about 30 - 80 feet (Mayne 1982). In addition, the preserve is comprised of seven understory species within the pine forest. These include grasses, huckleberry, coffeeberry, broom, oak, manzanita, and huckleberry-manzanita. The combination of an unusual, pleasant climate, a varied topography, and an elaborate pattern of different kinds of soils supports varied and highly unusual forms of plant growth.

Over the years many botanical pilgrims have trooped through what is now part of the Del Monte Forest in the central portion of the Monterey Peninsula. Early travelers simply called this spot the north slope of "Huckleberry Hill". In recent decades, students and associates of Ledyard Stebbins often used the term "Evolution Hill" for this location.

To fully appreciate this forest, something about the evolutionary history of closed-cone forests should be mentioned. These coastal conifer communities are usually dominated by Monterey Pine (Pinus radiata) or Bishop Pine (Pinus muricata). Both pines have cones that are slow to open; in fact, Bishop pine cones seldom open unless they are burned.

Several million years ago the immediate ancestors of these pines grew in inland areas of mild climate. As the climate in the interior cooled, the frost-susceptible pines must have been forced toward the more temperate coast. There appears to have been closed-cone forests for a long time along much of the California coast and on adjacent islands. Fossil evidence of many localities supports this idea.

IIIb. Property Description, Natural History (Continued)

During glacial times, the level of the California coastline changed drastically. The rising ocean cut terraces and the retreating ocean later spread beach deposits over those terraces. By the late Pleistocene, the highest terrace in the Del Monte Forest may have had an elevation of 600 feet. After the glacial periods were over from 8,000 to 3,000 years ago, a warm, dry climate developed (Howitt 1972). This climate was too severe for much of the closed-cone forest. The conifers were exterminated in many places with only isolated patches of forest surviving where there was a particularly favorable combination of soil and climate. How long the present forests have been isolated and just how they came to be isolated are still debatable; but it is beyond question that the present closed-cone forests are a mere fraction of a once extensive community.

Huckleberry Hill is the only place where Monterey pine and Bishop pine survived together. Although pines so closely related often hybridize when they meet in nature, very little crossing has occurred on Huckleberry Hill (Howitt 1979). The two species remain distinct and their continued isolation is of great genetic interest. Bishop pine is an extremely variable species, and the trees in the Huckleberry Hill population are somewhat different morphologically and chemically from those growing to the north and to the south of Monterey.

IVa. General Physiographic Features

CLIMATE

The Presidio of Monterey is located within the Mediterranean climatic zone characterized by cool, dry summers, mild winters, and light annual precipitation. Since the Monterey Peninsula is almost completely surrounded by the Pacific Ocean, the marine influence dominates the climatic pattern, with local variations determined largely by the topography (U.S. Department of the Army 1976).

The prevailing climatic condition is the sea breeze/land breeze regime. The onshore sea breeze with west to northwest surface winds, often exceeding 10 miles per hour in the spring and summer, develops during the day, with weak offshore flows developing at night. The marine layer of air associated with the sea breeze is modified by the ocean, so that the air temperature usually remains within a few degrees of the water temperature and the relative humidity is high. Since the ocean water temperature usually remains around 50°F throughout the year, the average air temperatures vary over a limited range (U.S. Department of the Army 1976).

During the summer months, days are generally sunny and dry. Coastal morning and evening fog is frequently drawn onshore, blanketing the coastal communities. In the fall the onshore breezes decline and reduce the influx of fog; the area has warm, pleasant weather. Average temperatures drop to the middle and low 50s (°F) during the winter. Over 90 percent of the area's rainfall occurs between November 1 and April 30. In March and April, the cool, wet days are interrupted by occasional warm, summy days, and blustery west winds are frequent. May and June bring a return to warm, summy days and the return of summer coastal fog int he low coastal areas (U.S. Department of the Army 1979).

IVb. General Physiographic Features

TOPOGRAPHY

Topography of the Presidio of Monterey is varied, with terrain rising rapidly beginning at the eastern boundary at Lighthouse Avenue, about 30 feet above mean sea level, and rising to 126 feet above mean sea level at Sloat Monument. Two hills are found on the Presidio of Monterey. The first, 597 feet above mean sea level, is located adjacent to Bishop Avenue. The second, Presidio Knoll, is over 770 feet above mean sea level.

IVc. General Physiographic Features

GEOLOGY AND SOIL

NcC - Narlon loamy fine sand, 2 to 9 percent slopes. This is a gently sloping and moderately sloping soil on dissected marine terraces. It has the profile described as representative of the series. The clay subsoil is at a depth of 15 to 20 inches. Slopes are mostly 3 to 6 percent.

Included with this soil in mapping were small areas of a Narlon soil that has slopes of 9 to 15 percent and areas of Tangair soils. Also included, and making up about 15 percent of the acreage, were soils that have a clay subsoil at a depth of more than 24 inches or a subsoil that is medium acid or slightly acid. Included at an elevation above 600 feet were small areas of soils that have bedrock at a depth of less than 20 inches or soils that hae no clay subsoil, but have cemented sand at a depth of 10 to 20 inches.

Runoff is slow to medium, and temporary shallow ponds form in swales in wet winters. The erosion hazard is moderate.

This soil is used mostly for woodland. Some areas are used for grazing and homesites. The soil has moderate productivity for Monterey pine (site index averages about 75). The seedling mortality is low, and the windthrow hazard is severe. The equipment limitation is moderate or severe. Capability unit IVe-3(14); Claypan range site.

NcE - Narlon loamy fine sand, 15 to 30 percent slopes. This is a strongly sloping and moderately steep soil on uplands. It has a profile similar to the one described as a representative of the series, but depth to the clay subsoil is 12 to 20 inches. Slopes are mostly 12 to 20 percent. (See Map 2.)

Included with this soil in mapping, and making up about 50 percent of the acreage, were small areas of Chamist, Cieneba, Tangair, Santa Lucia, Sheridan, and Santa Ynez soils; some areas of soils that have a clay or sandy loam subsoil at a depth of less than 20 inches; and soils that have no clay subsoil, but have cemented sand at a depth of 10 to 20 inches.

Runoff is medium, and the erosion hazard is moderate.

This soil is used mostly for woodland. Some areas are used for grazing.

The soil has moderately low productivity for Monterey pine (site index averages about 60). The seedling mortality is low, and the windthrow hazard is severe. The equipment limitation is severe. The productivity rating is based on the premise that trees 60 to 90

feet are common, and some are to 100 feet - heights that are attained in 80 to 100 years. Meyer's curves (21) could not be used directly for this species, but the species is comparable to ponderosa pine if mature trees about 100 years of age are used. Monterey pine commonly grows more rapidly in the first years than ponderosa pine. Early growth is more like coastal Douglas-fir or redwood. Capability unit VIIe-1(15); Claypan range site.

SoE - Sheridan course sandy loam, 15 to 30 percent slopes. This is a moderately steep slope on rounded hills. It has a profile described as a representative of series.

Included with this soil in mapping were small areas of Vista, McCoy, Pfieffer, San Andreas, and Diablo soils; some soils that have a subsoil of sandy clay loam, clay loam, or clay; and some grayish brown sandy loams that are less than 20 inches deep. Also included was a soil that is very similar to this Sheridan soil, but has less than 1 percent organic matter above a depth of 20 inches, which makes up 40 to 50 percent of the acreage in some places. Small areas of Sheridan soils that have 30 to 50 percent slopes or are 40 to 60 inches deep to weathered rock were also included.

Runoff is rapid, and the erosion hazard is moderate.

This soil is used mostly for range. On the Monterey Peninsula and along the coast, some areas are used for homesites. Capability unit VI3e-1(15); Granitic range site.

Va. Forest Description

FOREST TYPE

The forest type on Huckleberry Hill is dominated by Monterey Pine (Pinus radiata) which forms a nearly closed canopy forest over most of the area. This forest can be subdivided on the basis of dominant understory species into several types. The variation in species composition within the understory results from the differences in the forest environment. Aspect, soil moisture, and soil depth appear to be the major factors controlling the distribution of understory species within the forest. Grass, huckleberry, manzanita and huckleberry-manzanita types have the greatest coverage and interdigitate throughout the pine forest. Pine/broom is most abundant along the disturbed edges of dirt roads crossing the knoll.

Central Maritime Chaparral

The central maritime chaparral plant community is dominated by broad mounds of Hooker's manzanita and dense thickets of wooly-leaf manzanita. Interspersed in this vegetation type are Monterey pine and coast live oak, as well as other shrubs and herbs.

The largest stand of central maritime chaparral is near the southernmost corner of Huckleberry Hill on the west facing slope. This stand covers approximately 2.5 acres.

Eucalyptus Groves and Other Exotics

Groves of eucalyptus trees and other exotic grasses and forbes are located in disturbed areas on the Huckleberry knoll. In certain areas, these species are intermixed with Monterey pines and coast live oaks.

Two "rare" but not "endangered" species, Hooker's manzanita and Monterey pine, are abundant throughout undisturbed portions of the forest. Monterey pine is the dominant tree in the Monterey pine forest and central maritime chaparral.

Bishop Pine Stands

Resource maps developed for the Monterey County General Plan and the Skyline local Coastal Program Land Use Plan indicated the possible presence of Bishop pine and Gowen cypress stands on Huckleberry Hill. During initial field investigations conducted for this study, no Gowen cypress were observed on the knoll, but a few scattered individuals of Bishop pine were observed along the

Va. Forest Description, Forest Type (Continued)

southwest boundary of Huckleberry Hill near Highway 68. However, no extensive stands of Bishop pines were found as suggested by the Monterey County General Plan and the Skyline Land Use Plan. The trees observed are possibly few in number and merely scattered outliers of the main Bishop pine stands downslope in Del Monte Forest.

Vb. Forest Description

ACCESS AND ROADS

Public access to the Huckleberry Hill Nature Preserve will be available by foot traffic only at three points designated on Map 3. Vehicular ingress and egress shall be limited to maintenance vehicles only at two designated access gates as shown by the map. The two vehicle entrance gates to the area will be locked at all times with Army locks. A key to the locks will be provided by the Army to the City. Plans for the location and construction of the fence and vehicle gates will be forwarded to the Directorate of Engineering and Housing, Fort Ord, California.

VIa. Appendix

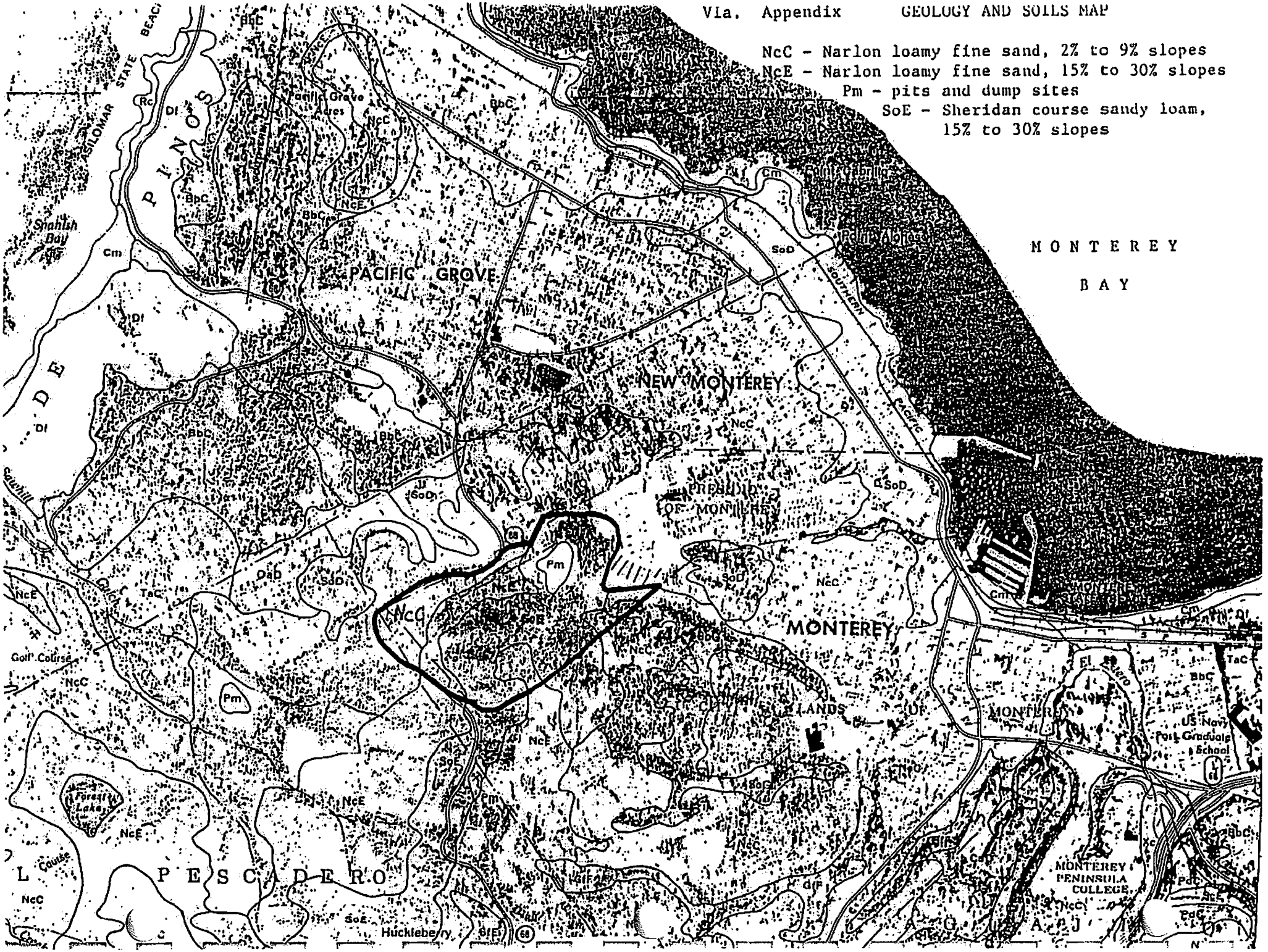
VARIOUS MAPS

1. General Site Map.
2. Geology and Soils Map.
3. Access and Roads Map.
4. Fence and Boundary Map.

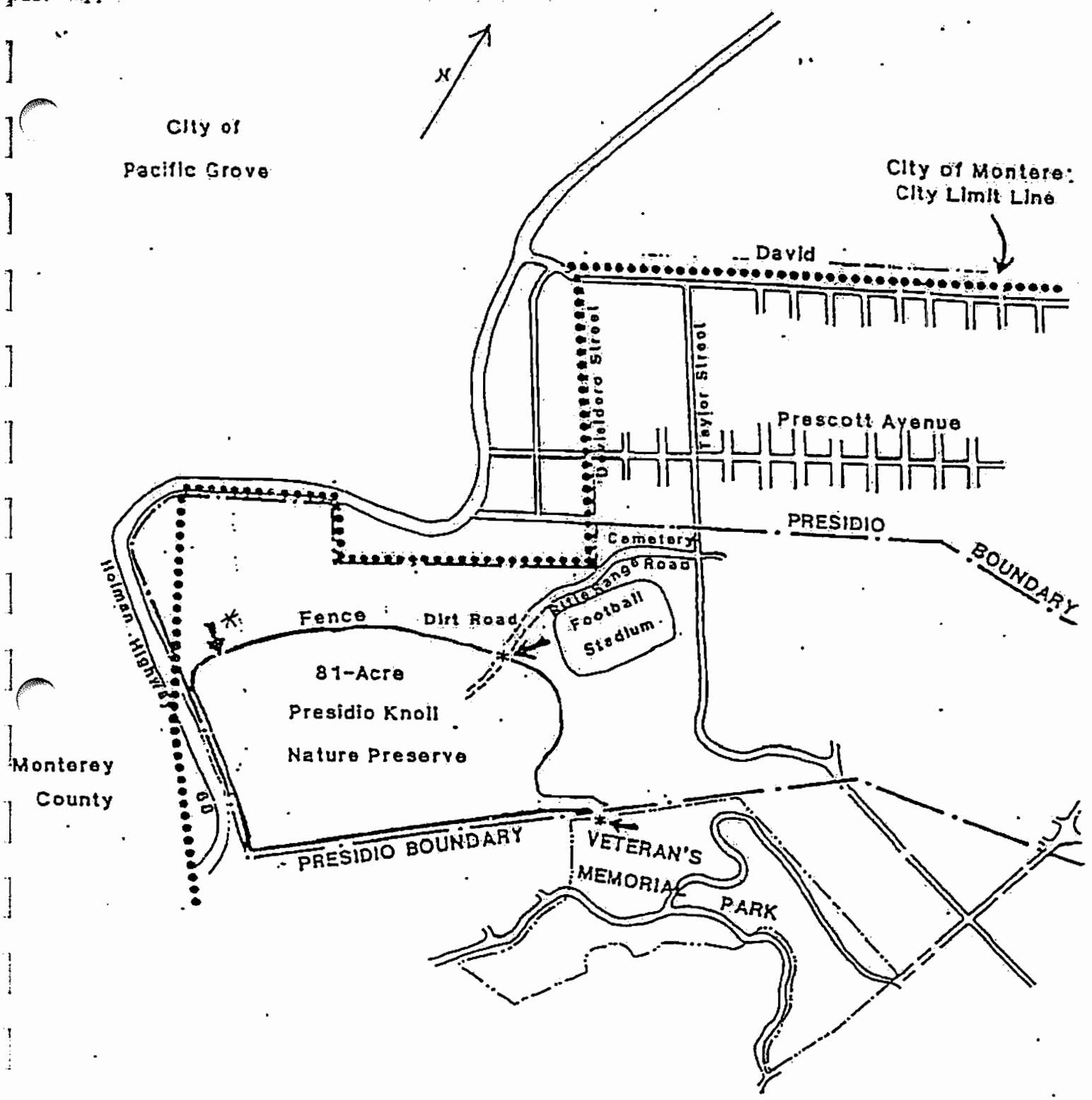
VIa. Appendix

GENERAL SITE MAP

VIa. Appendix GEOLOGY AND SOILS MAP



ACCESS AND ROADS MAP



→ Proposed Pedestrian Access

* Proposed Vehicle Entry Gates

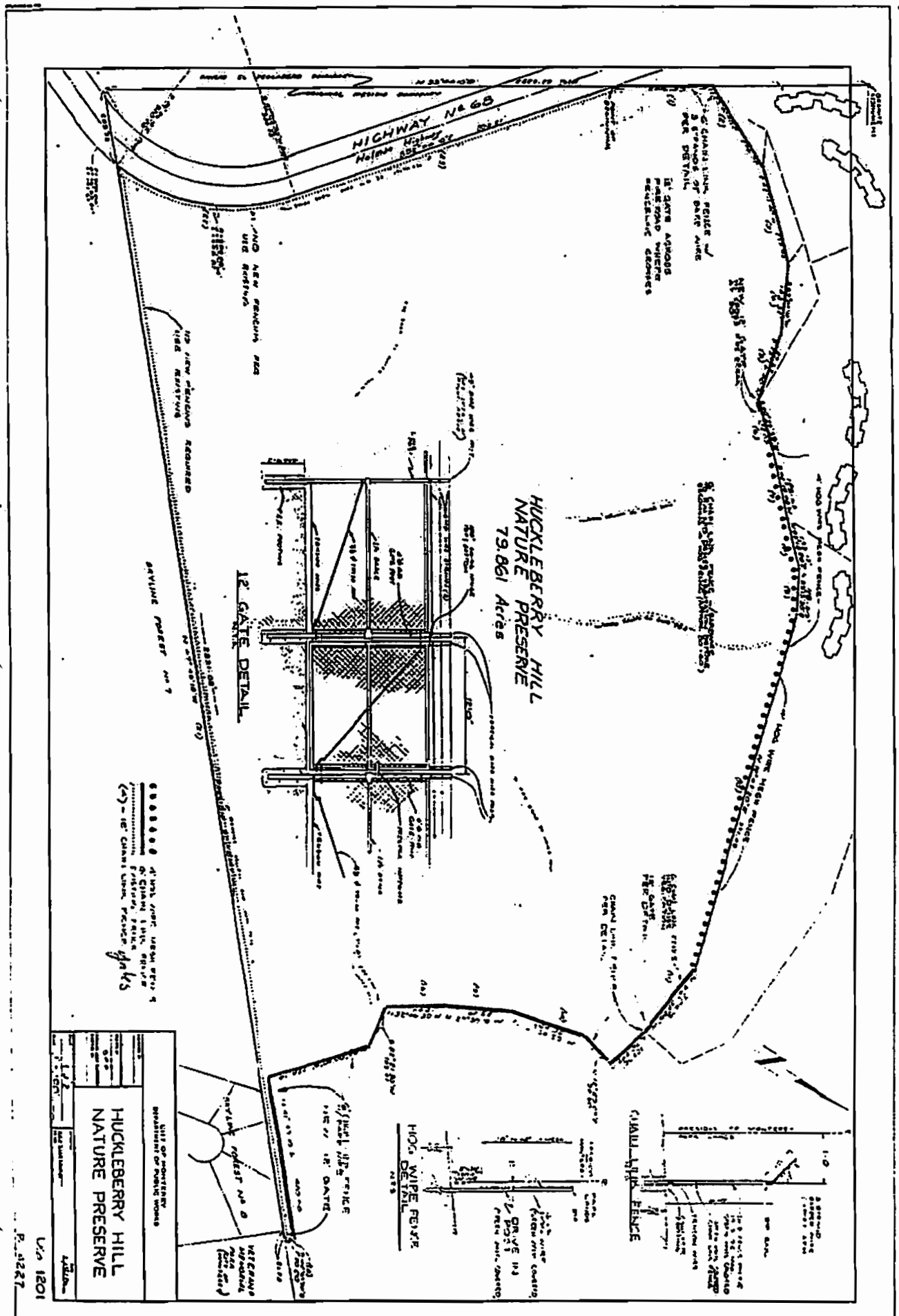
0 1,000 2,000

SCALE IN FEET

Presidio Knoll Nature Preserve
81 Acres

Proposed Pedestrian & Vehicular Access Points

Schematic Drawing Only; not for


HIGHWAY No. 68
HUCKLEBERRY HILL NATURE PRESERVE
79.861 Acres
12' GATE DETAIL
HOG WIRE FENCE DETAIL
CHAIN LINK FENCE
HUCKLEBERRY HILL NATURE PRESERVE

VIb. Appendix

TABLE 1
MAMMALS AND BIRDS LIKELY TO OCCUR AT HUCKLEBERRY HILL

COMMON NAME	SCIENTIFIC NAME
MAMMALS[1]	
Virginia opossum	Didelphis virginiana
Trowbridge's shrew	Sorex trowbridgii
Little brown myotis	Myotia lucifugus
California myotis	M. californicus
Red bat	Lasiurus borealis
Hoary bat	L. cinereus
Brush rabbit	Sylvilagus bachmani
Black-tailed hare	Lepus californicus
California ground squirrel	Spermophilus beecheyi
Western gray squirrel	Sciurus griseus
Western harvest mouse	Reithrodontomys megalotis
California mouse	Peromyscus californicus
Deer mouse	P. maniculatus
Dusky-footed woodrat	Neotoma fuscipes
House mouse	Mus musculus
Coyote[2]	Canis latrans
Gray fox[2]	Urocyon cinereoargenteus
Raccoon	Proycyon lotor
Striped skunk	Mephitis mephitis
Mountain lion[2]	Felis concolor
Bobcat[2]	Lynx rufus
Columbian black-tailed deer	Odocoileus hemionus columbianus
BIRDS[1,3]	
Turkey vulture (m)	Cathartes aura
Sharp-shinned hawk (r)	Accipiter striatus
Cooper's hawk (r)	A. cooperii
Red-tailed hawk (r)	Buteo jamaicensis
American kestrel (r)	Falco sparverius
California quail (r)	Callipepla californica
Killdeer (r)	Charadrius vociferus
Band-tailed pigeon (r)	Columba fasciata
Mourning dove (r)	Zenaidura macroura
Western screech-owl	Otus kennicottii
Great horned owl (r)	Bubo virginianus
Anna's hummingbird (r)	Calypte anna
Rufous hummingbird (m)	Selasphorus rufus
Allen's hummingbird (s)	S. sasin
Northern flicker (r)	Colaptes auratus
Acorn woodpecker (r)	Melanerpes formicivorous
Hairy woodpecker (r)	Picoides villosus
Downy woodpecker (r)	P. pubescens

VIb. Appendix, Table 1 (Continued)

COMMON NAME	SCIENTIFIC NAME
Western kingbird (s)	Tyrannus verticalis
Say's phoebe (w)	Sayornis saya
Western flycatcher (s)	Empidonax difficilis
Ash-throated flycatcher (m)	Myiarchus cinerascens
Olive-sided flycatcher (s)	Contopus borealis
Violet-green swallow (m)	Tachycineta thalassina
Steller's jay (r)	Cyanocitta stelleri
Scrub jay (r)	Aphelocoma coerulescens
American crow (r)	Corvus brachyrhynchos
Chestnut-backed chickadee (r)	Parus rufescens
Plain titmouse (r)	P. inoratus
Bushtit (r)	Psaltriparus minimus
White-breasted nuthatch (r)	Sitta carolinensis
Red-breasted nuthatch (w)	S. canadensis
Pygmy nuthatch (r)	S. pygmaea
Brown creeper (r)	Certhia americana
Wrentit (r)	Chamaca fasciata
House wren (m)	Troglodytes aedon
Winter wren (m)	T. troglodytes
Bewick's wren (r)	Thryomanes bewickii
California thrasher (r)	Toxostoma redivivum
American robin (r)	Turdus migratorius
Hermit thrush (r)	Catharus guttatus
Blue-gray gnatcatcher (m)	Polioptila caerulea
Western bluebird (r)	Sialia mexicana
Loggerhead shrike (r)	Lanius ludovicianus
European starling	Sturnis vulgaris
Hutton's vireo (r)	Vireo huttoni
Orange-crowned warbler (s)	Vermivora celata
Yellow warbler (s)	Dendroica petechia
Yellow-rumped warbler (w)	D. coronata
Townsend's warbler (w)	D. townsendi
Hermit warbler (w)	D. occidentalis
Wilson's warbler (s)	Wilsonia pusilla
Northern oriole (m)	Icterus galbula
Brewer's blackbird (r)	Euphagus cyanocephalus
Western meadowlark (r)	Sturnella neglecta
Western tanager (m)	Piranga ludoviciana
Lazuli bunting (m)	Passerina amoena
Purple finch (r)	Carpodacus purpureus
House finch (r)	C. mexicanus
Lesser goldfinch (r)	Carduelis psaltria
Lawrence's goldfinch (m)	C. lawrencei
Red crossbill (w)	Loxia curvirostra
Rufous-sided towhee (r)	Pipilo erythrophthalmus
Brown towhee (r)	P. fuscus
Rufous-crowned sparrow (r)	Aimophila ruficeps
Lark sparrow (r)	Chondestes grammacus
Sage sparrow (r)	Amphispiza belli
Dark-eyed junco (r)	Junco hyemalis

VIb. Appendix, TABLE 1 (Continued)

COMMON NAME	SCIENTIFIC NAME
Chipping sparrow (m)	Spizella passerina
Black-chinned sparrow (m)	S. atrogularis
White-crowned sparrow (r)	Zonotrichia leucophrys
Golden-crowned sparrow (w)	Z. atricapilla
Fox sparrow (w)	Passerella iliaca
House sparrow (r)	Passer domesticus

---

[1] Nomenclature according to Laudenslayer and Grenfell (1983).

[2] Occasional transient.

[3] Compiled with the aid of Monterey Peninsula Audobon Society (Stallard pers. comm.) and Howitt 1972.

r = year-round resident
m = migrant
w = winter visitor
s = summer resident

VIb. Appendix

TABLE 2

REPTILES AND AMPHIBIANS LIKELY TO OCCUR AT HUCKLEBERRY HILL

COMMON NAME	SCIENTIFIC NAME
REPTILES[1]	
Western fence lizard	Sceloporus occidentalis
Western skink	Eumeces skiltonianus
Southern alligator lizard	Gerrhonotus multicarinatus
Gopher snake	Pituophis melanoleucus
Common kingsnake	Lampropeltis getulus
Common garter snake	Thamnophis sirtalis
AMPHIBIANS[1]	
Ensatina	Ensatina eschscholtzi
California slender salamander	Batrachoseps attenuatus
Arboreal salamander	Aneides lugubris
Western toad	Bufo boreas
Pacific treefrog	Hyla regilla

[1] Nomenclature according to Laudenslayer and Grenfell (1983).

VIb. Appendix

TABLE 3

PLANTS LIKELY TO OCCUR AT HUCKLEBERRY HILL

COMMON NAME	SCIENTIFIC NAME
Baccharis	Baccharis pilularis
Bed straw	Galium aparine
Blackberry	Rubus vitifolius
Blue blossom	Ceanothus thyrsiflorus
Blue wild rye	Elymus glaucus
Bracken fern	Pteridium aquilinum var. lanuginosum
Clintonia	Clintonia andrewsiana
Coast live oak	Quercus agrifolia
Coffeeberry	Rhamnus californica
Douglas iris	Iris douglasiana
Eucalyptus	Eucalyptus globulus
French broom	Cytisus canariensis
Honeysuckle	Lonicera hispidula
Hooker manzanita	Arctostaphylos hookeri
Huckleberry	Vacciuium ovatum
Ice plant	Mesembryanthemum edule
Indian paintbrush	Pedicularis densiflora
Lizard tail	Eriophyllum staechadifolium
Madrone	Arbutus menziesii
Mimosa	Albizzia julibrissim
Monkey flower	Mimulus aurantiacus
Monterey manzanita	Arctostaphylos tomentosa var. hebecloda
Monterey pine	Pinus radiata
Pacific snakeroot	Sanicula crassicaulis
Pampas grass	Cortaderia selloana
Pink flowering currant	Ribes sanguineum var. glutinosum
Poison oak	Toxicodendron radicans diversiloba
Salal	Gaultheria shallon
Scouler willow	Salix scouleriana
Snowberry	Symphoricarpos mollis
Soap plant	Chlorogalum pomeridianum
Strawberry	Fragaria californica
Toyon	Heteromeles arbutifolia
Wood rose	Rosa gymnocarpa
Yarrow	Achillea millefolium
Yerba buena	Satureja douglasii

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Appendix D
2005 Habitat Assessment Report Flora and Fauna Baseline Study
of the Presidio of Monterey, California

Habitat Assessment Report
Flora and Fauna Baseline Study of the Presidio of Monterey, California

Prepared for

U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814
Contact: William Collins
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MACTEC Project No. 4088053116 04

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William Reich
Principal Environmental Scientist

December 7, 2005

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A SPECIAL-STATUS PLANT AND ANIMAL SPECIES OBSERVED AT THE PRESIDIO OF MONTEREY, CALIFORNIA, JUNE-AUGUST 2005
B PHOTOGRAPHS OF PLANTS AND VEGETATION HABITATS AT THE PRESIDIO OF MONTEREY
C CALIFORNIA NATIVE SPECIES FIELD SURVEY FORMS (I.E., RARE PLANT FORMS)
D DISTRIBUTION MAPS FOR SPECIAL-STATUS PLANT SPECIES AT THE PRESIDIO OF MONTEREY

DISTRIBUTION

1.0 INTRODUCTION

This report provides updated baseline information on the flora and fauna of the Presidio of Monterey (POM). It provides a qualitative and quantative analysis of flora and fauna information, with an emphasis on special-status species that are considered threatened, endangered or rare. Surveys of vegetation and wildlife resources were conducted by a MACTEC Engineering and Consulting, Inc. (MACTEC) biologist at the POM in June and July, 2005. The surveys focused on identifying occurrences and potential suitable habitat for plant and wildlife species considered to be of special concern, or are listed or managed as rare, threatened, or endangered by federal, state, or other agencies. The results contained within this report include information obtained from and provide an update of baseline data from *Flora and Fauna Baseline Study of the Presidio of Monterey, California (Jones & Stokes, Inc., 1995).*

1.1 Project Location

The POM comprises nearly 400-acres within the City of Monterey on the Monterey Peninsula in Monterey County, California (Plate 1 and 2). Areas surrounding the POM, which is within the Monterey 7.5-minute quadrangle, include residential neighborhoods of Monterey, undeveloped areas of Monterey pine forest (including the eastern edge of Point Lobos Reserve), and State Route (SR) 68.

Project Site Description

As illustrated by Plate 2, the POM's long shape resembles a bent leg as the site extends from within 150 feet of Monterey Bay at Lighthouse Avenue to SR 68 near the middle of the peninsula. Elevations vary within the POM from 26 feet above mean sea level (amsl) in elevation at the mouth of an unnamed stream at the site's southeastern corner to 771 feet amsl at the top of an unnamed summit near the site's southwestern corner. The site generally drains to the southeast.

Nearly all POM land parcels below 450 feet amsl have been developed as classroom buildings, dormitories, maintenance buildings, and many other ancillary structures associated with the Department of Defense Language Institute Foreign Language Center, the site's primary function. Most of the POM's undeveloped land supports natural stands of habitat classified as Monterey Pine Forest *(Holland, 1986).* A narrow plot of undeveloped land encompassing a stream corridor at the southeastern corner of the POM supports a Central Coast Live Oak Riparian Forest *(Holland, 1986).* In addition to these two natural habitats, the POM contains four other land classification areas: horticultural planting, grass and lawn, disturbed ground, and developed areas (Table 1).

Table 1. Land Cover Classifications at the POM

Habitat Type	Habitat Subtype
Horticultural planting	Monterey pine planting Monterey cypress planting Eucalyptus planting Mixed tree planting
Grass and lawn	Open grass and lawn Grass and lawn with scattered trees
Disturbed ground	Bare ground French broom thicket
Riparian	Monterey pine, coast live oak, and eucalyptus riparian forest Coast live oak riparian forest
Monterey pine forest	Monterey pine forest with hard shrub understory Monterey pine forest with mesic understory Monterey pine forest with grassy understory
Developed	No habitat subtypes

Plate tectonic shifts and related coastal uplifting and fluctuating sea levels (related to periodic ice age periods since the Pleistocene Epoch) have influenced the topography found within the POM. These forces sculpted a landscape that includes six coastal marine terraces that formed at different times *(Dupre, 1990)*. The POM displays portions of all six of these coastal terraces in a clearly defined ascending "staircase" pattern evident from Lighthouse Avenue to the unnamed summit (Plate 3) *(Jones & Stokes Associates, Inc. 1994b)*. The first through fourth terraces occur at lower elevations. These four and most of the fifth terrace have been developed. The sixth terrace, called "The Huckleberry Hill Preserve" is at the top of the summit at 700 feet amsl. It has not been developed.

2.0 METHODS

2.1 Special-Status Plant Species Surveys

Surveys for special-status and common plant species were conducted on June 28 through July 1, July 6-7, and August 2, 2005. The surveys were conducted by walking meandering transects through these two naturally vegetated, undeveloped habitats to provide visual observations of the plant communities supported by the natural habitat (Plate 4). A description of these four areas location within POM follows:

Area 1: A Monterey Pine Forest located on the west and south sides of Building 630, which is bordered by Rifle Range Drive and Mason Road (Plate 4).

Area 2: Three separate, naturally-indigenous, vegetated parcels, all of which are nearby each other in the central-southern, and southeastern portions of the POM (Plate 4). The first parcel supports a Monterey Pine Forest habitat established in two canyons in the south-central portion of the POM between Building 651and 622 and on the eastern edge of the Point Lobos Reserve that lies outside the site. The second parcel near the Franklin Entrance Gate adjacent to Buildings 418 and 419 also supports a Monterey pine forest with an ephemeral creek running through the middle of the site. The third parcel is located in the southeastern area of the POM and is a thin, rectangular plot containing a small creek within Central Coast Live Oak Riparian Forest *(Holland, 1986).* This area also contains non-native elements, primarily French broom *(Genista monspessulana)*, pampass grass *(Cortaderia jubata)*, and eucalyptus *(Eucalyptus globulus)*.

Area 3: A naturally-indigenous, vegetated Monterey Pine Forest adjacent to and outside the fenceline that encloses The Huckleberry Hill Preserve (Area 4) in the southwestern portion of the POM. It is located adjacent to MacArthur Street and adjacent to Buildings 811, 840, 838, 833, 832, 831, 660, 649, and 650 (Plate 4).

Area 4: The 80-acre Huckleberry Hill Preserve consists primarily of a native Monterey Pine Forest and is located on the southwestern edge of POM where its west-southwest border lies adjacent to SR 68 (Plate 4).

Both common and special-status plants were identified during the surveys. Special-status plants are emphasized in this report in terms of their population status and occurrence throughout the POM. Special-status plant species are legally protected under the Federal and State of California Endangered Species Acts and other regulations, in addition to being considered sufficiently rare by the scientific community, including the California Native Plant Society, which maintains rare plant data for informational use by many public agencies, local jurisdictions, and other agencies involved with land use decisions.

Special-status plant species are designated in California in accordance with the following federal and state regulations:

- Plants listed or proposed for listing as threatened or endangered under the federal Endangered Species Act {50 CFR 17.12 (listed plants) and various notices in the Federal Register (proposed species)};
- Plants that are Category 1 or 2 candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (58 Federal Register 188, September 30, 1993);

- 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 Department of Fish and Game (CDFG) 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). In addition, the following non-regulatory criteria are applied to particular plant species in California to determine if they meet special-status requirements;

- Plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists lB and 2 in *Skinner and Pavlik, 1994);*

- Plants listed by the California Native Plant Society (CNPS) as plants about which more information is needed to determine their status, as well as plants of limited distribution (Lists 3 and 4 in *Skinner and Pavlik, 1994*) that may be included as special-status species based on their local significance or recent biological information.

2.2 Wildlife Surveys

Reconnaissance-level field surveys occurred during every survey day (June 28-July 1; July 6-7; and August 2, 2005) to determine the presence of both common and special-status species of wildlife within the POM (Table 2). During the completion of these surveys, the primary goal was to detect the presence of special-status wildlife species that have been known to occur or suspected to occur in the POM, such as sharp-shinned hawk *(Accipiter striatus)*, Cooper's hawk *(Accipiter cooperi),* yellow warbler *(Dendroica petechia),* Monterey ornate shrew *(Sorex ornatus salaries),* and Monterey dusky-footed woodrat *(Neotoma fuscipes luclana) (CDFG, 2005b* and *Williams, D. F., 1986).* However, no formal, protocol level wildlife surveys were conducted to detect the presence of these species and no mammal trapping occurred. Instead, as a natural complement to the vegetation surveys, reconnaissance-level field surveys occurred during every survey day (June 28-July 1; July 6-7; and August 2, 2005) to determine the presence of both common and special-status species of wildlife (Table 2).

Evidence indicating the presence of a particular wildlife species was obtained by sight, by track, and by scat. During the surveys, boards, logs, and other materials were lifted to search for reptiles, amphibians and small mammals that could use these materials as cover/shelter. Bird species were identified by sight using binoculars, in addition to other evidence, including vocalizations (both songs and calls) nests, whitewash, droppings, feathers, and pellets.

3.0 RESULTS

This section presents the results of the vegetation and wildlife surveys conducted from June 28 through August 2, 2005. Documented observations of special-status plant and wildlife species within the POM, in addition to descriptions of the habitats in which these species were found, are discussed. A list of common and scientific names for all wildlife species observed at the POM during the field surveys is provided in Appendix A. Sections on special-status plant and wildlife species provide detailed information on their status and distribution *(U.S. Army Corps of Engineers, 1992).*

3.1 Results of Surveys within the POM's Monterey Pine Forest

3.1.1 Monterey Pine Forest

Within the POM's undeveloped natural areas, a special-status conifer tree species, Monterey pine *(Pinus radiata),* is the most dominant member of the Monterey Pine Forest habitat (Appendix B-15) *(Holland, 1986).* It occurs in all Areas 1, 2, 3, and 4 (Plate 4). A complementary co-dominant in this habitat typically is coast live oak *(Quercus agrifolia),* which is also present as an understory tree beneath the Monterey pine canopy throughout all four of the POM's natural areas. Other less common trees found in this habitat include madrone *(Arbutus menziesii)* and eucalyptus *(Eucalyptus globus).* Specific to the western slopes in Area 4 (Huckleberry Hill Preserve), bishop pine *(Pinus muricata)* and Gowen cypress *(Cupressus goveniana* var. *goveniana)* grow in selected spots.

French broom (Appendix B-12), an invasive exotic species, is a common shrub in disturbed areas in all four Monterey pine forests areas within the POM. Equally invasive and commonly present is the low-growing, prostrate (sometimes erect and climbing) poison oak, and the non-native quaking grass *(Briza maxima)* (Appendix B-16). All three species often form thick groves or ground layer mats that prevent little if any other different plant species to successfully grow.

Other associated plant species in this habitat type and also observed during the surveys include California huckleberry *(Vaccinium ovatum),* chamise *(Adenostoma fasciculata),* common vetch *(Vicia sativa* ssp. *sativa),* shaggy-barked manzanita *(Arctostaphylos tomentosa* ssp. *tomentosa),*coffeeberry *(Rhamnus californica sp. californica*), Scotch broom *(Cytisus scoparius),* Coyote brush *(Baccharis pilularis),*bush monkeyflower *(Mimulus aurantiacus)*, yerba buena *(Satureja douglasii),* wild oats *(Avena fatua),* slender wild oats *(Avena barbata),* rose clover *(Trifolium hirtum),* smooth cat's-ear *(Hypochaeris glabra),* common yarrow *(Achillea millefolium),* Himalya berry *(Rubus discolor),* California hedge nettle *(Stachys bullata),* soap plant *(Chlorogalum pomeridianum),* soft rush *(Juncus effuses),* thistle *(Cirsium* sp.), wood fern *(Dryopteris arguta),* toyon *(Heteromeles arbutifolia),* radish *(Raphanus sativus),* California blackberry *(Rubus ursinus),* and blue-eyed grass *(Sisyrinchium bellum) (Bossard, Randall, Hoshovsky, 2000).*

In some of the POM's Monterey Pine Forest habitat, Hooker's manzanita *(Arctostaphylos hookeri* ssp. *hookerii),* a special-status species, is present (Appendix B-17). Except for selected groves, however, it is usually not as common as the shaggy-barked manzanita besides which dense pockets of Hooker's manzanita sometimes grows. In addition to these plants, this habitat hosts special-status plant species such as the Yadon's rein orchid *(Piperia yadonii)* and small-leaved lomatium *(Lomatium parvifolium).* Both of these species were observed in this habitat during the recent surveys. The Yadon's rein orchid was seen within Areas 1 and 3 while the small-leaved lomatium was observed only within Area 4 (Appendix B-6).

The greatest concentration and largest quantity of Yadon's rein orchid occurs in the southern and south-central regions within Area 1 immediately next to Building 630 (Plate 5 and Appendix B-2, B-3). Here, populations of this species are most prominent near a shallow, empty cement culvert that runs adjacent to the building on both its west and south sides. Another high concentration of this species (75 total individuals) was observed nearby within a fenced area surrounding a water tank on a summit approximately 250 feet west-southwest of this building within Area 1. Here, 70 plants appeared inside a pedestrian gate located 10 feet south of a vehicle gate, with another five individuals inside the fence along its perimeter (Plate 5).

Aside from Area 1, Yadon's rein orchid's presence within POM is more limited. Only Area 3 exhibited additional populations of Yadon's rein orchid, primarily limited to a small pocket in this area's western extreme. Here, 65 individuals were observed on a hillside strip beneath Monterey pine forest (Appendix B-4) immediately adjacent to and 100 feet south of MacArthur Road and 30 feet northwest and downhill from the fence surrounding Area 4 (Plate 4, Huckleberry Hill Preserve). One isolated individual was observed in the eastern portion of Area 3 underneath Monterey pine forest along a foot trail that runs parallel to the Huckleberry Hill Preserve 100 feet east of a parking area that abuts MacArthur Road (Appendix D-7). In total, 428 Yadon's rein orchids were observed during the surveys (Table 3, below, and Plate 5).

Multiple populations of small-leaved lomatium occurred within the Huckleberry Hill Preserve, the majority of which occurred nearby and adjacent to the Scenic Trail. Other populations of this species were identified close to Bear Track Road on the western-southwestern facing hillsides of Area 4 near SR 68. In addition, populations were observed near the Wild Boar Trail and next to the intersections of Water Tank Road and the Presidio View Trail. In total, 316 small-leaved lomatium were observed during the surveys (Table 3, below, and Plate 5). Area 1 hosted eight individuals of this species, approximately 100-200 feet northeast of the track and field in a Monterey pine forest adjacent to Mason Road. One-hundred thirty-three individuals were observed in Area 3 on a hillside strip beneath Monterey pine forest immediately adjacent to and approximately 100 feet south of MacArthur Road and 60 feet north-northwest and downhill from the fence surrounding Area 4 (the Huckleberry Hill Preserve) (Plate 4).

All the observed small-leaved lomatium populations were especially prominent and clustered where breaks occur within the canopy of Monterey pine, and where an understory of bare ground predominates. In every instance, small-leaved lomatium appeared in areas devoid of invasive plants such as quaking grass, French broom, and poison oak (Appendix B-13).

Table 3 – Total Populations and Locations of Special-Status Species Plants Yadon's Rein Orchid and Small-Leaved Lomatium within POM

Species	Total Individuals Observed	Locations of Populations
Yadon's rein orchid *Piperia yadonii*	428 (Area 1 = 362 individuals; Area 3 = 66 individuals)	Areas 1 and 3 (Plate 4, 5)
Small-leaved lomatium *Lomatium parvifolium*	316 (Areas 1, 3 and 4) (Area 1 = 8; Area 3 = 133; Area 4 = 175)	Areas 1, 3 and 4 (Plate 4, 5)

The Monterey pine forest provides a variety of microhabitat conditions that may be used by several common wildlife species, including raccoon *(Procyon lotor),* mule deer *(Odocoileus hemionus),* western gray tree squirrel *(Sciurus griseus),*and Virginia opossum *(Didelphis marsupialis).* The initial three of these four species were detected during the surveys. Not all Monterey pine forest habitats within the POM contain the same understory elements. Microhabitat conditions such as slope aspect, altitude, ground disturbance, soil type, temperature, animal-type presence or absence, and other factors that may alter the understory from one location to another. For this reason, three kinds of Monterey pine forests (called subtypes) with different microhabitat conditions occur: Monterey pine forest with hard shrub understory; Monterey pine forest with mesic understory; Monterey pine forest with grassy understory *(Holland, 1986; Sawyer and Keeler-Wolf, 1995).*

Monterey pine forest with a hard shrub understory is the most common forest subtype at the POM (Appendix B-15). "Hard shrubs" refers to species of shrubs with sclerophyllous (hard) leaves containing a resistant cuticle designed to prevent water loss as an adaptation for seasonal drought (typical of the Mediterannean climate within which the POM resides).

Monterey pine forest with a mesic (or moist) understory is not common on the POM, occurring primarily in a moist canyon in the northwest portion of the Huckleberry Hill Preserve (Area 4) and the forest parcel immediately adjacent to the "Point Lobos Preserve" within the south-southcentral area of POM. Monterey pine forest with a grassy understory occurs primarily in the forest patch east of the new sports arena and adjacent to Mason Drive west of the track and nearby Building 660.

In each of these forest subtypes, branches within the canopy may be used as perching, roosting, and nesting sites by raptors such as great horned owl *(Bubo virginaus)*, western screech owl *(Otus kennicottii)*, and red-shouldered hawk *(Buteo lineatus).* During the surveys, small birds such as pygmy nuthatch *(Sitta pygmaea)* were seen foraging on the trunks and branches of the pines. Brown creepers *(Certhia Americana)* utilized the main trunk and large branch surfaces to search for insects and their larvae. Dark-eyed juncos *(Junco hyemalis)*, band-tailed pigeon *(Columba fasciata),* American robin *(Turdus migratorious),* Steller's jay *(Cyanocitta stelleri),* and western scrub jay *(Aphelocoma californica)*

were seen within the lower and upper portions of the forest profile along with acorn woodpecker *(Melanerpes formicivorus),* and northern flicker *(Colaptes auratus)* (another woodpecker species). Spotted towhee *(Pipilo maculates)* was observed near the forest floor within the understory.

A resident hummingbird species, Anna's hummingbird *(Calipte anna),* may also occur in Monterey pine forest habitat, both nesting in the area and also foraging on the nectar provided by huckleberry, madrone, and shaggy-barked and Hooker's manzanita. Coast live oak trees existing in the Monterey pine forest provide acorns as important food sources for scrub jays, acorn woodpeckers, and mule deer. Fallen logs and old stumps on the forest floor offer cover for amphibians such as California slender and arboreal salamander species.

3.1.2 Riparian Habitat

Riparian forest habitat (included as one of the three parcels within Area 2, Plate 4) occurs on the side-slopes, bank, and bed of an intermittent to perennial stream that follows the southeastern boundary of the POM from Franklin Street to Lighthouse Avenue. It flows from east to west at a depth that varies from two to 12 inches in depth.

Two forest subtypes occur in the POM's riparian area based on differences in composition of the dominant overstory trees: central coast live oak riparian forest and Monterey pine, coast live oak and eucalyptus riparian forest. Unlike classic riparian habitats that typically support a variety of wildlife species, the POM's two different riparian forest sub-types appear to host few total species. Species that occur regularly include mule deer and raccoon, and both of these species were observed during the surveys. Gray fox *(Urocyon cinereoargenteus),* coyote *(Canis latrans),* and the non-native Norway rat *(Rattus norvegicus)* also likely occur in this area. Avifauna seen during the surveys included scrub jay, Stellar's jay, oak titmouse *(Baeolophus inornatus)*, chestnut-backed chickadee *(Poecile rufescens)*, California quail *(Callipepla californica)*, and red-shouldered hawk. Cooper's hawk *(Accipiter cooperii)*, a special-status species, may occasionally forage and/or nest in this area, while another raptor, the sharp-shinned hawk, could use this habitat as a winter foraging area. The POM offers both of these species potential nesting habitat.

3.1.3 Central Coast Live Oak Riparian Forest

Coast live oak riparian forest occurs on the lower slopes, bank, and creekbed next to and within the riparian corridor (Appendix B-5). Besides coast live oak, other overstory species may be present in fewer numbers, primarily Arroyo willow *(Salix lasiolepis)* in moist or seasonally wet areas, with Scouler's willow *(Salix scouleriana)* also sometimes present. The understory supports California blackberry, California wild grape *(Vitis californica)*, California manroot *(Marah fabaceous)*, and poison-oak. The latter species dominates the understory as both a ground dweller and erect climber that often entangles itself upon other understory vegetation. Non-native species have also overtaken much of the understory, including the following observed species: French broom, Himalaya blackberry, English ivy *(Hedera helix)*, German ivy *(Senecio mikaniodes)*, periwinkle *(Vinca major)*, and nasturtium *(Tropaeolum majus) (Holland, 1986).*

3.1.4 Monterey Pine, Coast Live Oak, and Eucalyptus Riparian Forest

The Monterey pine, coast live oak, eucalyptus riparian forest primarily occurs on upper slopes and upper elevations of the riparian corridor. During the surveys, it was noted that eucalyptus individuals grow within and next to the creek bed, in addition to upslope. Other tree species present in patches near the creekside include arroyo and Scouler's willow. Understory plants in this habitat include California blackberry, poison-oak, and French broom. Associated forbs and grasses include goose grass *(Galium*

aparine), soft chess *(Bromus hordeaceus)*, leather-leaf fern *(Polypodium scouleri)*, Bermuda buttercup *(Oxalis pes-caprae)*, and three-cornered onion *(Allium triquetrum)*.

3.2 Special-Status Plant Species This section includes species profiles for special-status plants found at the POM during the recent surveys (Appendix D-1 through D-8), including Monterey pine, Hooker's manzanita, Yadon's rein orchid, and small- leaved lomatium.

Monterey pine is a CNPS List 1B species for the state and has no federal designation. As a List 1B species, it is considered to be rare throughout its limited range in California (Appendix D-2). It also meets the definition of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the CDFG code and is therefore eligible for state listing.

Hooker's manzanita and Yadon's rein orchid are also CNPS List 1B species. Hooker's manzanita has no federal or state listing status, and its distribution is limited to the Monterey peninsula (Appendix D-4). Yadon's rein orchid, which grows in Monterey County only (Appendix B-3 and B-4), is a federally listed species. Small-leaved lomatium is a CNPS List 4 species and has no state or federal listing status. This designation suggests this species has limited distribution or is infrequent throughout a broader area in California (Appendix D-6). In addition, List 4 status indicates a plant species should be monitored regularly.

Appendix A-1, *Special-Status Plant and Wildlife Species Observed Within the Presidio of Monterey, California*, provides information relating to the location, status, and ecology of special-status species observed during the surveys (Table 3 and Plate 5).

3.2.1 Monterey Pine *(Pinus radiata)*

Status and Distribution. Monterey pine does not have federal status, but the CNPS lists Monterey pine as rare and endangered in California (List 1B). This species is endemic to California and, where it grows naturally, occurs in five populations (Appendix D-2):

- between Ano and Swanton in southern San Mateo and northern Santa Cruz Counties, California;
- on the Monterey and Point Lobos Peninsulas and adjacent inland areas of Monterey County, California, including the POM;
- in areas surrounding Cambria in San Luis Obispo County, California;
- on moist mountain slopes and ridges and canyons of Cedros Island, Mexico, off the coast of Baja California; and
- on moist mountain slopes and ridges of northern Guadalupe Island, Mexico, off the coast of Baja California.

Fewer than 14,000 acres of naturally-growing Monterey pine forests remain in California. Beyond its native habitat range mentioned above, elsewhere in California it is planted as an ornamental tree and on Christmas tree farms *(Critchfield and Little, 1966)*.

Qualitative descriptions (*Jones & Stokes 1994a*) point out the high level of variation in species composition among the three areas where the pine grows. At the Ano Nuevo area, Monterey pine associates with coast live oak, Douglas-fir, knobcone pine, madrone, ponderosa pine, and redwood. In the other areas, this pine grows in association with Bishop pine and coast live oak. Cylinder (*1995*) describes the link between marine terrace conditions and Monterey pine success. His eight proposed

vegetation types suggest that Monterey pine dominates in stands of distinct species composition on different terraces, and that it is also a secondary species in other series, such as Bishop pine series, Coyote brush series, and knobcone pine series *(Sawyer and Keeler-Wolf, 1995).*

Habitat Requirements. Monterey pine occurs naturally in coastal areas where the majority of rain events occur during winter and frequent summer fog pervades. Close to the coast, Monterey pine appears on forest terraces underlain by Pleistocene dune deposits. In more inland areas of occurrence, the Monterey pine forest intergrades with regionally dominant vegetation such as redwood/Douglas-fir forest, coast live oak forest, grassland, and chaparral. The inland range of Monterey pine distribution is likely the limit of substantial summer fog. Summer fog reduces the rates of evaporation and transpiration and contributes to soil moisture through fog drip in some locales. Monterey pine's farthest extension inland occurs in canyons and riparian corridors where ephemeral and intermittent streams exist *(Sawyer and Keeler-Wolf, 1995).*

Occurrence at Presidio of Monterey. Monterey pine forest habitat dominates the remaining natural land parcels of the POM (Areas 1 through 4) (Appendix B-1, B-9 and Appendix D-1 and D-2). This habitat is considered to be the historical dominant native forest vegetation type of the POM. Monterey pine also occurs in horticultural plantings and as scattered trees (whether planted or naturally established) in managed grass and lawn areas.

Reasons for Decline. Several factors contribute to the decline of Monterey pine in California and the Monterey peninsula. Genetic diversity of Monterey pine is currently a major hurdle for the species survival in its current natural range. Urban and recreational development has decreased the natural range of the species and planted Monterey pines of unknown or nonlocal origin provide a threat of genetic contamination to natural populations in some places. In addition, pitch canker disease, caused by an introduced fungus *(Fusarium circinatum),* is contributing to the premature death of trees, thus endangering the few remaining natural populations of trees. A Pitch Canker Task Force (a subcommittee of the California Forest Pest Council, an advisory body to the California Department of Forestry and Fire Protection (CDF) on pest protection matters) has been formed to work towards a statewide course of action for pitch canker issues *(Roy, 1966* and *Rogers, 2002).*

These current problems follow large scale logging of Monterey pine in the 19th and early 20th centuries. Some of these forests have recovered as second growth generation tree populations. Recent and current development coincides with its extant natural range where our largest human population and urbanized areas exist. Plates describing its loss of habitat vary, but most estimates center on a 50 percent reduction *(Rogers, 2002).*

3.2.2 Hooker's Manzanita (Arctostaphylos hookeri ssp. hookeri)

Status and Distribution. Hooker's manzanita (Appendix B-11 and B-17) is a mat-forming to erect shrub in the heath family. It has no federal or state listing status but it is considered rare and endangered in California by CNPS (List 1B). Hooker's manzanita is endemic to the Monterey Bay area. In addition to the POM, populations occur in the Larkin Valley, Prunedale Hills, Monterey Peninsula, and the northern end of the Santa Lucia Range in Santa Cruz and Monterey County (Appendix D-4). The lands of the former Fort Ord supports the largest population along with selected portions of Area 4 (POM Huckleberry Hill Preserve).

Habitat Requirements. Hooker's manzanita grows in maritime chaparral, closed-cone coniferous forest (such as Monterey pine forest), pygmy forest; cismontane woodland, and coastal scrub. It occurs on coastal terraces, Pleistocene Epoch dune deposits, and granitic bedrock within the zone of coastal fog influence *(Griffin, 1978).*

Occurrence at Presidio of Monterey. At the POM, Hooker's manzanita occurs in the understory of Monterey pine forest on the fifth and sixth coastal terraces and slopes between these terraces (Appendix D-3). Hooker's manzanita is also planted in median strips and other horticultural sites within POM.

Reasons for Decline. Hooker's manzanita has declined primarily as a result of coastal development, particularly on the Monterey Peninsula. Most of the lands of the former Fort Ord and Santa Lucia Range populations have been relatively unaffected. Some of the population for this species is on lands of the former Fort Ord that is expected to be transferred to, and protected by, the U.S. Department of the Interior Bureau of Land Management. Most of the Prunedale Hills population is protected in Manzanita Regional Park.

3.2.3 Small-Leaved Lomatium *(Lomatium parvifolium)*

Status and Distribution. Small-leaved lomatium is an erect, perennial, taprooted forb in the carrot family (Appendix B-6). It has no federal or state listing status but is recognized as a plant of limited distribution by CNPS (List 4). Small-leaved lomatium is found in Monterey, Santa Cruz, and San Luis Obispo Counties. Populations are widely scattered throughout this region (Appendix D-6)

Habitat Requirements. Small-leaved lomatium occurs in close-cone coniferous forest, coastal scrub, riparian woodland, and chaparral habitats, in addition to serpentine outcrops. It is sensitive to excess shade that happens when invasive plants such as poison oak, quaking grass, and French broom grow too abundantly with the POM and cause crowding of the understory and ground plant layers.

Occurrence at Presidio of Monterey. At the POM, small-leaved lomatium (Appendix D-5) grows in the understory of Monterey pine forest and in chaparral dominated by Hooker's manzanita. During the recent surveys in Area 4 (Huckleberry Hill Preserve) (Plate 4), this species was most commonly observed on bare ground within sunny openings. In addition, the species can be present beneath Monterey pine stands devoid of tall grasses and forbs.

Reasons for Decline. Small-leaved lomatium has declined because of coastal development over large areas of its habitat, including impacts upon Monterey pine forest and maritime chaparral habitat. The spread of non-native, invasive plants is a related trend that is considered a reason for the decline of this species.

3.2.4 Yadon's rein orchid *(Piperia yadonii)*

Status and Distribution. Yadon's rein orchid is a perennial herb in the orchid family (Appendix B-2, B-3 and B-4). It has no state listing status but it is considered federally endangered on the federal list and by CNPS (List 1B). Yadon's rein orchid is known only from coastal areas of northern Monterey County from Elkhorn Slough to the Monterey Peninsula (Appendix D-8).

Habitat Requirements. Yadon's rein orchid occurs in maritime chaparral and closed-cone conifer forests. Closed-coned conifer forests where this orchid has been found include Monterey pine forest, Monterey cypress forest, and Bishop Pine-Gowen cypress pygmy forest. In conifer forests, Yadon's rein orchid typically grows in openings with short-cropped grassy understory cover or where barren ground dominates. In chaparral, this orchid is often found growing during June and July in open areas that are not too densely packed with other forbs or dense grass displays. In chaparral, Yadon's rein orchid is often found associated with Hooker's manzanita.

Occurrence at Presidio of Monterey. Yadon's rein orchid was observed during the surveys to grow in two of the four earlier-described areas within POM (Area 1 and 3). A total of 428 individuals were counted (Table 3, Plate 5, Appendix B-2 through B-4, Appendix D-7), all of which exist in association

with Monterey pine forest. This total represents less than one percent of the population within the species range (Appendix D-7 and D-8) Descriptions of this species' locations within the POM appear above in Section 3.1.

Reasons for Decline. Yadon's rein orchid is threatened by urban development, recreation development, and competition from non-native species, including rattlesnake grass, quaking grass, French broom, and poison oak. In addition, trampling from off-trail hikers appears to be a major factor in the mortality of some individuals. Excess trash deposition is another possible stress factor upon this species.

3.3 Special-Status Wildlife Species

Although the recent surveys focused primarily on detecting the presence or absence of special-status plant species, wildlife species were also observed concurrently. No focused wildlife surveys were conducted. One special-status species was observed during general wildlife surveys: an olive-sided flycatcher *(Contopus cooperi)* in the Huckleberry Hill Preserve (Area 4, Plate 2). No special-status raptors were noted, though the non-listed red-shouldered hawk was seen often during the survey of Area 2 (Plate 6).

3.3.1 Olive-sided Flycatcher

The only special-status bird observed at the POM was olive-sided flycatcher at the Huckleberry Hill Preserve (Area 4) (Plate 4). It was both seen and heard often during the surveys in this area, especially while perched in Monterey pine trees or flying among them (Appendix B-9) Nests were not found nor were young observed.

Status and Distribution. This species is designated a species of concern, though it's not considered threatened or endangered on the state and federal lists. Instead, the olive-sided flycatcher is designated a Bird of Conservation Concern (BCC) by the USFWS and is also a Watch List member, based on its inclusion among species listed in the United States Bird Conservation Watch List *(CDFG, 2005a)*

This neotropical migrant breeds throughout the West and northern California except for the state's Central Valley, eastern deserts, and southern mountains (Appendix Plate C-10). It typically arrives during the spring to breeding territory no later than May 1st in central California where the POM lies and disperses and/or migrates usually no later than October 1st *(Roberson and Tenney, 1993)*.

Habitat Requirements. Olive-sided flycatcher breeds in habitat along forest edges and openings, including natural edges of bogs, marshes, and open water; semi-open forest; burn areas; and harvested forest with some structure retained. Tall, prominent trees and snags, which serve as singing and foraging perches, and unobstructed air space for foraging, are common features of all nesting habitats *(Altman and Sallabanks, 2000)*.

Occurrence at Presidio of Monterey. A total of eight olive-sided flycatcher were detected in the Monterey pine forest at the Huckleberry Hill Preserve during surveys on July 6 and 7, 2005 (Area 4) (Plate 4). This species is present as a nesting species within the POM during the months of April through September.

Reason for Decline. Debate and uncertainty remain at the forefront of speculation as to why this species has declined in population *(U.S. Geological Survey, 2005)*. One factor may relate to the absence of forest fires that create forest openings and naturally patchy habitat with abundant edge. Fire suppression policies in recent years throughout the West and California, including within the POM, may have reduced this species preferred habitat, especially for breeding *(Hutto, 1995)*. Another potential limiting factor is availability of prey. This species shows high degree of specialization for flying insects, particularly hymenopterans. As long-distance neotropical migrant, this species is vulnerable to climatic and

environmental changes during migration. On breeding grounds, extreme weather (rain, snow, cold temperatures) that depresses activity, or reduces availability, of flying insects could delay reproductive activities or affect nestling survival.

4.0 CONCLUSIONS

Given that a large percentage of the POM's 400 acres has been developed, the remaining habitat described in this report serves as important refugia that support resources of high biological value (Plate 4). Despite the fragmentation of the previously described habitat types (Plate 4; see Area 1, 2, 3) Monterey pine forest, Monterey pine-coast live oak-eucalyptus riparian forest, and coast live oak riparian forest, an impressive biological diversity of plant and wildlife species flourish in these areas.

Specific to the Monterey pine forest (that represents the largest percentage of undeveloped remaining natural habitats), Area 1 offers an exceptionally valuable refuge for Yadon's rein orchid, the aforementioned federally endangered special-status species. The 362 individuals found in Area 1 during the recent surveys provide testimony to the optimal environmental conditions within this undisturbed portion of the POM. This orchid species' extent of presence in area continues to spread, based on a comparison of this year's survey results with past annual survey findings. Moreover, surveys for this species in recent years suggest an increasing trend in its population within Area 1 *(Collins, personal conversation and unpublished GIS data, 2005),* despite the presence of development that has occurred on all boundaries surrounding this area.

In addition, the current survey with Area 1 documented this species' presence in locations farther to the north-northwest than where populations were previously detected. Likewise, the population of this species within Area 3 (66 total individuals) also appears to be larger in quantity than the number of individuals documented in that area during previous surveys. However, this population could soon be overcrowded and displaced due to the presence of young French broom that will likely continue to flourish and get larger, thereby soon casting shade that may inhibit or prevent the Yadon's rein orchid from occurring.

It's worth noting that trampling of some Yadon's rein orchid plants in Area 1 appear to originate from hikers venturing off trail, despite the existence of multiple informational signs advising hikers of the plant's presence in order to conserve its populations. Training activities within and nearby the Obstacle Course next to Area 1 may also be a contributing factor to the trampling of selected Yadon's rein orchids.

Assuring the safety of remaining individuals is further complicated by the fact that many of the observed orchid individuals grow in areas nearby, but outside of, the boundary noted by the informational signs. Thus, hikers venturing off-trail within Area 1 may not be aware that their activities are injuring or killing special-status species plants. The entire population of this species in Area 1 is also imperiled by the deposition of large quantities of trash.

In regard to the biological value of the Huckleberry Hill Preserve (Area 4) (Plate 4), it provides exceptional plant and wildlife resource value. Its biological resource importance is especially noteworthy because this parcel's approximately 80 acres represent a large swath of unfragmented acreage where a diverse alchemy of floral and faunal species subsist and perpetuate their populations. Large, intact, non-fragmented habitat within a landscape is well known and documented as essential for preserving local populations of vegetation and wildlife. Its significance to wildlife requiring large tracts of land (including using large parcels as migration and dispersal corridors) is often imperative to their survival *(Forman, 1995, Marzluff and Ewing, 2001).*

In this manner, the POM's natural areas also serve as valuable connecting corridor to natural habitat bordering the POM, which, in turn, connects to other natural habitat within the Monterey area and the Monterey peninsula. In addition, the POM's remaining natural areas (including Areas 1 through 4) are crucial refugia because they increase the effective amount of habitat that is available for species displaced

from habitat fragmented elsewhere. For this reason, the POM represents preserved habitat that effectively reverses the negative effects of habitat fragmentation. The POM's natural habitat corridors also enhance the ability of wildlife populations to interbreed, improving long-term genetic viability *(Hudson, 1991; Smith and Hellmund, 1993).*

Continued fragmentation in remaining smaller parcels of Monterey pine habitat within the POM (e.g., Area 1, 2 and 3) not only causes less biological diversity but it also subjects habitat to the invasion of non-native vegetation that replaces native flora. For example, in the fragmented Monterey pine forest that remains next to developed areas, massive invasions of French broom, quaking grass, and poison oak are evident. The populations of these three hardy, non-native plants are further invited to spread when areas are developed. Disturbed soil is subject to pioneer growth by invading seed stock transported by machines, people, wildlife, and wind. The resulting scenario is that these three plants often dominate the understory throughout much of the remaining natural habitat in Areas 1, 2, 3, and 4.

Deleterious results upon wildlife and native vegetation occur when non-native flora is introduced and spreads due to development that disturbs the soil and allows pioneer colonization by aggressive non-natives. The non-native quaking grass, for example, replaces native forbs and ferns that provide wildlife food, shelter and breeding areas. Its presence, however, offers little resource value in return to wildlife, as this invasive grass species does not provide food, shelter and breeding habitat value to wildlife seeking these resources.

Stands of remaining Monterey pine forest within the Huckleberry Hill Preserve offer especially high resource value, especially within the fifth and sixth coastal terrace (Plate 3) *(Jones & Stokes Associates, 1995).* These two coastal terrace areas along with others within POM are considered important biological resource habitat if they host:

- naturally occurring stands of Monterey pine, Hooker's manzanita, small-leaved lomatium or Yadon's rein orchid
- stands of riparian forest; and
- known occurrences of or suitable habitat for olive-sided flycatcher and other special-status species, including raptors that may likely forage and/or nest within POM, such as Cooper's hawk and sharp-shinned hawk.

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TABLES

Table 2. Special-Status Plant Species Targeted for Rare Plant Surveys at the Presidio of Monterey
Habitat Assessment Report
Flora and Fauna Baseline Study

Scientific Name	Common Name	Status	CNPS R-E-D Code	Habitat
Plants				
Allium hickmanii	Hickman's onion	--/--/1B	2-2-3	Closed-cone conifer forest, chaparral, and grasslands
Arctostaphylos hookeri ssp. *hookeri*	Hooker's manzanita	--/--/1B	2-2-3	Sand Hill and Aromas Formations, maritime chaparral and closed-cone coniferous forest
Arctostaphylos hooveri	Hoover's manzanita	--/--/4	1-1-3	Chaparral
Arctostaphylos montereyensis	Toro manzanita	--/--/1B	3-2-3	Chaparral, oak woodland, and coastal scrub
Arctostaphylos pajaroensis	Pajaro manzanita	--/--/4	2-3-3	Sandy hills in chaparral
Arctostaphylos pumila	sandmat manzanita	--/--/1B	3-2-3	Closed-cone conifer forest, coastal scrub, and coastal dunes
Astragalus tener var. *titi*	Coastal dune milk-vetch	FE/SE/1B	3-2-3	Coastal dunes and dune scrub
Ceanothus cuneatus var. *rigidus*	Monterey ceanothus	--/--/4	1-2-3	Maritime chaparral; closed-cone conifer forest on sandy hills and flats
Chorizanthe douglasi	Douglas' spineflower	--/--/4	1-2-3	Cismontane woodland and lower conifer forest on sandy or gravelly slopes
Chorizanthe pungens var. *pungens*	Monterey spineflower	FT/--/1B	2-2-3	Maritime chaparral; closed-cone conifer forest on sandy hills and flats
Clarkia lewisii	Lewis' clarkia	--/--/4	1-1-3	Coastal scrub
Chorizanthe robusta var. *robusta*	robust spineflower	FE/--/1B	3-3-3	Sandy soils in coastal dune and scrub habitat.
Cordylanthus rigidus var. *littoralis*	seaside bird's-beak	--/SE/1B	2-3-3	Coastal scrub, closed-cone conifer forest, oak woodland, and chaparral on dry, sandy soils below 3,000 feet
Cupressus goveniana ssp. *Goveniana*	Gowen cypress	FT/--/1B	3-2-3	Pygmy conifer forest
Delphinium hutchinsoniae	Hutchinson's larkspur	--/--/1B	3-2-3	Coastal scrub, coastal prairie, and mixed evergreen forest
Eriastrum virgatum	Virgate eriastrum	--/--/4	1-1-3	Coastal dunes
Ericameria fasciculata	Eastwood's goldenbush	--/--/1B	3-3-3	Closed-cone conifer forest, maritime chaparral, and coastal scrub
Erysimum ammophilum	coast wallflower	--/--/1B	2-2-3	Coastal dunes, coastal scrub, and chaparral
Fritillaria liliacea	Fragrant fritillary	--/--/1B	2-2-3	Coastal scrub and grassland; often on ultramafic soils
Gilia tenuiflora ssp. *arenaria*	sand gilia	FE/ST/1B	3-2-3	Coastal dunes and scrub

Table 2. Special-Status Plant Species Targeted for Rare Plant Surveys at the Presidio of Monterey
Habitat Assessment Report
Flora and Fauna Baseline Study

Scientific Name	Common Name	Status	CNPS R-E-D Code	Habitat
Horkelia cuneata ssp. *sericea*	Wedge-leaved horkelia	--/--/1B	3-3-3	Sandy and gravelly places in coastal scrub and closed-cone conifer forest
Layia jonesii	Jones' layia	--/--/1B	3-2-3	Chaparral and grassland
Lomatium parvifolium	small-leaved lomatium	--/--/4	1-2-3	Pine forests, chaparral, and serpentine outcrops
Mimulus rattanii var. *decurtatus*	Santa Cruz County monkeyflower	--/--/4	1-2-3	Chaparral and conifer forest
Monardella undulata var. *undulata*	Curly-leaved monardella	--/--/4	1-2-3	Chaparral and coastal dunes and scrub below 500 feet elevation
Perideridia gairdneri ssp.	Gairdner's yampah	--/--/4	1-2-3	Chaparral and broad-leafed upland forest, typically on wet, heavy soils
Pinus radiata	Monterey pine	--/--/1B	3-3-2	Closed-cone conifer forest on poor soils in summer fog zone
Piperia yadonii	Yadon's piperia	FE/--/1B	3-3-3	Chaparral; coastal scrub; and closed-cone conifer forest
Piperia elongata ssp. *michaelli*	Purple-flowered piperia	4	3-3-3	Coastal bluff scrub
Potentilla hickmanii	Hickman's cinquefoil	FE/SE/1B	3-3-3	Grassy openings in closed-cone forest on vernally mesic sites
Trifolium polyodon	Pacific Grove clover	--/SR/1B	3-3-3	Closed-cone conifer forest, coastal prairie, and meadow on mesic sites
Trifolium trichocalyx	Monterey clover	FE/SE/1B	3-3-3	Closed-cone conifer forest in recently burned sites
WILDLIFE				
Birds				
Athene cunicularia hypugaea	burrowing owl	BCC/CSC		Grasslands, desert, and ag areas where abandoned ground squirrel burrows occur
Accipiter striatus	sharp-shinned hawk	--/CSC		Riparian forests, conifer forests, and oak woodlands
Accipter cooperi	Cooper's hawk	--/CSC		Nests in riparian forests and dense canopy oak woodlands; forages in open woodlands
Aquila chrysaetos	golden eagle	BCC/CSC		Nests in cliffs and large oaks; forages in annual grasslands, chaparral, oak woodlands
Dendroica petechia	yellow warbler	--/CSC		Nests in riparian areas dominated by willows, alders, cottonwoods, or sycamores; may also use oaks, conifers, and urban areas if they are within bottomlands
Mammals				
Sorex ornatus salarius	Monterey ornate shrew	--/CSC		Riparian, woodland, and upland areas where thick duff or downed logs occur
Neotoma fuscipes luciana	Monterey dusky-footed woodrat	--/CSC		Uses habitats with moderate to dense cover and abundant dead wood for nest construction
Taxidea taxus	American badger	--/CSC		Uses open, grassy areas with scattered shrubs or trees for cover and loose soil for digging

STATUS CODES

FEDERAL

- FE - Listed as endangered under the Federal Endangered Species Act
- FT - Listed as threatened under the Federal Endangered Species Act
- FC - Federal Candidate for listing by the Federal Government
- BCC - Birds of Conservation Concern (US Fish & Wildlife Service)

CNPS

- List 1B - Rare or Endangered in California and elsewhere
- List 4 - Plants with limited distributions

STATE

- - Listed as endangered under the California Endangered Species Act
- ST - Listed as threatened under the California Endangered Species Act
- CSC - California Species of Special Concern
- SR - California state listed as "rare"

R-E-D Code

- R (Rarity)
- 1 Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time
- 2 Distributed in a limited number of occurrences, occasionally more if each occurrence is small
- 3 Distributed in one to several highly restricted occurrences, or present in such small numbers that is seldom reported
- E (Endangerment)
- 2 Endangered in a portion of its range
- 3 Endangered throughout its range
- D (Distribution)
- 3 Endemic to California

Checked DE
Approved LWR

PLATES

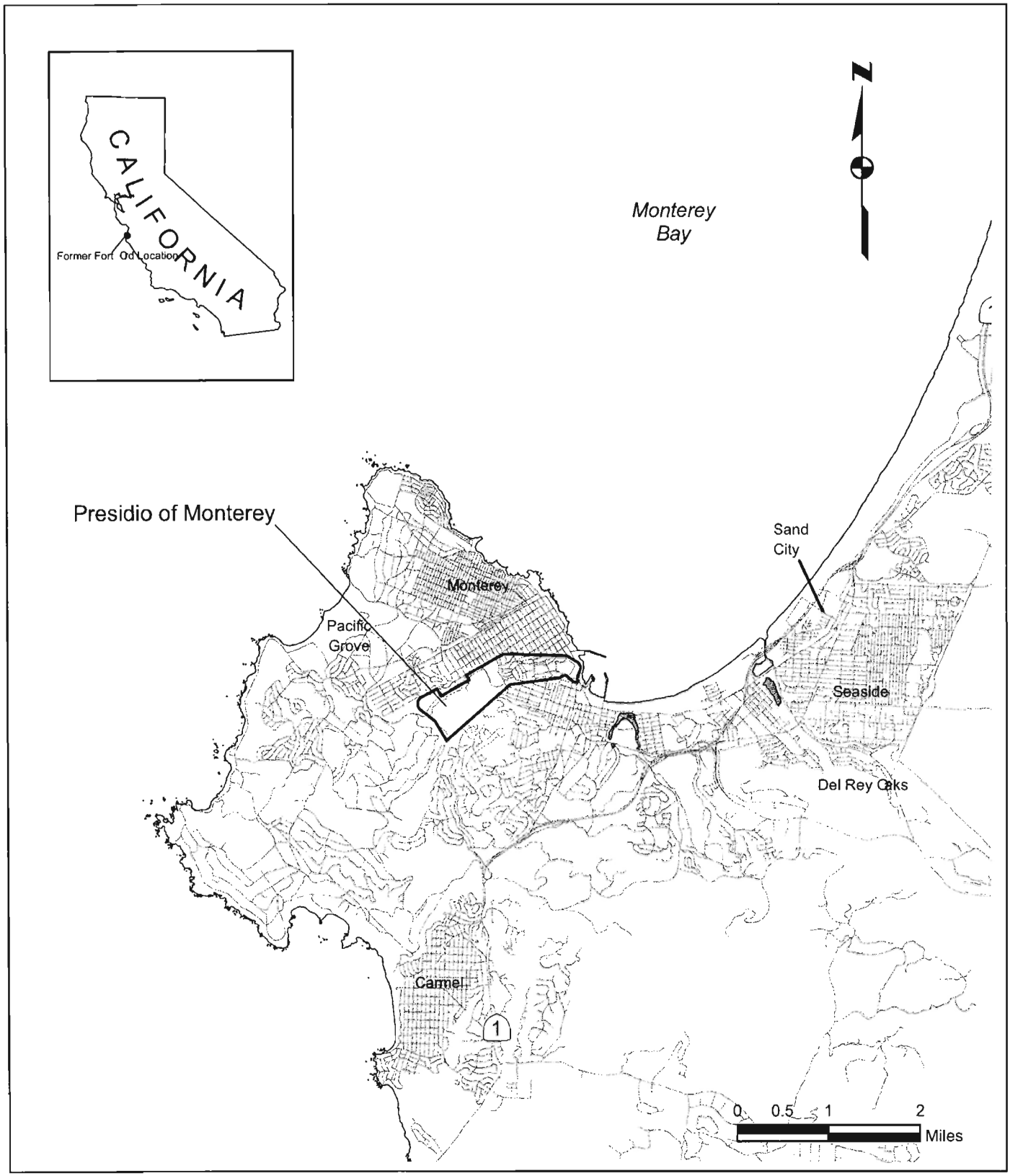

Figure1.mxd - 7/25/05

PLATE

MACTEC

Location of Presidio of Monterey on the Monterey Peninsula

Monterey, California

1

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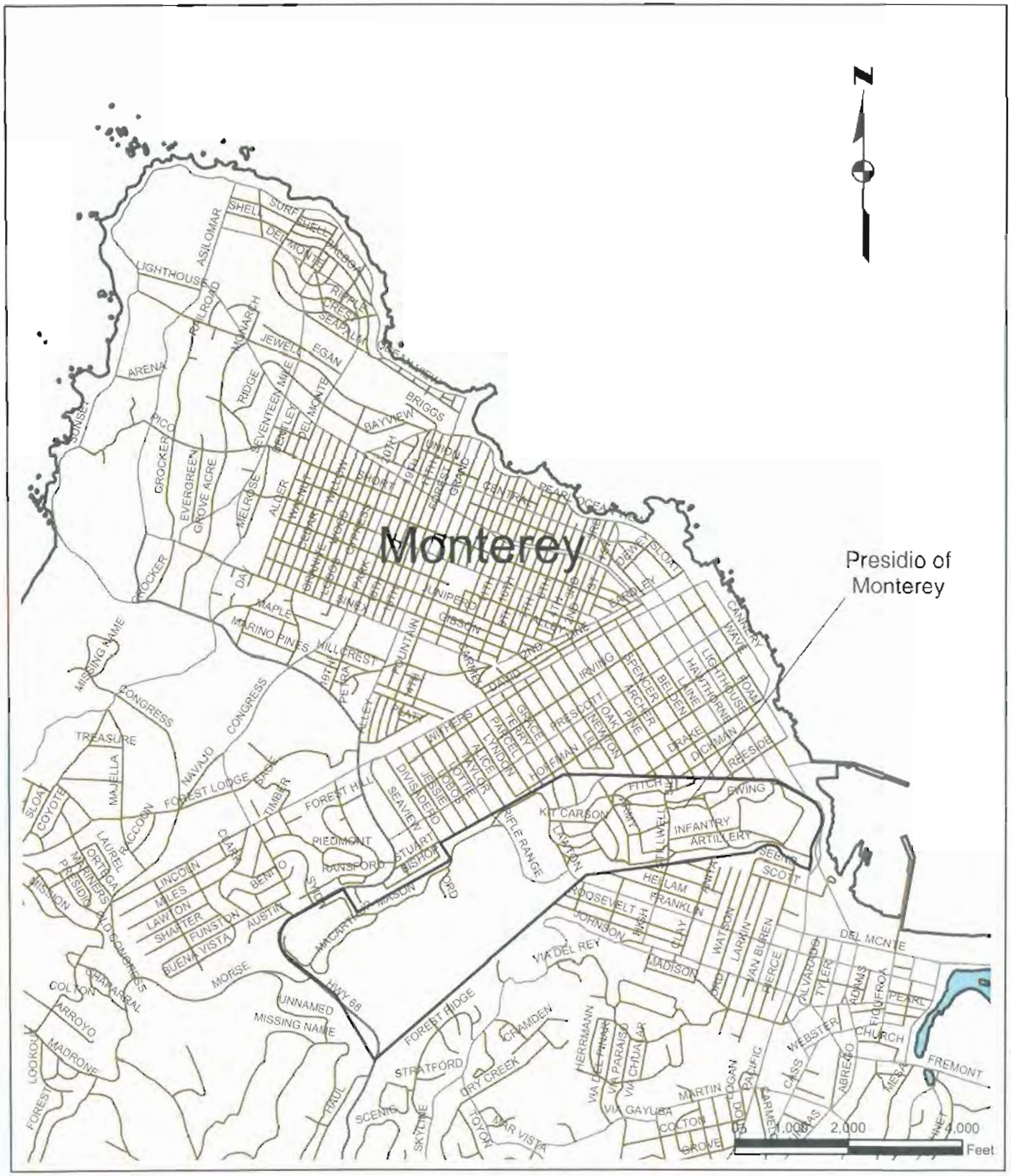

Figure2.mxd - 7/26/05

PLATE

MACTEC

Location of Presidio of Monterey in Monterey, CA

2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
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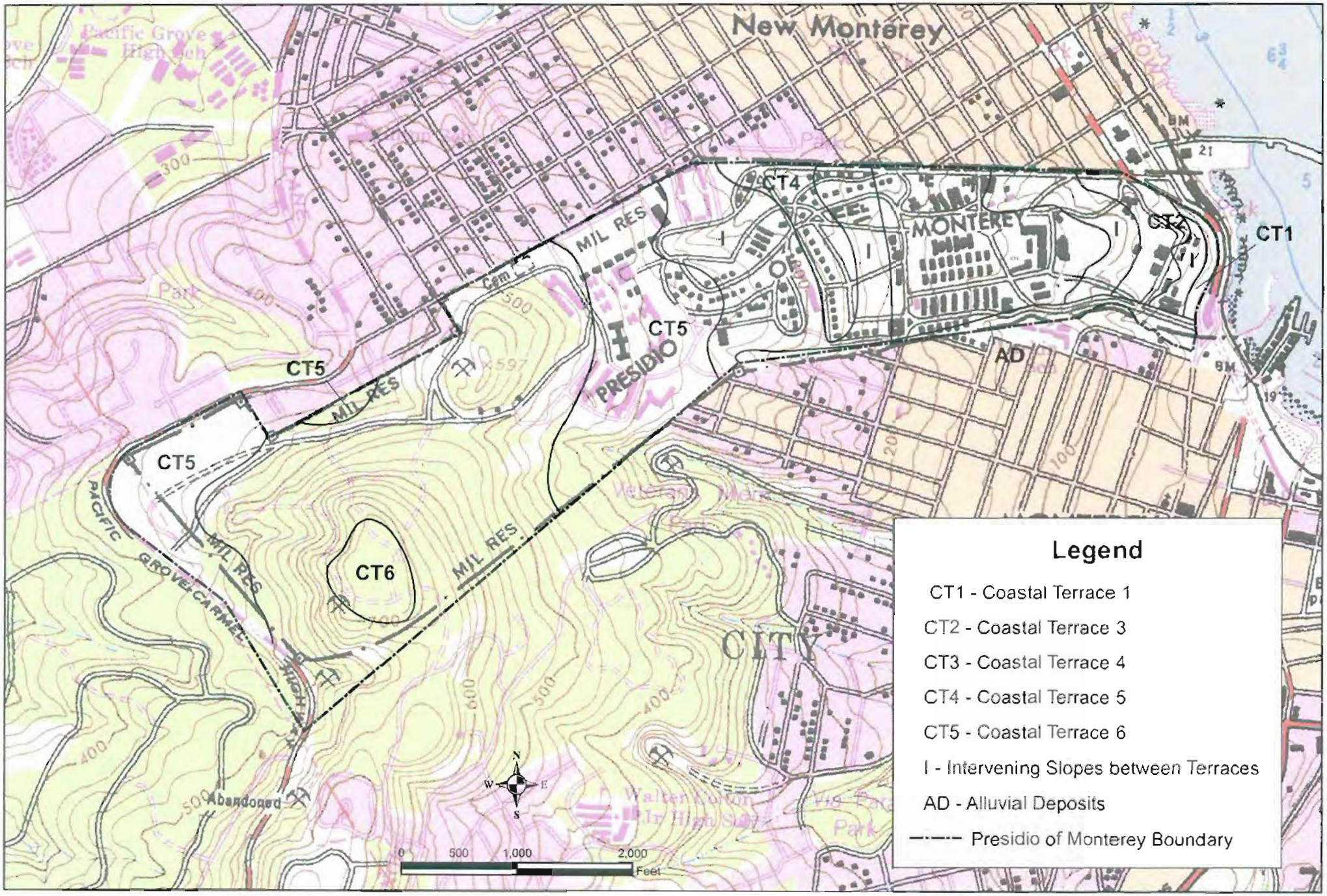
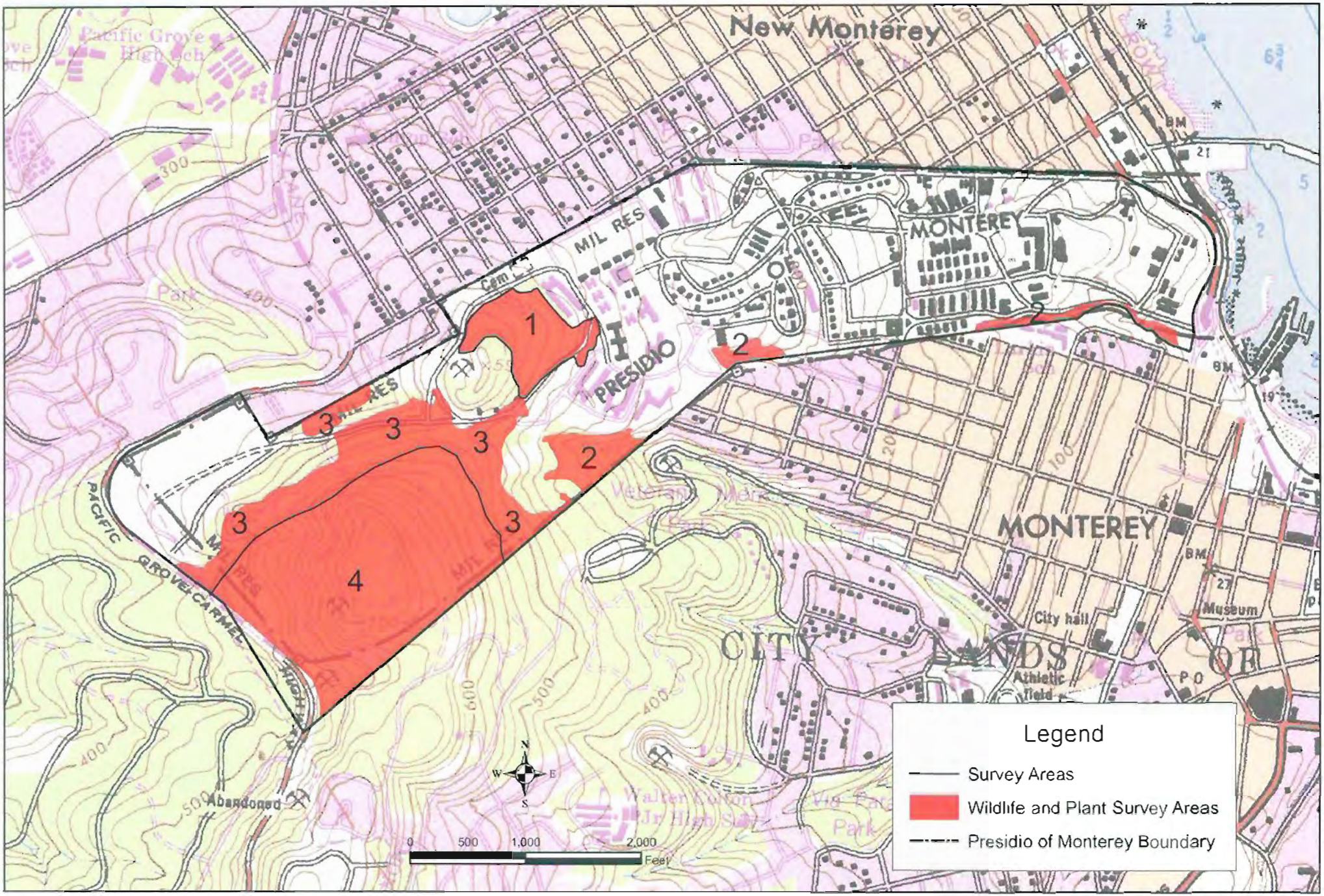


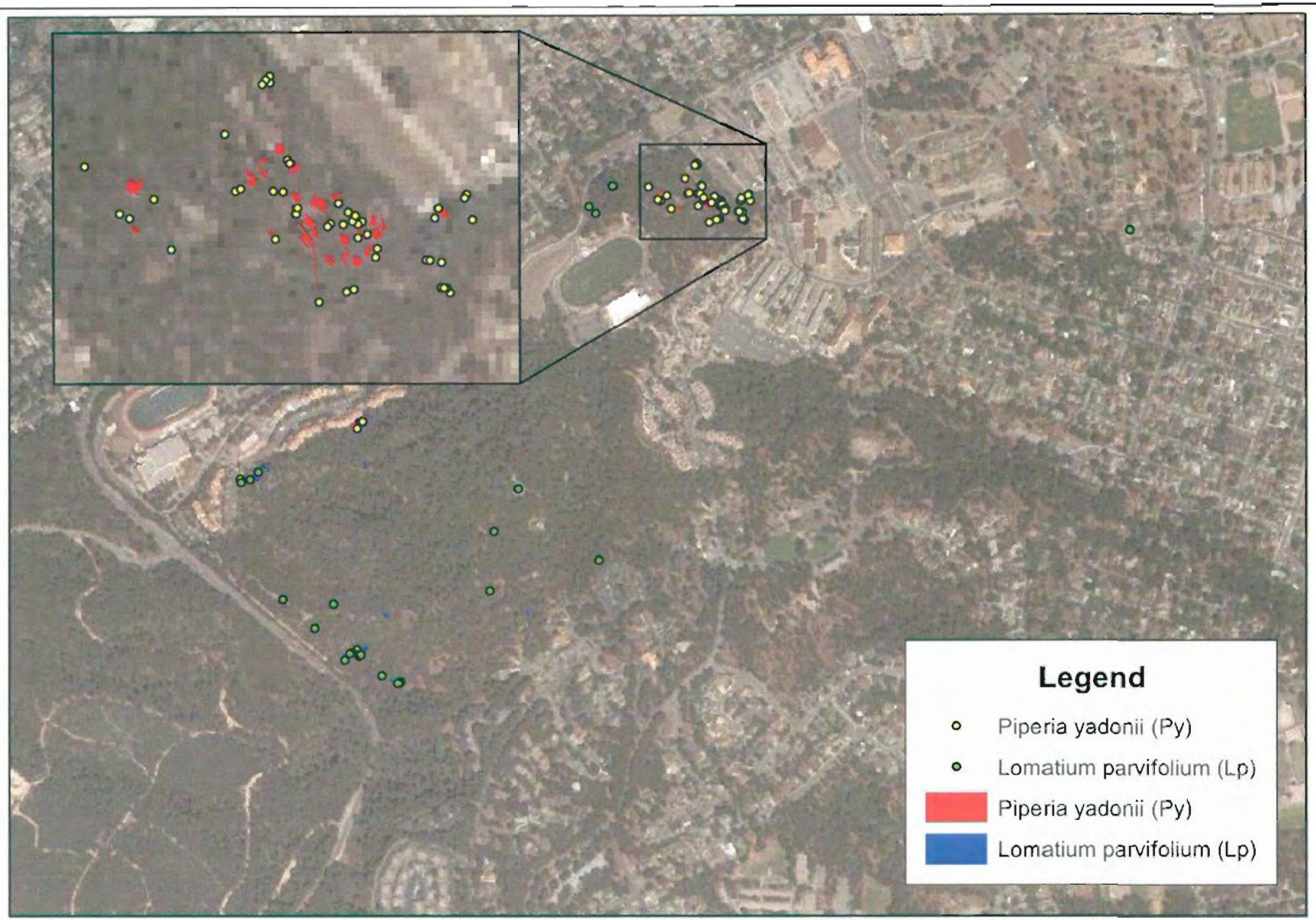
MACTEC **Geomorphic Surfaces at the Presidio of Monterey**
Monterey, California

3



MACTEC Survey Areas at the Presidio of Monterey
Monterey, California

4



MACTEC

Piperia yadonii(Py) and Lomatium parvifolium (Lp) Populations
GPS Site Walks, July 2005
Presidio of Monterey
Monterey County, California

PLATE
5

DRAWN::	PROJECT NO:	CHECKED:	DATE:	APPROVED	DATE:
FPC	4088053116.04		08/09/2005		

APPENDIX A

SPECIAL-STATUS PLANT AND ANIMAL SPECIES OBSERVED AT THE PRESIDIO OF MONTEREY, CALIFORNIA, JUNE-AUGUST 2005

Appendix A. Special-Status Plant and Wildlife Species Observed Within Presidio of Monterey, California, June-August Surveys, 2005
Habitat Assessment Report

Scientific Name	Common Name	Status	CNPS R-E-D Code	Habitat
Plants				
Arctostaphylos h. hookeri	Hooker's manzanita	--/--/1B	2-2-3	Sand Hill and Aromas Formations, maritime chaparral and closed-cone coniferous forest
Lomatium parvifolium	small-leaved lomatium	--/--/1B	1/2/2003	Closed-cone coniferous forest, chaparral, coastal scrub, riparian woodland/serpentinite
Pinus radiata	Monterey pine	--/--/1B	3/3/200[illegible]	Closed-cone coniferous forest, cismontane woodland
Piperia yadonii	Yadon's piperia	FE/--/1B	3-3-3	Sandy soil in maritime chaparral, coastal scrub, and closed-cone coniferous forest
Birds				
Contopus cooperi	Olive-sided flycatcher	--/BCC	NA	Forest edges and openings, including burns; natural edges of bogs, marshes, and open water

Footnotes

STATUS CODES

FEDERAL

FE - Listed as endangered under the Federal Endangered Species Act
FT - Listed as threatened under the Federal Endangered Species Act
FC - Federal Candidate for listing by the Federal Government
BCC - Birds of Conservation Concern

STATE

SE - Listed as endangered under the California Endangered Species Act
ST - Listed as threatened under the California Endangered Species Act
CSC - California Species of Special Concern

CNPS

List 1B - Rare or Endangered in California and elsewhere
List 4 - Plants with limited distributions

R-E-D Code

R (Rarity)
1 Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time
2 Distributed in a limited number of occurrences, occasionally more if each occurrence is small
3 Distributed in one to several highly restricted occurrences, or present in such small numbers that is seldom reported
E (Endangerment)
2 Endangered in a portion of its range
3 Endangered throughout its range
D (Distribution)
3 Endemic to California

Checked
Approved

APPENDIX B

PHOTOGRAPHS OF PLANTS AND VEGETATION HABITATS AT THE PRESIDIO OF MONTEREY

Looking southwest, a Monterey pine forest habitat hosts an understory of quaking grass *(Briza maxima)* (center and right) and French broom *(Genista monspessulana)* within Area 1 next to Building 630 and its parking lot.

MACTEC Engineering & Consulting, Inc.

Figure B-1
Monterey Pine Forest Habitat Within Area 1

Looking west-northwest, an information sign along a trail is one of many forming a boundary around populations of Yadon's rein orchid *(Piperia yadonii)* where visitors to Area 1 (next to Building 630) are apprised of this federally endangered flower's presence and advised to take caution.

MACTEC Engineering & Consulting, Inc.

Figure B-2
Monterey Pine Forest Habitat Within Area 1

Yadon's rein orchid *(Piperia yadonii)*, a federally endangered species, in Area 1 underneath Monterey pine forest, 150' west-southwest of Building 630. In total, 428 Yadon's rein orchid individuals were found during the surveys within the Presidio of Monterey.

Looking uphill within Monterey pine forest on a north-northwestern facing hillside, a group of 10 Yadon's rein orchid *(Piperia yadonii)* grows in Area 3 among 66 total individuals, 100 feet south of MacArthur Rd and 30 feet northwest and downhill from the fence surrounding Area 4 (Huckleberry Hill Preserve).

Note: Amidst the orchids, young French broom *(Genista monspessulan)*, an invasive non-native competitor grows. These young shrub individuals will likely continue to grow and spread, thereby casting shade and obtaining soil moisture and nutrients that could, in turn, possibly inhibit or prevent the growth of future orchid generations.

A mule deer *(Odocoelius hemionus)* in the background (center) stands within Coast Live Oak Riparian Forest habitat (Area 2) next to a narrow stream flowing east and amidst an understory of poison oak *(Toxicodendron diversilobum)* (foreground), English ivy *(Hedera helix)* (on tree trunk, center), French broom *(Genista monspessulana)*(background), and California blackberry *(Rubus ursinus)* (left, front). The photo is looking southwest.

MACTEC Engineering & Consulting, Inc.

Figure B-5
Coast Live Oak Riparian Forest Habitat Within Area 2

Within Area 4 (Huckleberry Hill Preserve), 128 small-leaved lomatium (*Lomatium parvifolium*), including this one, were observed July 7, 2005 on a southwestern facing slope amidst an opening in the Monterey pine forest habitat.

MACTEC Engineering & Consulting, Inc.

Figure B-6
Special-Status Species
Within Area 4 (Huckleberry Hill Preserve)

Pretty face *(Triteleia ixioides),* an Amaryllis family member, blooms in a group on the forest floor amidst dried quaking grass *(Briza maxima)* within an understory of Monterey pine habitat in Area 1 next to Building 630. The photo looks toward the southwest.

MACTEC Engineering & Consulting, Inc.

Figure B-7
Monterey Pine Forest Habitat Within Area 1

Fallen Monterey pine logs in a canyon lie within a shallow creek flowing through a canyon within Area 2 of the POM that is immediately north-northwest of the "Point Lobos Reserve." This parcel, which is located in the south-central portion of POM between Buildings 622 and 651, contains Monterey pine forest with an understory shown here of California coffeeberry *(Rhamnus californica* ssp. *californica)* (front, right), French broom *(Genista monspessulana)* (front center and lower right) and wood fern *(Dryopteris arguta)* (left, center and top).

MACTEC Engineering & Consulting, Inc.

Figure B-8
Monterey Pine Forest Habitat Within Area 2

Within Area 4 (Huckleberry Hill Preserve), looking northeast upslope, a classic example of young Monterey pine grow beneath more mature ones, with an understory of coast live oak *(Quercus agrifolia)* (center and left), French broom *(Genista monspessulana)* (front center and right), and bush monkeyflower *(Mimulus aurantiacus)* (orange shrub, front center).

Looking southwest, coast live oak *(Quercus agrifolia)* trees grow in a locale that is southwest of the field and track area within Area 3 near Building 660 in the central portion of the Presidio of Monterey (and close to the northeast corner of Area 4, Huckleberry Hill Preserve).

Similar to the majority of all natural areas within the Presidio of Monterey, the understory is dominated with non-native, invasive French broom *(Genista monspessulana)* (low growing green shrub in center, left and far background) and quaking grass *(Briza maxima)* (tan stalks below left side and center right).

Groves of Hooker's manzanita *(Arctostaphylos hookerii* ssp. *hookeri)* (background, left), a shrub species designated as rare throughout its range, periodically appear amidst the more common shaggy-barked manzanita *(Arctostaphylos tomentosa* ssp. *tomentosa)* (foreground, center and right), including this southwestern-facing hillside within Area 4 (Huckleberry Hill Preserve).

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Figure B-11
Coast Live Oak Forest Habitat
Within Area 4 (Huckleberry Hill Preserve)

Seeing French broom *(Genista monspessulana)* in blossom is a common sight throughout the POM's remaining natural areas where this invasive, non-native shrub often dominates the understory. The photo is looking south in Area 1 near Building 630.

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Figure B-12
Monterey Pine Forest Habitat Within Area 1

Breaks in the Monterey pine canopy within Area 4 (Huckleberry Hill Preserve) typically exhibit an understory carpet of the invasive, non-native quaking grass *(Briza maxima)* (foreground, tan low grasses) combined with young French broom shoots *(Genista monspessulana)* (foreground, low green shrubs).

These non-natives have likely displaced former populations of the small-leaved lomatium *(Lomatium parvifolium)*, a listed native species. It likely previously grew more abundantly nearby in openings like this one, and scattered populations remain in Area 4, where this invasive grass and shrub are absent.

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Figure B-13
Monterey Pine Forest Habitat Within Area 4

The non-native pampas grass *(Cortaderia selloana)* in Area 1 (looking west) is an invasive non-native that often appears within the POM's Monterey pine forest habitat. After it gets established, it may outcompete other plants and grow in clumps that form a monoculture in the understory.

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Figure B-14
Monterey Pine Forest Habitat Within Area 1

An uneven stand of Monterey pine forest (looking north-northwest) in Area 4 (Huckleberry Hill) contains both young and older trees. As succession progresses, this southwestern portion of Area 4 will likely host large Monterey pine trees that gradually replace others, such as the taller ones on the left.

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Figure B-15
Monterey Pine Forest Habitat Within Area 4

The invasive non-native quaking grass *(Briza maxima)* grows throughout openings within the POM's remaining natural parcels, including Area 1 near Building 630 (looking west). When present, this grass forms thick mats that dominate the understory, preventing the growth of native forb species such as Yadon's rein orchid *(Piperia yadonii)* and small-leaved lomatium *(Lomatium parvifolium)*, as well as other native plants.

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Figure B-16
Monterey Pine Forest Habitat Within Area 1

The special-status shrub species Hooker's manzanita *(Arctostaphylos hookeri* ssp. *hookeri)* appears as an understory element in many of the POM's natural areas, including this west-facing slope in Area 4 (Huckleberry Hill Preserve) within Monterey pine forest.

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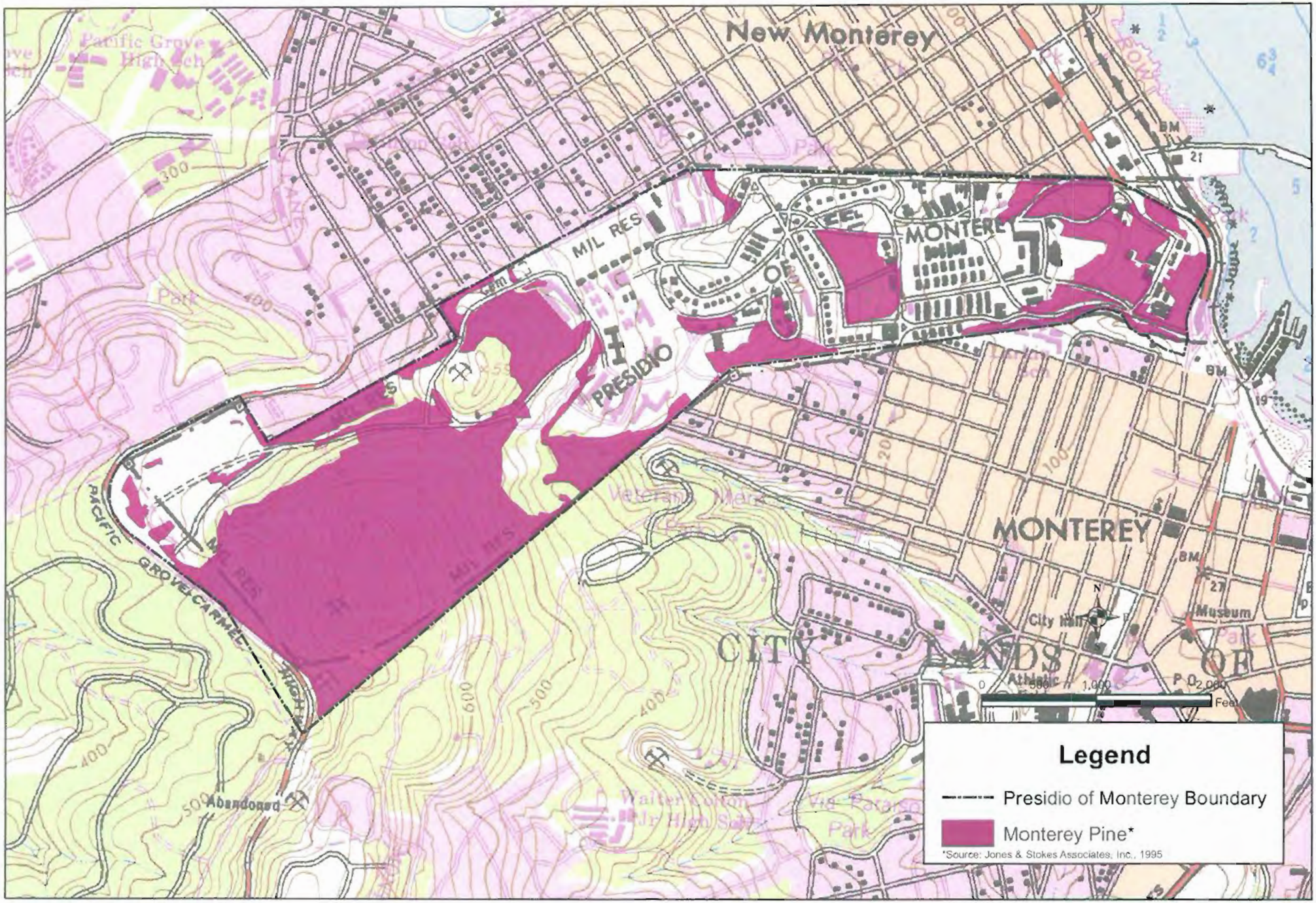
Figure B-17
Monterey Pine Forest Habitat Within Area 4

APPENDIX C

CALIFORNIA NATIVE SPECIES FIELD SURVEY FORMS (I.E., RARE PLANT FORMS)

APPENDIX D

DISTRIBUTION MAPS FOR SPECIAL-STATUS PLANT SPECIES AT THE PRESIDIO OF MONTEREY



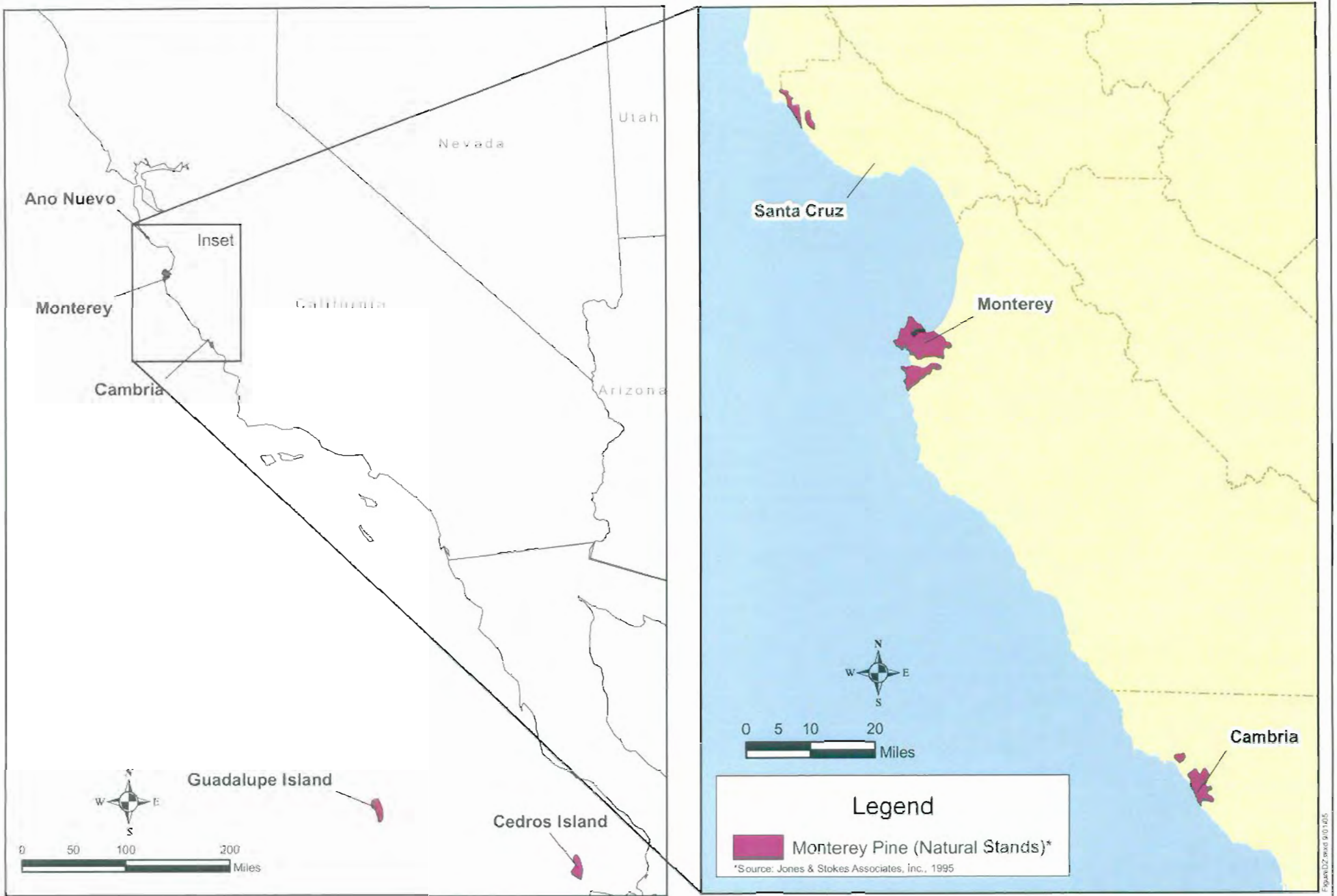
MACTEC

Distribution of Monterey Pine at the Presidio of Monterey
Monterey, California

PLATE D-1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
FPC	4088053116.4		09/05	

FigureD1.mxd 9/14/05



MACTEC

Known Distribution of Monterey Pine (Natural Stands)
Monterey, California

PLATE D-2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
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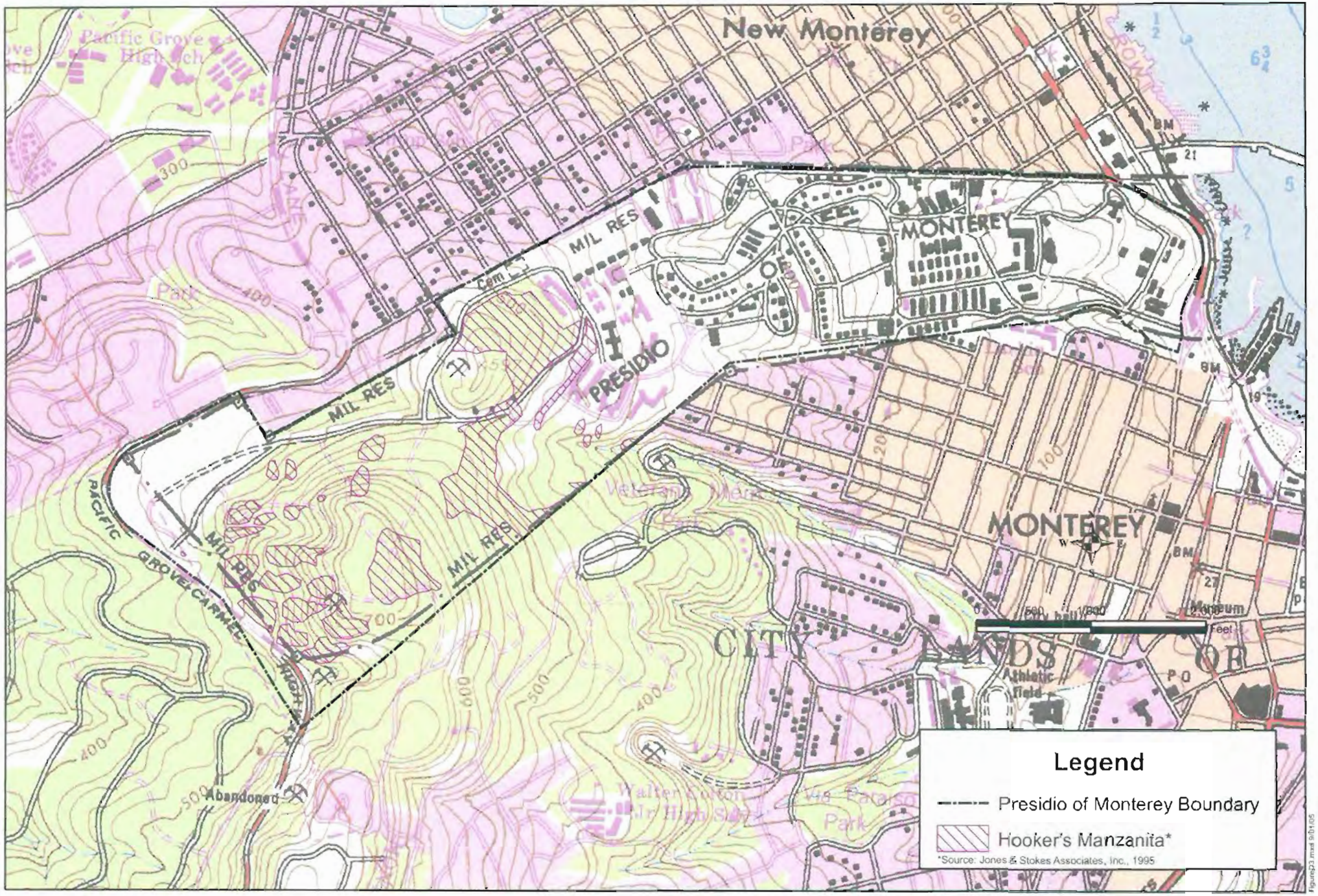

MACTEC

Distribution of Hooker's Manzanita at the Presidio of Monterey
Monterey, California

PLATE D-3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
FPC	4088053116.4		09/05	

MACTEC

Known Distribution of Hooker's Manzanita
Monterey, California

PLATE D-4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
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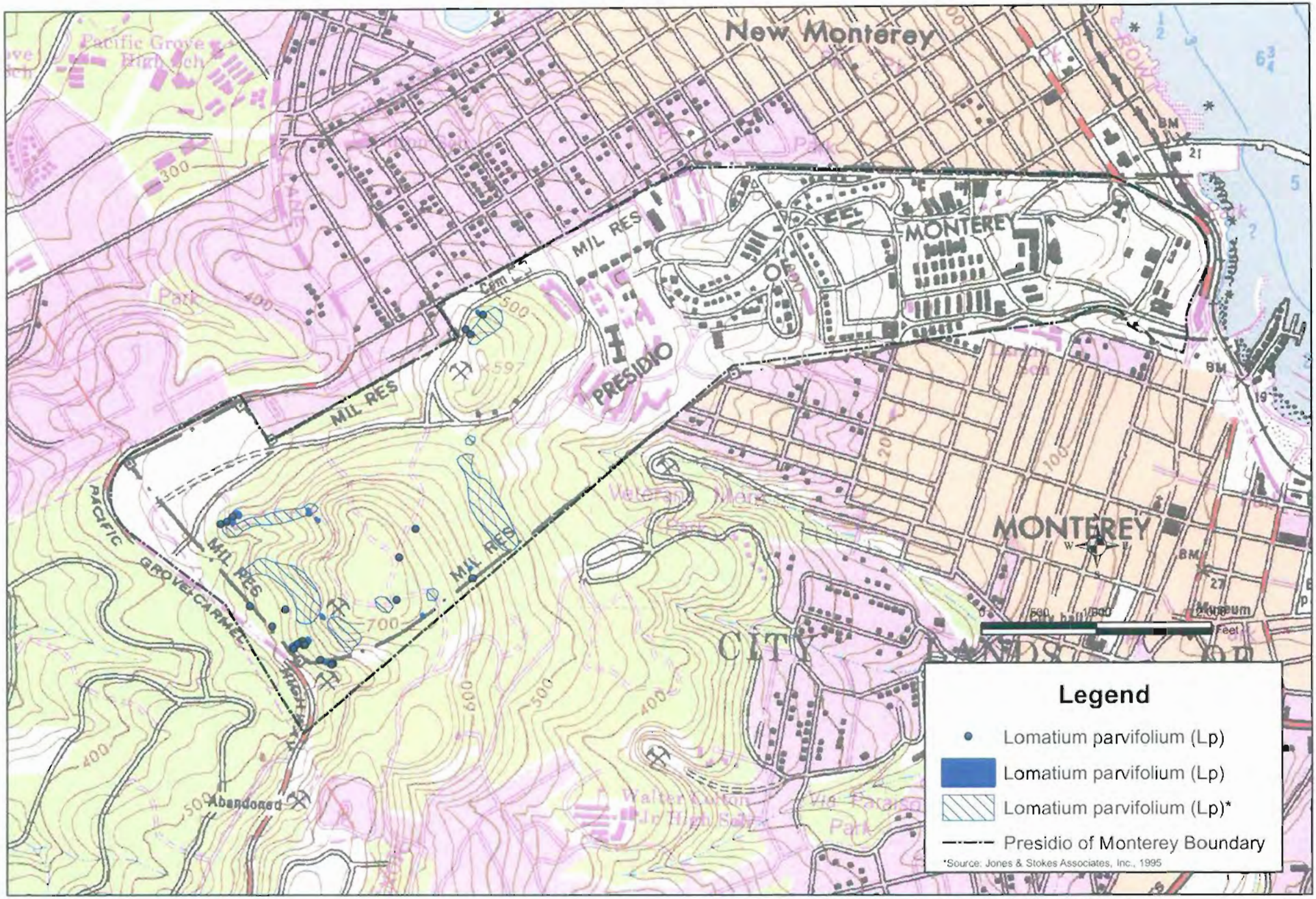
FigureD4.ai.mxd 9/01/05



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Distribution of Small-Leaved Lomatium at the Presidio of Monterey
Monterey, California

PLATE D-5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
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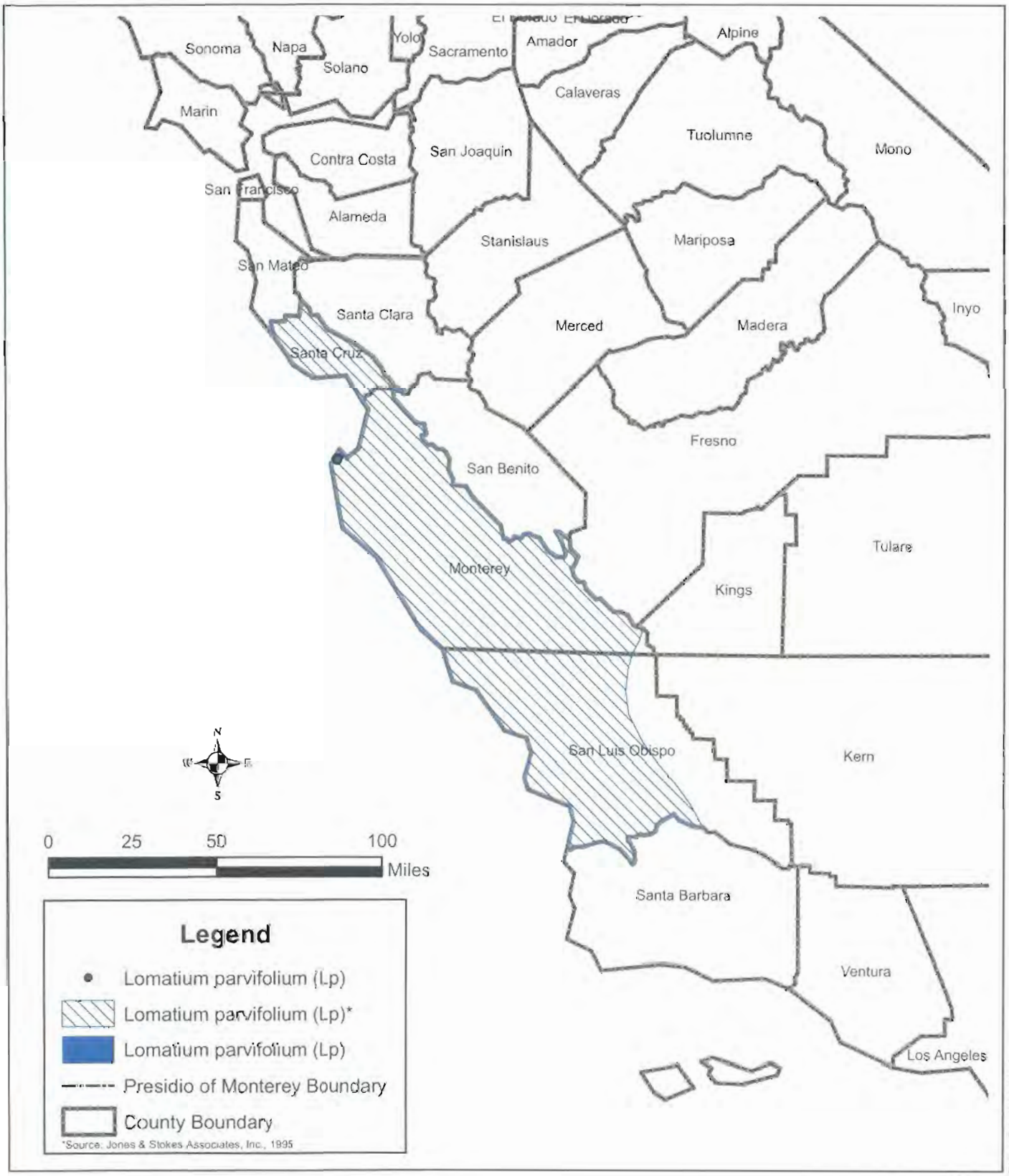


FigureD6.mxd 9/1/05

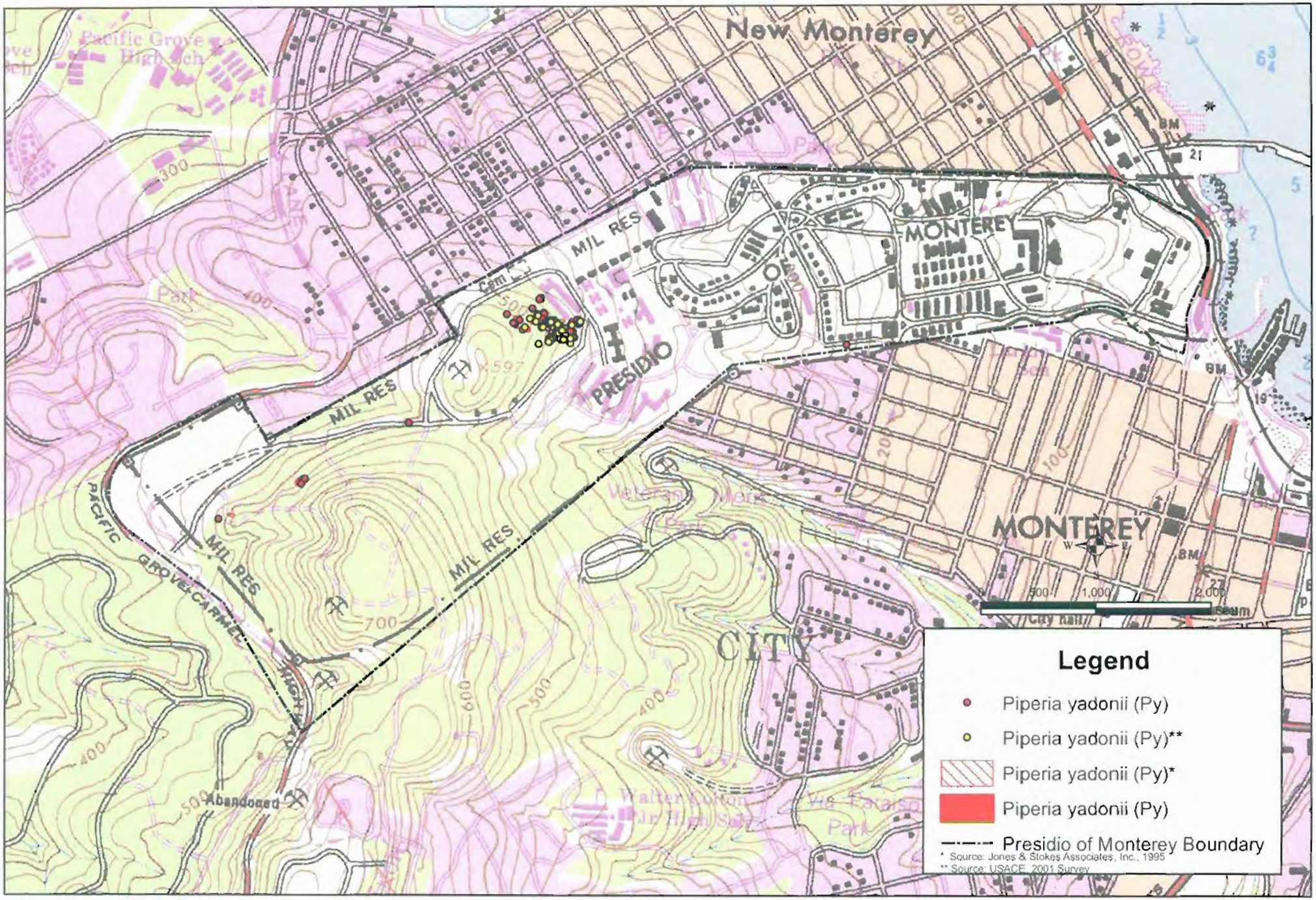
PLATE

MACTEC

Known Distribution of Small-Leaved Lomatium
Monterey, California

D-6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
FPC	4088053116.4	DE | WR	9/2005	



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Distribution of Yadon's Piperia at the Presidio of Monterey
Monterey, California

PLATE D-7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
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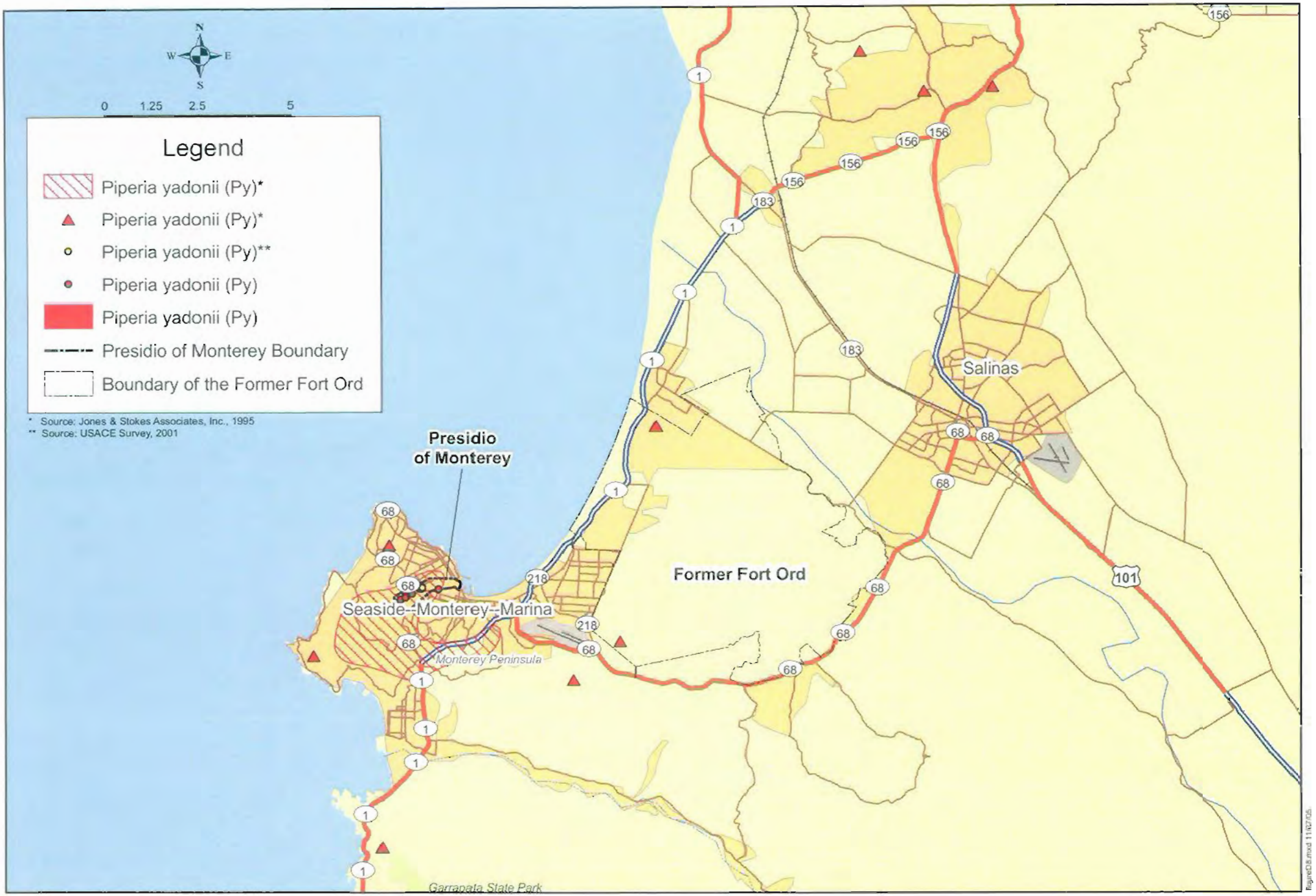
Figure37.mxd 9/8/2005



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Known Distribution of Yadon's Piperia
Monterey, California

D-8

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
RTT	4088053116.4		9/05	11/05

DISTRIBUTION

Habitat Assessment Report
Flora and Fauna Baseline Study of the
Presidio of Monterey, California

December 7, 2005

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Copy 10:	Mr. George Siller USACE 1325 J Street Sacramento, CA 95814-2922
Copy 11:	Mr. Scott Bradley, CEHNC-ED-CS-P P.O. Box 1600 Huntsville, AL 35807-4301
Copy 12-13:	MACTEC

DE/WR/klb/KB61446.DOC-POM

Appendix E
ANSI Pruning Standards

American National Standard

for Tree Care Operations — Tree, Shrub, and Other Woody Plant Maintenance — Standard Practices (Pruning)

ANSI A300 (Part 1)-2001 Pruning
Revision of ANSI A300-1995

Approved American National Standard

ANSI

ANSI®
A300 (Part 1)-2001
Revision of
ANSI A300-1995

American National Standard
for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices *(Pruning)*

Secretariat
National Arborist Association, Inc.

Approved May 22, 2001
American National Standards Institute, Inc.
Headquarters:
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Sixth Floor
Washington, DC 20036
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25 West 43rd Street
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New York, NY 10036

American National Standard

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Contents

Forward (This foreword is not part of American National Standard A300 Part 1-2001.)

An industry-consensus standard must have the input of the industry that it is intended to affect. The Accredited Standards Committee A300 was approved June 28, 1991. The committee includes representatives from the residential and commercial tree care industry, the utility, municipal, and federal sectors, the landscape and nursery industries, and other interested organizations. Representatives from varied geographic areas with broad knowledge and technical expertise contributed.

The A300 standard can be best placed in proper context if one reads its *Scope, Purpose,* and *Application.* This document presents performance standards for the care and maintenance of trees, shrubs, and other woody plants. It is intended as a guide in the drafting of maintenance specifications for federal, state, municipal, and private authorities including property owners, property managers, and utilities.

The A300 standard stipulates that specifications for tree work should be written and administered by a professional possessing the technical competence to provide for, or supervise, the management of woody landscape plants. Users of this standard must first interpret its wording, then apply their knowledge of growth habits of certain plant species in a given environment. In this manner, the user ultimately develops their own specifications for plant maintenance.

ANSI A300 Part 1 – *Pruning,* should be used in conjunction with the rest of the A300 standard when writing specifications for tree care operations.

Suggestions for improvement of this standard should be forwarded to: NAA300 Secretary, c/o National Arborist Association, 3 Perimeter Rd. - Unit 1, Manchester, NH 03103, USA or Email: naa@natlarb.com.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee on Tree, Shrub, and Other Woody Plant Maintenance Operations – *Standard Practices,* A300. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the A300 committee had the following members:

Tim Johnson, Chair (Artistic Arborist, Inc.)

Bob Rouse, Secretary (National Arborist Association, Inc.)

Organizations Represented	*Name of Representative*
American Forests	Staff (Observer)
American Nursery and Landscape Association	Craig J. Regelbrugge
American Society of Consulting Arborists	Andrew Graham
	Donald Blair (Adviser)
	Beth Palys (Adviser)
American Society of Landscape Architects	Ron Leighton
Asplundh Tree Expert Company	Geoff Kempter
Associated Landscape Contractors of America	Preston Leyshon
	Jeff Bourne (Alt.)
The Davey Tree Expert Company	Joseph Tommasi
	Dick Jones (Alt.)
	Richard Rathjens (Adviser)
The F.A. Bartlett Tree Expert Company	Peter Becker
	Dr. Thomas Smiley (Alt.)
International Society of Arboriculture	Ed Brennan
	Sharon Lilly (Alt.)
National Arborist Association	Ronald Rubin
	Tom Mugridge (Alt.)
National Park Service	Robert DeFeo
Professional Grounds Management Society	Kevin O'Donnell
Society of Municipal Arborists	Andrew Hillman
U.S. Forest Service	Ed Macie
	Mike Galvin (Alt.)
	Philip D. Rodbell (Alt.)

Organizations Represented	*Name of Representative*
Utility Arborist Association	Jeffery Smith
	Matt Simons (Alt.)

American National Standard for Tree Care Operations –

Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices *(Pruning)*

1 ANSI A300 standards

1.1 Scope

ANSI A300 standards present performance standards for the care and maintenance of trees, shrubs, and other woody plants.

1.2 Purpose

ANSI A300 standards are intended as guides for federal, state, municipal and private authorities including property owners, property managers, and utilities in the drafting of their maintenance specifications.

1.3 Application

ANSI A300 standards shall apply to any person or entity engaged in the business, trade, or performance of repairing, maintaining, or preserving trees, shrubs, or other woody plants.

1.4 Implementation

Specifications for tree maintenance should be written and administered by an arborist.

2 Part 1 – Pruning standards

2.1 Purpose

The purpose of this document is to provide standards for developing specifications for tree pruning.

2.2 Reasons for pruning

The reasons for tree pruning may include, but are not limited to, reducing risk, maintaining or improving tree health and structure, improving aesthetics, or satisfying a specific need. Pruning practices for agricultural, horticultural production, or silvicultural purposes are exempt from this standard.

2.3 Safety

2.3.1 Tree maintenance shall be performed only by arborists or arborist trainees who, through related training or on-the-job experience, or both, are familiar with the practices and hazards of arboriculture and the equipment used in such operations.

2.3.2 This standard shall not take precedence over arboricultural safe work practices.

2.3.3 Operations shall comply with applicable Occupational Safety and Health Administration (OSHA) standards, ANSI Z133.1, as well as state and local regulations.

3 Normative references

The following standards contain provisions, which, through reference in the text, constitute provisions of this American National Standard. All standards are subject to revision, and parties to agreements based on this American National Standard shall apply the most recent edition of the standards indicated below.

ANSI Z60.1, *Nursery stock*

ANSI Z133.1, *Tree care operations - Pruning, trimming, repairing, maintaining, and removing trees, and cutting brush - Safety requirements*

29 CFR 1910, General industry [1)]

29 CFR 1910.268, Telecommunications [1)]

29 CFR 1910.269, Electric power generation, transmission, and distribution [1)]

29 CFR 1910.331 - 335, Electrical safety-related work practices [1)]

4 Definitions

4.1 anvil-type pruning tool: A pruning tool that

has a sharp straight blade that cuts against a flat metal cutting surface, in contrast to a *hook-and-blade-type pruning tool* (4.21).

4.2 **apical dominance:** Inhibition of growth of lateral buds by the terminal bud.

4.3 **arboriculture:** The art, science, technology, and business of commercial, public, and utility tree care.

4.4 **arborist:** An individual engaged in the profession of arboriculture who, through experience, education, and related training, possesses the competence to provide for or supervise the management of trees and other woody plants.

4.5 **arborist trainee:** An individual undergoing on-the-job training to obtain the experience and the competence required to provide for or supervise the management of trees and other woody plants. Such trainees shall be under the direct supervision of an arborist.

4.6 **branch bark ridge:** The raised area of bark in the branch crotch that marks where the branch and parent meet.

4.7 **branch collar:** The swollen area at the base of a branch.

4.8 **callus:** Undifferentiated tissue formed by the cambium around a wound.

4.9 **cambium:** The dividing layer of cells that forms sapwood (xylem) to the inside and inner bark (phloem) to the outside.

4.10 **cleaning:** Selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches (5.6.1).

4.11 **climbing spurs:** Sharp, pointed devices affixed to a climber's boot used to assist in climbing trees. (syn.: gaffs, hooks, spurs, spikes, climbers)

4.12 **closure:** The process of woundwood covering a cut or other tree injury.

4.13 **crown:** The leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree.

4.14 **decay:** The degradation of woody tissue caused by microorganisms.

4.15 **espalier:** The combination of pruning, supporting, and training branches to orient a plant in one plane (5.7.2).

4.16 **establishment:** The point after planting when a tree's root system has grown sufficiently into the surrounding soil to support shoot growth and anchor the tree.

4.17 **facility:** A structure or equipment used to deliver or provide protection for the delivery of an essential service, such as electricity or communications.

4.18 **final cut:** A cut that completes the removal or reduction of a branch or stub.

4.19 **frond:** A leaf of a palm.

4.20 **heading:** 1. Cutting a currently growing, or a 1-year-old shoot, back to a bud. 2. Cutting an older branch or stem back to a stub in order to meet a defined structural objective. 3. Cutting an older branch or stem back to a lateral branch not large enough to assume apical dominance in order to meet a defined structural objective. Heading may or may not be an acceptable pruning practice, depending on the application.

4.21 **hook-and-blade-type pruning tool:** A pruning tool that has a sharp curved blade that overlaps a supporting hook; in contrast to an *anvil-type pruning tool* (4.1). (syn.: by-pass pruner)

4.22 **interfering branches:** Crossing, rubbing, or upright branches that have the potential to damage tree structure and/or health.

4.23 **internodal cut:** A cut located between lateral branches or buds.

4.24 **lateral branch:** A shoot or stem growing from a parent branch or stem.

4.25 **leader:** A dominant or co-dominant, upright stem.

4.26 **limb:** A large, prominent branch.

4.27 **lion's tailing:** The removal of an excessive number of inner, lateral branches from parent

branches. Lion's tailing is not an acceptable pruning practice (5.5.7).

4.28 mechanical pruning: A utility pruning technique where large-scale power equipment is used to cut back branches (5.9.2.2).

4.29 parent branch or stem: A tree trunk, limb, or prominent branch from which shoots or stems grow.

4.30 peeling: *For palms:* The removal of only the dead frond bases at the point they make contact with the trunk without damaging living trunk tissue. (syn.: shaving)

4.31 petiole: A stalk of a leaf or frond.

4.32 phloem: Inner bark conducting tissues that transport organic substances, primarily carbohydrates, from leaves and stems to other parts of the plant.

4.33 pollarding: The maintenance of a tree by making internodal cuts to reduce the size of a young tree, followed by the annual removal of shoot growth at its point of origin (5.7.3).

4.34 pruning: The selective removal of plant parts to meet specific goals and objectives.

4.35 qualified line-clearance arborist: An individual who, through related training and on-the-job experience, is familiar with the equipment and hazards in line clearance and has demonstrated the ability to perform the special techniques involved. This individual may or may not be currently employed by a line-clearance contractor.

4.36 qualified line-clearance arborist trainee: An individual undergoing line-clearance training and who, in the course of such training, is familiar with the hazards and equipment involved in line clearance and has demonstrated ability in the performance of the special techniques involved. This individual shall be under the direct supervision of a qualified line-clearance arborist.

4.37 raising: Selective pruning to provide vertical clearance (5.6.3).

4.38 reduction: Selective pruning to decrease height and/or spread (5.6.4).

4.39 remote/rural areas: Locations associated with very little human activity, land improvement, or development.

4.40 restoration: Selective pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged (5.7.4).

4.41 shall: As used in this standard, denotes a mandatory requirement.

4.42 should: As used in this standard, denotes an advisory recommendation.

4.43 stub: An undesirable short length of a branch remaining after a break or incorrect pruning cut is made.

4.44 thinning: Selective pruning to reduce density of live branches (5.6.2).

4.45 throwline: A small, lightweight line with a weighted end used to position a climber's rope in a tree.

4.46 topping: The reduction of a tree's size using heading cuts that shorten limbs or branches back to a predetermined crown limit. Topping is not an acceptable pruning practice (5.5.7).

4.47 tracing: The removal of loose, damaged tissue from in and around the wound.

4.48 urban/residential areas: Locations, such as populated areas including public and private property, that are normally associated with human activity.

4.49 utility: An entity that delivers a public service, such as electricity or communications.

4.50 utility space: The physical area occupied by a utility's facilities and the additional space required to ensure its operation.

4.51 vista pruning: Selective pruning to allow a specific view (5.7.5).

4.52 watersprouts: New stems originating from epicormic buds. (syn.: epicormic shoots)

4.53 wound: An opening that is created when the bark of a live branch or stem is penetrated, cut, or removed.

4.54 woundwood: Partially differentiated tissue responsible for closing wounds. Woundwood develops from callus associated with wounds.

4.55 xylem: Wood tissue. Active xylem is sapwood; inactive xylem is heartwood.

4.56 young tree: A tree young in age or a newly transplanted tree.

5 Pruning practices

5.1 Tree inspection

5.1.1 An arborist or arborist trainee shall visually inspect each tree before beginning work.

5.1.2 If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

5.2 Tools and equipment

5.2.1 Equipment and work practices that damage living tissue and bark beyond the scope of the work should be avoided.

5.2.2 Climbing spurs shall not be used when climbing and pruning trees.

Exceptions:
- when limbs are more than throwline distance apart and there is no other means of climbing the tree;
- when the bark is thick enough to prevent damage to the cambium;
- in remote or rural utility rights-of-way.

5.3 Pruning cuts

5.3.1 Pruning tools used in making pruning cuts shall be sharp.

5.3.2 A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub (see Figure 5.3.2).

5.3.3 A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem (see Figure 5.3.3).

5.3.4 The final cut shall result in a flat surface with adjacent bark firmly attached.

5.3.5 When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

5.3.6 Tree branches shall be removed 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 shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 5.3.2). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

5.3.7 A final cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent limb (see Figure 5.3.7).

5.3.8 Severed limbs shall be removed from the crown upon completion of the pruning, at times when the tree would be left unattended, or at the end of the workday.

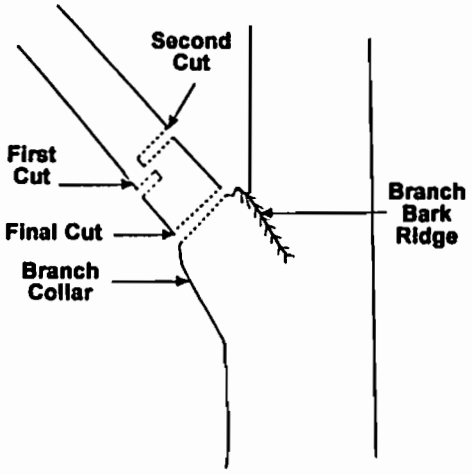

Figure 5.3.2. – A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub. Branches too large to support with one hand shall be precut to avoid splitting of the wood or tearing of the bark.

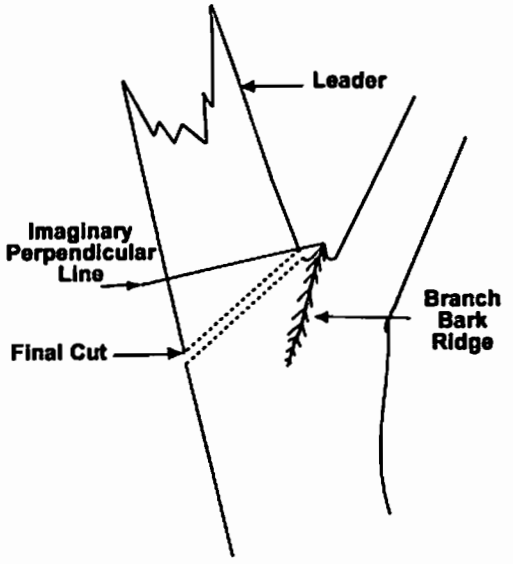

Figure 5.3.3. – A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem.

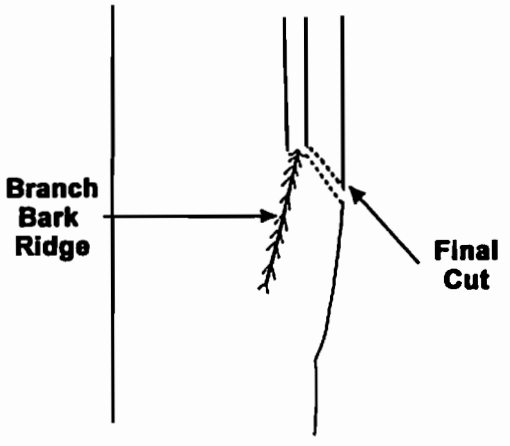

Figure 5.3.7. – A final cut that removes a branch with a narrow angle of attachment should be made from the outside of the branch to prevent damage to the parent limb.

5.4 Wound treatment

5.4.1 Wound treatments should not be used to cover wounds or pruning cuts, except when recommended for disease, insect, mistletoe, or sprout control, or for cosmetic reasons.

5.4.2 Wound treatments that are damaging to tree tissues shall not be used.

5.4.3 When tracing wounds, only loose, damaged tissue should be removed.

5.5 Pruning objectives

5.5.1 Pruning objectives shall be established prior to beginning any pruning operation.

5.5.2 To obtain the defined objective, the growth cycles and structure of individual species and the type of pruning to be performed should be considered.

5.5.3 Not more than 25 percent of the foliage should be removed within an annual growing season. The percentage and distribution of foliage to be removed shall be adjusted according to the plant's species, age, health, and site.

5.5.4 Not more than 25 percent of the foliage of a branch or limb should be removed when it is cut back to a lateral. That lateral should be large enough to assume apical dominance.

5.5.5 Pruning cuts should be made in accordance with 5.3 *Pruning cuts.*

5.5.6 Heading should be considered an acceptable practice for shrub or specialty pruning when needed to reach a defined objective.

5.5.7 Topping and lion's tailing shall be considered unacceptable pruning practices for trees.

5.6 Pruning types

Specifications for pruning should consist of, but are not limited to, one or more of the following types:

5.6.1 Clean: Cleaning shall consist of selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches.

5.6.1.1 Location of parts to be removed shall be specified.

5.6.1.2 Size range of parts to be removed shall be specified.

5.6.2 **Thin:** Thinning shall consist of selective pruning to reduce density of live branches.

5.6.2.1 Thinning should result in an even distribution of branches on individual limbs and throughout the crown.

5.6.2.2 Not more than 25 percent of the crown should be removed within an annual growing season.

5.6.2.3 Location of parts to be removed shall be specified.

5.6.2.4 Percentage of foliage and size range of parts to be removed shall be specified.

5.6.3 **Raise:** Raising shall consist of selective pruning to provide vertical clearance.

5.6.3.1 Vertical clearance should be specified.

5.6.3.2 Location and size range of parts to be removed should be specified.

5.6.4 **Reduce:** Reduction shall consist of selective pruning to decrease height and/or spread.

5.6.4.1 Consideration shall be given to the ability of a species to tolerate this type of pruning.

5.6.4.2 Location of parts to be removed and clearance should be specified.

5.6.4.3 Size range of parts should be specified.

5.7 Specialty pruning

Consideration shall be given to the ability of a species to tolerate specialty pruning, using one or more pruning types (5.6).

5.7.1 Young trees

5.7.1.1 The reasons for young tree pruning may include, but are not limited to, reducing risk, maintaining or improving tree health and structure, improving aesthetics, or satisfying a specific need.

5.7.1.2 Young trees that will not tolerate repetitive pruning and have the potential to outgrow their space should be considered for relocation or removal.

5.7.1.3 At planting

5.7.1.3.1 Pruning should be limited to cleaning (5.6.1).

5.7.1.3.2 Branches should be retained on the lower trunk.

5.7.1.4 Once established

5.7.1.4.1 Cleaning should be performed (5.6.1).

5.7.1.4.2 Rubbing and poorly attached branches should be removed.

5.7.1.4.3 A central leader or leader(s) as appropriate should be developed.

5.7.1.4.4 A strong, properly spaced scaffold branch structure should be selected and maintained.

5.7.1.4.5 Interfering branches should be reduced or removed.

5.7.2 Espalier

5.7.2.1 Branches that extend outside the desired plane of growth shall be pruned or tied back.

5.7.2.2 Ties should be replaced as needed to prevent girdling the branches at the attachment site.

5.7.3 Pollarding

5.7.3.1 Consideration shall be given to the ability of the individual tree to respond to pollarding.

5.7.3.2 Management plans shall be made prior to the start of the pollarding process for routine removal of watersprouts.

5.7.3.3 Internodal cuts shall be made at specific locations to start the pollarding process. After the initial cuts are made, no additional internodal cut shall be made.

5.7.3.4 Watersprouts growing from the cut ends of branches (knuckles) should be removed annually during the dormant season.

5.7.4 Restoration

5.7.4.1 Restoration shall consist of selective pruning to improve the structure, form, and appearance of trees that have been severely headed, vandalized, or damaged.

5.7.4.2 Location in tree, size range of parts, and percentage of watersprouts to be removed should be specified.

5.7.5 Vista pruning

5.7.5.1 Vista pruning shall consist of selective pruning to allow a specific view.

5.7.5.2 Size range of parts, location in tree, and percentage of foliage to be removed should be specified.

5.8 Palm pruning

5.8.1 Palm pruning should be performed when fronds, fruit, or loose petioles may create a dangerous condition.

5.8.2 Live healthy fronds, initiating at an angle of 45 degrees or greater from horizontal, with frond tips at or below horizontal, should not be removed.

5.8.3 Fronds removed should be severed close to the petiole base without damaging living trunk tissue.

5.8.4 Palm peeling (shaving) should consist of the removal of only the dead frond bases at the point they make contact with the trunk without damaging living trunk tissue.

5.9 Utility pruning

5.9.1 General

5.9.1.1 The purpose of utility pruning is to prevent the loss of service, comply with mandated clearance laws, prevent damage to equipment, avoid access impairment, and uphold the intended usage of the facility/utility space.

5.9.1.2 Only a qualified line clearance arborist or line clearance arborist trainee shall be assigned to line clearance work in accordance with ANSI Z133.1, 29 CFR 1910.331 – 335, 29 CFR 1910.268 or 29 CFR 1910.269.

5.9.1.3 Utility pruning operations are exempt from requirements in 5.1 Tree Inspection:

5.1.1 An arborist or arborist trainee shall visually inspect each tree before beginning work.

5.1.2 If a condition is observed requiring attention beyond the original scope of the work, the condition should be reported to an immediate supervisor, the owner, or the person responsible for authorizing the work.

5.9.1.4 Safety inspections of the work area are required as outlined in ANSI Z133.1 4.1.3, *job briefing.*

5.9.2 Utility crown reduction pruning

5.9.2.1 Urban/residential environment

5.9.2.1.1 Pruning cuts should be made in accordance with 5.3, Pruning cuts. The following requirements and recommendations of 5.9.2.1.1 are repeated from 5.3 Pruning cuts.

5.9.2.1.1.1 A pruning cut that removes a branch at its point of origin shall be made close to the trunk or parent limb, without cutting into the branch bark ridge or collar, or leaving a stub (see Figure 5.3.2).

5.9.2.1.1.2 A pruning cut that reduces the length of a branch or parent stem should bisect the angle between its branch bark ridge and an imaginary line perpendicular to the branch or stem (see Figure 5.3.3).

5.9.2.1.1.3 The final cut shall result in a flat surface with adjacent bark firmly attached.

5.9.2.1.1.4 When removing a dead branch, the final cut shall be made just outside the collar of living tissue.

5.9.2.1.1.5 Tree branches shall be removed 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 shall be precut to avoid splitting of the wood or tearing of the bark (see Figure 5.3.2). Where necessary, ropes or other equipment shall be used to lower large branches or portions of branches to the ground.

5.9.2.1.1.6 A final cut that removes a branch

with a narrow angle of attachment should be made from the bottom of the branch to prevent damage to the parent limb (see Figure 5.3.7).

5.9.2.1.2 A minimum number of pruning cuts should be made to accomplish the purpose of facility/utility pruning. The natural structure of the tree should be considered.

5.9.2.1.3 Trees directly under and growing into facility/utility spaces should be removed or pruned. Such pruning should be done by removing entire branches or by removing branches that have laterals growing into (or once pruned, will grow into) the facility/utility space.

5.9.2.1.4 Trees growing next to, and into or toward facility/utility spaces should be pruned by reducing branches to laterals (5.3.3) to direct growth away from the utility space or by removing entire branches. Branches that, when cut, will produce watersprouts that would grow into facilities and/or utility space should be removed.

5.9.2.1.5 Branches should be cut to laterals or the parent branch and not at a pre-established clearing limit. If clearance limits are established, pruning cuts should be made at laterals or parent branches outside the specified clearance zone.

5.9.2.2 Rural/remote locations – mechanical pruning

Cuts should be made close to the main stem, outside of the branch bark ridge and branch collar. Precautions should be taken to avoid stripping or tearing of bark or excessive wounding.

5.9.3 Emergency service restoration

During a utility-declared emergency, service must be restored as quickly as possible in accordance with ANSI Z133.1, 29 CFR 1910.331 – 335, 29 CFR 1910.268, or 29 CFR 1910.269. At such times it may be necessary, because of safety and the urgency of service restoration, to deviate from the use of proper pruning techniques as defined in this standard. Following the emergency, corrective pruning should be done as necessary.

Annex A
(informative)

Reference publications

International Society of Arboriculture (ISA). 1995. *Tree Pruning Guidelines.* Savoy, IL: International Society of Arboriculture (ISA).

Appendix F
Subinstallation Management and SATCOM Facility Biological Opinion

Appendix F. Sub-installation Management and Satellite Communications Station (SATCOM) Facility Biological Opinion

In June 2004, the US Army at the Presidio of Monterey signed an Inter Service Support Agreement (ISA) with the US Signal Command at Camp Roberts to provide certain services in support of the Satellite Communications Station (SATCOM) facility located in San Luis Obispo County, California. Services include: environmental support when requested, review of facility operations plans and SOPs for inclusion in POM environmental programs, review of environmental documentation, compliance with natural and cultural resource laws, and management of environmental permits and licenses (Army 2004).

The SATCOM facility is considered an Army sub-installation of the Presidio of Monterey. It occupies a fenced 24-acre area located on 28 acres in the southeastern portion of Camp Roberts and consists of 13 buildings (FWS 1996). The California Army National Guard (CANG) leases all lands of Camp Roberts, with the exception of the SATCOM site, from the US Army. In 2004, the US Army prepared an Area Development Plan and Environmental Assessment that would allow the facility to expand to 81.5 acres in the future (USACE 2005).

SATCOM is a high-security complex with restricted access designation (USACE 1996). It was constructed in the early 1960's as a research and development facility for the US Army Advent Program. SATCOM played an integral role during the Vietnam War as a communications link between Washington, DC and the Far East. The Army's Combat Development Command used the facilities for testing during the Vietnam War (CANG 2001). The facility has provided logistics support, administration, repairs, and utilities in support of the operational requirements of the US Army, US Navy, US Air Force, Defense Information Systems Agency, US Army Space Command, and Ground Mobile Force (CANG 1996).

As a sub-installation, SATCOM operates under the Presidio of Monterey's environmental plans including the INRMP, Pest Management Plan and Hazardous Waste Management Plan. The 1996 Fish and Wildlife Service Biological Opinion (BO) for Normal Operations and Construction Activities in Support of the Satellite Communications Facility at Camp Roberts, San Luis Obispo and Monterey Counties, California (1-8-96-F-25) guides management of special status species on the 28 acres in lieu of an Endangered Species Management Plan. The BO is attached below.

Appendix F. References

California Army National Guard (CANG), 1996. *Combined-Forces Training Activities, New Equipment Utilization, and Range Modernization Program at Camp Roberts Army National Guard Training Site, California.* Prepared for the National Guard Bureau and the US Army Corps of Engineers.

California Army National Guard (CANG), 2001. *Final Draft Integrated Natural Resources Management Plan.* Prepared by EcoLogik, Inc. for the California Military Department Environmental Branch.

US Army (Army), 2004. Inter Service Support Agreement between the US Signal Command at Camp Roberts and the US Army at the Presidio of Monterey.

US Army Corps of Engineers (USACE), 2005. *Programmatic Environmental Assessment SATCOM Area Development Plan Camp Roberts, California*. Prepared by Jones & Stokes for Nakata Planning Group, LLC.

US Fish and Wildlife Service (FWS), 1996. *Biological Opinion for Normal Operations and Construction Activities in Support of the Satellite Communications Facility at Camp Roberts, San Luis Obispo and Monterey Counties, California* (1-8-96-F-25).

United States Department of the Interior

FISH AND WILDLIFE SERVICE

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May 21, 1996

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Subject: Biological Opinion for Normal Operations and Construction Activities in Support of the Satellite Communications Facility at Camp Roberts, San Luis Obispo and Monterey Counties, California (1-8-96-F-25).

Dear Mr. Stedman:

This biological opinion responds to the Department of the Army's (Army) request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your request was dated February 16, 1996, and amended on April 9, 1996 following correspondence by the Service, dated April 3, 1996, requesting additional information on the proposed activities and their impacts to listed species. At issue are the impacts that vehicle traffic, construction, repair, and pest control activities in support of the Satellite Communications Facility (SATCOM) may have on the endangered San Joaquin kit fox (*Vulpes macrotis mutica*), the threatened bald eagle (*Haliaeetus leucocephalus*), and vernal pool fairy shrimp (*Branchinecta lynchi*). This biological opinion will not address the least Bell's vireo (*Vireo bellii pusillus*) and the American peregrine falcon (*Falco peregrinus anatum*). The Service concurs with the Army's determination that the proposed activities would not affect these species.

This biological opinion was prepared using the following sources of information: your February 16, 1996 request for consultation; your April 9, 1996 amendment to the consultation request; informal consultation and discussion between our staffs; and our files.

Consultation History

The Service informally consulted with Army staff on the proposed installation of a water well, which was to be initiated before this biological opinion could be issued. The Service advised the Army to follow protective measures for the San Joaquin kit fox during construction activities.

Adherence to these measures would lower the potential for take. However, the Army was informed that adherence to these measures would not authorize incidental take or exempt the Army from the prohibition against incidental take.

Biological Opinion

It is the opinion of the Service that the proposed actions are not likely to jeopardize the continued existence of the San Joaquin kit fox, bald eagle, and vernal pool fairy shrimp. Critical habitat has not been designated for these species; therefore, the proposed action would not affect critical habitat.

Description of the Proposed Actions

The SATCOM facility is an Army sub-installation of Fort Lewis, Washington and consists of 13 buildings within a 28 acre fenced area within Camp Roberts, San Luis Obispo and Monterey Counties. The primary mission of the SATCOM facility is to receive, process, and send data. Other activities that are conducted include those associated with the daily operation and maintenance of the SATCOM facility, and construction projects. No field training exercises, such as maneuvering, weapons firing, or bivouacking occur at the SATCOM facility or at Camp Roberts by SATCOM personnel.

The Service issued a biological opinion (1-6-92-F-26), dated July 13, 1992, to the California Army National Guard (Guard) for its military and support activities on Camp Roberts. The Army leases Camp Roberts to the Guard. Because the Army's operations are independent of the Guard's operations at Camp Roberts, and are not under the jurisdiction of the Guard, the Army's activities were not previously addressed; therefore, the Army has requested formal consultation from the Service regarding the SATCOM facility.

The Army has identified several ongoing and pending activities in its biological assessment. Projects and activities of particular concern to the Service because they may adversely affect listed species are briefly described as follows:

1. Vehicle Traffic in Support of the SATCOM Facility

The SATCOM facility is accessed from the East Perimeter Road, primarily from Gate 9 at Camp Roberts. The East Perimeter road is subject daily to approximately 70 vehicle round trips by SATCOM personnel, contractors, and delivery services during the course of normal facility operations and maintenance. Some traffic does occur between SATCOM and the cantonment area of Camp Roberts, either to perform business at Camp Roberts or to use the gates at the north access area.

2. Pest Management Activities

The Army's Pest Management Plan for the SATCOM facility, dated February 1996, includes control of unwanted vegetation, ground squirrels, insects, and fungus. Rodenticides are proposed to be used according to label restrictions and not more than 5 feet from the outside of the installation boundary. Rodenticides would not be applied directly to water or wetlands. Insecticides, herbicides, and fungicides will be used in compliance with all Federal, State, local, and Army regulations.

3. Construction and Repair Activities

Within the fenced SATCOM facility, the Army proposes to convert an existing structure to a warehouse, replace existing underground storage tanks, relocate perimeter lighting, demolish an old security fence, conduct building maintenance and repair activities, install an electric meter, repair asphalt paving, correct surface drainage and fence erosion problems, stabilize a slope and a retaining wall, and close an old hazardous waste site. The surface and fence erosion problems are associated with a ravine forming under the perimeter fence. Some of this work would be performed immediately adjacent to the installation boundary.

Outside the SATCOM facility, the Army proposes to upgrade an existing water distribution system, provide a redundant power supply, and install 4,500 feet of guard rail. The water distribution system upgrade would involve replacing, inside and outside the facility, 8,000 feet of below-grade pipe with four-inch pipe, installing a 100,000 gallon concrete water storage tank, sealing off and abandoning in place an existing 18,000 gallon concrete storage tank, and installing a water distribution system for fire hydrants. The water pipes would connect to a new water well site located 1.5 miles south of the SATCOM facility within Camp Roberts. Water well construction was described in the biological assessment and will not be addressed here because construction was initiated prior to the issuance of this biological opinion. A 96 square foot pump house enclosed by a 40 by 40 foot, 8 foot high, chain link fence would be constructed in association with the water well.

The installation of a redundant power supply would involve connection to an existing electric transmission line in the cantonment area via a 12 kilovolt pole-mounted power line from the SATCOM facility along East Perimeter Road and the eastern boundary of Camp Roberts. The power line would be installed by auguring pilot holes and driving the poles with a truck-mounted pile driver. Installation of the guard rail posts would be conducted in a similar method.

The Army has proposed the following measures to avoid or minimize the potential for incidental take. Measures 1 though 12 apply to San Joaquin kit foxes; measure 13 applies to bald eagles; and measure 14 applies to vernal pool fairy shrimp.

1. Pre-activity surveys for presence of kit foxes will be conducted within 60 days of project initiation and will cover all off-road areas which will be affected by ground disturbing activities

associated with projects. Exclusion zones will be established around dens found within the project area. No ground disturbance or vehicle traffic is allowed within the exclusion zones. If an established roadway falls within an exclusion zone, vehicle traffic will be allowed only if critical need exists and alternate routes are not available. Foot traffic will be allowed for transit only when necessary and where alternate routes are not available. Exclusion zones will be based on the following criteria:

a. Potential den	50 foot (15 meter) radius
b. Known den	100 foot (30 meter) radius
c. Known natal or pupping den	150 foot (45 meter) radius

Potential dens are defined as dens (ground holes) having entrances of sufficient size to allow use by San Joaquin kit foxes, and that occur in habitat suitable for the kit fox. Known dens are those known to be currently inhabited by kit foxes, or where kit foxes have been observed in the past. Know natal or pupping dens are those dens where pregnant females or females with pups have been observed. The exclusion radius is measured from the center of a single den, or from the center of a group of dens.

Exclusion zones will be clearly staked, encircled with cord or tape, and flagged. Establishment of exclusion zones will be done by a qualified wildlife biologist.

2. Proposed activities will be designed to minimize off-road vehicle traffic. Proponents will make use of existing roads, trails, and previously disturbed areas wherever possible. Parking and staging areas should be clearly delineated wherever possible.

3. All vehicle traffic is subject to a 25 mile per hour speed limit, except where posted. Night time construction activities should be minimized.

4. Construction activities will be limited to the smallest possible areas(s) of disturbance. Efforts should be made to use previously disturbed areas wherever possible.

5. The following measures will be implemented to avoid accidental entrapment of animals:

a. All steep-sided excavations greater than two (2) feet deep shall be equipped with one or more earth or plank escape ramps.

b. All excavations will be throughly inspected for animals prior to sealing or refilling to avoid accidental burial. Permanent and semi-permanent structures installed in-ground or underground will be constructed so that animals will not become entrapped within.

c. Any pipe, culvert, or similar material with an inside diameter or four inches or more will be thoroughly inspected for animals prior to sealing or re-connection. If animals are found inside the materials, the material should not be used until the animals vacates or is

conducted out of the area. Pipelines temporarily left open in place will be covered or blocked until work is completed.

6. Planned, intentional destruction of dens may be allowed, but should be avoided except where absolutely necessary. Planned destruction of any den(s) will require the written notification to the Service, and in most cases, will require its concurrence. Intentional den destruction will occur only under the direct supervision of a qualified wildlife biologist. Destruction of known dens may require mitigation measures as directed by the Service.

7. Contour and restoration of disturbed areas will be performed following the conclusion of a project or activity. All temporary excavations will be filled in, contoured, and vegetated were practicable to restore as closely as possible the existing condition of the site(s). Permanent and semi-permanent construction will be blended into the surrounding landscape and vegetated where practicable. Local or California native plant species shall be used wherever possible.

8. All trash, especially food-related items, will be deposited in closed containers or bags and regularly removed from the site.

9. Use of toxic chemicals, such as rodenticides and herbicides, shall be in strict accordance with Federal, State, local, and Army regulations.

10. Project or activity supervisors will be briefed on environmental and conservation procedures by SATCOM staff prior to commencement. The briefing shall include information on endangered species and other environmental concerns and conservation measures. Supervisors will then be responsible for dissemination of the information to the project or activity personnel, and implementation of the procedures discussed.

11. Anyone encountering a dead, injured, or trapped animal will immediately notify their supervisors. The supervisor will in turn notify the appropriate persons including, but not limited to, the SATCOM Repairs and Utilities (R&U) branch chief. The following guidelines will be observed:

a. Trapped animals: Cease activity in the immediate vicinity. Provide a ramp or other means of escape, if practicable. Do NOT attempt to grasp or hold a wild animal.

b. Injured animal(s): DO NOT ATTEMPT TO HANDLE THE ANIMAL! Note the type and severity of injury, if possible, the location and the time the animal was found. Notify R&U branch chief.

c. Dead animals: Do not touch or move the carcass, and avoid disturbing the area around the carcass. Mark the location and notify the R&U branch chief.

12. Contractors are not allowed to have pets on Camp Roberts or the SATCOM facility at any time.

13. To reduce the likelihood of electrocution of bald eagles attempting to perch on power poles, "Bird and Raptor Guards" will be installed as poles are erected and where this potential exists.

14. Although the proposed project sites and ongoing operations are located on well-drained sites, surveys to locate potential vernal pool fairy shrimp habitat which may be affected, to include off-road travel for survey or construction activities, will be performed prior to or concurrently with kit fox pre-activity survey efforts. Any vernal pool fairy shrimp habitat will be avoided during all phases of the projects, if at all possible. If impacts to vernal pools are unavoidable and surveys indicate the presence of this species, separate consultation will be initiated for the specific project. In addition, mitigation measures will be implemented to restore the functional values of any vernal pools affected by construction projects.

Effects of the Proposed Actions on the Listed Species

Species Account

San Joaquin Kit Fox

Details of the life history and biology of the San Joaquin kit fox are contained in the recovery plan for the San Joaquin kit fox (Service 1983). Detailed information on the presence and status of the species on Camp Roberts has been described by the National Guard Bureau and California National Guard (1991).

In general, the Camp Roberts area, including the SATCOM facility, is characterized as open grassland with low to moderate relief. San Joaquin kit fox habitat within the SATCOM facility consists of scattered oaks and grassy areas. In contrast to buildings leased by the Guard on Camp Roberts, no crawl spaces exist under SATCOM's buildings which could be accessible to kit foxes (Van Hoesen pers. comm. 1996). No kit foxes were detected within the SATCOM facility during surveys conducted during December 1995, although seven potential den sites were found. Dens were monitored according to the survey protocol recommended by the Service and no kit fox activity was detected. Although no kit foxes were detected during that survey, because the species is highly mobile, the potential exists for kit foxes to enter the facility and project areas.

All proposed projects which would be located outside the SATCOM facility are located completely within the area of known San Joaquin kit fox habitat at Camp Roberts. Exceptions include the redundant power supply system and some sections of the access roads to the SATCOM facility, which are located east of this area.

Vernal Pool Fairy Shrimp

A description of the vernal pool fairy shrimp and specifics about its life history and ecology are found in 59 Federal Register 48136, the final rule which listed this species as threatened. In California, the vernal pool fairy shrimp inhabits vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. Vernal pool fairy shrimp eggs are capable of withstanding heat, cold, and prolonged desiccation, and the egg bank in the soil may be composed of the eggs from several years of breeding. Vernal pool fairy shrimp have been found in numerous temporary pools that have formed on, across, and adjacent to established roads, firebreaks, and equipment sites in other areas, including Fort Hunter Liggett in Monterey County.

Vernal pool fairy shrimp habitat has not been found during surveys conducted in support of construction projects within the fenced SATCOM facility. Although a complete survey has not been conducted on SATCOM, the Army reports that biologists from Jones and Stokes Associates have identified potential habitat in an area near the security fence. Surveys are underway to identify potential habitat on other areas of Camp Roberts outside the SATCOM facility.

Bald Eagle

Bald eagles occur throughout North America at lakes, river systems, and some rangeland and coastal wetlands. The largest wintering concentrations of bald eagles near Camp Roberts are at Lake San Antonio and Nacimiento Lake, which are located about 1.5 miles northwest of Camp Roberts. Approximately 44 bald eagles winter at Nacimiento Lake and Lake San Antonio annually.

Bald eagles are occasionally observed at Camp Roberts from November through April, with no more than one or two seen at any one time. Most bald eagles at Camp Roberts are seen perching in trees along the Nacimiento, Salinas, or San Antonio Rivers. Bald eagles have not nested at or near Camp Roberts.

Analysis of Effects

Vehicle Travel

San Joaquin kit foxes are vulnerable to vehicle strikes. Since 1994, 2 kit foxes have died from vehicle strikes along the East Perimeter Road. These deaths were included under the Guard's incidental take limit as stated in the July 13, 1992 biological opinion. Off-road vehicle traffic may also result in death or injury to kit foxes through vehicle strikes or by crushing or entrapping them in a den. Take associated with the use of roads may be avoided or reduced by adherence to the posted speed limits and slowing or stopping vehicles when in the proximity of animals near roads. Take associated with off-road vehicle use may be avoided or reduced by conducting surveys prior to the off-road travel and avoiding areas with kit fox dens.

Vehicle traffic and equipment operation along established roads to and within the SATCOM facility may result in the mortality of adults and eggs of vernal pool fairy shrimp. Off-road vehicle travel may also result in mortality of vernal pool fairy shrimp and degradation or damage of their habitat. These activities may crush individuals or eggs, or break the hardpans which may underlay the pool. These effects may be avoided or reduced by conducting surveys prior to the off-road travel and avoiding areas vernal pool fairy shrimp habitat.

Pest Control

The rodenticides which the Army proposes to use have been approved for use within the range of the San Joaquin kit fox, pursuant to a biological opinion, issued November 1993, to the Environmental Protection Agency (EPA). This biological opinion was issued for the nationwide use of 16 vertebrate pest control substances within the range of several listed species, including the San Joaquin kit fox. It allowed for "fine tuning" at the Field Office level which could result in modifications to the terms and conditions set forth in the March 1993 biological opinion. The Service worked with the California Environmental Protection Agency to develop application guidelines to limit the potential for take of kit foxes while reducing burdens to agriculturalists. Following the Service's concurrence, pursuant to section 7 of the Act, these guidelines were published in December 1995 as an interim measures bulletin by the County Agricultural Commissions which included the Counties of San Luis Obispo and Monterey. As part of its biological assessment, the Army included a copy of San Luis Obispo County's interim measures bulletin for protection of the kit fox, which states measures to reduce the potential for take. Because the Service has previously consulted on the use of these rodenticides, which include, but are not limited to, zinc phosphide, chlorophacinone, diphacinone, and aluminum phosphide within the range of the kit fox, we will not address their impacts here. The incidental take limit in the 1993 biological opinion for San Joaquin kit foxes was set at one (1). If that limit is met anywhere within the range of the species, EPA must reinitiate consultation with the Service. The biological opinion states that incidental take in excess of 1 would not be considered a violation of section 9 of the Act. Because of its proven lower risk to kit foxes, the Service recommends the use of zinc phosphide for the control of rodents.

The November 1993 biological opinion did not address impacts to the bald eagle from rodenticides. Injury and direct mortality could occur from the ingestion of poison bait or from consumption of poisoned prey items. Implementation of the interim measures for reducing take of kit foxes, would also benefit the bald eagle. Depending on the type of rodenticide, such measures include collecting rodent carcasses, ensuring no spillage of poison bait, and preventing contact with water or wetlands. Additional measures, not specified in the interim measures bulletin, include conducting preactivity surveys for the presence of bald eagles, switching to less toxic forms of rodenticies such as zinc phosphide, and live-trapping for rodents. The Service is presuming that bald eagles are not expected to receive exposure to insecticides, herbicides, and fungicides, as described, because of the lack of bald eagle habitat at application sites.

The November 1993 biological opinion did not address impacts to vernal pool fairy shrimp from rodenticides because the species was not listed at that time. The Army did not provide information to the Service on the effects of rodenticides on vernal pool fairy shrimp. However, because the Army proposes to use rodenticides, insecticides, herbicides, and fungicides only within the SATCOM installation boundary, and because vernal pool fairy shrimp habitat may potentially exist only within a small area within the installation, the potential is low that this species would be affected. All uses of such compounds should observe label and other restrictions mandated by EPA, California Department of Food and Agriculture, and other State and Federal legislation.

Construction and Repair Activities

Protection of known and potential kit fox dens for use as shelter, escape cover, and reproduction is vital to the survival of the species. Mortality or injury could occur to the San Joaquin kit fox as a result of activities that involve excavation, or other ground disturbing activities. Kit foxes could become entrapped in holes, trenches, pipes, culverts, or other structures with a four inch or greater diameter. Predators such as coyotes may be attracted to the area by food scraps. Kit foxes could be more vulnerable to predation if proposed activities result in their displacement to unfamiliar or less secure habitat. Kit foxes may be vulnerable to hazardous substances improperly distributed during the clean up of hazardous waste. This potential take may be reduced by the implementation of the mitigation measures such as providing employee education programs, preactivity surveys, escape ramps, trash removal, inspection of all structures for kit foxes prior to sealing or burying, and reducing the potential for listed species to be exposed to hazardous waste. Potential take may be avoided by conducting activities when kit foxes are not present in or near the project site(s).

Mortality of injury could occur to bald eagles attempting to land on power poles. Implementation of the proposed mitigation measure to install devices to prevent bald eagles from landing on power poles would reduce or eliminate this form of incidental take.

Mortality or injury to vernal pool fairy shrimp and degradation of vernal pool fairy shrimp habitat could occur as a result of ground disturbing activities, including excavation and construction activities. Excavation would eliminate the habitat and remove the bank of eggs along with the soil. If excavations are made while the pool still holds water, adults may be injured or killed by crushing, or by draining of the pool and subsequent exposure. For areas located outside the footprint of the SATCOM facility, existing roads, and equipment stations, this potential take may be avoided or reduced by the implementation of the proposed mitigation measures, such as conducting preactivity surveys for vernal pool fairy shrimp and locating construction projects where vernal pool fairy shrimp would not be affected. For the purposes of this biological opinion, the Service anticipates that all vernal pool fairy shrimp adults and eggs in temporary pools located within the footprints of the SATCOM facility, existing roads, and equipment stations may be incidentally taken by vehicle traffic, construction activities, application of insecticides, herbicides, and fungicides, and equipment operation, as described. However, this level of take is not

expected to result in the extirpation of the species at Camp Roberts provided the remaining areas will be undisturbed by SATCOM and their support personnel.

The Service believes that the impacts described above are not likely to jeopardize the continued existence of the San Joaquin kit fox, the bald eagle, and vernal pool fairy shrimp. We reach this conclusion for the following reasons:

1. Habitat loss is one of the most imminent threats to the San Joaquin kit fox and vernal pool fairy shrimp throughout their ranges. However, proposed activities at the SATCOM facility and by Army personnel or their agents involve minimal loss of habitat of listed species compared to the amount of habitat available.

2. The Army has proposed actions to minimize the take of the San Joaquin kit fox, bald eagle, and vernal pool fairy shrimp, and loss or damage of their habitats.

3. Most of the ground disturbing actions that may be harmful to the San Joaquin kit fox, such as excavation and construction activities, are temporary in nature.

Cumulative Effects

Cumulative effects are those impacts of future State and private actions that are reasonably certain to occur in the project area. Future Federal actions will be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Because the Army manages all of the land surrounding the proposed activities or leases it to tenants, such as the Guard, most of the actions that are reasonably expected to occur within the vicinity of the SATCOM facility and associated structures will be subject to formal consultation with the Service.

Incidental Take

Section 9 of the Act prohibits any taking (i.e., to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of listed species without special exemption. Harm is further defined to include significant habitat modification or degradation that results in the death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not a purpose of the agency action is not considered taking within the bounds of the Act, provided that such taking is in compliance with this incidental take statement. The measures described below as reasonable and prudent measures and terms and conditions are non-discretionary, and must be undertaken by the agency or made a binding condition of any grant or permit, as appropriate.

This biological opinion anticipates the following forms of take:

1. One (1) San Joaquin kit fox in the form of direct mortality each calendar year this biological opinion is in effect. Examples of direct mortality might include accidental death from a collision with a vehicle, from being crushed or trapped within a den or hole, from entrapment in construction materials, or from other unintentional incidents that may occur on the SATCOM facility or by Army personnel on Camp Roberts from activities over which the Army has discretionary control. Incidental take in the form of mortality as a result of exposure to the proposed rodenticides was authorized in a November 1993 biological opinion to the EPA which addressed 16 vertebrate control substances within the range of several listed species.

2. The Service anticipates that harassment of San Joaquin kit foxes will occur during the proposed activities. However, estimation of the number of individual kit foxes that are subject to harassment is difficult to determine, given the many variables that govern San Joaquin kit fox responses to various activities. Therefore, the Service authorizes harassment of San Joaquin kit foxes under this incidental take statement within the boundaries of the SATCOM facility and within the civil boundaries of Camp Roberts by SATCOM personnel, provided that: (a) all terms and conditions cited below are fully implemented; (b) that any harassment resulting from the proposed activities is inadvertent; and (c) if deliberate, that any harassment resulting from the Army's activities is for the purpose of kit fox protection or rescue, for example den excavations or removal of trapped foxes from holes or trenches. Any deliberate harassment of kit foxes by Army personnel or their agents on Camp Roberts, for other than protective purposes is not authorized by this incidental take statement. Any such harassment shall not be covered by this incidental take limit and would be considered a violation of the Act.

3. All vernal pool fairy shrimp adults and eggs in temporary pools found within the footprints of the fenced SATCOM facility, existing roads, and equipment areas in the form of accidental death or injury resulting from vehicle traffic, equipment operation, and power pole and guard rail installation within those pools.

4. All vernal pool fairy shrimp in temporary pools found within the footprints of the SATCOM facility, existing roads, and equipment areas resulting from vehicle traffic, equipment operation, power pole and guard rail installation within those pools in the form of harm resulting from degradation or destruction of habitat.

5. Zero (0) bald eagles found within the SATCOM facility and areas associated with the Army's activities within Camp Roberts in the form of accidental death or injury resulting from any activities in support of SATCOM or by Army personnel and its contractors.

If the incidental take authorized by this biological opinion is met, the Army shall immediately notify the Service in writing. If the incidental take authorized by this opinion is exceeded, the

Army shall immediately cease the activity resulting in the take and shall reinitiate formal consultation with the Service.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the incidental taking authorized by this biological opinion:

1. The potential for take of San Joaquin kit foxes and their habitat shall be minimized during the course of normal operations and construction activities.

2. Electrocution of bald eagles shall be minimized by the installation of raptor exclusion devices on power poles.

3. The Army shall avoid take of vernal pool fairy shrimp that could result from vehicle traffic, construction and repair activities beyond the footprints of the SATCOM facility, existing roads, firebreaks, and equipment stations by establishing all temporary pools with vernal pool fairy shrimp as off-limits to these activities.

4. Worker education programs, defined work areas, and well-defined operational procedures shall be implemented to avoid the take of listed species and their habitat during proposed activities.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Army is responsible for compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. Terms and are adapted from the mitigation measures proposed by the Army in its request for formal consultation. Several of the proposed measures are combined, slightly modified, or contain added detail.

Terms and conditions 1 through 12 implement reasonable and prudent measure 1. Term and condition 13 implements reasonable and prudent measure 2. Terms and conditions 5, 14, and 15 implement reasonable and prudent measure 3. Terms and conditions 2, 5, 7, 11, and 15 implement reasonable and prudent measure 4.

1. Pre-activity surveys for kit fox presence shall be conducted by a qualified biologist within 60 days, and to the extent practicable, within 30 days of project initiation using methodologies acceptable to the Service. Surveys shall be conducted for all off-road areas and areas in which kit fox dens could potentially be found, such as grassy areas within the SATCOM facility which would be affected from ground disturbing activities associated with projects, including vehicle travel. Exclusion zones shall be established around dens found within the project area. No ground disturbance or vehicle traffic is allowed within the exclusion zones. If an established

roadway falls within an exclusion zone, vehicle traffic shall be allowed only if critical need exists and alternate routes are not available. Foot traffic shall be allowed for transit only when necessary and where alternate routes are not available. Exclusion zones shall be based on the following criteria:

a. Potential den	50 foot (15 meter) radius
b. Known den	100 foot (30 meter) radius
c. Known natal or pupping den	150 foot (45 meter) radius

Potential dens are defined as dens (ground holes) having entrances of sufficient size to allow use by San Joaquin kit foxes, and that occur in habitat suitable. Known dens are those known to be currently inhabited by kit foxes, or where kit foxes have been observed in the past. Known natal or pupping dens are those dens where pregnant females or females with pups have been observed. The exclusion radius is measured from the center of a single den, or from the center of a group of dens.

2. Only qualified biologists shall conduct surveys and other activities pursuant to this biological opinions that pertain to San Joaquin kit foxes. Virginia Getz of Jones and Stokes Associates; Sue Orloff, an independent consultant; and Julie Eliason and Bill Berry of the California Army National Guard at Camp Roberts and experienced biologists under their direct supervision are hereby authorized to conduct surveys and other activities as described. If the Army wishes to use other biologists, the names and credentials shall be supplied to the Service for its review and approval at least 15 days prior to the onset of the activities which they are being authorized to conduct.

3. Exclusion dens shall be clearly staked, encircled with cord or tape, and flagged. Establishment of exclusion zones shall be done by a qualified wildlife biologist.

4. Disturbance to all San Joaquin kit fox dens shall be avoided to the maximum extent possible. However, in the event the destruction of a potential den is considered unavoidable, a biologist qualified to conduct preactivity surveys may, after appropriate monitoring, destroy a potential den without prior approval from the Service. Potential dens shall be destroyed only in the event that normal operations or construction activities would destroy the den and the den cannot be avoided. A potential den shall be carefully excavated by hand tools under the supervision of a qualified biologist before construction begins to ensure that no San Joaquin kit fox are present. If at any point during excavation a San Joaquin kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring, as described in the Standardized Recommendations for Protection of the San Joaquin Kit Fox, shall be resumed. Destruction of the den may be completed when, in the judgement of the conducting biologist, the animal has escaped from the partially destroyed den. The den should be fully excavated and then filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period.

5. Limited destruction of known kit fox dens may be allowed, but should be avoided except where absolutely necessary. Prior to destruction of any known den, the Service shall be notified in writing of the intent to destroy the subject dens(s) and the reasons why alternate courses of action are not possible. The Service will review the proposal and will either concur or recommend alternate methods to avoid den destruction or reduce impacts. Destruction of known or suspected natal or pupping dens shall be avoided during the breeding season (November 1 - July 31). Therefore, project activities at some sites may have to be postponed. Destruction of known dens may require mitigation measures, such as installation of replacement dens, as directed by the Service. Any den excavation would precede as described in term and condition 4.

6. Proposed activities shall be designed to minimize off-road vehicle traffic and limited to the smallest possible areas(s) of disturbance. Proponents shall make use of existing reads, trails, and previously disturbed areas wherever possible. Off-road parking and staging areas shall be clearly delineated.

7. All vehicle traffic is subject to a 25 mile per hour speed limit, except where posted lower. Night time construction activities shall be minimized.

8. The following measures shall be implemented to avoid accidental entrapment of animals:

a. All steep-sided excavations greater than two (2) feet deep shall be equipped with one or more earth or plank escape ramps.

b. All excavations shall be throughly inspected for animals prior to sealing or refilling to avoid accidental burial. Permanent and semi-permanent structures installed in-ground or underground shall be constructed so that animals will not become entrapped within.

c. Any pipe, culvert, or similar material with an inside diameter or four inches or more shall be thoroughly inspected for animals prior to sealing or re-connection. If animals are found inside the materials, the material shall not be moved, or moved only once to remove it from the path of construction activity until the animals vacate the area. Pipelines temporarily left open in place shall be covered or blocked until work is completed.

9. Contour and restoration of disturbed areas shall be performed following the conclusion of a project or activity. All temporary excavations shall be filled in, contoured, and vegetated were practicable to restore as closely as possible the existing condition of the site(s). Permanent and semi-permanent construction shall be blended into the surrounding landscape and vegetated where practicable. Local native plant species shall be used wherever possible.

10. All trash, especially food-related items, shall be deposited in closed containers or bags and regularly removed from the site.

11. Use of pest control substances, such as rodenticides and herbicides, shall be in strict accordance with all Federal, Sate, local, and Army regulations. In the event that kit foxes are sighted or an active den exists within a one (1) mile radius of the SATCOM facility, the Army shall endeavor to use methods of rodent control that have little or no toxicity to kit foxes, such as zinc phosphide or live-trapping, to the maximum extent practicable, particularly during the pupping season from January 1 to April 30. Aluminum phosphide (phostoxin) should be used only in ground holes where ground squirrels are observed using the target holes.

12. An employee education program shall be conducted for any project that has expected impacts to listed species. Project or activity supervisors shall be briefed on environmental and conservation procedures by SATCOM staff prior to commencement. The briefing shall include information on endangered species and other environmental concerns and conservation measures. Supervisors shall then be responsible for dissemination of the information to the project or activity personnel, and implementation of the procedures discussed. A fact sheet conveying this information shall be prepared for distribution to all contractors, their employees, and military and agency personnel involved in the subject project.

13. To prevent harassment or mortality to listed species by dogs or cats, pets shall not be permitted on the project site, unless pets are tethered, in buildings, under direct control, or otherwise restricted from access to listed species.

14. To reduce the likelihood of electrocution of bald eagles attempting to perch on power poles, "Bird and Raptor Guards" shall be installed as poles are erected and where this potential exists.

15. To avoid take of vernal pool fairy shrimp outside the footprints of the SATCOM facility, existing roads, and equipment areas, a 50-foot buffer shall be clearly demarcated around pools supporting vernal pool fairy shrimp. Vehicle traffic and equipment operation shall be prohibited within the 50-foot buffers surrounding occupied pools. If impacts to occupied vernal pools located outside these footprints are unavoidable, and surveys indicate the presence of this species, separate consultation shall be initiated for the specific project.

Reporting Requirement

An annual report detailing normal operations, all construction and repair activities, and results of listed species protection measures for the previous year shall be submitted to the Service. The report shall contain a brief discussion of the activities completed or planned; approximate acreage of kit fox habitat temporarily and permanently affected; number of kit fox dens affected; number of potential kit fox dens excavated; occurrences of incidental take, if any, including known harassment; problems encountered in implementing mitigation measures and terms and conditions; recommendations for modifying the terms and conditions to enhance listed species protection; pertinent results of biological surveys and sighting records; and any other pertinent information. The report shall be postmarked or submitted by January 31 each year. The Service shall be notified in case of a delay.

Disposition of Dead, Injured, or Sick San Joaquin Kit Foxes, Bald Eagles, and Vernal Pool Fairy Shrimp

Upon locating a dead, injured or sick listed species, other than vernal pool fairy shrimp, initial notification must be made to the Service's Division of Law Enforcement by facsimile at (310) 328-6399 and the Ventura Field Office via phone (805) 644-1766 immediately, and in writing within three (3) working days. Notification must include the date, time, and location of the carcass; cause of death, if known; and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. The finder has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed, unless to remove it from the path of further harm or destruction. Should any treated listed species survive, the Service should be contacted regarding the final disposition of the animals. Any listed species found dead, except for vernal pool fairy shrimp, shall be turned in to the California Department of Fish and Game (CDFG), unless authorized agreements have been made with CDFG to the contrary. The CDFG contact is Terry Palmissano at (408) 848-2576. Salvage and preservation of vernal pool fairy shrimp injured or killed by the proposed actions considered by this biological opinion are not required.

Conservation Recommendations

The Endangered Species Act [sections 2(c) and 7(a)(1))] mandates Federal agencies to use their authorities to implement programs for the conservation of listed species. We recommend the following:

1. The Army should explore and implement alternate methods of rodent control that are least toxic to listed species, such as live-trapping. The Army should also conduct pre-activity surveys for San Joaquin kit foxes prior to rodenticide application, and prohibit the use of rodenticides within 1 mile of an active kit fox den.

2. Candidate species, such as California tiger salamanders (*Ambystoma californiense*), should be considered during project planning to reduce the need for future consultations.

3. The Army should investigate alternate forms of vehicle speed control on the East Perimeter Road, such as speed bumps, to better ensure compliance with posted speed limits. To alert drivers to the possibility of kit foxes occurring along and within established roads, the Army should consider placing signs, or other markers, along the East Perimeter Road in the vicinity of known dens and recent kit fox sightings. Moveable signs may be more effective than permanently installed signs because of the ability to place signs in areas of the most recent kit fox activity, and because of the potential for drivers to habituate to the presence of permanently affixed signs.

4. The Army should consider other forms of raptor exclusion devices, such as Nixalite (Nixalite of America (800/624-1189), which may be more effective and economical than the proposed device.

5. The Army should coordinate with the Guard and various agencies on issues related to listed species and their habitats on Camp Roberts.

The Service requests notification of the implementation of any conservation recommendations so we may remain apprised of new information which may aid in the recovery of the species.

Conclusion

This concludes formal consultation on the normal operations and construction activities in support of the SATCOM facility at Camp Roberts. Reinitiation of formal consultation is required if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency actions that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action (50 CFR 402.16). Any expansion of activities beyond the scope proposed would be considered reason to reinitiate consultation. Any questions or comments should be directed to Kate Symonds of my staff at 805/644-1766.

Sincerely,

Raymond Bransfield

Diane K. Noda
Acting Field Supervisor

References Cited

National Guard Bureau and California National Guard. 1991. Biological assessment of the effects of activities conducted at Camp Roberts Army National Guard training site, Monterey and San Luis Obispo Counties, California, on endangered species. Unpublished report dated December 1991. Prepared by EG&G Energy Measurements, Inc., Goleta, California. 71 pp. plus appendices.

U.S. Fish and Wildlife Service. 1983. San Joaquin Kit Fox Recovery Plan. Fish and Wildlife Service, Portland, Oregon. 84 pp.

Van Hoesen, B. 1996. Personal communication. U.S. Army, Fort Lewis, Washington.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Ventura Field Office
2493 Portola Road, Suite B
Ventura, California 93003

June 18, 1996

Gary D. Stedman, Chief
Environmental and Natural Resources Division
Public Works
AFZH-DEQ MS 17 (Van Hoesen)
P.O.Box 339500
Fort Lewis, Washington 98433-9500

Subject: Page Substitution for Biological Opinion for Normal Operations and Construction Activities in Support of the Satellite Communications Facility at Camp Roberts, San Luis Obispo and Monterey Counties, California (1-8-96-F-25).

Dear Mr. Stedman:

The U.S. Fish and Wildlife Service was informed by Bill Van Hoesen of your staff of a typographical error on page 11 of the subject document, dated May 21, 1996. Please substitute the enclosure for page 11 of the subject document. If you have further questions on this or related matters, please contact Kate Symonds of my staff at 805/644-1766.

Sincerely,

Judy Hohman

Diane K. Noda
Field Supervisor

Enclosure

This biological opinion anticipates the following forms of take:

1. One (1) San Joaquin kit fox in the form of direct mortality each calendar year this biological opinion is in effect. Examples of direct mortality might include accidental death from a collision with a vehicle, from being crushed or trapped within a den or hole, from entrapment in construction materials, or from other unintentional incidents that may occur on the SATCOM facility or by Army personnel on Camp Roberts from activities over which the Army has discretionary control. Incidental take in the form of mortality as a result of exposure to the proposed rodenticides was authorized in a November 1993 biological opinion to the EPA which addressed 16 vertebrate control substances within the range of several listed species.

2. The Service anticipates that harassment of San Joaquin kit foxes will occur during the proposed activities. However, estimation of the number of individual kit foxes that are subject to harassment is difficult to determine, given the many variables that govern San Joaquin kit fox responses to various activities. Therefore, the Service authorizes harassment of San Joaquin kit foxes under this incidental take statement within the boundaries of the SATCOM facility and within the civil boundaries of Camp Roberts by SATCOM personnel, provided that: (a) all terms and conditions cited below are fully implemented; (b) that any harassment resulting from the proposed activities is inadvertent; and (c) if deliberate, that any harassment resulting from the Army's activities is for the purpose of kit fox protection or rescue, for example den excavations or removal of trapped foxes from holes or trenches. Any deliberate harassment of kit foxes by Army personnel or their agents on Camp Roberts, for other than protective purposes is not authorized by this incidental take statement. Any such harassment shall not be covered by this incidental take limit and would be considered a violation of the Act and.

3. All vernal pool fairy shrimp adults and eggs in temporary pools found within the footprints of the fenced SATCOM facility, existing roads, and equipment areas in the form of accidental death or injury resulting from vehicle traffic, equipment operation, and power pole and guard rail installation within those pools.

4. All vernal pool fairy shrimp in temporary pools found within the footprints of the SATCOM facility, existing roads, and equipment areas resulting from vehicle traffic, equipment operation, power pole and guard rail installation within those pools in the form of harm resulting from degradation or destruction of habitat.

5. Zero (0) bald eagles found within the SATCOM facility and areas associated with the Army's activities within Camp Roberts in the form of accidental death or injury resulting from any activities in support of SATCOM or by Army personnel and its contractors.

If the incidental take authorized by this biological opinion is met, the Army shall immediately notify the Service in writing. If the incidental take authorized by this opinion is exceeded, the

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Field Office
2493 Portola Road, Suite B
Ventura, California 93003

November 5, 1996

Gary D. Stedman, Chief
Environmental and Natural Resources Division
Public Works
AFZH-DEQ MS 17 (Van Hoesen)
P.O. Box 339500
Fort Lewis, Washington 98433-9500

Subject: Amendment of Biological Opinion for Normal Operations and Construction Activities in Support of the Satellite Communications Facility at Camp Roberts, San Luis Obispo and Monterey Counties, California (1-8-96-F-25)

Dear Mr. Stedman:

The U.S. Fish and Wildlife Service (Service) has reviewed the request, made through the Department of the Army's (Army) attorney-advisor, to amend the subject biological opinion to allow trained on-site Satellite Communications (SATCOM) personnel to conduct preliminary pre-activity surveys (pre-surveys) for the San Joaquin kit fox (*Vulpes macrotis mutica*) at the SATCOM facility on Camp Roberts, San Luis Obispo and Monterey Counties, California. Your request was dated September 13, 1996 and received by us on September 18, 1996. You requested this modification to reduce the time and funding spent by the Army on contracting for biological surveys.

The Army seeks to allow trained, on-site SATCOM personnel to conduct pre-surveys to determine whether indications of San Joaquin kit fox habitat are present within a given project area. If such indications are present, SATCOM would initiate a full survey using a qualified biologist. If no indications of San Joaquin kit fox habitat exist within the project boundaries, SATCOM would proceed with the project. The Army would have SATCOM personnel trained to the level satisfactory to the Service. However, the Army would not train personnel to the level of a qualified biologist; personnel would only be trained to a level that would allow them to determine whether a qualified biologist would be needed to conduct a pre-activity survey for a given project.

Because SATCOM will conduct its activities in a relatively small area within Camp Roberts and will continue to use a qualified biologist to conduct pre-activity surveys when potential San Joaquin kit fox sign exists, the Service believes the proposed amendment to the subject

biological opinion would continue to protect San Joaquin kit foxes during activities in support of the SATCOM facility at Camp Roberts.

Terms and conditions 1 through 3 of the subject biological opinion (1-8-96-F-25) are hereby replaced by the following three terms and conditions:

1. The Army may use Service-approved trained SATCOM personnel to conduct pre-survey assessments to locate potential San Joaquin kit fox presence on project sites, regardless of the size of the project site. Pre-surveys shall be conducted within 60 days of project initiation. Pre-surveys shall be conducted for all off-road areas and areas in which San Joaquin kit fox dens could potentially be found, such as grassy areas within the SATCOM facility which would be affected from ground disturbing activities associated with projects, including vehicle travel. If pre-survey results indicate potential San Joaquin kit fox presence (e.g., den sites) and the area is considered unavoidable, or no pre-survey was conducted, the Army shall initiate a pre-activity survey using a qualified biologist within 60 days, and to the extent practicable, within 30 days of project initiation using methodologies acceptable to the Service. If no indications of San Joaquin kit fox exist in the vicinity of the project, the Army would proceed with the project, assuming no other listed species would be adversely affected by the action.

2. SATCOM personnel to be conducting pre-surveys shall be exposed to a minimum of one hour of classroom training and a minimum of eight hours of field training to locate and identify potential signs of the San Joaquin kit fox and to practice establishing exclusion zones around potential dens. Classroom instruction should include but not be limited to the following subjects: identification, biology, ecology, and behavior of San Joaquin kit foxes; identification of potential San Joaquin kit fox dens, establishment of exclusion zones around dens; threats to the species and its habitat; the general provisions of the Endangered Species Act; the necessity for adhering to the provisions of the Act; and the penalties associated with violating the provisions of the Act. Because aptitude for detecting wildlife varies considerably between individuals, SATCOM personnel who demonstrate an interest in or experience with wildlife should be selected for such training.

The training shall be conducted by a qualified biologist who possesses a valid recovery permit for the San Joaquin kit fox. The Army shall submit, for Service review and approval, the qualified biologist's written assessment of each SATCOM trainee's ability to conduct San Joaquin kit fox pre-surveys a minimum of 15 days prior to the start of the project for which authorization to use the SATCOM trainee is requested. Trainees who lack sufficient skill in identifying potential sign of the San Joaquin kit fox may need to receive additional training from a qualified biologist until a sufficient skill level is achieved. To ensure that pre-survey skills are maintained, trained SATCOM personnel who do not conduct more than three pre-surveys a year may be subject to annual training by a qualified biologist, at the discretion of the Service.

Other activities pertaining to San Joaquin kit foxes that require a qualified biologist include conducting pre-activity surveys, monitoring dens, and destroying a den, pursuant to the biological

opinion. Virginia Getz, Sue Orloff, Julie Eliason, Bill Berry, Bill Standley, and experienced biologists under their direct on-site supervision are hereby authorized to conduct pre-activity surveys and other activities as described. If the Army wishes to use other qualified biologists, the names and credentials shall be supplied to the Service for its review and approval at least 15 days prior to the onset of the activities which they are being authorized to conduct.

3. Exclusion zones shall be established around dens found in the vicinity of the project area. No ground disturbance or vehicle traffic is allowed within the exclusion zones. If an established roadway falls within an exclusion zone, vehicle traffic shall be allowed only if critical need exists and alternate routes are not available. Foot traffic shall be allowed for transit only when necessary and where alternate routes are not available. Exclusion zones may be established around potential dens by trained SATCOM personnel, or around known dens by a qualified biologist, and shall be based on the following criteria:

a. Potential den	50 foot (15 meter) radius
b. Known den	100 foot (30 meter) radius
c. Known natal or pupping den	150 foot (45 meter) radius

Potential dens are defined as dens (ground holes) having entrances of sufficient size to allow use by San Joaquin kit foxes, and that occur in suitable habitat. Known dens are those known to be currently inhabited by kit foxes, or where kit foxes have been observed in the past. Known natal or pupping dens are those dens where pregnant females or females with pups have been observed. The exclusion radius is measured from the center of a single den, or from the center of a group of dens. Exclusion dens shall be clearly staked, encircled with cord or tape, and flagged.

If you have further questions on this matter, please contact Kate Symonds of my staff at (805)644-1766.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

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Appendix G
Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices

Office of the Federal Environmental Executive; Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds

Office of the Federal Environmental Executive; Guidance for

[Federal Register: August 10, 1995 (Volume 60, Number 154)]
[Notices]

[Page 40837-40841]

>From the Federal Register Online via GPO Access [wais.access.gpo.gov]

ENVIRONMENTAL PROTECTION AGENCY

[FRL-5275-6]

Office of the Federal Environmental Executive; Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds

AGENCY: Office of the Federal Environmental Executive, EPA.

ACTION: Notice.

SUMMARY: This document announces guidance developed by the interagency workgroup under the direction of the Federal Environmental Executive to assist federal agencies in the implementation of environmentally and economically beneficial landscape practices. This guidance is in response to the requirements of the executive memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds.

FOR FURTHER INFORMATION CONTACT: Debra Yap, (202) 260-9291.

SUPPLEMENTARY INFORMATION: On April 26, 1994, the President issued a memorandum to Federal agencies addressing landscape management practices on federal landscaped grounds. In developing the implementing guidance, the Federal Environmental Executive sought public comment through a Federal Register ``Notice, Review & Comment.'' This guidance, as written by the interagency taskforce, represents the culmination of discussions among interested parties, industry and government, and the responses to the Federal Register Notice.<SUP>1

\1\ Federal Register, Vol. 59, No. 161, Monday August 22, 1994. The Executive Memorandum was incorporated and printed in the Notice, Review & Comment.

The principles identified here provide a framework for the use of environmentally and economically beneficial landscape practices on managed federal lands and federally-funded projects. They are meant to improve and expand upon current principles of landscape design, implementation and management. They are intended to assist in federal planning and decision-making and can be incorporated into federal agency guidance/policy for landscape management practices.

As identified in the memorandum the guidance focuses on 5 (five) guiding principles: (1) Use regionally native plants (see definition below) for landscaping; (2) Design, use or promote construction practices that minimize adverse effects on the natural habitat; (3) Seek to prevent pollution; (4) Implement water and energy efficient practices; (5) Create outdoor demonstration projects.

This guidance is intended to promote principles of ``sustainable landscape design and management'' which recognizes the interconnection of natural resources, human resources, site design, building design, energy management, water supply, waste prevention, and facility maintenance and operation. In general, sustainable design embodies the concept that,

- * * human civilization is an integral part of the natural world and that nature must be preserved and perpetuated if the human community is to sustain itself indefinitely.<SUP>2

\2\ p. 4, Guiding Principles of Sustainable Design, U.S. Department of the Interior, National Park Service, Denver Service Center, September 1993.

Sustainable landscape management seeks to minimize impact on the environment and maximize the value received for the dollars expended.

Sustainable landscape design is economically beneficial in its principle of evaluating and optimizing the full life-cycle of products and processes: cost is considered from initial design through the life of the project. For example, although sustainable site design and

development may have a higher initial cost, it may prove economical over the life of the project.

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In this example, a well-designed and implemented plan can result in healthier, longer-lived plantings which rely less on pesticides and fertilizers, minimize water use, require less maintenance, and increase erosion control. Sustainable landscape design considers the characteristics of the site and soil, intended effect and use of the developed area, in addition to the selection of plants.

It is not the intent of this guidance to supersede federal agency directives, policy, or other guidance which relate to the mission of that agency or to health and safety concerns. It is not intended to supersede agency objectives or guiding principles such as those pertaining to the National Park Service's four primary management zones--natural, cultural, park development, special use--and their subzones; or those pertaining to the Forest Service's National Hierarchy and Recreation Opportunity Spectrum classification systems. Finally, this guidance does not advocate replacement of existing landscapes, unless it is cost-effective to do so.

Intent of Guiding Principles

The following describes the intent of the implementing guidance and discusses opportunities for federal initiatives. These opportunities are not all-inclusive and federal agencies are encouraged to investigate other initiatives for environmentally and economically beneficial landscaping practices.

1. Use Regionally Native Plants for Landscaping

In the selection of plants for managed federal lands and federallyfunded projects, the federal government has the opportunity to choose plants which are aesthetically pleasing, require minimal care, and reflect a ``sense of place,'' i.e. the physical, or symbolic representations of a community or area. By carefully selecting the ``right plants for the right place'' and matching plant characteristics to site and soil conditions, federal agencies can promote sustainable landscapes. Characteristics of sustainable landscapes include: minimizing water use, reducing the need for pesticides and fertilizers, reducing maintenance costs, utilizing hardy plants, and increasing erosion control. Where the appropriate conditions exist, regionally native plants offer the advantages of natural adaptation to the climatic and geologic environments. In addition, use of regionally native plants can promote regional identity, and enhance wildlife habitat and biodiversity.

2. Design, Use or Promote Construction Practices That Minimize Adverse Effects on the Natural Habitat

Construction practices can adversely affect and alter natural and other habitat. Federal projects can be sited, designed, and constructed to minimize that impact. Federal agencies can incorporate elements of

sustainable design into their architectural and engineering plans and specifications for projects planned, designed, and constructed by federal agency or contractor personnel.

Structures can be integrated with the existing plant and animal communities and cultural (human) environments. Considerations include such elements as: ecology of the site; human factors (i.e. historic issues, mission, adjacent land use, and local culture, neighboring communities); water/energy use; pollution prevention and other special issues.

Impact on existing vegetation can be minimized by protecting and integrating plants into the site design. Analyses of the soil and subsurface material are important to the later success of existing and future plantings. These analyses can also indicate the existence of toxic or other undesirable material.

Additional beneficial construction practices which minimize adverse impacts to natural habitat include the proper disposal of construction waste and debris such as paints and other chemicals, concrete, and other building material.

3. Seek to Prevent Pollution

Pollution prevention is a national policy and one of the principles of sustainable landscape management. The primary tenet is: whenever feasible, pollution should be prevented or reduced at the source, and where pollution cannot be prevented, it should be recycled in an environmentally safe manner. Executive Order 12856, ``Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements'' was issued to ensure that

- * * all Federal agencies conduct their facility management and acquisition activities so that, to the maximum extent practicable, the quantity of toxic chemicals entering any wastestream, including any releases to the environment, is reduced as expeditiously as possible through source reduction; that waste that is generated is recycled to the maximum extent practicable; and that any wastes remaining are stored, treated or disposed of in a manner protective of public health and the environment * * * <SUP>3

\3\ Executive Order 12856 of August 3, 1993 ``Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements'', Federal Register Vol. 58, No. 150, Friday, August 6, 1993.

In keeping with the executive order and the principles of sustainable landscapes practices, the following initiatives have been identified as having a salutary effect on landscape management.

Manage Pesticides and Fertilizers

The improper use of pesticides and fertilizers contributes to the pollution of both surface and groundwater in the United States. Using effective landscape management practices, and appropriate application of pesticides and fertilizers, federal agencies may minimize that impact on water quality as well as to other aspects of the environment.

Further, federal agencies may better manage soil amendments and

fertilizers by utilizing soil and plant tissue samples analyses which can indicate soil deficiencies and nutrient use. The recommended method of managing pests and pesticides is called Integrated Pest Management or IPM as described below.

Use IPM

Through the use of appropriate control measures and proper application, IPM can result in a reduction in the use of chemicals contained in pesticides which may adversely impact human health and the environment. Integrated Pest Management is a decision-making process which considers cultural, mechanical, biological, and chemical controls of pests. Control mechanisms are selected as each situation warrants. Where chemical control is used, specific pest populations are targeted when they are most vulnerable rather than indiscriminate application of these chemicals.

Minimize Runoff

Uncontrolled runoff adversely impacts the environment: (1) As a major contributor to soil erosion; and (2) the primary vehicle for chemical pollutants to be introduced into the environment (particularly non-point source runoff). Federal agencies can ameliorate adverse impacts associated with run-off through a variety of preventative mechanisms: physical; vegetative, and operational. For example, grasses have been demonstrated to be a viable mechanism for minimizing run-off and controlling soil erosion. A viable method of managing the pollutants associated with the first flush of stormwater run-off is bioretention of the storm water in an appropriately landscaped area.

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Recycle Landscape Trimmings

Federal agencies have the opportunity to effect both good landscape management practices and good waste management practices by recycling and using recycled landscape trimmings. A significant portion of what is treated as waste is comprised of leaves, grass clippings, plant trimmings, and woody material. These elements are a desirable resource for composted material, mulches, and landscape amendments. By using these products, federal agencies can effectively and economically enrich the soil, promote plant growth, preserve soil moisture, reduce erosion, and inhibit weed growth.

4. Implement Water and Energy Efficient Practices

Irrigating lawns and landscapes can account for a significant proportion of total water use, particularly during peak watering season. Reducing the inefficient irrigation of lawns and landscapes with potable water can reduce water cost, and the energy usage/cost associated with water pumping. In addition, water use efficiency can relieve the increasing demand being placed on water resources, distribution systems, and wastewater treatment systems.

Federal facilities can effectively reduce water use and conserve potable water through a number of practices. For example, water usage can be reduced through the use of mulches and careful selection and siting of plants. Plants adapted to local conditions can be selected so

supplemental water will not be required after an initial establishment period of 3-5 years. Other water-efficient landscape practices include: determining the water requirements for discrete water-use zones; using and maintaining efficient irrigation systems; and watering only as needed. A water-efficient and cost-effective manner of irrigation which is becoming increasingly popular, where available, is the use of recycled or reclaimed water.

Recent legislation, as well as recent executive orders, reflect the federal government's commitment to energy and water conservation. Water-efficient landscape practices contribute two-fold: first, to the conservation of fresh, potable water; and second, to the conservation of energy associated with the distribution and treatment of water. Landscape practices may also directly impact energy conservation by siting plants to provide shade and cooling to paved surfaces and building structures resulting in reduced building cooling loads. Conversely, plants may also be sited such that they optimize solar heat gain and inhibit heat loss during cooler periods to reduce building heating loads.

To assist agencies in meeting the energy and water conservation requirements mandated by the Energy Policy Act of 1992 [Public Law 102-486, October 24, 1992], the Department of Energy was directed to establish the Federal Energy Efficiency Fund. Administered by the Federal Energy Management Program office, the fund provides grants to agencies for energy and water conserving projects. Grant proposals are competitively assessed for their technical and economic effectiveness. Water conserving landscapes are eligible to compete for grants under this fund.

5. Create Outdoor Demonstration Projects

Landscape demonstration projects promote public awareness and education and can be a catalyst for similar initiatives by the general public as well as other governmental agencies. They can also aid in the development and expansion of beneficial techniques and technologies. Outdoor demonstration projects are an effective method of promoting and sharing information about environmentally sensitive landscape approaches and the use of environmentally and economically beneficial landscape practices. Outdoor demonstration projects can also showcase partnership opportunities among industry, academia, and other governmental agencies. Cooperative agreements can assist in the development of technologies and techniques in such areas as recycled or reclaimed water use.

Other Initiatives

To further promote and demonstrate that environmentally beneficial practices can be both beautiful and economical, the Executive Memorandum identified a number of initiatives. These include: (1) The establishment of annual awards to recognize outstanding efforts in site design, and development, landscaping management practices of agencies and individual employees; and (2) the requirement for the Department of Agriculture to conduct research on the sustainability, propagation and use of native plants.

<bullet> Establishment of Annual Award

The Office of the Federal Environmental Executive in conjunction

with the Department of Energy's Federal Energy Management Program (FEMP), has established an annual award recognizing outstanding efforts by agencies and individual employees in the demonstration of beneficial landscape management practices. This annual award has been incorporated into FEMP's Annual Federal Energy and Water Conservation Award Program. In October 1995, the winners of the first annual Beneficial Landscape Practices award will be announced.

<bullet> Research by the Department of Agriculture in Cooperation With Other Agencies on Suitability, Propagation and Use of Native Plants for Landscaping

As identified in the National Performance Review, Accompanying Report: Reinventing Environmental Management, barriers to the use of native plants include: limited availability of native plants; lack of knowledge about the use, maintenance, and propagation of native plants; the more prevalent use of exotic species; and the spread of invasive exotics. The U.S. Department of Agriculture possesses experience and expertise in the development of plants, management of federal lands, and conservation of soils. By working with other federal agencies, universities, botanic gardens, arboreta, and commercial nurseries, the USDA's Agricultural Research Service and Natural Resource and Conservation Service can further the use of native plant species in the landscape. In addition, the USDA has been directed to make information available to agencies and the public on the suitability, propagation and use of native plants for landscaping.

Guidelines

Applicability

These guidelines are meant to assist Federal decision-making at the agency and facility level. Where cost effective and to the maximum extent practicable, they shall be incorporated into agency guidance and policy and reflected in agency landscape management practices, site design, and development. These guidelines apply to decisions regarding landscape management practices, site design, and development on Federal grounds and at Federal projects in any state of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, and any other territory or possession over which the United States has jurisdiction. Federal facilities located outside the customs territory of

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the United States and Federal agencies at overseas U.S. facilities are encouraged to abide by the principles set forth in the Executive Memorandum and these guidelines. Where Federal funding is provided to support landscaping projects on non-federal lands, these guidelines shall also apply.

The policies and recommendations set out in this document are not final action, but are intended solely as interpretive guidance for implementation of the Executive Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscape Grounds by affected Federal government agencies. This Guidance does not

supersede Federal agency policies or directives or established regulation. Nothing in this document shall create any right or benefit, substantive or procedural, enforceable by any party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

Definitions

Native Plant

A native plant species is one that occurs naturally in a particular region, ecosystem and/or habitat without direct or indirect human actions.

Pesticide

A pesticide is ``any substance or mixture of substances: (a) For preventing, destroying, repelling, or mitigating any pest, or (b) for use as a plant regulator, defoliant, or desiccant.'' [FIFRA Section 2(u)]

Pest

A pest is ``(1) any insect, rodent, nematode, fungus, weed, or (2) any other form of terrestrial or aquatic plant or animal life or virus, bacteria, or other micro-organism (except viruses, bacteria, or other micro-organisms on or in living man or other living animals) which the Administrator declares to be a pest.'' [FIFRA Section 2 (t)]

Compliance With the National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) provides a mandate and a framework for federal agencies to consider all reasonably foreseeable environmental effects of their actions. Where Federal projects or federally-funded activities or projects considered in the NEPA process include landscape considerations, draft and final NEPA documentation and Record of Decision for the proposed action and alternatives, as applicable, shall reflect the recommendations established in this Guidance.

1. Use of Regionally Native Plants for Landscaping

Federal agencies, Federal projects or federally-funded projects, shall incorporate regionally native plants in site design and implementation where cost-effective and to the maximum extent practicable. Federal agencies shall strive to avoid or minimize adverse impacts of proposed actions or projects on existing communities of native plants.

Federal agencies shall ensure that the appropriate site and soil analyses are performed during pre-design stages of the project. To aid

in proper plant selection and to ensure success of the plantings, analyses should match plant characteristics with site and soil conditions. Site design and implementation as well as plant selection shall incorporate such considerations as their biological needs, minimal plant care, low water use, and minimal need for fertilizers and pesticides.

Plants selected shall be in character with the project site plant communities. Those plants selected for Federal landscape projects or federally-funded landscape projects shall be nursery propagated from sources as close as practicable to the project area. Native plants collected from existing indigenous populations shall not be used unless they are salvaged from an area where they would otherwise be destroyed in the near-term. Where native plant seeds are to be used for federal projects, they should be unadulterated by other plant species. Federal agencies should ensure that appropriate actions are taken to support the success of native plant species used for Federal or federallyfunded landscaping projects.

2. Design, Use, or Promote Construction Practices That Minimize Adverse Impacts on the Natural Habitat

Federal agencies, Federal projects or federally-funded projects shall avoid or minimize adverse impacts to natural habitat. During preliminary selection of sites for Federal or federally-funded projects, Federal agencies shall avoid sites which are relatively undisturbed. If such areas cannot be avoided, Federal agencies should employ construction practices and procedures which minimize adverse impacts to natural habitat and incorporate existing vegetation and associated natural habitat into the project. Where new projects require use of a relatively undisturbed site, site clearing and preparation should be limited in order to prevent unnecessary adverse impacts. Where adverse impacts to natural habitat occur as a result of Federal or federally-funded projects, Federal agencies shall mitigate impacts to natural habitat on-site where feasible. On-site and off-site compensatory mitigation shall fully reflect lost natural habitat values.

Federal site design and development should consider: environmental elements, human factors, context, sustainability, and pertinent special issues. Development of the site should include assessments of the soil and subsurface material.

Project decision-makers, including designers, contract supervisors, contractors, field inspectors, site or facility master planners, and maintenance personnel shall either be knowledgeable of or informed of likely project related impacts to natural habitat. Where existing plantings are incorporated into the site design, they shall be adequately protected from construction activities. Project plans and specifications shall include explicit direction regarding construction practices to meet the goals of this guidance. On-site project managers and contractors shall ensure that practices which minimize impacts to natural habitat are followed during project construction. Such practices may include site management to control soil erosion and nonpoint source run-off and proper disposal of construction material and debris. Where practicable, personnel responsible for on-site construction practices, including contractors and construction inspectors, shall be knowledgeable about natural habitat resources.

3. Seek to Prevent Pollution

Federal agencies, Federal projects or federally-funded projects shall use chemical management practices which reduce or eliminate pollution associated with the use of chemical fertilizers and pesticides. Wherever practicable, Federal agencies shall employ practices which avoid or minimize the need for using fertilizers and pesticides. These practices include, but are not limited to: selection of plant species that do not require chemical fertilizers and pesticides; use of landscape management products and practices that limit growth of ``weed'' species; use of integrated pest management techniques and practices; use of chemical pesticides which biodegrade, and use of slow-release fertilizers.

Federal agencies shall recycle and/or compost leaves, grass clippings, and landscape trimmings for further use as both soil amendments and mulches. Woody debris such as tree trunks,

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stumps, limbs, etc., resulting from federally-funded activities shall also be recycled as appropriate.

Federal agencies shall use landscape management practices, including plant selection and placement, which control and minimize soil erosion, runoff of chemicals, and pollution of groundwater. Federal agencies shall also consider energy and water conservation benefits in the siting and selection of plants.

Federal agencies and facilities subject to the requirements of Executive Order 12856 shall identify those chemicals used at their facilities for landscape management and develop alternative landscape management practices to reduce or eliminate the use of those chemicals.

4. Implement Water and Energy Efficient Landscape Practices

Federal agencies, Federal projects or federally-funded projects, shall use water-efficient landscape design and management practices. These practices (such as Xeriscape) shall include planning and designing landscaping projects with consideration to: watering requirements, existing vegetation, topography, climate, intended use of the property and water-use zones. In addition, facility managers shall conduct soil analyses and, as appropriate, amend the soil at the project site to improve its ability to support plants and retain water. Initial site design as well as the addition of plants in established areas shall seek to establish water-use zones and promote efficient irrigation practices.

Where irrigation systems have been installed, irrigation scheduling should be adjusted seasonally to the evapo-transpiration rate (ET) for the plants in that particular climate.

Irrigation with recycled or reclaimed water, where practicable, shall serve as a preferred alternative to the use of potable water. Finally, Federal agencies and facilities, Federal projects and federally-funded projects, are encouraged to use water audits to identify additional opportunities for water-efficient landscape

practices.

5. Create Outdoor Demonstration Projects

Federal agencies, Federal projects or federally-funded projects, shall create and maintain outdoor demonstration projects exhibiting and promoting the benefits of economically and environmentally sound landscaping practices. These exhibits may include the selection and use of native plant species and the use of water-efficient and energyconserving practices. Exhibits may include small scale projects, such as interpretive or wildlife gardens, that focus on environmentally sound landscape management practices, site design, and development appropriate for residential, commercial, and institutional application. Additionally, demonstration projects may highlight larger projects, such as wetland or grassland restoration or woodland rehabilitation, that are more likely implemented by groups or state and local governments. Federal agencies are encouraged to form public/private partnerships with groups such as educational institutions, arboreta, commercial nurseries, botanic gardens and garden clubs, to advance the goals of the Executive Memorandum. Federal agencies are encouraged to work with and share information with other interested nonfederal parties to promote the use of environmentally and economically sound landscaping practices.

Fran McPoland,

Federal Environmental Executive.

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