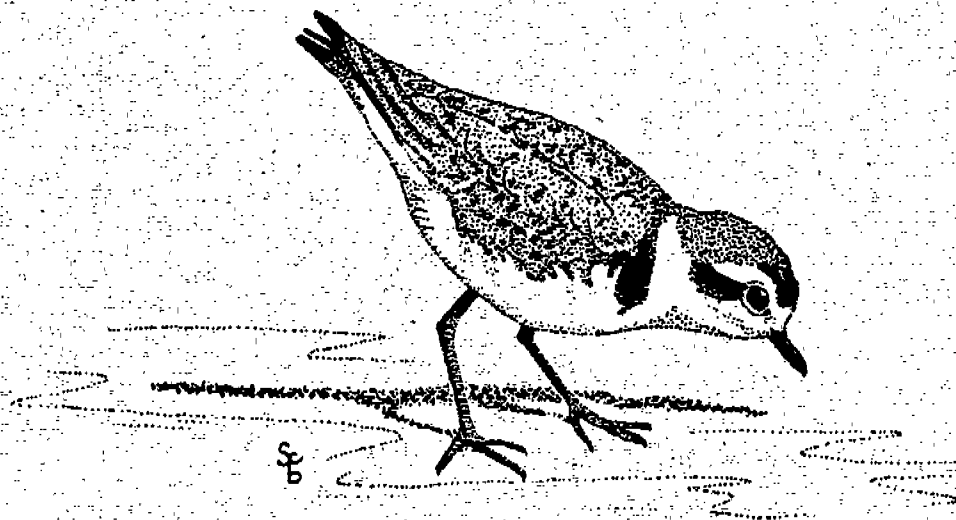


Habitat Management for Predisposal Actions



Western Snowy Plover

Chapter 3. Habitat Management for Predisposal Actions

Predisposal actions include placing former Fort Ord into a caretaker status, remediating contaminated sites, conducting ordnance and explosives removal, and supporting interim uses. As the 7th Infantry Division (Light) (IDL) realigned from Fort Ord, the U.S. Army (Army) placed structures, utilities, and operation and maintenance systems into a caretaker status until property disposal decisions are implemented. Caretaker status is defined by Army regulation as "the minimum required staffing to maintain an installation in a state of repair that maintains safety, security, and health standards".

Cleanup of contaminated sites is required in preparing lands for disposal and proposed future uses. The entire former Fort Ord installation is listed on the National Priorities List as a Superfund site. A federal facilities agreement, negotiated under Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), requires the Army to perform the Superfund cleanup process described in the Other Physical Attributes Baseline Study of Fort Ord, California (U.S. Army Corps of Engineers, Sacramento District 1992c). Cleanup activities that have potential to affect biological resources include excavation of contaminated soils, landfill remediation, removal of lead and other heavy metals, and ordnance and explosives removal. Impacts resulting from each of these actions are discussed separately in this chapter.

Habitat Management Plan (HMP) guidelines for the cleanup of contaminated sites have been developed based on the best available information. Mitigation for cleanup activities may be modified in the future based on findings and conclusions in the Fort Ord Basewide Record of Decision for the Remedial Investigation/Feasibility Study, which is currently in preparation. Other mitigation measures may be considered based on site-specific information, results of human health and ecological risk assessments, and the development and screening of remedial alternatives. Any modifications to this HMP based on new information must be reviewed and approved by U.S. Fish and Wildlife Service (USFWS).

Interim uses, before disposal, could affect HMP species and habitats. Interim use is the use of real property through real estate documentation, such as leases, licenses, and permits, before disposal of federal land is accomplished. Interim uses could include leasing of office space, storage space, housing, and other developed facilities; training facilities; or other facilities to non-Army entities. Some public access and recreational use may also be permitted on limited areas of the former Fort Ord dunes and beach before disposal of property west of Highway 1. Use permits are also possible for scientific and cultural uses. Interim uses on currently developed lands will have no impact on biological resources. Impacts resulting from interim uses on undeveloped land are addressed in this chapter.

CONTAMINATED SOILS TREATMENT

Impacts

The majority of cleanup and remediation of contaminated soils will take place in developed areas of the Main Garrison that do not have HMP requirements.

Limited removal of contaminated soils will take place in the inland range area in locations that support natural habitats. Contaminated soils in these areas will be excavated and likely used as engineering fill under the landfill cap (described in the next section). Vegetation will be removed during soil excavation. However,

the impact will be temporary because excavated soils will be replaced with clean fill or contoured into the landscape and disturbed areas either will be allowed to revegetate naturally or will be actively restored. Each area will be retained and managed as part of the U.S. Bureau of Land Management (BLM) Natural Resource Management Area.

HMP species associated with maritime chaparral could potentially be affected by contaminated soils removal in the inland range. Species potentially affected include sand gilia, Monterey spineflower, Seaside bird's-beak, Toro manzanita, sandmat manzanita, Monterey ceanothus, Eastwood's ericameria, and Hooker's manzanita. If these soil remediation sites are within maritime chaparral habitat in areas with baywood sands or oceano soils, black legless lizards may also be affected (see Figure B-16 in Appendix B).

Mitigation

Specific impacts and mitigation for disturbance of natural habitats in the inland range area during contaminated soil removal will be identified on a case-by-case basis. During the remedial design phase of the contaminated soil removal process, impacts will be identified based on anticipated levels and types of disturbance required to treat each area, and mitigation will be incorporated into the project design to minimize disturbance to natural resources. Areas will be allowed to naturally revegetate or will be actively revegetated using methods and level of effort appropriate to each situation.

Similar mitigation, monitoring, and reporting requirements as described in the following "Unexploded Ordnance Removal" section of Chapter 3 will also be implemented as applicable at contaminated soil removal sites in the inland range area.

LANDFILL REMEDIATION

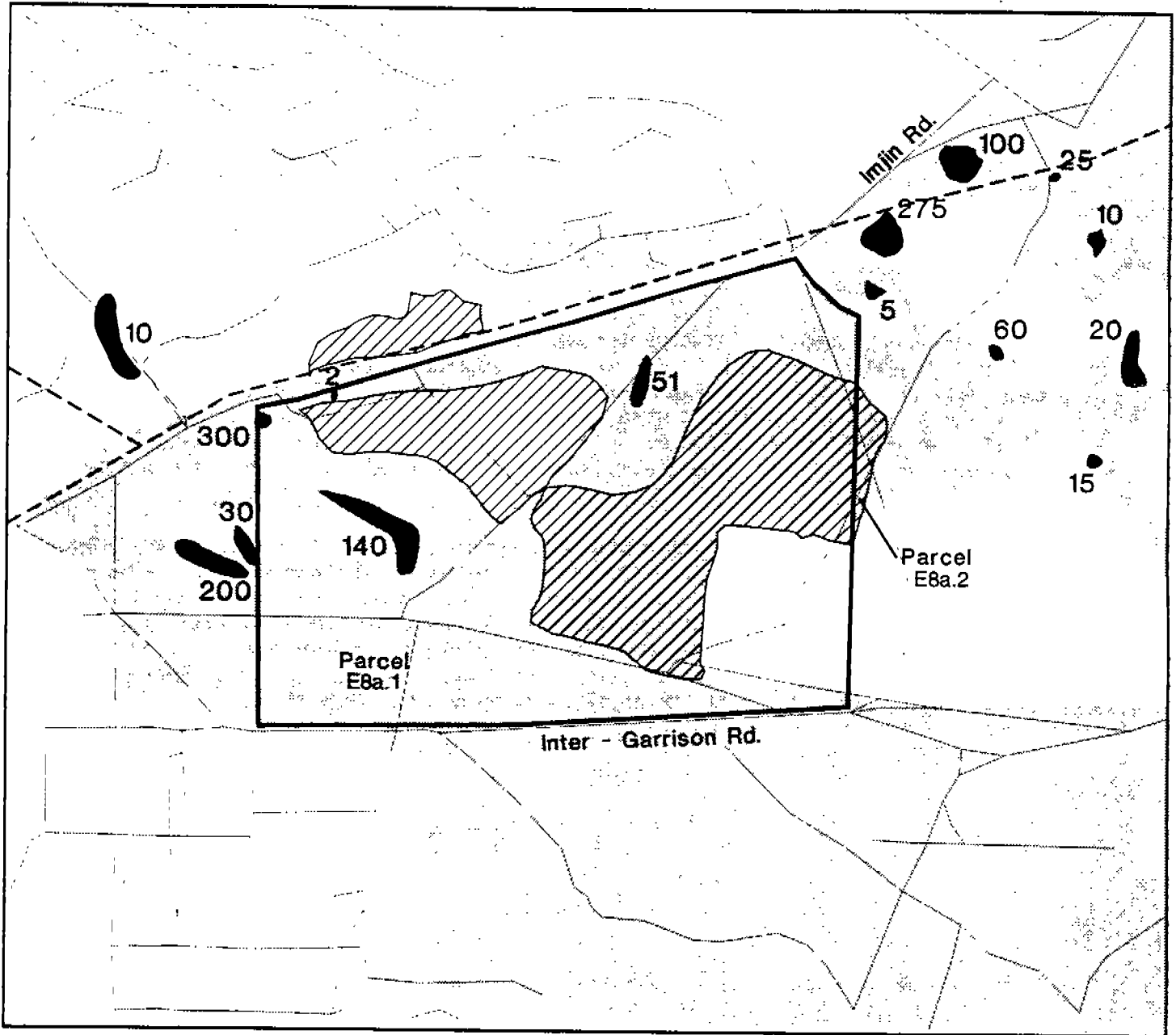
Impacts

Two landfill areas (one just north of Imjin Road and one just south of the road) are proposed for remediation. The landfill on the south side of Imjin Road will be capped. The landfill on the north side of the road will be excavated and consolidated on the fill areas on the south side of Imjin Road.

Capping the landfill on the south side of Imjin Road will result in the loss of populations of Monterey spineflower and sand gilia. The landfill north of Imjin Road encompasses approximately 30 acres and does not support Monterey spineflower or sand gilia; the landfill south of Imjin Road occupies approximately 120 acres and contains low-density populations of Monterey spineflower and small sand gilia populations (Figure 3-1).

Placement of groundwater treatment facilities in the landfill area has already been completed and groundwater remediation has begun. Groundwater remediation activities were conducted outside designated habitat areas and no sand gilia or Monterey spineflower were affected.

Capping the landfills will involve stripping existing vegetation from the landfill surfaces. The landfill cells will be consolidated in the area south of Imjin Road. Cover material will be used to bring the grade of the landfill area to the level of the flexible membrane liner (FML). Soils from the dunes collected during the lead removal process (after large lead particles are sifted out) may be used for portions of the fill material under the FML. Approximately 2 feet of soil will be placed over the FML to achieve the final grade and surface to be achieved by the remedial action. Stripping of vegetation from the landfill surfaces will remove individuals of Monterey spineflower and sand gilia. However, seed has been salvaged from plants to be affected. The



Legend

200 Location of Population of Sand Gilia and Approximate Number of Individuals (1993 Survey)

Approximate Locations of Landfill

Proposed Multi-Modal Corridor

Habitat Supporting Monterey Spineflower at Low to Medium Density (1992 Survey)

Figure 3-1
Locations of Sand Gilia and Monterey Spineflower
Populations in and Adjacent to Parcels E8.1 and E8.2

seed will be available to future land recipients if desired for restoration activities. Vehicle traffic bringing fill to the site could eliminate some Monterey spineflower habitat and individual plants at sites adjacent to the landfill.

The Army will use appropriate construction management practices to limit construction disturbance to designated work areas. Construction access routes and haul roads within natural habitat areas will be selected to avoid large areas of habitat and will be marked to confine construction traffic to the designated areas.

Mitigation

According to the agreement between the Army, USFWS, BLM, University of California (UC), and Fort Ord Reuse Authority (FORA) included in Appendix A, the Army is not required to perform any mitigation for impacts on biological resources associated with remediation of the landfill. The requirement for the landfill parcel to be included as an HMP habitat management area is not an Army responsibility. Subject to approval by the UC governing body, UC will accept the landfill parcel and manage habitat. Alternatively, FORA will accept and manage the landfill parcel (see the section titled "Parcels E8a.1 and E8a.2 - Landfill Parcel" in Chapter 4).

Although the Army is not required to perform mitigation for biological resource impacts associated with capping of the landfill, the following actions have been or will be taken. The Army will exercise appropriate construction management techniques to avoid unnecessary disturbance of habitat during remediation of the landfill. The Army will not be required to restore habitat on the landfill cap nor will the Army be required to restore or monitor threatened and endangered species or perform other habitat management activities in the parcel while the landfill is being remediated or is in caretaker status. The Army has salvaged seed from sand gilia and Monterey spineflower plants affected by remediation activities. The seed will be made available to future land recipients for restoration activities. The Army will avoid using invasive exotic plant species in erosion control seed mixes.

REMOVAL OF LEAD AND OTHER HEAVY METALS

Impacts

Lead will be removed at certain beach firing ranges. Large lead particles will be sifted out of sand at the Corrective Action Management Unit (CAMU). Soils contaminated with metals would likely be excavated and used as engineer fill under the landfill caps, as described earlier. In locations where these remediation measures are conducted, Monterey spineflower, coast wallflower, Smith's blue butterfly, and black legless lizard may be adversely affected through direct mortality and temporary loss of habitat. The expected area of lead removal would not reach areas of western snowy plover habitat along the beach.

Sands contaminated with heavy metals could be disturbed or removed in areas supporting less than 1% of the total occupied habitat of Monterey spineflower at former Fort Ord. The specific number of individuals and amount of habitat affected cannot be determined because the extent of lead removal is unknown. The coastal dune areas of former Fort Ord support approximately 3-4% of the entire known range of Monterey spineflower.

Smith's blue butterfly requires seacliff or coast buckwheat as host plants. Remediation of the beach firing ranges will involve excavation of contaminated soil, resulting in the removal of approximately 20 acres of seacliff and coast buckwheat habitat used by the Smith's blue butterfly (Figure B-19). This area of

disturbance may increase if other areas require cleanup based on ongoing remedial investigations. Removal of host plants could also result in direct mortality to adults, larvae, or pupae depending on the time of year remediation takes place.

Coastal populations of western snowy plover nest on Pacific coast beaches above the high tide line. Western snowy plovers are highly sensitive to human disturbance. Lead removal activity will be concentrated at the dune backstops of the firing ranges occurring at various distances inland from the beach. Lead removal activities are not anticipated in or near snowy plover nesting habitat. If lead removal is required on or near the beaches at former Fort Ord, disturbance from remediation activities could cause nest abandonment and nesting failures for western snowy plovers, resulting in direct mortality.

The black legless lizard occurs in areas of loose, sandy soils supporting native dune, coastal scrub, maritime chaparral, oak woodland, or oak savanna vegetation. Soil excavation associated with lead removal on the dunes could result in mortality and temporary loss of habitat for black legless lizards. The range of the black legless lizard is restricted to the Monterey Bay region. Intergrades between black and silvery legless lizards have been found elsewhere along the California coast from the east side of the San Francisco Bay to San Luis Obispo County, but the status and distribution of these varieties are unresolved.

Because of the limited range of the black legless lizard and the scarcity of suitable habitat in the Monterey Bay region, loss of habitat and individual animals at former Fort Ord may substantially reduce the range of the species and could contribute to state or federal listing as threatened or endangered.

Mitigation

High concentrations of lead near the target areas will be removed to reduce lead exposure to levels that are protective of human health. Based on human health risk assessment, areas with 10% and greater surface cover of spent ammunition were defined as the Soil Remedial Unit for Site 3 Beach Trainfire Ranges.

The remedial action objectives for site 3 are to reduce the risks associated with site-related chemicals and reduce potential adverse health and environmental effects for site-related chemicals by remediation to the health-based level of concern. The areas with 10% and greater surface cover of spent ammunition will be excavated. Approximately 63,000 cubic yards of spent ammunition and soil will be excavated down to a depth of approximately 2 feet below ground surface. Large lead particles will be separated from the soil using screens and gravity-feed separation techniques at the CAMU. The screened soil will be placed in the OU2 landfill.

The 10% and greater areas of spent ammunition compose a relatively small portion (approximately 20 acres) of the overall dunes area and are heavily disturbed from previous use.

The ecological risk assessment results for site 3 are not final. There is a need for additional ecological assessment activities and finalization of the environmental cleanup level. The finalization of the ecological assessment activities and finalization of an environmental cleanup level will result in a determination of whether further remedial actions are needed at site 3 (beyond lead removal at areas with 10% or greater surface cover of spent ammunition as already planned). If additional areas (less than 10% spent ammunition) must be treated to reach a desired environmental cleanup level, the biological resources of these areas will be examined together rather than as separate remediation sites. This will allow lead removal and mitigation to be planned in a manner that will minimize impacts on sensitive plant and wildlife species and increase the effectiveness and efficiency of dune restoration efforts. A comprehensive lead removal and dune restoration program will be developed that will provide guidelines for timing and location of lead removal and methods and priorities for restoration efforts. In addition to HMP species and habitat considerations, the timing and method of lead removal at specific sites will be adjusted based on the level of human health risk associated with each site.

Minimize Disturbance Associated with Lead Removal

Lead removal sites will be limited to the smallest area possible and marked to ensure effective cleaning of the site and limit unnecessary disturbance of habitat. Placement of all access roads, staging areas, and other appurtenant facilities will attempt to avoid areas containing HMP plant and wildlife species and native dune vegetation.

Identify Resources and Restoration Potential before Lead Removal

Once the Army has identified all sites where lead must be removed, these sites will be surveyed for plant and wildlife resources and the restoration potential for each area will be estimated. Typically, areas with 10% or greater surface cover of lead concentrations support poor-quality habitat because of high disturbance and grading activities that have occurred. Although these areas contain poor-quality habitat, they will be surveyed for existing plant resources to provide a baseline for vegetation replacement.

Before lead removal actions are initiated at sites with less than 10% lead concentration, each site will be surveyed for populations of sand gilia, Monterey spineflower, coast wallflower, and black legless lizard and for populations of or suitable habitat (buckwheat populations) for Smith's blue butterfly. Beach areas within or near lead removal sites (although this is not anticipated) will be surveyed for western snowy plover nesting activity. The number of individuals of each of these species will be estimated for each lead removal site by direct counts or by using appropriate field sampling methods (e.g., quadrat or transect methods). These data will be used to establish mitigation success criteria.

Estimates of restoration potential will indicate plant and wildlife species that could be established and the population densities expected at each site following lead removal. Restoration potential should be estimated for native dune vegetation, sand gilia, Monterey spineflower, coast wallflower, black legless lizard, and Smith's blue butterfly. Estimates will be based on occurrences of these resources before lead removal, occurrence of non-native vegetation, current soil conditions, expected soil conditions after lead removal, slope, aspect, specific microhabitat conditions, proximity to existing populations of each species, and habitat associations of all species considered.

Develop Restoration Plans for Each Site Where Lead Will Be Removed

A restoration plan will be developed for each lead removal site. The Army will coordinate with California Department of Parks and Recreation (DPR) during development of restoration plans. The restoration plan will include plant and wildlife species to be established at the site, target densities for all species, a monitoring plan, and corrective measures if goals are not met. At a minimum, native dune vegetation will be established at each site, as well as HMP species populations equitable with those that were removed. Specific success criteria for restoration of vegetation and wildlife populations are described in the "Success Criteria" section following the mitigation section.

Recontouring of sand dunes following lead excavation activities will be included in restoration plans. All restored areas will be recontoured to create a natural dune landscape that grades smoothly into existing topography.

Seed and/or cuttings for revegetation will be collected from former Fort Ord or from other dune areas less than 10 miles from the installation. Plants that may be transplanted will be removed from areas before cleanup and transferred to restoration areas. Seed will be collected from plants within former Fort Ord or from adjacent dunes and used for restoration. Seed may be either directly broadcast in restoration areas or propagated in nurseries and transplanted, depending on which method is most successful for each species.

Purchased nursery stock of local origin will be used only if at least three attempts to use transplants and seed collected from local dunes prove insufficient to meet restoration success criteria.

The Army and DPR may work cooperatively on restoration efforts. The Army will be responsible for restoring biological resources lost during lead removal so that criteria described in the "Success Criteria" section are met. DPR will be responsible for additional restoration and/or enhancement outside lead removal areas required to compensate for impacts associated with reuse of former Fort Ord. Success criteria for restoration efforts to be completed by DPR are described in Chapter 4.

DPR may complete its restoration and enhancement responsibilities with Army restoration efforts or after Army restoration activities are complete. The Army will coordinate with DPR to ensure that Army restoration activities are compatible with future DPR restoration and enhancement goals. The Army may also contract with DPR or other appropriate agencies to develop and implement dune restoration plans associated with lead removal.

Restoration of HMP species populations after lead removal will not be conducted in areas designated by DPR for future development. After lead removal, sand will be stabilized in these areas using straw plugs or other suitable techniques.

Remove Lead

The order of lead removal from cleanup sites will be based primarily on the human health risk associated with each site. The total dune area disturbed by lead removal at any one time may also be limited to protect biological resources. If more than 15% of the coastal former Fort Ord occurrence of HMP species populations or habitat is to be impacted (before successful restoration of previously disturbed areas) the Army will coordinate with USFWS to determine if phasing of the cleanup activity is necessary to protect the affected HMP resources. Restored populations and habitat for each species can be included as part of the total coastal occurrence when restoration success criteria have been fulfilled.

Before an area is disturbed for lead removal, all plants that may be transplanted will be removed and planted in an area cleaned previously. Seed also will be collected from all available plants and used for propagation of new material and restoration.

Immediately after lead removal procedures have been completed in an area, straw will be plugged and spread over the location to stabilize the loose sand. The restoration plan for that site will be implemented once the final cleanup of the site is completed. Lead will not be removed in a new area (above the 15% allowable habitat disturbance) until resources are restored in the previously cleaned locations.

Mitigation for impacts on wildlife species may alter the timing of lead removal in certain areas. Specific mitigation measures for vegetation and wildlife species are described below.

Erosion Control

The loose, sandy texture of the dune soils at former Fort Ord (U.S. Army Corps of Engineers 1992b), the temporary removal of protective vegetation during lead removal, the lack of particle-binding organic matter in the soil, and the presence of strong prevailing winds off the Pacific Ocean are all factors that combine to create a high potential for wind erosion during lead cleanup.

Use of straw plugs and straw mulch is an effective wind erosion control technique at Marina State Beach and other coastal dunes in the Monterey Bay area. Four-foot-high wood lath and wire or plastic snow fences can be used to reduce wind erosion in the most severe sites. Snow fences are placed perpendicular to the prevailing wind direction in parallel rows approximately 100 feet apart.

Control of windblown sand can best be achieved by controlling the movement of sand over an entire area of bare sand. Problems often occur when stabilization is attempted downwind from an area of drifting, unstable sand. The blowing sand from the unstable upwind area will continually cover the mulch and/or seedling plants on the treatment site. If an entire area can be stabilized, straw plugs or straw mulch is an inexpensive, effective technique.

Native Vegetation

In accordance with the overall restoration plan, native dune vegetation will be reestablished at each lead removal site following final cleanup actions. The procedure given below will be followed to restore native dune vegetation. Restoration techniques may be modified if necessary to better accommodate site-specific conditions or if previous restoration efforts at former Fort Ord indicate different techniques may be more successful. USFWS must approve all major modifications of restoration procedures. This procedure is based on a similar, nearby restoration effort at Marina State Beach, where various methods were used to determine the most successful procedure for restoring coastal dune habitat (Ferreira and Gray 1987):

- Collect seeds of native plants onsite and from other local dune populations in the Monterey Bay region.
- Recontour sand following lead excavation activities to create a natural dune landscape that grades smoothly into the existing dune topography. This measure will be included in the restoration plans for each lead removal area.
- Remove ice plant by hand and dispose of the plants offsite, remove by hand and lay the plant upside down on the sand or in compost piles, or apply Roundup or other appropriate herbicides and leave dead plants in place to hold substrate. European beach grass may also be removed as necessary using techniques appropriate for the species.
- Promote dune stabilization where sand is exposed. The "straw planting" technique described in Ferreira and Gray (1987) is a method that could be used.
- Prepare two types of seed mix that reflect the species compositions characteristic of coastal strand and dune scrub habitats, depending on where restoration activities are to occur on the dunes. Table 3-1 illustrates possible seed mixes. Species may be planted as seeds or seedlings, depending on which method is most effective.
- Apply seed mixes to coastal strand restoration sites in the foredune and mid-dune habitats, and dune scrub restoration sites in the rear dune habitat, at approximately 40 pounds per acre (lbs/ac). Irrigation is not usually necessary for dune restoration. Summer irrigation should not be conducted because of its high potential to promote the growth of weedy, non-native species, and to alter the life cycle of native plants.
- Plant nursery propagated seedlings in locations with appropriate microhabitat conditions for each species.
- Control human access to dunes and implement a beach access plan during the interim period between closure, cleanup, and disposal of former Fort Ord lands.

Potential sources of labor that may be employed in implementing the restoration procedures described above include the California Conservation Corps (CCC), the Monterey County Court Work Alternative Program, and California Native Plant Society (CNPS) volunteers. The Army may also contract with DPR to implement restoration procedures.

Table 3-1. Example of Potential Seed Mixes for Restoring Coastal Strand
and Dune Scrub Communities

Coastal Strand

Abronia latifolia
Abronia umbellata
Ambrosia chamissonis
Armeria maritima
Artemisia pycnocephala
Atriplex leucophylla
Calystegia soldanella
Camissonia cheiranthifolia
Dudleya caespitosa
Ericameria ericoides
Erigeron glaucus
Eriogonum latifolium^a
Eriogonum parvifolium^a
Eriophyllum staechadifolium
Lessingia filaginifolia
Poa douglasii

Dune Scrub

Achillea millefolium
Baccharis pilularis
Ericameria ericoides
Lupinus arboreus
Lupinus chamissonis

^a At Smith's blue butterfly restoration sites the amount of the species removed during remediation will be proportional to that which is used during restoration.

Specific mitigation actions described below for sand gilia, Monterey spineflower, coast wallflower, Smith's blue butterfly, and black legless lizard will be conducted with the restoration procedures described above. Lead removal is not anticipated in or near beach areas considered habitat for the western snowy plover and the species is not expected to be affected. However, mitigation is included in the event that lead removal activities extend to the vicinity of snowy plover nesting areas.

Sand Gilia, Monterey Spineflower, and Coast Wallflower

In conjunction with and following establishment of native dune vegetation, establishment of populations and habitat for sand gilia, Monterey spineflower, and coast wallflower will be encouraged within the dune restoration sites. The following measures will be taken to establish sand gilia, Monterey spineflower, and coast wallflower in the dunes:

- Collect and store all seed from populations of sand gilia, Monterey spineflower, and coast wallflower to be removed by lead removal activities.
- Collect seed from other populations of these species on the former Fort Ord dunes or other Monterey Bay dune sites. Seed should be collected from no more than 10% of plants in these populations to prevent adverse effects on local reproduction.
- Distribute seed into suitable habitat for each of these species within the restoration sites following restoration of dune topography. Plants may be germinated in a nursery and whole plants transferred to the restored dune habitat if this method is found to be more successful than broadcasting seed.

Restoring lead cleanup sites to dune contours with native vegetation is expected to result in micro-habitat conditions favoring the establishment of at least small, localized populations of sand gilia; larger, widespread populations of Monterey spineflower; and scattered individuals of coast wallflower. Sand gilia and Monterey spineflower typically occur in small openings in stabilized dune vegetation.

Smith's Blue Butterfly Habitat and Populations

The Smith's blue butterfly is completely dependent on seacliff buckwheat and coast buckwheat for oviposition, food for larvae, and as a nectar source for adults. Both seacliff and coast buckwheat occur at former Fort Ord.

The ranges of seacliff and coast buckwheat overlap in Monterey and San Luis Obispo Counties (Munz 1959). This range overlap allows both these food plants to be used by Smith's blue butterfly at former Fort Ord. However, variations in the life histories for both buckwheat species have resulted in differences in timing of breeding for Smith's blue butterfly at former Fort Ord. Coast buckwheat blooms up to 1 month before seacliff buckwheat. Adult Smith's blue butterflies emerge to breed as host plants bloom. The difference in blooming times between seacliff and coast buckwheat has instigated a temporal breeding separation between Smith's blue butterflies using each species of buckwheat, resulting in two relatively distinct races of butterflies (Arnold 1980). One race occurs primarily in the northern portion of the dunes and favors coast buckwheat, and the other occurs primarily in the southern portion of the dunes and favors seacliff buckwheat (Arnold 1980). Natural speciation may be occurring between the two races of Smith's blue butterfly (Arnold pers. comm.). Maintaining spatial separation of seacliff and coast buckwheat at former Fort Ord will allow this process to continue.

No more than 15% of the 135 acres (based on 1995 inventories) of coastal former Fort Ord occurrence of seacliff and coast buckwheat may be disturbed at any one time during lead removal. These areas are shown in Figure B-19 in Appendix B. If more than 15% of the total population is to be

disturbed, the additional buckwheat cannot be removed until restoration sites that fully compensate for the affected areas have been successfully established.

Buckwheat will be planted as seedlings in restoration areas. Seed will be collected from seacliff and coast buckwheat plants at former Fort Ord and cultivated in a nursery for up to 9 months. This method was chosen because success rates are higher for planting seedlings than for broadcasting seed, and buckwheat plants reach maturity faster if initially grown in greenhouse conditions (Kreiberg pers. comm.). Buckwheat plants can also be transplanted from sites to be disturbed and, if successfully established, may complement the nursery-grown plants to meet the compensation requirements for the affected areas.

Collection of buckwheat seed could adversely affect Smith's blue butterfly pupae in the flowering head of the plant. Care should be taken to avoid collecting seed from flowering heads that contain pupae. Additionally, as much buckwheat seed as possible should be collected from plants within soil remediation areas before removal or transplanting of these plants. This will minimize the need to collect seed (and disturb plants) outside remediation areas.

The two races of Smith's blue butterfly and species of buckwheat at former Fort Ord should be treated separately during dune restoration efforts. Coast buckwheat affected by lead removal should be replaced with coast buckwheat, and seacliff buckwheat should be replaced with seacliff buckwheat. Plantings of these two species should not be mixed in the same area because densities of favorable plants for each race of Smith's blue butterfly would be diluted at the site and because favorable habitat conditions differ for each plant. Coast buckwheat occurs primarily in ferritin habitat where there is more coastal influence, and seacliff buckwheat occurs primarily in more sheltered rear dune habitat (Arnold pers. comm.). Revegetation efforts should mimic this trend.

Where feasible, leaf litter from under buckwheat plants will be collected from lead removal areas before disturbance and relocated to restoration sites. Collection and relocation of leaf litter should also result in relocation of some Smith's blue butterfly pupae. Leaf litter of seacliff and coast buckwheat will be segregated during collection and relocation to avoid the mixing of these two species as described above.

Western Snowy Plover

Coastal populations of western snowy plovers breed on the upper portions of flat sandy beaches above the high tide line (Grinnell and Miller 1944). Breeding western snowy plovers are very sensitive to human disturbance, and nesting success can be significantly reduced by human intrusion (57 Federal Register (FR) 1443, January 14, 1992). The USFWS has proposed critical habitat for the western snowy plover (60 FR 11768, March 2, 1995). The beaches at former Fort Ord are among the areas proposed as critical habitat. Lead removal is not expected to occur in the vicinity of snowy plover nesting habitat. However, the following mitigation has been developed in the event that removal activities extend near these areas.

To prevent disturbance to western snowy plovers, restrictions will be placed on timing of lead removal and restoration activities in some areas. If lead removal or restoration operations can be seen or heard from the shoreline where snowy plovers nest, all activities will be conducted between October and February (avoiding the snowy plover breeding and nesting season). Cleanup and restoration personnel will not be permitted on the beach during the breeding and nesting season.

Surveys for western snowy plovers are being conducted by Point Reyes Bird Observatory along coastal areas, including the former Fort Ord beach area, to determine exact nesting locations. If no nesting birds are found near an area proposed for lead removal or restoration, these activities may proceed through the nesting season and personnel may use that portion of the beach during that time.

Black Legless Lizard Habitat and Populations

Black legless lizards occur at former Fort Ord in areas with sandy soils and native dune, coastal scrub, maritime chaparral, oak woodland, and oak savanna vegetation. Black legless lizards appear to be more abundant on former Fort Ord than previously thought.

Restoration of dune habitat will mitigate impacts on black legless lizards. If lizards are encountered during construction, they will be relocated to nearby habitat. However, it is not anticipated that significant numbers of black legless lizards would be encountered in areas of poor-quality habitat, such as iceplant mats and denuded and lead-encrusted target areas (such as areas remediated for human health), where black legless lizards may occur in low densities.

Only cover boards will be used during follow-up surveys to prevent disturbance to leaf litter and plant root systems caused by raking in restoration areas. Black legless lizards have very low dispersal ability on a regional level, but may disperse over short distances between adjacent areas of suitable habitat. Therefore, any lizards present in restoration areas may be relocated animals or resident animals from adjacent areas.

Success Criteria

Native Dune Vegetation

Healthy native coastal dune habitat is described in Chapter 2 in the "Habitat Management Plan Habitats" section. This description and comparisons with other sites supporting coastal strand and dune scrub should be used to measure the success of restored habitat. The restored habitat will consist of naturally regenerating native coastal strand and dune scrub habitats. After 5 years, the vegetative cover and species diversity should be similar to existing occurrences of these habitats in the Monterey Bay area. The extent of non-native, weedy species (e.g., African ice plant and European beach grass) shall be no more than 20% of vegetative cover.

Sand Gilia, Monterey Spineflower, and Coast Wallflower

Restoration efforts for sand gilia, Monterey spineflower, and coast wallflower will be considered successful if:

- self-sustaining populations of these species result within naturally functioning coastal strand habitat,
- suitable habitat for these species is created within the coastal strand habitat that is at least as extensive as that present before site remediation, and
- annual reproduction and soil seed bank of restored populations are comparable to that of existing populations nearby.

Smith's Blue Butterfly

To mitigate for removal of potential but unoccupied Smith's blue butterfly habitat, new populations of seacliff and coast buckwheat will be established at dune restoration sites. Mitigation will be considered successful if buckwheat populations established in restoration areas are of least equal in size and density as populations lost during lead removal. These populations must also produce at least equal densities of

flowering heads as do removed populations. Populations of seacliff and coast buckwheat should not be mixed in restoration areas.

If occupied Smith's blue butterfly habitat is removed during lead cleanup, both buckwheat populations and butterfly populations must be established in restoration areas. Success criteria for buckwheat populations are the same as those described above for unoccupied habitat. Mitigation for removal of butterfly populations will be considered successful if restored areas support Smith's blue butterfly populations for at least 2 of 5 years.

Western Snowy Plover

Mitigation for potential impacts on nesting western snowy plovers is designed to prevent disturbance to the nesting population. Mitigation will be considered successful if lead removal activities are not visible or audible from active western snowy plover nest sites at former Fort Ord during the breeding and nesting season.

Black Legless Lizard

Losses of black legless lizard populations during lead removal will be mitigated for by establishing new black legless lizard populations in restored dune habitat. Mitigation will be considered successful if, after black legless lizard relocation, suitable habitat is present, and adult lizards are found every year for 5 years.

Monitoring

A monitoring program will be conducted to evaluate the success of restoration efforts for native dune vegetation, sand gilia, Monterey spineflower, coast wallflower, Smith's blue butterfly, western snowy plover, and black legless lizard. The following monitoring procedures will be conducted annually, or more often as stated.

Native Dune Vegetation, Sand Gilia, Monterey Spineflower, and Coast Wallflower

Monitoring of restored dune vegetation, sand gilia, Monterey spineflower, and coast wallflower will include the following actions:

- Conduct relevés or transects of random samples of restored coastal dune vegetation and gather data on species composition, cover, and reproduction of dune plants. Estimate cover of non-native, weedy plant species.
- Estimate the number of individuals and amount of suitable habitat for sand gilia, Monterey spineflower, and coast wallflower on restoration sites. Map the locations of populations and habitat.
- Measure reproduction in populations of sand gilia, Monterey spineflower, and coast wallflower at restoration sites and at nearby existing population sites.
- Estimate relative amounts of viable seed in the soil seed bank between restoration and existing populations of sand gilia, Monterey spineflower, and coast wallflower.
- Record vegetation establishment with color photographs from fixed locations.

Smith's Blue Butterfly

A monitoring program will be implemented to evaluate the success of restoring potential and occupied Smith's blue butterfly habitat. Monitoring for the first 2 years after planting will determine whether buckwheat plants are surviving in adequate numbers to potentially fulfill success criteria. Monitoring for quality of Smith's blue butterfly habitat will be conducted for 5 years and will begin 2 years after planting to allow buckwheat seedlings to reach a mature state. The monitoring procedures for potential habitat are as follows:

- Conduct annual surveys of seacliff and coast buckwheat populations for 2 years after planting to determine densities and survivorship of newly established seedlings.
- Conduct annual surveys of seacliff and coast buckwheat populations at restoration sites for 5 consecutive years starting 2 years after planting of buckwheat seedlings to determine quality of habitat for Smith's blue butterfly.
- Use randomly placed quadrats of appropriate size and number to accurately estimate the density of seacliff and coast buckwheat plants in restoration areas during both the 2-year and 5-year monitoring periods. During the 5-year monitoring period the same quadrats will also be used to determine vegetative cover of these species and average number of flowering heads per plant.
- Each year plot on the ground and map the boundaries of seacliff and coast buckwheat populations surveyed to determine if population size is expanding, contracting, or remaining stable.

The vegetation monitoring procedures for occupied habitat will be the same as for potential habitat. In addition Smith's blue butterfly populations will be monitored where occupied habitat is to be restored. Monitoring procedures for butterfly populations are:

- Conduct annual surveys for Smith's blue butterfly for 5 consecutive years, starting 2 years after buckwheat seedlings have been planted.
- Sufficient surveys will be conducted during the adult flight period (mid-June to early August for populations using coast buckwheat and mid-July to early September for populations using seacliff buckwheat) to determine butterfly use.

Western Snowy Plover

A monitoring program will be implemented as needed to determine whether lead removal activities could potentially disturb nesting western snowy plovers. Annual surveys for western snowy plovers will be conducted at former Fort Ord by the Point Reyes Bird Observatory (see the previous discussion of western snowy plover under the mitigation portion of this section). If no western snowy plovers are found nesting at former Fort Ord, no further monitoring or restrictions on lead removal activities will be required.

If western snowy plovers are found to nest at former Fort Ord, all lead removal activities that can be seen or heard from the nesting area will be stopped until the end of the breeding and nesting season (March 1 to September 30).

However, no lead removal activities are expected in the immediate vicinity of the beaches at former Fort Ord where snowy plovers may nest. Lead removal activities that are not visible or audible from the coastline are not expected to disturb nesting western snowy plovers and need not restrict their activities during the breeding and nesting season.

Black Legless Lizard

Annual black legless lizard surveys will be conducted for 5 years after lizard relocation into restoration areas. To avoid disturbing vegetation in restoration areas, raking will not be used as a survey technique. Cover boards will be placed under shrubs in the restoration area no later than early March. Sufficient numbers of boards will be used to adequately assess black legless lizard population trends in the area. Boards will be checked during periods and conditions when legless lizards are most likely to be near the surface (March through July when warm weather follows rain). Numbers of lizards found and size class (snout-vent length) will be recorded.

In addition to this monitoring, the Army will allow appropriate agencies (i.e., UC, California State University, or USFWS) to conduct research on relocated black legless lizards in conjunction with Army relocation and monitoring efforts. Research studies may include but are not limited to marking and tracking individual lizards, using monitoring data for mark-recapture analysis, and measuring specific habitat conditions in restoration sites. Agencies conducting the research will be responsible for research costs.

Corrective Measures

If monitoring indicates success criteria are not met for native dune vegetation or any HMP species, correction measures will be implemented as described below.

Native Dune Vegetation, Sand Gila, Monterey Spineflower, and Coast Wallflower

Based on the results of each year's monitoring, the restored dune habitat will be supplementally recontoured, weeded, replanted, or reseeded as needed to meet the established success criteria.

Improvement of sand gilia, Monterey spineflower, and coast wallflower habitat will be conducted if success criteria for these species are not met.

Smith's Blue Butterfly

If during the first 2 years after planting buckwheat seedlings it appears densities or survivorship of young plants will not be adequate to eventually fulfill success criteria for restoration of potential Smith's blue butterfly habitat, additional plantings of coast or seacliff buckwheat seedlings will be attempted in the restoration area to increase densities of individual plants. If after two attempted plantings densities of young plants are still not sufficient to eventually meet success criteria for densities of mature plants, a new area will be used as a restoration site and will be monitored using the same procedures as for the original restoration site.

If sufficient densities of mature plants are present after the 2-year monitoring period to fulfill success criteria, but densities of flowering heads are inadequate, one additional planting of buckwheat seedlings will be attempted to increase densities of flowering heads available in restoration sites. If 2 years after the supplemental planting densities of flowering heads still do not fulfill the success criteria, a new area will be used as a restoration site and will be monitored using the same procedures as for the original restoration site.

If the restoration area is intended to support Smith's blue butterfly populations, but butterfly use does not fulfill the success criteria for the site, additional seacliff or coast buckwheat will be planted to attempt to improve the habitat quality. Areas of additional plantings will be monitored for 5 years to determine whether Smith's blue butterfly use is sufficient to fulfill the success criteria. If after one attempted planting success

criteria are not met, a new area will be used as a restoration site. The new area must meet the same success criteria and will be monitored in the same manner as the original restoration site.

If a restored area intended to replace occupied Smith's blue butterfly habitat satisfies success criteria for buckwheat populations, but supports no Smith's blue butterflies, a new restoration site will be developed within 40 meters of an existing Smith's blue butterfly population. [Average daily movements for female Smith's blue butterflies are roughly 47.5 meters, and approximately 34.4 meters for males (Arnold 1983)]. The new site will be monitored in the same manner as the original site to determine if success criteria are met.

An alternative corrective measure could be transplanting Smith's blue butterfly larvae to the existing restoration site instead of creating a new restoration site. Moving Smith's blue butterfly larvae must be approved by USFWS before this measure is attempted. If larvae are to be transplanted, trial studies will be conducted with a small number of larvae to test whether larvae pupate and metamorphose into adults at the site. If trials are successful, more larvae may be moved. All transplanted larva will be monitored to determine if adults breed successfully. Larvae will not be transplanted to sites where butterfly populations already exist within 40 meters of the site. The existence of butterfly populations near an unoccupied site indicates that microhabitat conditions are not suitable for Smith's blue butterflies in the unoccupied restoration area.

Western Snowy Plover

If at any time between March 1 and September 30 lead removal activities are audible or visible from areas identified as containing nesting western snowy plovers, those activities will be stopped until after October 1.

Black Legless Lizard

If success criteria are not met after 5 years, monitoring may continue for 3 more years and if success criteria are not met after the additional 3 years, a new restoration site will be created.

Data gathered during monitoring of the unsuccessful restoration site will be used to better design and implement a restoration plan for the new site. The new restoration site will connect with an existing black legless lizard population and will be monitored for 5 years after it is determined that microhabitat conditions are suitable for black legless lizards (sufficient shrub size, leaf litter, and invertebrate populations). Success criteria for the new site will be the same as for the original restoration site.

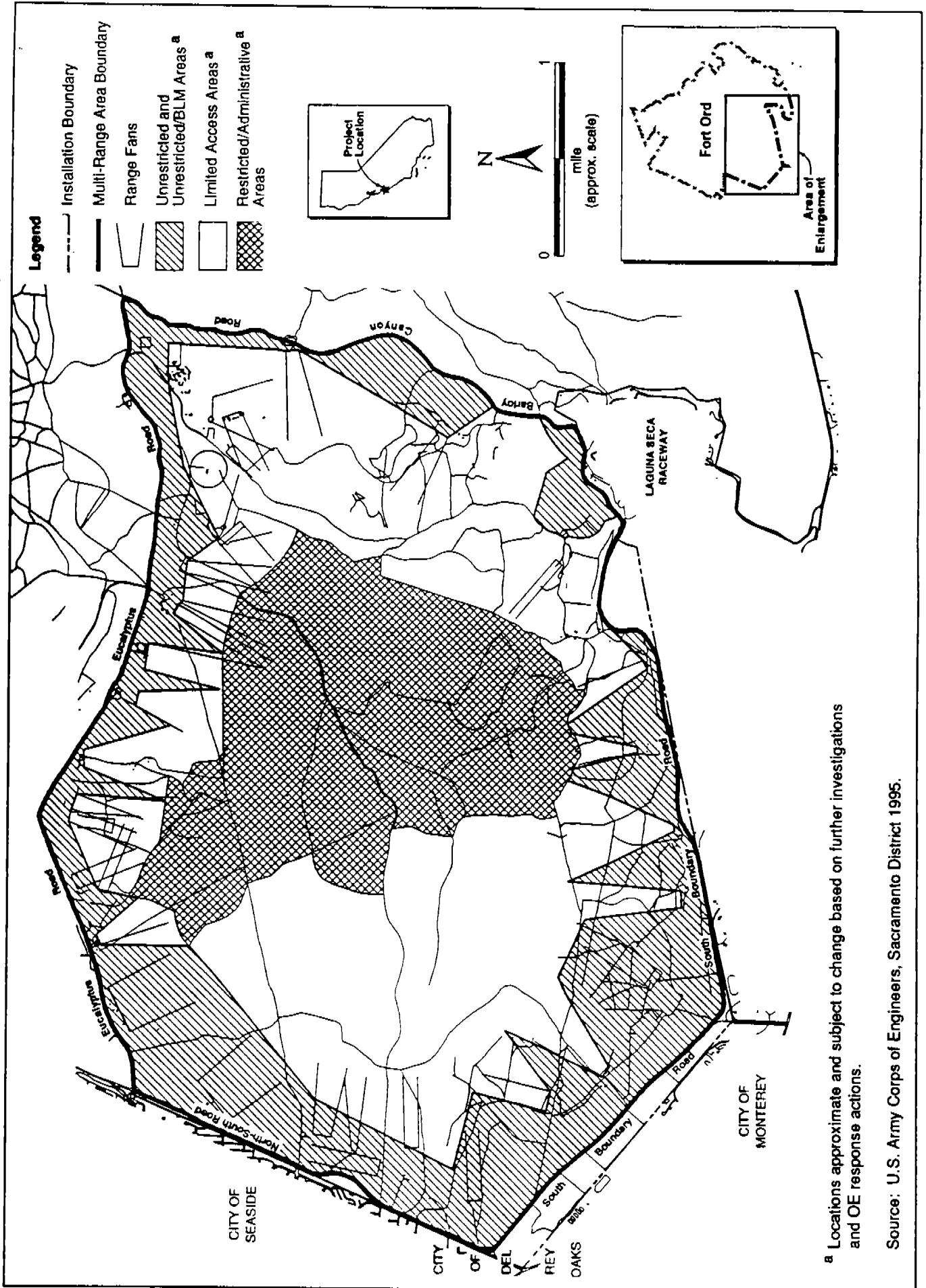
ORDNANCE AND EXPLOSIVES REMOVAL

Background

Former Fort Ord contains an approximately 8,000-acre multi-range area (MRA) (also referred to as the inland range area) with ordnance and explosives (OE), plus additional training areas that may contain OE.

The Army and BLM have completed a Site Use Management Plan for Land Transfer and Reuse of the Multi-Range Area (U.S. Army Corps of Engineers, Sacramento District July 1995a). This document discusses the future land uses within and adjacent to the multi-range area. The following site use descriptions represent current expectations for future public and administrative uses within the multi-range area (Figure 3-2). Boundaries for these areas are approximate and subject to change based on further investigations, OE response actions, or other factors.

Figure 3-2
 Conceptual Multi-Range Area Land Reuse Plan



^a Locations approximate and subject to change based on further investigations and OE response actions.

Source: U.S. Army Corps of Engineers, Sacramento District 1995.

- U - Unrestricted. Public access will be unrestricted upon clearance of ordnance. These areas are on the perimeter of the multi-range area and are typically at or behind the firing points used by military personnel during active use of former Fort Ord. These areas are within the multi-range area but outside the lands to be transferred to BLM. These areas will be cleared of unexploded ordnance (UXO) and other OE following the same standards applied to other parcels designated for development. They will be transferred with the same use restrictions that are being applied to development parcels outside the multi-range area.
- UB - Unrestricted/BLM. These areas will be unrestricted to the depth of clearance for use by BLM personnel. These areas are on the perimeter of the multi-range area and are typically at or behind the firing points used by military personnel during active use of former Fort Ord. These areas will be cleared of UXO and other OE following the same standards applied to future BLM lands outside the multi-range area. They will be transferred to BLM with the same use restrictions that are being applied to parcels outside the multi-range area.
- LA - Limited Access. These areas are limited to specific uses. These areas are located within the core of the multi-range area but will be cleared to a level safe for some uses. The areas generally include old range areas, range safety fans, and other areas outside the high-impact area. These areas will be cleared of UXO and other OE sufficient to permit pedestrian and other nonmotorized access. An existing system of fire roads and firebreaks will be cleared to a sufficient standard to allow annual maintenance of fire roads with heavy equipment. They may be transferred with use restrictions that prohibit any surface disturbance or excavation outside the established system of fire roads and trails.
- RA - Restricted/Administrative. These high-impact areas will be restricted for use by BLM to trained persons only and will be off-limits to the public. The areas will be fenced by the Army, and the fence will be maintained by BLM. A system of fire roads and firebreaks will be cleared within this area to allow access for fire suppression and habitat monitoring. These areas were the primary target areas. The density or hazard of UXO is such that it is not deemed cost-effective to remove UXO at present. UXO clearance of the high-density impact area is not planned. If new technology allows further clearance actions in a cost-effective manner, the Army and BLM would jointly seek funding for future clearances.

Clearance of OE may involve selectively removing vegetation, possibly by burning to clear the ground surface. Burning may be infeasible in overly dense or high-moisture content vegetation in some portions of the inland range area, in which case, vegetation may be cut and chipped by a "brush hog" or other mechanical means. Where burning or mechanical removal may be used, burning will be the preferred method because of the beneficial effects of fire on HMP species associated with maritime chaparral.

After vegetation clearing, OE will then be located by visual and electromagnetic means (metal detectors), identified, and disposed of. During the location process, inert ordnance and ordnance scrap will be collected and properly disposed of. Removal of OE may require excavation of soil from around the ordnance. Excavations could range in size from a single cubic foot to several cubic feet, depending on the type, location, and position of OE. A potential method of disposal of OE is *in situ* detonation, which would increase the amount of soil disturbed.

Subsurface investigation and clearance activities may be conducted in areas where historical record reviews and interviews indicate the possible presence of buried ammunition or in impact areas where the velocity, trajectory, and momentum of munitions are likely to cause them to penetrate the ground's surface. Subsurface OE is located by use of metal detectors, ground-penetrating radars, or other appropriate methods, and then the area is excavated to determine the source of the magnetic or radio wave anomaly. Depending on the type and means of delivery, excavations could reach depths greater than 10 feet and have surface areas ranging in size from several square feet to tens of square feet. *In situ* detonation of subsurface OE would increase the amount of soil disturbed.

Impacts

Ordnance clearance from the inland range area and other live fire areas could result in the loss of portions of sand gilia and Monterey spineflower populations. Sand gilia and Monterey spineflower plants would be removed by vegetation burning and cutting, whole plant excavation, crushing or trampling from movement of excavation equipment and removal team foot traffic, and onsite ordnance detonation. The maritime chaparral habitat that support these species would be removed by burning and cutting. However, the disturbance associated with burning and cutting may have benefits to sand gilia and Monterey spineflower.

Clearance of OE could occur in areas supporting approximately 75% of the occupied habitat of sand gilia and Monterey spineflower at former Fort Ord. The number of individuals and amount of habitat affected cannot be determined because the locations and amount of OE is unknown. Approximately 50-70% of the entire range of sand gilia and about 75-95% of the entire range of Monterey spineflower are located on former Fort Ord.

California linderiella and California tiger salamanders occur in ephemeral, freshwater aquatic habitats, such as vernal pools, swales, and ponds. California linderiella eggs are laid by adults when water bodies are full and remain in the soil after vernal pools and ponds have dried until the following rainy season. California tiger salamanders breed and lay eggs in these water bodies where the young develop from aquatic larvae to adults and leave the area by late spring. The excavation necessary for removal of subsurface OE could fill or severely disrupt several ponds and vernal pools that are considered to be habitat for California linderiella and California tiger salamanders. If OE is found inside a vernal pool or pond, *in situ* detonation of the ordnance may disrupt a significant portion of the soil in the area and potentially destroy California linderiella and California tiger salamander habitat and California linderiella eggs in the soil. Soil disruption during excavation or *in situ* detonation could also cover California linderiella eggs with sufficient soil to prevent them from hatching, resulting in direct mortality.

Ponds provide the only potential habitat for California red-legged frogs at former Fort Ord because the adult frogs require a relatively permanent water source. Although no California red-legged frogs were found at former Fort Ord during wetland surveys (Flora and Fauna Baseline Study of Fort Ord, California and later investigations), the installation is within the range of the species and potential habitat is available. Excavation or *in situ* detonation of OE would require ponds to be drained and thus could degrade the habitat quality of the ponds for this species.

The ponds and vernal pools described above constitute wetland habitat. OE that must be detonated onsite could adversely alter the hydrological functioning of these wetlands. The exact amount of ordnance clearing that will occur in wetlands is unknown. Vernal pools and freshwater marshes potentially are jurisdictional wetlands regulated under the Clean Water Act.

Sampling and clearance of OE could result in the loss of portions of populations and habitat of other HMP plant species occurring at former Fort Ord. Potential impact mechanisms are the same as those described above for sand gilia and Monterey spineflower. Ordnance clearance could result in the loss of individual plants and reduction of suitable habitat for Seaside bird's-beak, Eastwood's ericameria, coast wallflower, Toro manzanita, sandmat manzanita, and Monterey ceanothus. The amount of loss of these species cannot be estimated because the amount of buried ordnance has not been determined. Large reductions in numbers and habitat for Seaside bird's-beak, Eastwood's ericameria, Toro manzanita, sandmat manzanita, and Monterey ceanothus could result in their eligibility for federal listing as threatened or endangered.

Clearance of OE in the inland range area and other live firing areas could result in adverse effects on 935 acres of the habitat of black legless lizards at former Fort Ord and direct mortality to individual animals.

The black legless lizard occurs in areas of loose sandy soils supporting native dune, coastal scrub, maritime chaparral, oak woodland, or oak savanna vegetation. The range of the black legless lizard is restricted to the Monterey Bay region. Intergrades between black and silvery legless lizards have been found elsewhere along the California coast from the east side of San Francisco Bay to San Luis Obispo County, but the status and distribution of these varieties are unresolved.

Clearance of OE could result in the temporary loss of habitat occupied by maritime chaparral. The amount of vegetation removed during ordnance removal activities cannot be estimated because the specific location and amount of ordnance in the ground is unknown.

Mitigation

Mitigation measures for impacts on HMP species and habitats resulting from OE sampling and removal activities will be implemented at all sites not planned for development (see Chapter 4). The primary objective of mitigation efforts is to reestablish healthy, high-diversity maritime chaparral habitat that has a variety of seral stages and age classes and that includes microhabitat for sand gilia, Monterey spineflower, Seaside bird's beak, and black legless lizard.

The health of maritime chaparral is marked by successful establishment of this community's component species, many of which are HMP species (i.e., sandmat manzanita, Monterey ceanothus, Eastwood's ericameria, Toro manzanita, and Hooker's manzanita).

Specific mitigation measures for vernal pools and ponds are also provided to minimize potential impacts on California linderiella, California tiger salamander, and red-legged frog.

Minimize Disturbance Associated with OE Removal

OE removal sites will be restricted to the smallest area possible to limit unnecessary disturbance of habitat. Placement of all access roads, staging areas, and other appurtenant facilities will attempt to avoid areas containing HMP plant and wildlife species and maritime chaparral vegetation. Existing roads will be used whenever possible and use of vehicles off roads will be minimized to the greatest extent practicable.

Avoid Disturbance of Sand Gilia and Seaside Bird's-Beak Populations

Where feasible, avoid populations of sand gilia and Seaside bird's-beak. Fence or flag known populations and educate ordnance clearing crews as to the location and identification of these species.

Coordinate Vegetation Management and Restoration with OE Removal

A vegetation burning and restoration program will be developed to coordinate with ordnance cleanup activities. The program should consist of a series of feedback mechanisms to allow for testing of burning and restoration methods on sites cleared early to be used to direct the burning and restoration program and maximize revegetation success on sites cleared later in the process. A 5-year burn plan for the inland range was completed in December 1994 and provides guidance on burn sizes and location (Jones & Stokes Associates 1994).

Clearing or burning vegetation for the cleanup of OE in maritime chaparral will initially be conducted at sites up to 400 acres in size with preferred burn sizes being between 200 and 300 acres. Cleanup sites should be separated by undisturbed chaparral, in patches greater than 25 acres, to create a mosaic of

patches burned or cleared at different times. No more than 800 acres of maritime chaparral per year should be cleared or burned. The cleanup site sizes and yearly acreage limit can be adjusted as better techniques and more understanding of maritime chaparral reestablishment are developed during early ordnance cleanup efforts.

Conduct Employee Education Program

Before OE removal or sampling activities begin, all supervisors and field personnel must attend a brief environmental training program. The training program will be presented by a qualified biologist familiar with this HMP plant and wildlife resources at former Fort Ord. As the project proceeds, all new personnel must attend an environmental training session before working on the site. Topics to be covered in the training session include:

- a description of HMP plant and wildlife species that could be encountered in the project area,
- pertinent state and federal laws relating to the conservation of these species,
- guidelines that personnel must follow to reduce or avoid impacts on HMP species, and
- the appropriate contacts to report unforeseen impacts on HMP species.

Minimize and Compensate for Impacts on California Linderiella, California Tiger Salamander, and California Red-Legged Frog

Vernal pools are considered potential habitat for California linderiella and California tiger salamander. Ponds also provide potential habitat for these two species, as well as for the California red-legged frog. Vernal pools and ponds will be avoided whenever possible during cleanup of OE. However, if these habitats must be disturbed during removal of OE (i.e., during excavation or *in situ* detonation of OE), a mitigation and habitat restoration plan will be developed and implemented for each vernal pool or pond that is affected.

Mitigation and habitat restoration plans will include measures to minimize disturbance to ponds and vernal pools during ordnance removal. Methods for reducing disturbance include minimizing excavation area and depth, completing *in situ* detonation in a manner that minimizes soil disturbance, and setting aside topsoil during excavation to salvage plant seeds and California linderiella eggs. Before any vernal pool or pond is disturbed, it will be surveyed and all data described in the monitoring section below will be collected.

The goal of restoration plans will be to restore affected wetlands so that they are of the same acreage and provide the same functions as before clearing of ordnance. Restoration objectives would include establishment of self-sustaining populations of California linderiella, California tiger salamander, and California red-legged frogs similar to those that existed before ordnance removal.

Minimize Impacts on Black Legless Lizards

Potential habitat for black legless lizards has been identified in the western portion of the inland range area and other locations (see Figure B-16 in Appendix B). Designation of suitable habitat was based on soil and vegetation conditions favorable to black legless lizards; however, the area has not been surveyed for the species.

Because of the difficulty and safety hazards associated with surveying for legless lizards in areas that may contain OE, all areas identified in Figure B-16 in Appendix B as potential habitat for the black legless lizard will be considered occupied.

These areas will be burned only between July 1 and February 1 so that burning takes place when legless lizards are most likely to have burrowed deep into the soil where they should not be affected by the fire. Implementation of the mitigation measures described below will minimize impacts on black legless lizards while OE clearance and other ground disturbance activities occur year round.

If a legless lizard is encountered during excavation of OE, maximum effort will be made to preserve the animal without unreasonably delaying excavation activities. The lizard will be captured by hand, making all efforts possible not to injure the animal. The first option for treatment is to release an unharmed lizard after the excavation or ground disturbing activity is completed. The lizard will be placed in a plastic container loosely filled with moist paper towels. If an injured or dead specimen is taken, a predetermined contact from USFWS or California Department of Fish and Game (DFG) will be immediately notified and may receive the specimen or recommend an appropriate person to receive the specimen. The live lizard either will be kept temporarily until activities are complete in the area where it was encountered and then released as near as possible to the point of capture, or it will be kept in captivity until the following spring and released in suitable habitat as near as possible to the point of capture. If the lizard encountered is dead, the person receiving the specimen will identify the species of legless lizard and give the specimen to an appropriate agency or institution.

Success Criteria

Healthy maritime chaparral habitat is described in Chapter 2 in the "Habitat Management Plan Habitats" section. This description and comparisons with undisturbed sites supporting maritime chaparral should be used to measure the success of restored habitat. The restored habitat will consist of naturally regenerating maritime chaparral that is managed using controlled burning and other techniques that maximize the habitat value for HMP species.

The acreages of habitat occupied by sand gilia, Monterey spineflower, and Seaside bird's-beak at low, medium, and high densities in areas in the inland range where some amount of OE is expected to occur are shown in Table 3-2 (based on 1992 field surveys). Based on rough estimates of plant densities, the occupied habitat identified in Table 3-2 may represent about 8,000-12,000 individual sand gilia plants, 5,000-10,000 Seaside bird's-beak plants, and 4-7 million Monterey spineflower plants in the inland range area. This does not include areas outside the inland range where there is potential for OE. Restoration for these species will be considered successful if, at the end of 5 years:

- self-sustaining populations result within a mosaic of maritime chaparral habitat in different stages of succession,
- the amount of occupied habitat varies over time within a range that includes amounts similar to the amount of habitat estimated for these species in 1992, and
- population sizes vary from year to year within a range that includes annual populations similar in size to those estimated for these species in 1992.

In many instances suitable habitat, occupied habitat, and populations of two or all three of these species will occur on the same site.

Vernal pool and pond restoration will be considered successful if affected wetlands are of the same acreage and provide the same functions as before clearing of ordnance. Also, if affected wetlands supported California linderiella, California tiger salamander, or California red-legged frogs before ordnance removal, they must support self-sustaining populations of these species for 5 years after restoration is complete.

Table 3-2. Approximate Acres of Habitat Supporting Sand Gilia, Monterey Spineflower, and Seaside Bird's-Beak in Areas in the Inland Range Expected to Contain Unexploded Ordnance

	Unexploded Ordnance Expected to Occur
Sand gilia^a	
Low density	1,115
Medium density	20
High density	0
Monterey spineflower^a	
Low density	2,135
Medium density	1,780
High density	410
Seaside bird's-beak^a	
Low density	390
Medium density	15
High density	0

^a From 1992 survey data.

Monitoring

Each patch of maritime chaparral cleared of ordnance will be monitored annually for 5 years beginning with the year of ordnance removal activities. In most cases, the monitored site will be delineated by the edge of a controlled burn area established before ordnance removal. Because ordnance removal will occur over several years, the 5-year monitoring period for groups of ordnance removal sites will be initiated in different years. The reestablishment of vegetation will be measured at each ordnance removal site, using releve, quadrat, transect, or a combination of vegetation survey methods. Each monitoring year, the following information will be recorded for each ordnance removal site:

- size of the site in acres (first year only);
- method used to clear vegetation (e.g., burning, chipping, none) (first year only);
- extent of soil disturbance from ordnance removal (first year only);
- percent absolute vegetative cover;
- percent cover of each woody plant species present (including HMP shrubs);
- percent herbaceous cover and list of dominant herbaceous species;
- percent cover by non-native weedy plants;
- estimated number of plants and mapped location of sand gilia, Monterey spineflower, Seaside bird's-beak, and coast wallflower;
- general wildlife use;
- vegetation establishment record through color photographs.

A protocol for conducting vegetation sampling at former Fort Ord has been developed to guide monitoring efforts (U.S. Army Corps of Engineers, Sacramento District, 1995). The protocol and results of monitoring efforts are being coordinated with the Coordinated Resource Management and Planning (CRMP) process (described at the end of Chapter 4), USFWS, and others. With ordnance removal sites varying from approximately 200 to 400 acres in size and the inland range comprising approximately 8,000 acres, there should be between 20 to 40 sites to be monitored for habitat reestablishment. This number could be reduced based on the final size of the Restricted/Administrative area shown in Figure 3-2. This information will be analyzed and compiled into annual monitoring reports. Conclusions drawn from the data in monitoring reports will be used to modify subsequent burning and ordnance clearing actions to promote more effective restoration of healthy, diverse maritime chaparral and habitat and populations of HMP species. The level of detail of monitoring data for maritime chaparral and associated HMP species may be adjusted over time, as the level of detail necessary to judge mitigation success is better understood through the results of monitoring the initial sites of vegetation clearing, ordnance cleanup, and vegetation reestablishment.

Restored vernal pools and ponds will be monitored during each rainy season for 5 years after restoration is completed. Each monitoring year, the following information will be recorded for each restored vernal pool or pond:

- dates each pool or pond begins to fill and when it dries relative to timing and abundance of yearly rainfall;
- water conditions including depth, surface area, turbidity, and pH;

- percent submergent, floating, and emergent vegetative cover (estimated using transects, quadrats, or other appropriate techniques) and species composition; and
- occurrence and relative abundance of California linderiella adults and adults and larvae of California tiger salamander and California red-legged frog.

This information will be analyzed and compiled into annual monitoring reports. Conclusions drawn from the data in monitoring reports will be used to modify subsequent ordnance removal practices in wetland habitats and implementation of future vernal pool and pond restoration plans. The level of detail of monitoring data for vernal pools and ponds may be adjusted over time, as the level of detail necessary to judge mitigation success is better understood through the results of monitoring the initial sites of vernal pool and pond restoration.

Corrective Measures

Based on the results of each year's monitoring, the restored maritime chaparral habitat management will be modified, if necessary, to meet success criteria. In some instances supplemental weeding, planting, or seeding may be needed to meet the established success criteria.

Improvement of sand gilia, Monterey spineflower, and Seaside bird's-beak habitat will be conducted if population levels for these species do not meet the success criteria.

If success criteria for vernal pool and pond restoration are not satisfied, corrective measures will be developed on a case-by-case basis to identify the cause of failure. Previous monitoring data will be analyzed, and, if necessary, specific studies will be undertaken to determine the reason for failure to meet success criteria. Corrective measure will be developed to respond to the cause of noncompliance determined from these data. An appropriate corrective measure must be implemented within 1 year of determination that success criteria will not be satisfied, and the vernal pool or pond will be monitored for additional 3 years after implementation.

USFWS, DFG, and the Army will review all proposed wetland corrective measures before they are implemented. If after two attempted corrective measure success criteria are still not satisfied, another mitigation site will be chosen for vernal pool or pond enhancement or creation.

INTERIM USES

Before final disposal of some former Fort Ord lands, property and structures will be made available for interim uses to various agencies. Use of existing structures in the developed portions of former Fort Ord will have no impact on biological resources. Recreational use along the dunes and beaches, another potential interim use, could have a potential adverse effect on HMP species if not managed properly.

Public Access to Dunes and Beaches

Impacts

Removal of lead from the dunes at former Fort Ord may require phasing of cleanup over several years. Phasing of cleanup will be required if the extent of remediation needed to minimize the human health risk exceeds the remediation allowed at any one time to protect biological resources. These lands cannot be

transferred until the lead has been removed. However, some public recreation uses may be permitted on the former Fort Ord dunes in areas that do not require lead removal, or where lead has already been removed, before the transfer of land to DPR.

If not properly managed, public use of the beaches and dunes could have adverse effects on sand gilia, Monterey spineflower, Smith's blue butterfly, western snowy plovers, and black legless lizards. Populations of sand gilia, Monterey spineflower, Smith's blue butterfly, and black legless lizards could potentially be eliminated by repeated foot traffic or unauthorized off-road vehicle use. Potential habitat for these species could also be lost through the same mechanisms. Nesting western snowy plovers may be sufficiently disturbed by recreational uses on the beach to abandon nests.

Mitigation

If the beaches and dunes at former Fort Ord are open for recreational use before disposal, measures will be taken to control and channel public access and uses.

The Army will coordinate with DPR to prevent damaging public foot and vehicle access to:

- sites supporting Smith's blue butterfly populations and habitat;
- existing populations of sand gilia and medium- and high-density occurrences of Monterey spineflower;
- beach areas supporting western snowy plover breeding habitat during the breeding season; and
- dune restoration areas.

Temporary signing and barriers will be installed, and sufficient law enforcement personnel will be present to ensure that the public does not degrade or damage these resources before the transfer of land to DPR.

The Army and DPR will also work cooperatively to ensure the public does not have access to current and future lead removal sites until lead removal activities are complete.

Success Criteria

Mitigation for potential impacts on HMP resources from interim public use of beaches and dunes at former Fort Ord will consist of various means of directing, restricting, and controlling public access to areas of beaches and dunes where HMP resources occur. Mitigation will be considered successful if no individuals of HMP species are disturbed or removed and no destruction of potential or occupied habitat for these species results from public use of the beaches and dunes at former Fort Ord.

Monitoring

The Army and DPR will provide coordination of sufficient law enforcement staff on the beaches and dunes at former Fort Ord to adequately patrol all areas west of Highway 1. These personnel will record any disturbance or evidence of disturbance to HMP species. The Army and USFWS will be notified immediately of the incident. The Army, USFWS, and DPR will work cooperatively to determine whether the impacts on HMP species are attributable to recreational use of the beaches and dunes at former Fort Ord and take

appropriate actions to prevent future impacts. The same process will be followed if destruction of potential or occupied habitat for HMP species is encountered. All other personnel working on the dunes (e.g., lead removal personnel, restoration crews, or biologists) will also report any incidents or evidence of impacts on HMP species or destruction of potential or occupied habitat to the Army and DPR.

Corrective Measures

If removal of any HMP species or destruction of potential or occupied habitat of any HMP species can be attributed to interim public use on the dunes at former Fort Ord, DPR, the Army, and USFWS will coordinate development of suitable corrective measures. Potential corrective measures include restoration or enhancement of dune habitat to compensate for lost habitat, increased monitoring effort, installation of additional temporary barriers and signing, or installation of permanent barriers and signing.

