OE-0208

Fort Ord
1994 Annual Monitoring Report for Biological Baseline Studies at Unexploded Ordnance Sites

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January 1995

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EXECUTIVE SUMMARY

Compliance with Fort Ord's Installation-Wide Multispecies Habitat Management Plan (HMP) (U.S. Army Corps of Engineers 1994) requires that biological resources be characterized to determine baseline conditions before unexploded ordnance removal activities begin. The methods employed and the results of this first year of study, designed to adhere to the HMP guidelines, are presented in this report. This information is intended to provide direction during habitat recovery and restoration efforts following the removal of unexploded ordnance.

Vegetation studies involved focused surveys for herbaceous HMP plant species, including sand gilia (*Gilia tenuiflora* ssp. *arenaria*), Monterey spineflower (*Chorizanthe pungens* ssp. *pungens*), Seaside bird's-beak (*Cordylanthus rigidus* var. *littoralis*), and coast wallflower (*Erysimum ammophillum*). Additionally, maritime chaparral was characterized to describe this HMP community and the habitat of HMP shrub species supported by it. Wildlife surveys focused on determining the presence of federally listed fairy shrimp species and associated special-status wetland amphibian species, and on describing the physical and biological characteristics of water bodies potentially affected by unexploded ordnance removal activities.

In summary, no herbaceous HMP plants were observed in areas designated for current unexploded ordnance removal activities. Monterey spineflower, however, is known to occur at site 16, which was not surveyed because of safety considerations. Additionally, sand gilia was observed in two areas with potential to support HMP resources (the eastern section of site 10 and site 12) that were initially proposed for current unexploded ordnance removal activities, but later removed from consideration.

Typical dominants found in mature maritime chaparral were chamise (*Adenostoma fasciculatum*), Toro manzanita (*Arctostaphylos montereyensis*) (an HMP species), and shaggy-barked manzanita (*Arctostaphylos tomentosa*). Other HMP species that commonly occurred were Hooker's manzanita (*Arctostaphylos hookeri*) and Monterey ceanothus (*Ceanothus rigidus*). Seral areas were characterized by a significant herbaceous component, as well as seedlings of chamise and shaggy-barked manzanita. Monterey ceanothus, an HMP species, represented a minor component of seral areas.

No federally listed threatened or endangered fairy shrimp species or special-status amphibians were observed during the wildlife investigations. Environmental conditions in 1994 may not have been suitable for the occurrence California tiger salamanders (*Ambystoma tigrinum californiense*), which were found at Fort Ord during surveys conducted in 1992.

BACKGROUND

In early 1994, the U.S. Army Corps of Engineers (Corps) contracted with Jones & Stokes Associates to collect baseline data on biological resources at Fort Ord that could potentially be affected by unexploded ordnance (UXO) removal activities. UXO removal is necessary on several parts of the installation to allow disposal of the property to various public and private entities.

Biological baseline data were collected in compliance with guidelines related to UXO removal described in Chapter 3 of the Installation-Wide Multispecies Habitat Management Plan for Fort Ord (U.S. Army Corps of Engineers 1994). The findings presented in this report represent the first year of data collection and establish baseline conditions for plant and wildlife species (Tables 1 and 2) and special habitats (maritime chaparral, vernal pools, and ponds) considered in the habitat management plan (HMP) that could be affected by current UXO removal activities.

This information will be used during UXO removal activities to identify measures to minimize impacts on HMP resources and as a baseline in restoration efforts following UXO removal to reestablish healthy maritime chaparral, vernal pools, and ponds. The objectives of these efforts will be to restore ecosystem function in these habitats and to establish self-sustaining populations of dependent HMP species.

METHODS

The methods described below were employed while gathering data on HMP plants, wildlife, and habitats and were developed in accordance with the monitoring guidelines specified in the HMP. Sites considered for 1994 biological monitoring surveys are shown in Figure 1. The following areas were monitored:

- the western section of site 10 (west of Hennekins Ranch Road);
- site 19;
- the proposed fuel break, known as the "blackline", proposed between Barloy Canyon Road and Wildcat Ridge, which will serve to prevent fires from escaping the inland range area during controlled burning; and
- water bodies that may be affected by UXO removal activities.

In addition, surveys were conducted for sand gilia in the eastern section of site 10 and at sites 11 and 12. After surveys had been conducted in these three additional areas, the Corps determined that the eastern section of site 10 would not be affected during current

Table 1. Special-Status Plant Species Considered in the Fort Ord Habitat Management Plan That Could be Affected by Current Unexploded Ordnance Removal

Plant Species	Listing Status[a] Federal/State/CNPS
Sand gilia *Gilia tenuiflora* ssp. *arenaria*	E/T/1B
Monterey spineflower *Chorizanthe pungens* var. *pungens*	T/--/1B
Seaside bird's-beak *Cordylanthus rigidus* var. *littoralis*	C1/E/1B
Coast wallflower *Erysimum ammophilum*	C2/--/1B
Hooker's manzanita *Arctostaphylos hookeri*	--/--/1B
Toro manzanita *Arctostaphylos montereyensis*	C2/--/1B
Sandmat manzanita *Arctostaphylos pumila*	C2/--/1B
Monterey ceanothus *Ceanothus cuneatus* var. *rigidus*	C2/--/4
Eastwood's ericameria *Ericameria fasciculata*	C2/--/1B
Yadon's piperia *Piperia yadoni*	C1/--/1B

[a] Status explanations:

= no designation.

Federal

C1 = Category 1 candidate for federal listing. Category 1 includes species for which U.S. Fish and Wildlife Service (USFWS) has on file enough substantial information on biological vulnerability and threats to support proposals to list them.

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.

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

California Native Plant Society

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

4 = List 4 species: plants of limited distribution.

Table 2. Special-Status Wildlife Species Considered in the Fort Ord Habitat Management Plan That Could be Affected by Current Unexploded Ordnance Removal

Wildlife Species	Listing Status [a] Federal/State
California red-legged frog *Rana aurora draytoni*	PE/SSC
California tiger salamander *Ambystoma tigrinum californiense*	C1/SSC
California black legless lizard *Anniella pulchra nigra*	C2(LP)/SSC
Monterey ornate shrew *Sorex ornatus salarius*	C2/--
California linderiella *Linderiella occidentalis*	--[b]/--

[a] Status explanations:

-- = no designation.

Federal

PE = proposed for federal listing as endangered under the federal Endangered Species Act.

C1 = Category 1 candidate for federal listing. Category 1 includes species for which USFWS has on file enough substantial information on biological vulnerability and threat to support proposals to list them.

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.

LP = listing package is being developed.

State

SSC = considered a State Species of Concern by California Department of Fish and Game.

[b] California linderiella was proposed by USFWS as endangered in 1991 but rejected for listing in 1994. However, other fairy shrimp species that were listed may occur at Fort Ord.

UXO clearing activities and that site 12 would not require vegetative clearing to complete UXO removal; thus, no further monitoring occurred. Additionally, site 11 was not monitored further because information is not yet available on the location of lanes to be cleared of vegetation, and this information is expected to assist in improving the quality of recovery monitoring. UXO site 16 was not monitored because of safety concerns posed by the type of ordnance thought to be present. UXO sites 5, 14, 17, and 21 were not monitored for HMP plants or maritime chaparral because suitable conditions are not present for these resources.

Plants Considered in the Habitat Management Plan

The methods used to monitor species of herbaceous and shrub vegetation considered in the HMP are described below.

Herbaceous Species

Jones & Stokes Associates botanists conducted field surveys on April 13, 14, 20, and 21, 1994, for herbaceous HMP plant species. The objectives of the surveys were to locate and map the plant species' distributions, estimate population sizes, and provide general descriptions of the surrounding habitat. Herbaceous species considered in the HMP are sand gilia, Monterey spineflower, Seaside bird's-beak, and coast wallflower (see Table 1-1 of the HMP). The botanists walked meandering transects across potential habitat areas to ensure adequate coverage. The locations of herbaceous HMP plants encountered were mapped on color copies of 1:12,000-scale aerial photographs taken in 1992.

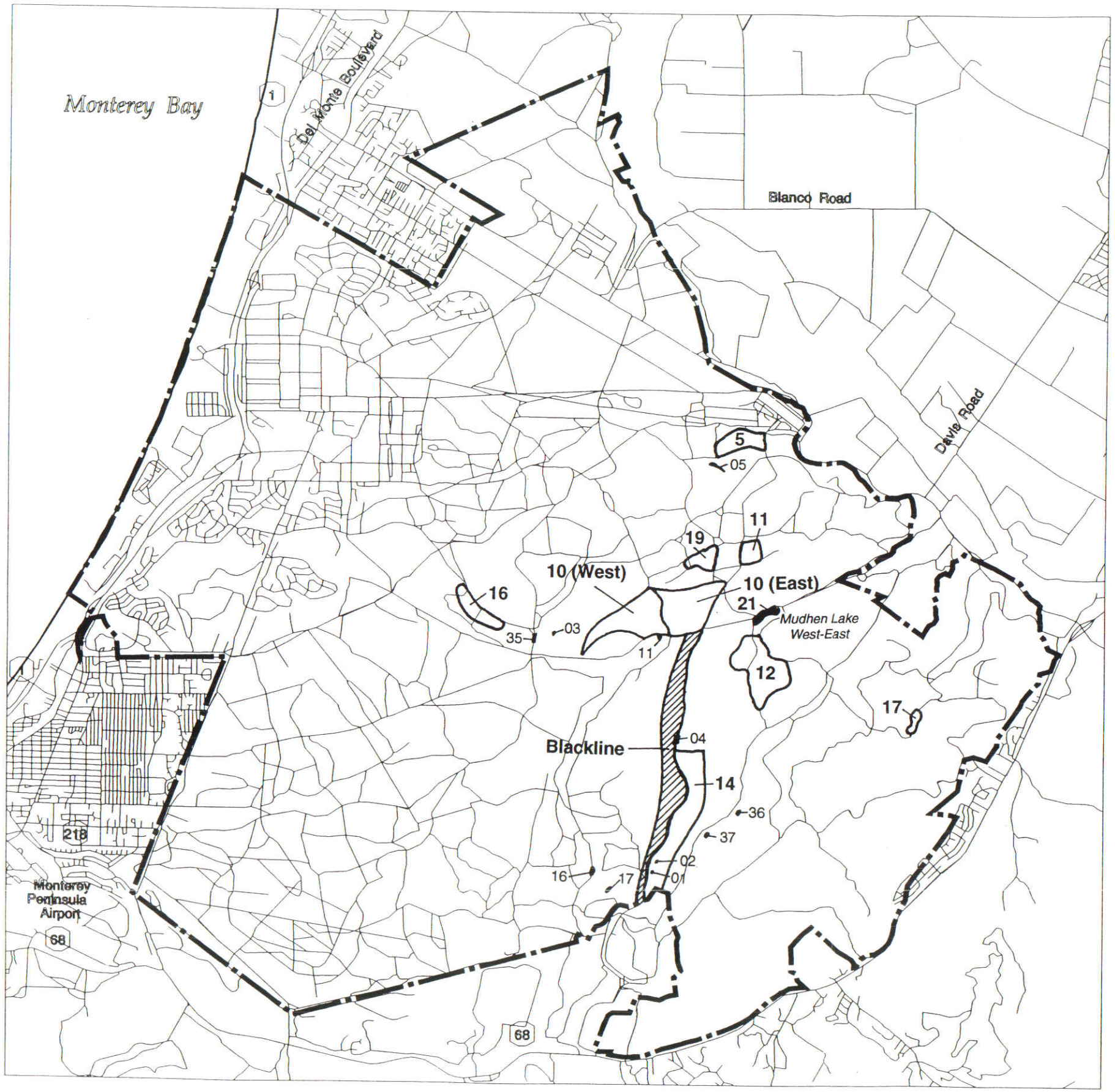
Shrub Species

Field surveys for HMP shrub species were conducted on July 12-14 and August 18, 1994. Line-intercept and quadrant sampling techniques were used. Estimates of percent cover of each HMP shrub species were made, and habitats were characterized, for each UXO site as described below under "Maritime Chaparral Habitat".

Maritime Chaparral Habitat

Jones & Stokes Associates botanists collected baseline data on maritime chaparral habitat on July 12-14 and August 18, 1994. Vegetative composition and cover of maritime chaparral habitat were characterized along transects using line-intercept and quadrant sampling techniques. The line-intercept method was used to characterize mature vegetation with dense shrubs and little herbaceous cover. Where a herbaceous component existed, such

Figure 1
Sites Considered for 1994
Biological Monitoring Surveys



LEGEND

- Proposed Unexploded Ordnance Removal Site
- Water Bodies (Vernal Pools and Ponds)
- Blackline

Scale 1:60,000

0 1 2 3 miles

0 2,500 5,000 7,500 10,000 feet

0 1 2 3 kilometers

as in recently burned or firebreak areas, the quadrant sampling technique was also employed.

Transect Locations. Transects were established at well-spaced locations in each UXO site with maritime chaparral (i.e., sites 10 and 19 and the blackline) to ensure adequate characterization (Figures A-1 and A-2). In addition to being scattered throughout a site, transects were strategically placed to incorporate areas of varying slope and aspect. In some instances, accessibility influenced the location of transects; extremely dense chaparral greatly impeded movement and limited transect placement. Some transects were marked permanently by staking painted rebar at either end of the transect to facilitate locating them in the future (Figures A-1 and A-2).

The maximum transect length over which sampling occurred was 50 meters. In instances where very dense chaparral impeded movement or the presence of UXO prohibited full extension of a transect, that length was shortened (Table A-1). The average length for all transects surveyed was 43 meters.

Transects will be established in site 11, which also supports maritime chaparral habitat, once the placement of lanes for vegetation clearing is designated. This site will not be burned because of the high potential for fire to escape. Establishing transects along the lanes will allow botanists to monitor vegetation recovery following clearing.

The transect locations were mapped on 1:12,000-scale color copies of aerial photographs, and the compass bearing was recorded to indicate the direction of the transect (Table A-1).

Line-Intercept Sampling Method. To determine shrub composition and obtain an estimate of species abundance, a measuring tape was extended over the length of the transect. Individual canopy cover was recorded for all plants that intercepted the tape. Each plant canopy was measured separately to obtain individual overlap foliar cover. Plants occupying less than 1 decimeter along the tape measure were not recorded. The presence of additional species near but not directly along the transect was also noted.

Preliminary analysis of cover variability suggested that a minimum sample size of eight transects is required to adequately characterize mature maritime chaparral habitat at each UXO site. This was found by plotting the successive averaged relative percent cover of each HMP shrub species against the number of transects sampled. The number of transects sampled was determined to be sufficient when a change in relative cover of less than 5% was achieved for all species. As a result, at least eight transects were sampled in mature habitat at each UXO site. Several transects were also established in newly colonizing firebreak and recently burned areas, where vegetation was in a seral state.

Data analysis for each UXO site consisted of calculating the percent absolute cover of each species using the following formula:

% absolute cover of shrub species = (linear extent of transects intercepted by foliar crowns of shrub species at each site) ÷ (total length of transects at each site) x 100.

The data on mature and seral vegetation at site 10 were analyzed separately to reflect this qualitative difference.

Quadrant Sampling Method. To characterize areas with a herbaceous component (found at site 10), a 0.25-square-meter quadrant was placed at regularly spaced 10-meter intervals along the transect, alternating on right and left sides of the line-intercept measuring tape. Each species present within the quadrant was recorded, and the absolute cover was estimated visually. The relative abundance of each species was then calculated.

Photography Points. On the vegetation sampling days, photographs of the vegetation sampled were taken from one end of each transect. A set of slides has been given to the Corps Sacramento District project manager, and another set is available for viewing at Jones & Stokes Associates' Sacramento office. Slides of some transects are absent because no image showed after processing. Photographs depicting two sites where vegetation monitoring was conducted are shown in Figures 2 and 3.

Wildlife Considered in the Habitat Management Plan

The HMP wildlife species that could be affected by current UXO removal activities and that required baseline monitoring surveys are federally listed fairy shrimp species and associated wetland amphibian species. The sampling method and means of identifying the fairy shrimp and amphibians are described below.

Sampling Method

Surveys for special-status fairy shrimp species and associated wetland amphibian species at Fort Ord were conducted on March 15 and 29 and April 13 and 14, 1994. A total of 13 water bodies were surveyed. Water bodies were labeled as numbers 01-05, 11, 16, 17, 35, 36, 37, Mudhen Lake West, and Mudhen Lake East. This labeling system was carried over from wetland wildlife surveys conducted by Jones & Stokes Associates in 1992 (U.S. Army Corps of Engineers 1992), and new numbers were added as needed for water bodies not previously surveyed. The location of each water body surveyed is shown in Figure 1.

All surveyed water bodies were either within proposed UXO removal sites or close enough to the edge of a site that, if the area of UXO occurrence expanded, the water body could be affected.

Except for numbers 03 and 05, every water body was investigated during each of the three field visits. Water body 03 was dropped from surveys after the first visit because it

Figure 2. Line-Intercept Sampling Conducted in Mature Maritime Chaparral at Site 19 on July 13, 1994

Figure 3. Line-Intercept and Quadrat Sampling (to Be Initiated on the Left-Hand Side of Measuring Tape) Conducted in Seral Vegetation at Site 10 on July 12, 1994

was determined to be too distant from UXO removal operations to be potentially affected by expanded UXO occurrence. Water body 05 was not surveyed during the March 15 visit because no route that avoided UXO removal activities could be located in the field. An appropriate route was identified at a later date, and the pool was surveyed on March 29 and April 13.

Each water body was surveyed using a dip net with appropriate mesh size to capture fairy shrimp. In several instances, a "kick" net of larger mesh size was also used to attempt to capture amphibian larvae. The number of times each net was passed through the water and the number and species of invertebrates and amphibians captured were recorded. Water body characteristics such as depth, water temperature, turbidity, and water surface area, as well as wildlife species observed near the water body, were also recorded. All data were documented on standardized data sheets. Copies of the field data sheets are presented in Appendix B. In addition, on April 13 and 14, Jones & Stokes Associates botanists recorded the vegetation characteristics of some water bodies (01, 02, 04, 05, 16, 17, 35, and Mudhen Lake), including the dominant species and percent cover occupied by submergent, floating, and emergent plants.

Biologists sampled both the perimeter and the water column of each water body. Depth was measured at the deepest point possible up to 4 feet deep. If the water column could be sampled sufficiently and the depth determined without entering a water body, all sampling was done from shore to limit disturbance to the habitat.

Fairy Shrimp Identification

Where fairy shrimp were encountered, a general level of abundance was determined in the field. The abundance estimate was based on the number of fairy shrimp captured per pass of the dip net through the water. Voucher specimens of captured fairy shrimp were preserved in alcohol and brought to Jones & Stokes Associates' office for identification. Biologists qualified in fairy shrimp identification examined the voucher specimens and determined the species of fairy shrimp present. Preserved voucher specimens are available for examination upon request.

Amphibian Identification

All amphibian egg masses, larvae, and adults encountered during surveys were identified in the field, and species were recorded on the data sheets. No voucher specimens were collected.

Photography Points

Standardized photography points were established at each water body. Slides were taken during each sampling visit from the photography point, as well as from other locations in several instances. One complete set of slides has been turned over to the Corps Sacramento District project manager, and another set is available at Jones & Stokes Associates' office. Some water bodies have fewer photographic records than others because several photographs showed no image after processing. Photographs depicting two sites where wildlife monitoring was conducted is shown in Figures 4 and 5.

RESULTS

Plants Considered in the Habitat Management Plan

Herbaceous Species

The results of surveys for sand gilia, Monterey spineflower, Seaside bird's-beak, and coast wallflower are presented below.

Sand Gilia. Sand gilia (*Gilia tenuiflora* ssp. *arenaria*) populations were encountered at UXO sites 10 and 12. Both populations were identified previously during focused surveys for sand gilia in 1993. At that time, these populations were determined to be the subspecies *arenaria* and not the subspecies *tenuiflora*.

In the eastern section of site 10, approximately 100 individuals were observed over an approximately 1.2-acre area (Figure C-1). Individuals were present at low density and were widely scattered throughout the area. The area was characterized by approximately 50% total vegetative cover. Plant species associated with this sand gilia population are chamise (*Adenostoma fasiculatum*), rush rose (*Helianthemum scoparium*), California croton (*Croton californicus*), common wedge-leaf horkelia (*Horkelia cuneata* var. *cuneata*), and sticky monkeyflower (*Mimulus auranticus*).

At site 12, sand gilia occurs along an old road and in adjacent areas on a slope above an existing dirt road (Figure C-2). The dense population comprises approximately 800-1,000 individuals occurring over an approximately 0.3-acre area. Species associated with this sand gilia population are wild oat (*Avena fatua*), ripgut brome (*Bromus rigidus*), telegraph weed (*Heterotheca grandiflora*), red brome (*Bromus rubens*), and bracken fern (*Pteridium aquilinum* var. *pubescens*). The surrounding vegetation is dominated by oak woodland and coastal scrub and consists of species such as coast live oak (*Quercus agrifolia*), black sage (*Salvia mellifera*), Eastwood's ericameria (*Ericameria fasciculata*), and coyote brush (*Baccharis pilularis*).

Figure 4. Fairy Shrimp and Amphibian Surveys Conducted in Water Body 35 on March 15, 1994

Figure 5. Mudhen Lake West during Wildlife Sampling Visit on March 15, 1994

Monterey Spineflower. Monterey spineflower (*Chorizanthe pungens* var. *pungens*) was not observed in the survey areas. However, it was found at low density at site 16 during 1992 baseline surveys. This site was not resurveyed during 1994 because of safety concerns regarding UXO.

Seaside Bird's-Beak. One population of Seaside bird's-beak (*Cordylanthus rigidus* var. *littoralis*) was identified on the eastern side of UXO site 10 along Eucalyptus Road during 1992 biological baseline surveys (U.S. Army Corps of Engineers 1992) (Figure C-1). The surrounding vegetation types are maritime chaparral and oak woodland. Because the Corps determined that this portion of site 10 would not be cleared of UXO at this time, the site supporting Seaside bird's-beak was not revisited during the appropriate period for identification.

Coast Wallflower. No populations of coast wallflower (*Erysimum ammophilum*) were observed in the survey area.

Shrub Species

Three HMP shrub species characterized the chaparral in the survey areas: Toro manzanita (*Arctostaphylos montereyensis*), Hooker's manzanita (*Arctostaphylos hookeri*), and Monterey ceanothus (*Ceanothus cuneatus* var. *rigidus*). The relative cover occupied by these species along transects and the general characteristics of the habitats in which they occur are described below under "Maritime Chaparral".

Maritime Chaparral

Results of the line-intercept and quadrant sampling conducted along the transects in maritime chaparral habitat are given below.

The average absolute cover occupied by shrub species and bare ground in each sample area is shown in Table 3 and displayed graphically in Figure 6. Data gathered at site 10 were divided into areas with mature and seral vegetation. Site 19 and the blackline were characterized predominantly by mature vegetation. In mature vegetation, the three dominant species were chamise, Toro manzanita (an HMP species), and shaggy-barked manzanita. Other common plants were Hooker's manzanita (an HMP species), Monterey ceanothus (an HMP species), and sticky monkeyflower. No significant herbaceous component (less than 5% cover) existed in stands of mature vegetation.

At sites supporting seral vegetation, chamise and shaggy-barked manzanita were the dominant species in the shrub layer. Monterey ceanothus and sticky monkeyflower were minor components of the cover. Seral areas had a much higher cover of herbaceous vegetation (including seedlings) than mature chaparral (Figure 6). The amount of bare

Table 3. Average Absolute Percent Cover Occupied by Shrub Species and Bare Ground in the Seral and Mature Areas of Site 10, Mature Areas of Site 19, and Blackline

Common Name	Scientific Name	Site 10 Seral (%)	Site 10 Mature (%)	Site 19 Mature (%)	Blackline Mature (%)
Chamise	*Adenostoma fasciculatum*	8.1	28.2	39.2	20.4
Hooker's manzanita	*Arctostaphylos hookeri*	0.0	8.3	0.2	3.5
Toro manzanita	*Arctostaphylos montereyensis*	0.0	23.7	12.7	30.5
Shaggy-barked manzanita	*Arctostaphylos tomentosa*	9.5	17.3	33.4	12.7
Coyote brush	*Baccharis pilularis*	0.1	0.0	0.4	0.0
Cropleaf ceanothus	*Ceanothus dentatus*	0.8	0.0	0.0	0.0
Monterey ceanothus	*Ceanothus cuneatus* var. *rigidus*	0.9	0.5	4.7	6.5
Heather goldenbush	*Ericameria ericoides*	0.2	0.0	0.0	0.0
Eastwood's ericameria	*Ericameria fasciculata*	0.0	0.1	0.0	0.0
Coast silktassel	*Garrya elliptica*	0.4	0.9	0.0	0.6
Toyon	*Heteromeles arbutifolia*	0.0	0.5	1.4	0.0
Pitcher sage	*Lepechinia calycina*	0.0	0.0	0.4	0.0
Sticky monkeyflower	*Mimulus auranticus*	0.5	7.2	0.8	0.6
Coast live oak	*Quercus agrifolia*	0.0	0.0	0.8	0.3
California coffeeberry	*Rhamnus californica*	0.0	0.0	0.0	1.7
Fuchsia-flowered gooseberry	*Ribes speciosum*	0.0	0.0	0.4	0.0
Black sage	*Salvia mellifera*	0.0	1.9	1.3	2.4
Poison oak	*Toxicodendron diversilobum*	1.0	0.8	0.2	0.0
Herbaceous vegetation		35.0	0.0	0.1	0.4
Bare ground		46.0	22.3	11.6	26.2

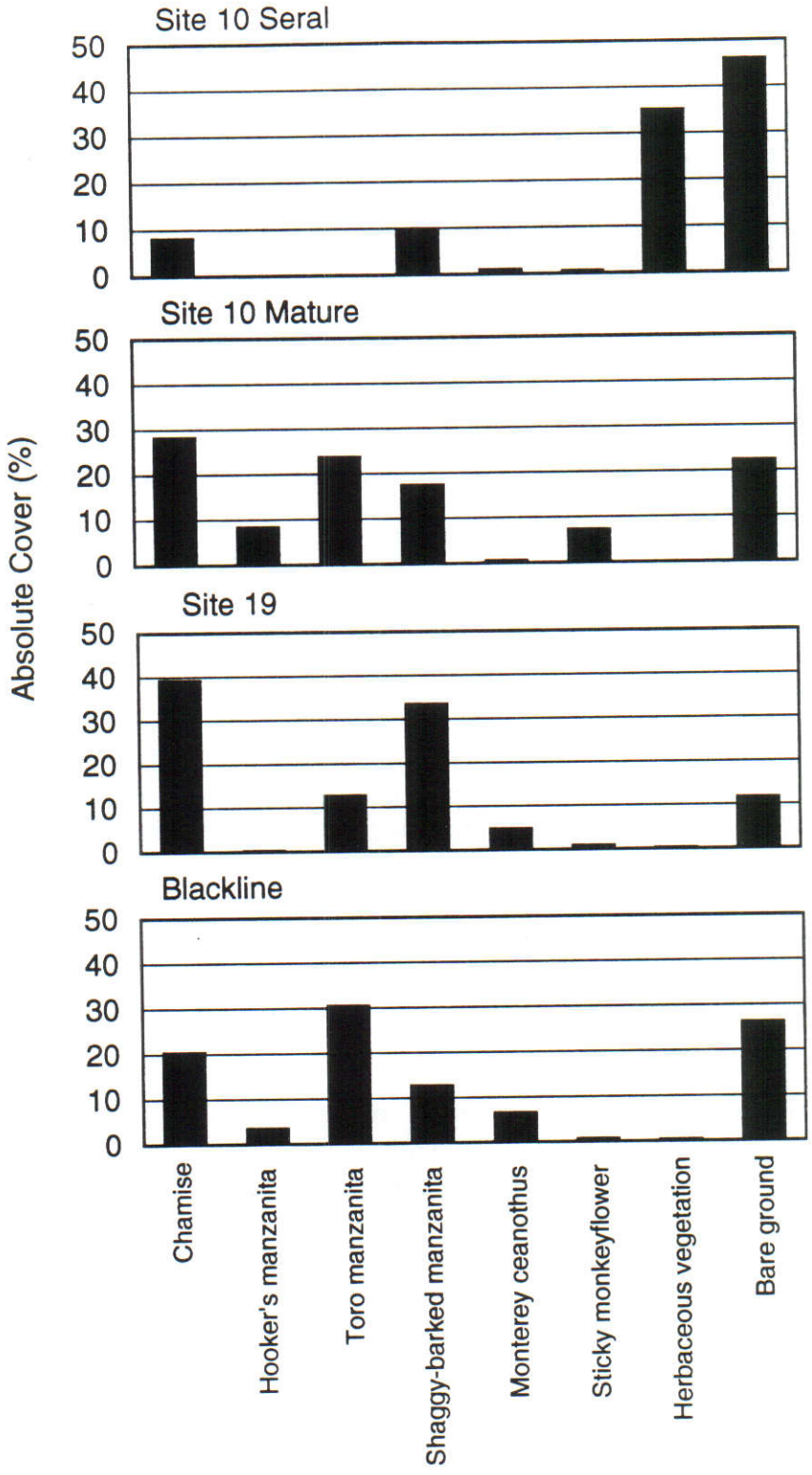


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Figure 6
Average Absolute Cover Occupied by Shrubs, Herbs, and Bare Ground at Transect Sample Sites

ground in recently colonizing areas was substantially greater than in mature vegetation, amounting to approximately 46% of absolute cover compared to 22% in site 10.

The average relative cover of herbaceous plants and shrub seedlings characterizing seral areas at site 10 was calculated from the quadrant sampling data and is displayed graphically in Figure 7. Shrub seedlings that were prevalent included chamise, shaggy-barked manzanita (*Arctostaphylos tomentosa*), heather goldenbush (*Ericameria ericoides*), and coast silktassel (*Garrya elliptica*). African ice plant (*Carpobrotus edulis*), golden yarrow (*Eriophyllum confertiflorum*), and rush rose (*Helianthemum scoparium*) are herbaceous plants that were present in significant cover. Dead plant material and bare ground were also significant components of the cover in seral areas.

Wildlife Considered in the Habitat Management Plan

Results of the fairy shrimp and amphibian investigations are described below.

Fairy Shrimp

Table 4 summarizes the results of the spring 1994 fairy shrimp surveys at Fort Ord. The pool number, habitat classification, approximate size, depth during each visit, occurrence and abundance of fairy shrimp species, and vegetation characteristics of select water bodies are all listed.

California linderiella (*Linderiella occidentalis*) was the only fairy shrimp species encountered during the spring 1994 wetland wildlife surveys at Fort Ord. No fairy shrimp species listed as threatened or endangered under the Endangered Species Act were observed.

Survey Timing. The protocol for fairy shrimp surveys provided by the U.S. Fish and Wildlife Service at the time of the 1994 field visits required surveys of ephemeral water bodies every 2 weeks beginning when water bodies first hold water and ending when they are dry. Because of the time necessary to complete contracting procedures, surveys at Fort Ord could not be initiated immediately after ephemeral water bodies at the installation started holding water. The Corps is aware of the lack of early-season information on aquatic wildlife species at Fort Ord and is funding additional wetland surveys for the winter of 1994-1995.

Not all ephemeral water bodies at Fort Ord were dry when surveys were ended. Occurrences of late-season fairy shrimp were not likely to be missed during the survey, however. Many of the water bodies where California linderiella occur at Fort Ord are semi-permanent and retain water well beyond the time adult fairy shrimp typically occur. Also, the sharp decline in California linderiella occurrence between surveys indicates that fairy

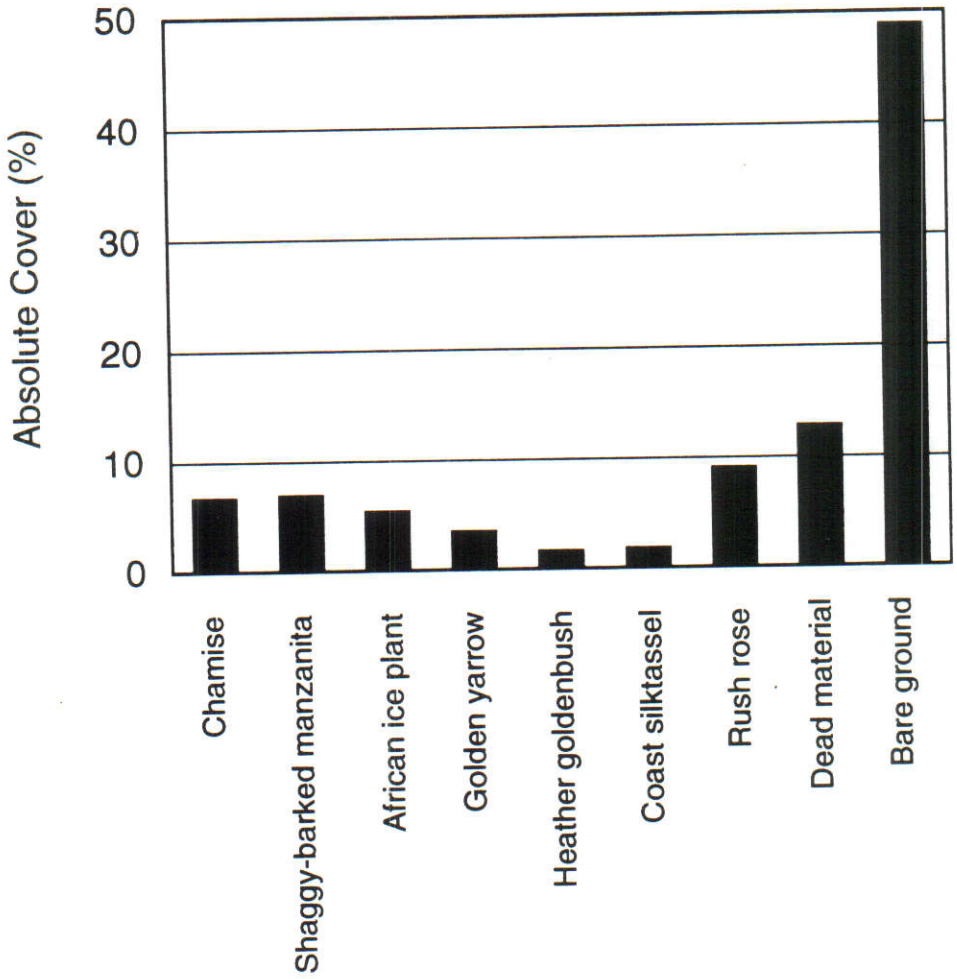

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Figure 7
Average Absolute Cover Occupied by Herbs, Young Shrubs, Dead Material, and Bare Ground in Seral Areas Sampled at Site 10

shrimp had completed their life cycle for the year. These results also correspond with data collected during wetland wildlife surveys in 1992. California linderiella were present in several water bodies in late March 1992, but by late April, none were encountered.

Special-Status Amphibians

No egg masses, larvae, or adults of special-status amphibians were observed during the spring 1994 wetland wildlife surveys at Fort Ord. Special-status species that could occur include California tiger salamander (*Ambystoma tigrinum californiense*) and California red-legged frog (*Rana aurora draytoni*). Pacific treefrog (*Hyla regilla*) adults and larvae were encountered in most water bodies at Fort Ord, California newt (*Taricha torosa*) were observed in two stock ponds, and bullfrogs (*Rana catesbeiana*) were observed at Mudhen Lake East and West.

California tiger salamanders were not expected to be observed during the March surveys at Fort Ord because typically, at this time, either tiger salamander eggs have not hatched or larvae are too small to identify. The lack of tiger salamanders during the April surveys should be noted, however. Tiger salamanders are known to occur at Fort Ord and were observed during surveys conducted in late April 1992. Several of the water bodies where tiger salamanders were observed during those surveys were also surveyed in April 1994, and no California tiger salamander larvae were encountered. Rainfall conditions, temperature, or other factors may have influenced the absence of California tiger salamanders in 1994.

ACKNOWLEDGMENTS

This monitoring report was prepared by Vicki Lake and Sean Bechta. Michael Rushton served as principal-in-charge on this project. Sean Bechta acted as project manager and coordinated the wildlife field studies, and Vicki Lake coordinated the botanical field studies. Gerrit Platenkamp analyzed the vegetation data. Paul Cylinder reviewed the report. Jones & Stokes Associates staff members who assisted in report production were Jane Palik, word processing operator; Debra Lilly, editor; and Tony Rypich and Christy Anderson, graphic artists.

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Table 4. Results of Spring 1994 Fairy Shrimp Surveys at Fort Ord

Water Body	Habitat Classification	Approximate Size	Listed Fairy Shrimp Observed	Occurrence of California Linderiella			Water Depth (inches)			Vegetation				
				Abundance Visit 1	Abundance Visit 2	Abundance Visit 3	Visit 1	Visit 2	Visit 3	Dominants	Percent Submergent	Percent Floating	Percent Emergent	Absolute Cover (Percent)
01	Dammed swale	1,500 sq ft	None	High	High	None	30	24	18	*Eleocharis macrostachya*	0	0	100	35
02	Dammed swale	300 sq ft	None	Low to moderate	Low	None	Not measured	24	18	*Eleocharis macrostachya*	0	0	100	30
03	Excavated trench	450 sq ft	None	None	--	--	30	--	--	--	--	--	--	--
04	Stock pond	0.25 acre	None	None	None	None	Not measured	30	16	*Bromus rubens; Gnaphalium* sp.; *Polypogon monspeliensis; Bromus hordeaceus*	0	0	100	25
05	Vernal pool	3.0 acres	None	--	None	None	--	12	8	*Eleocharis macrostachya; Juncus balticus; Plagiobothrys* sp.	0	0	100	100
11	Vernal pool	0.5 acre	None	Low to moderate	None	None	6	4	Pool was dry	--	--	--	--	--
16	Pond	0.5 acre	None	High	Low	Very low	>40	>40	>40	*Conium maculatum; Cyperus* sp.	0	0	100	10
17	Marsh/pond	0.15 acre	None	None	None	None	8	10	4	*Typha latifolia; Juncus effusus*	0	0	100	80
35	Swale	0.2 acre	None	High	Low	None	18	24	13	*Eleocharis macrostachya; Plantago lanceolata*	0	0	100	15
36	Stock pond	0.3 acre	None	None	None	None	>40	>40	>40	--	--	--	--	--
37	Stock pond	0.5 acre	None	None	None	None	>40	>40	>40	--	--	--	--	--
Mudhen Lake West	Pond	1.5 acres	None	None	None	None	12	Not measured	12	*Polygonum persicaria; Polygonum monspeliensis*				
Mudhen Lake East	Pond	3.0 acres	None	None	None	None	>40	>40	>40	*Juncus balticus*; *Gnaphalium* sp.; *Carex* sp.	0	0	100	5

Note: -- = not surveyed.

_____. 1994. Installation-wide multispecies habitat management plan for Fort Ord, California. February. Sacramento District. With technical assistance from Jones & Stokes Associates. (JSA 90-214.) Sacramento, CA.