Revised Draft

Fort Ord Ammunition Supply Point Project Mitigation and Monitoring Plan

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Table of Contents

List of Tables and Figures

INTRODUCTION

The U.S. Department of the Army (Army) constructed a new ammunition supply point (ASP) in 1991 to replace the ammunition supply igloos at the old, coastal ASP at Fort Ord, California (Figures 1 and 2). An inland location was chosen for the new ASP because the old ASP was built on a coastal dune terrace formation that is being progressively eroded by wind and surf action (Figure 1). Previous documents described the new ASP project, impacts resulting from its construction, and mitigation measures to reduce impacts to a less-than-significant level (Jones & Stokes Associates 1990, 1991). Table 1 summarizes the impacts and mitigation measures identified in these reports, mitigation measures acknowledged under the California Native Plant Society agreement, and the resulting mitigation measures presented in this revised draft mitigation and monitoring report.

A draft mitigation and monitoring plan for the new ASP was completed on November 14, 1990, before construction activities were initiated (Jones & Stokes Associates 1990). The purpose of the 1990 draft mitigation and monitoring plan was to describe mitigation measures necessary to reduce the vegetation, erosion, and fire hazard impacts to less-than-significant levels. The 1990 draft mitigation and monitoring plan included performance standards, monitoring provisions, and an implementation schedule for mitigation actions. In addition, revegetation measures were also included for the old ASP, as recommended in the environmental assessment (EA) (Jones & Stokes Associates 1991).

The following revised draft mitigation and monitoring plan incorporates Army comments on the 1990 draft mitigation and monitoring plan and presents a plan for mitigation of impacts on biotic and physical resources at the new ASP site. The revised draft mitigation and monitoring plan does not include measures for revegetating the dunes or other mitigation at the old ASP because the old ASP will not be demolished, and vegetation and soils will not be disrupted. The plan is organized into four general sections: Introduction, Mitigation Plan, Monitoring Plan, and Implementation Schedule. Detailed management plans for vegetation, erosion, and fire are included in Appendices A-C. A restoration plan to correct impacts that occurred during and after construction of the ASP is presented in Appendix D.

Ammunition Supply Point Facility Site

The ASP facility supports approximately 51 acres of roads and structures, maritime chaparral, and herbaceous vegetation. Based on a comparison of aerial photographs taken before and after ASP construction, approximately __ acres [Acreage to be calculated from aerial photograph] of maritime chaparral were removed for buildings, roads, and firebreaks. This unique chaparral type is dominated by chamise (*Adenostoma fasciculatum*), brittle-leaf manzanita (*Arctostaphylos tomentosa* ssp. *crustacea*) and toyon (*Heteromeles arbutifolia*) with associated silktassel (*Garrya elliptica*), black sage (*Salvia mellifera*), Toro manzanita, cropleaf

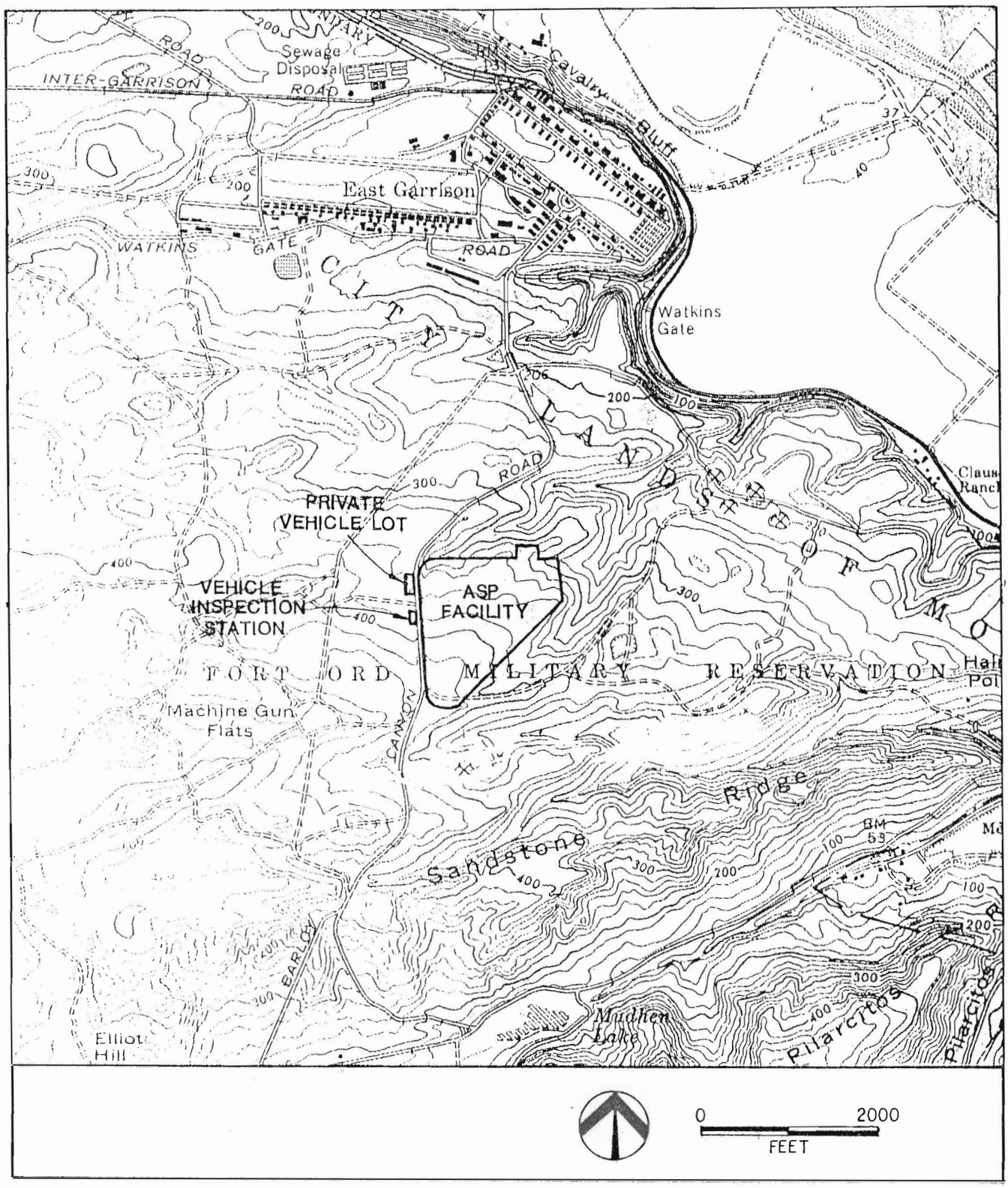

Figure 2. Detail of New ASP Facility

Environmental Assessment [a]	California Native Plant Society Agreement [b]	Revised Draft Mitigation and Monitoring Plan
		Mitigation Measure: Establish Native Plant Reserves
Designate a 30- to 50-acre area or larger at Fort Ord as a protected botanical reserve for maritime chaparral	Designate 3 new plant reserves and expand existing reserve to protect 100 acres of unique botanical resources	Three native plant reserves have been designated (6, 11, and 12) and 1 existing reserve (6) has been expanded
	Mark boundaries of the native plant reserves with signs and stakes that discourage activities or encroachment into the reserves	Each reserve was posted with signs in 1992
	Identify all native plant reserves on the Fort Ord master plan map and facilities map	Interpretive signs will be developed and will describe ecological information pertinent to the plant reserve
	Restore damaged native plant reserves	All plant reserves will be clearly identified on the Fort Ord Master Plan map and training facilities map
	Eliminate invasive exotic plants from native plant reserves	Soil erosion and weed control measures will be implemented in each reserve, as needed
	Identify specific performance standards for restoring any areas in the reserves that may be damaged by activities prohibited by the agreement	Native plant reserves will be monitored yearly for 5 years
	Conduct controlled burns in native plant reserves with maritime chaparral	
	Prohibit construction of fire roads and other soil-disturbing activities in the reserves	
		Mitigation Measure: Protect Special-Status Plant Species near the Ammunition Supply Point
Avoid impacts on special-status plants by marking and protecting designated colonies with suitable barriers and by careful road layout	Prepare a vegetation management and monitoring plan that includes monitoring for at least 5 years, protection of special-status plants found during botanical surveys, and minimizing loss of maritime chaparral	Special-status plant populations near the ASP will be monitored yearly for at least 5 years

Environmental Assessment [a]	California Native Plant Society Agreement [b]	Revised Draft Mitigation and Monitoring Plan
Avoid additional loss of maritime chaparral and special-status plants from fire management and increased off-road vehicle activity by designating firebreaks and vehicle use areas		Recommendations will be made, if needed, for fencing, posting signs, or constructing berms to protect threatened populations Remedial actions will be developed for adverse impacts on special-status plant populations near the ASP
		Mitigation Measure: Institute Weed Eradication Program
Reduce potential degradation of native vegetation and fire hazard from an increase in noxious and flammable weeds by eradicating weed populations yearly		Remove pampas grass, French broom, and kikuyu grass from the ASP site The ASP site will be surveyed yearly and eradication measures applied as needed Treated areas will be revegetated with annual grasses or native chaparral vegetation
		Mitigation Measure: Reduce Fuel Loads
Clear all brush from ASP site and establish grass Maintain a 50-foot unvegetated buffer around entire ASP and parking area perimeter	Use large mowers around the ASP to maintain vegetation rather than convert the area to grassland	A 20-foot-wide herbaceous buffer around the perimeter of the ASP will be maintained by mowing 30 feet of maritime chaparral beyond the 20-foot-wide buffer will be cut with a "brush hog" and cleared of dead material Erosion control seed mix will be distributed in areas cleared of vegetation (within a 20-foot buffer) Biannual surveys will be conducted to document the width of the buffer, establishment of seeded species, and fuel load of the chaparral vegetation in the buffer zone

Table 1. Continued

Environmental Assessment [a]	California Native Plant Society Agreement [b]	Revised Draft Mitigation and Monitoring Plan
		A 50-foot-wide buffer around chaparral vegetation within the ASP will be managed by similar methods as discussed above
		Mitigation Measure: Implement Erosion Control Plan
Implement the Army erosion control plan with modifications to seed mix and mulching	Design the erosion control plan for the ASP to minimize removal of vegetation and utilize native grass species	Cut-and-fill slopes were seeded and straw and fiber mulch was applied as required in the Army's erosion control plan (with modifications)
Extend drains to bottom of ravines with either culvert- or rock-lined swale		Fertilizer was applied to low-fertility soils
Place rock in all drainage ditches greater than 8% slope or reduce ditch grades		A drainage system was designed to collect and divert runoff away from cut-and-fill slopes
Divert runoff from cuts and fills		Persistent bare areas will be reseeded with perennial grasses or other native chaparral species
		Mitigation Measure: Implement a Restoration Plan for Corrective Actions
		Revegetate eroded sites in and around ASP site
		Control gully erosion through construction of gabions, temporary retaining walls, or other structural measures
		Replace non-native cover with native plant species

[a] Only mitigation measure that pertain to postconstruction of the ASP are discussed.

[b] Letter of Agreement sent to Colonel Leo M. Laska on December 12, 1989, from CNPS, Monterey Bay Chapter.

Sources: Jones & Stokes Associates 1989, 1991; California Native Plant Society 1989.

ceanothus (*Ceanothus dentatus)*, Monterey ceanothus (*Ceanothus rigidus*), and coyote brush (*Baccharis pilularis* ssp. *consanguinea*). Because fire has been excluded from the ASP area, most of this chaparral vegetation is mature and dense and, at some sites, senescent. The fire hazard potential in this area is high given the flammable nature of the chaparral vegetation.

Several special-status plant species, as defined in the ASP relocation EA (Jones & Stokes Associates 1991), are associated with maritime chaparral. Populations of four special-status species occur within or immediately adjacent to the new site (Figure 3). These include Toro manzanita, Monterey ceanothus, Eastwood's ericameria (*Ericameria fasciculata*), and purple-flowered piperia (*Piperia elongata* ssp. *michaeli*). Six special-status plant species occur on or near the ASP facility (Table 2).

Small, localized colonies of invasive exotic weed species also occur on the ASP site including hottentot fig (*Carpobrotus edulis*), pampas grass (*Cortaderia jubata*), French broom (*Cytissus monspessulanus*), and kikuyu grass (*Pennisetum clandestinum*). These species invade sites that have been disturbed by cutting of fire breaks, off-road vehicle traffic, or construction activities.

The ASP site occurs on Aromas sandstone formation. Generally, this formation is weakly consolidated, but in places it is indurate and has prominent escarpments where the indurated layer is exposed. The combination of steep canyons surrounding the ASP site and erosive Aromas soils can lead to severe erosion on and around the ASP.

Private Vehicle Lot and Vehicle Inspection Station

The new sites for the private vehicle lot and the vehicle inspection station are located across Barloy Canyon Road from the ASP (Figure 2). Coyote brush-bush monkeyflower scrub and oak woodland were removed for construction of these facilities. The scrub community was dominated by coyote brush and bush monkeyflower (*Diplacus aurantiacus*) with occasional coast live oak (*Quercus agrifolia*) saplings, brittle-leaf manzanita, and chamise. The oak woodland supported an overstory of coast live oak, a shrub layer with coyote brush and bush monkeyflower, and an herbaceous layer of annual grasses and native purple needlegrass (*Stipa pulchra*).

Although these facilities are on Aromas sandstone, the soil erosion potential is moderate because of the site's level terrain and high soil permeability.

Similar to the ASP, the fire potential around the parking facilities is high because of the surrounding maritime chaparral vegetation.

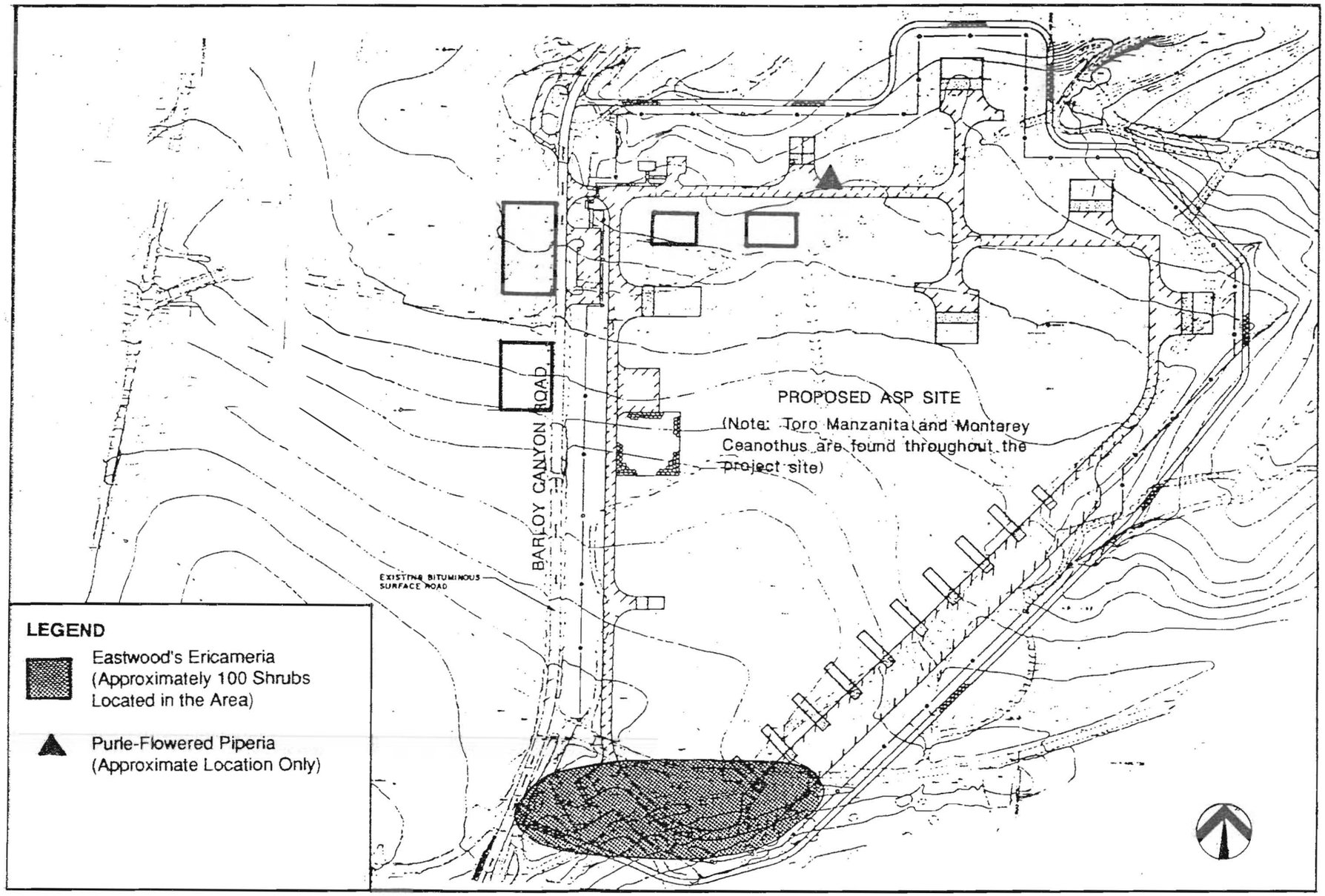

Figure 3. Locations of Special-Status Plants at the New ASP Prior to Construction

Table 2. Special-Status Plant Species Observed On or Near the Fort Ord Ammunition Supply Point[a]

Scientific and Common Name	Listing Status[b] Federal/State/CNPS	Comments
Arctostaphylos montereyensis Toro manzanita	C2/--/1b	Occurs in the center and around the ASP
Arctostaphylos hookeri ssp. *hookeri* Hooker's manzanita	--/--/1b	Occurs south and east of the ASP
Ceanothus rigidus Monterey ceanothus	C2/--/4	Occurs in the center and around the ASP
Ericameria fasciculata Eastwood's ericameria	C2/--/1b	Occurs in the center and east, west, and south of the ASP
Horkelia cuneata ssp. *sericea* Wedge-leaved horkelia	C2/--/1b	Occurs west, east, and south of ASP
Piperia elongata ssp. *michaelii* Purple-flowered piperia	--/--/4	Occurs west of the ASP

[a] = Information on plant occurrences is based on the Draft Fort Ord Ammunition Supply Point Project Mitigation and Monitoring Plan (1990) and data gathered during rare plant surveys for Flora and Fauna Baseline Study (1992) and Fort Ord Closure EIS (1992).

[b] = Status definitions:

-- = no designation.

Federal

C2 = Category 2 candidate for federal listing. Category 2 includes species for which USFWS has some biological information indicating that listing may be appropriate but for which further biological research and field study are usually needed to clarify the most appropriate status. Category 2 species are not necessarily less rare, threatened, or endangered than Category 1 species or listed species; the distinction relates to the amount of data available and is therefore administrative, not biological.

California Native Plant Society

1b = List 1b species: rare, threatened, or endangered in California and elsewhere.

4 = List 4 species: plants of limited distribution that may be considered rare under CEQA.

MITIGATION PLAN

Several mitigation measures were discussed in the EA to reduce or mitigate adverse impacts on biotic and physical resources at the ASP site (Jones & Stokes Associates 1991). This revised draft mitigation and monitoring plan focuses on mitigation measures identified in the EA (Table 1). The primary objectives of this mitigation plan are to reduce impacts on biological and physical resources that resulted from ASP construction through the following measures:

- Establish three new botanical reserves and expand boundaries of existing plant preserves at Fort Ord. This measure was designed to compensate for the loss of approximately ___ acres [Acreage to be calculated from aerial photograph] of maritime chaparral vegetation and associated special-status plants.

- Protect special-status plants located adjacent to the ASP and associated facilities.

- Institute a yearly weed eradication program at the ASP to prevent large-scale infestations of invasive species.

- Reduce fire hazard by implementing a fire management plan to reduce fuel loads in and around the ASP and parking facilities. The management plan focuses on reducing the fuel load while also minimizing the loss of maritime chaparral vegetation.

- Implement an erosion control plan based on the Army's proposed erosion plan and modifications discussed in the EA. The plan includes seeding disturbed sites that have a high erosion potential; diverting runoff away from cuts and fills; and installing pipelines to transfer water to the bottoms of drainage slopes.

- Implement a restoration plan for corrective action to remediate erosion control and vegetation management actions executed under the 1990 draft mitigation and monitoring plan.

These mitigation measures and performance standards are described below. Detailed management plans for vegetation, fire, and erosion are included in Appendices A-C. The restoration plan for corrective actions is in Appendix D.

Mitigation Measure: Establish Native Plant Reserves

Approximately 100 acres of native plant reserves will be created as mitigation for vegetation impacts associated with the construction of the new ASP (Figure 4). The boundaries of existing reserve area 6 will be expanded to maximize the extent of central

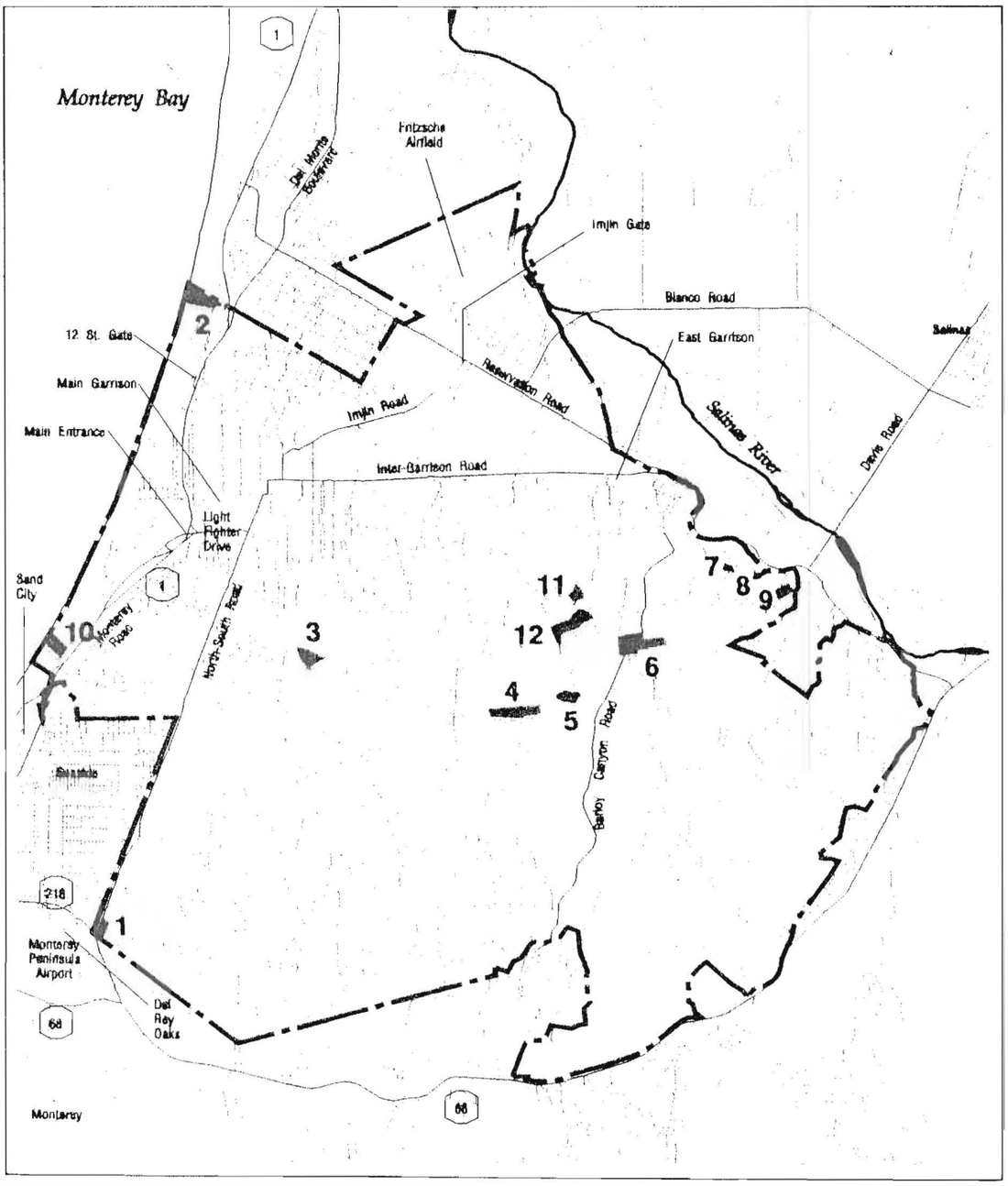

Figure 4. Location of Native Plant Reserves

maritime chaparral vegetation protected. New reserve areas 6, 11, and 12 will protect populations of Hickman's onion (*Allium hickmanii*), a federal candidate (Category 1) for listing as threatened or endangered; mima mound topography; and vernal pools. California Native Plant Society (CNPS) has identified the three latter areas as warranting special protection (Matthews pers. comm.). Locations of the 12 botanical reserves (old reserves 4 and 5 have been combined into a new reserve 4) are presented in Figure 4.

Boundary signs were posted 50 feet apart along the perimeter of each reserve in 1992. Each sign states that the area is a botanical plant reserve and that the following activities are prohibited within its confines: construction, grading, ditching, filling, clearing of vegetation, use of tracked vehicles, or any vehicle entry when soil is wet. The signs are affixed to 8-foot posts, set approximately 3 feet into the ground. Additionally, a large sign providing interpretive information will be posted at each of the new and existing plant reserves. These interpretive signs will contain ecological information pertinent to the plant reserve.

All plant reserves will be clearly marked on the Fort Ord Master Plan map and the training facilities map.

Performance Standards

The performance standard for each of the new plant reserves will be established based on the biological characteristics of the reserve at the time of designation. The establishment of these performance standards will require a vegetation inventory of each plant reserve, including the documentation of species composition, vegetation cover, and plant vigor. Plant reserves will be maintained in a natural condition. Changes in vegetative composition should be allowed only by the normal process of community aging and natural succession or through natural disturbances such as fire, drought, erosion, deposition, and disease.

Mitigation Measure: Protect Special-Status Plant Species Near the Ammunition Supply Point

Impacts on special-status plants resulting from construction of the ASP facility were reduced and compensated for by establishment of permanent plant reserves (see "Establish Native Plant Reserves" above).

Impacts on special-status plants located in the vicinity of the ASP were avoided to the fullest extent possible. Populations of Toro manzanita, Hooker's manzanita, Monterey ceanothus, Eastwood's ericameria, wedged-leaved horkelia, and purple-flowered piperia occur near the ASP and parking facilities. Location of special-status plant species at the new ASP site are presented in Figure 3.

Performance Standards

The performance standard for the protection of special-status plants located adjacent to the ASP and associated facilities is to maintain viable special-status plant populations. Inadvertent loss of these colonies will require remediation. These populations will be monitored on a yearly basis as discussed under "Monitoring Program".

Mitigation Measure: Institute Weed Eradication Program

Weed eradication will be an ongoing effort in and around the ASP to prevent spreading of noxious weed. A weed eradication program is presented in "Vegetation Management Plan" (Appendix A).

A backhoe may be required to remove pampas grass and French broom that occur in the ASP area. Kikuyu grass and hottentot fig will be treated with spot applications of herbicide. Sites where extensive amounts of vegetation are removed will be reseeded with either annual grasses or maritime chaparral vegetation.

Performance Standards

The performance standard for weed control will be zero tolerance of target weed species within and surrounding the ASP and associated facilities. The zero-tolerance level is appropriate because of the highly invasive nature of the target weed species in the Fort Ord area. The range conservationist should oversee the program and assess methods on a yearly basis.

Mitigation Measure: Reduce Fuel Loads

Chaparral vegetation surrounding and within the new ASP is highly flammable. To reduce the fire hazard potential during operation of the ASP, a vegetation buffer extending approximately 20 feet from the perimeter fence of the ASP was established. This buffer was seeded with herbaceous vegetation and is mowed on a regular basis. A 30-foot-wide area of chaparral vegetation outside this herbaceous buffer will be thinned by a combination of cutting with a "brush hog" and clearing of dead material. The fire management buffer around the ASP will total 50 feet. Vegetation removal should be conducted during the summer when shrubs are brittle and avoided during winter months when the soils are moist and erosion potential high. A fire management buffer adjacent to chaparral in the central portion of the ASP should be managed by similar means.

Fuel load reductions and firebreaks are discussed in detail in the "Fire Management Plan" (Appendix B).

Performance Standards

The performance standards for the fire management plan will include maintaining at least a 20-foot buffer of herbaceous vegetation around the perimeter of the ASP and around the central patch of chaparral within the ASP. In addition to the 20-foot herbaceous buffer, a 30-foot wide buffer of chaparral between the herbaceous buffer and mature maritime chaparral will be cut and maintained using a "brush hog".

The fire management program will be assessed on a yearly basis by the fire marshal, range conservationist, and a botanist to modify the program, as needed.

Mitigation Measure: Implement Erosion Control Plan

The grading associated with construction of the new ASP and parking facilities created cut-and-fill slopes and exposed loosely consolidated sandstone soil to wind and water erosion. The impacts associated with construction of the ASP and parking facilities were mitigated by implementing the Army's erosion control plan (Appendix E) with a few minor modifications. Revisions in the species to be seeded and their application rates, modifications to site preparation methods, and other minor changes were made to improve the overall effectiveness of the prescriptions, reduce the fire biomass, and reduce implementation cost.

Straw and fiber mulch was applied, as described in the erosion control plan, on all exposed soil areas, cut-and-fill slopes, and other denuded slopes.

The sandy soils onsite have low fertility and very low water-holding capacity. For this reason, fertilizer applied in the fall or winter may not be available to plants during spring, the primary growth period. Fertilizer was applied during early spring, in addition to the fertilizer that was applied with the seed and mulch. The fertilizer was a quick-release 16-20-0-12 (N, P, K, and S) applied at 200 pounds per acre. Higher application rates often result in burns to plants growing in sandy soils.

Erosion impacts associated with site runoff during the operation of the ASP were mitigated through a drainage system designed to collect and divert runoff away from the cut-and-fill slopes. Concentrated runoff was piped to the bottom of drainage slopes to reduce gully formation.

In areas where soil stabilization measures failed to prevent erosion, structural measures may be required. Further erosion in areas around the new ASP site could be arrested by constructing gabions or temporary retaining walls along the eroding slopes. Other runoff management techniques should be used in conjunction with the structural measures, such as sandbag sediment barriers, straw bale sediment barriers, filter or siltation berms, or a flexible downdrain. These erosion control measures are described in more detail in the "Erosion Control Plan" (Appendix C).

Performance Standards

The performance standard for erosion control will be the establishment of 60% vegetative cover after the first year, 70% cover after the second year, and 80% cover the third year following seeding in all areas where seed was applied. For 3 years following initial seeding, areas failing to achieve these performance standards will be reseeded with the prescribed seed mix. Areas dominated by annual grasses and forbs should be mowed and reseeded with perennial grasses.

Bare areas greater than 5 feet in diameter occurring on the cut-and-fill slopes will be hand seeded with the erosion control seed mix and hand raked. Persistent bare areas may require additional erosion stabilization. Erosion damage occurring in seeded areas will be repaired in accordance with Section 9.3 of the Army's erosion control seeding specifications (Appendix E).

Mitigation Measure: Implement a Restoration Plan for Corrective Actions

A restoration plan will be implemented to correct unsuccessful erosion control and vegetation management measures that were conducted under the 1990 draft mitigation and monitoring plan. Corrective actions will include revegetating eroded areas, controlling gully erosion, and replacing non-native cover with local native plant species.

Performance Standards

Corrective actions for erosion control and vegetation management are considered successful once the performance standards under "Institute Weed Eradication Program" and "Implement Erosion Control Plan" are met.

MONITORING PROGRAM

The mitigation action for the new ASP and parking facilities will be monitored for at least 5 years following implementation of each mitigation measure. All monitoring will be performed by qualified biologists and soils specialists who are familiar with the vegetation and soils at Fort Ord. The data collected will be summarized in a yearly monitoring report and sent to the Directorate of Engineering and Housing (DEH). Management plans may be altered based on the yearly monitoring results. Funding for this monitoring and for all remedial actions needed to maintain the performance standards will be the responsibility of DEH.

The monitoring program for each mitigation measure is discussed below.

Native Plant Reserves

The primary reason for monitoring the plant reserves is to document the condition of the reserves through time and identify remedial actions as needed to retain or enhance the botanical value of these areas. Each of the reserves will be monitored during late spring of each year. Permanent vegetation transects and photography points will be established in each reserve. The specific monitoring objectives will be to:

- assess the overall condition of the plant reserve and document adverse changes in conditions;
- check condition of posted signs and educational panels;
- take photographs from established photography points;
- gather information on plant species composition, cover, and vigor along established transects;
- assess the condition of special-status plant populations; and
- determine the need for weed eradication, erosion control, and revegetation measures.

All monitoring will be performed by a botanist familiar with the native vegetation at Fort Ord. After 5 years of monitoring, the botanist will prepare a summary report including recommendations for the long-term maintenance and monitoring of the plant reserves. Copies of this report will be distributed to CNPS and DEH. Funding for the monitoring of the plant reserves and for all remedial actions needed to meet the performance standards will be the responsibility of DEH.

Vegetation in the plant reserves disturbed or destroyed by activities prohibited within the reserves will be replaced in proportion to the species lost. Target weed species found to be invading a reserve will be removed without disturbing native vegetation. Active soil erosion resulting from prohibited activities will be stabilized in a manner commensurate with the extent of erosion. Any area requiring remedial action will become a permanent observation site for photographic documentation during subsequent monitoring.

Special-Status Plant Species Protection

Special-status plant populations near the ASP will be monitored on a yearly basis. This effort will involve locating and documenting the size and condition of previously identified special-status plant populations near the ASP. Adverse impacts will be noted and remedial actions developed. Recommendations for remediation measures, if needed, will be presented in the yearly monitoring report.

Weed Eradication Program

The ASP site, parking facilities, and surrounding area within 500 feet will be surveyed for the presence of target weed species. Information will be gathered on the success of prior weed eradication measures (i.e., herbicides or manual removal). The need for additional weed removal will be documented including weed types and locations and recommended method of removal.

Fuel Loads

Biannual surveys of all vegetation buffers (20-foot herbaceous buffer and 30-foot chaparral buffer) will be conducted to document the width of the buffer, establishment of seeded species, and fuel load of the chaparral vegetation in the buffer zone. Vegetation composition data will be gathered to determine if the cutting methods are adversely changing chaparral species composition.

Erosion Control Plan

The ASP area will be surveyed twice a year, in September before the fall rains begin and in May after the last spring rains. Structural and nonstructural measures established during the year will be checked and repaired, as needed. Vegetative cover will be measured at sites seeded with the erosion control seed mix.

Restoration Plan for Corrective Actions

The monitoring program for the restoration plan will be the same as the monitoring discussed above for the erosion control plan and weed eradication program.

IMPLEMENTATION SCHEDULE

The implementation schedule for the vegetation, erosion, and fire management plans are included in Appendices A-C. The schedule for initiating the restoration plan for corrective measures is included in Appendix D.

CITATIONS

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