



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

BW-2233

AR

In Reply Refer To: 2002-7F-248.1

October 22, 2002

James M. Willison
Director, Environmental and Natural Resource Management
Department of the Army
Defense Language Institute Foreign Language Center and the Presidio of Monterey
Presidio of Monterey, California 93944-5006

Subject: Biological Opinion on the Closure and Reuse of Fort Ord, Monterey County, California, as it affects Monterey Spineflower Critical Habitat, (1-8-01-F-70R)

Dear Mr. Willison:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based upon our review of U.S. Department of the Army (Army) actions associated with the closure and reuse of former Fort Ord and their effects on Monterey spineflower (*Chorizanthe pungens* var. *pungens*) critical habitat. This biological opinion addresses the effects of these actions only on designated critical habitat for Monterey spineflower, in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act). The effects of these actions on other listed species and critical habitat are already addressed in biological and conference opinion #1-8-99-F/C-39R. Your request for formal conferencing was dated and received on September 18, 2001, and was later changed to a request for formal consultation on May 30, 2002 (see Consultation History section).

In your letter of September 18, 2001, you also requested that we adopt as a biological opinion the non-jeopardy conference opinion #1-8-99-F/C-39R, issued on March 30, 1999, that addresses critical habitat for the western snowy plover. We designated final critical habitat for the western snowy plover on December 7, 1999. We have determined that no significant changes that will affect western snowy plover critical habitat have occurred in the proposed action since the issuance of our conference opinion. Therefore, we confirm the conference opinion #1-8-99-F/C-39R as the biological opinion for western snowy plover critical habitat and no further section 7 consultation is necessary.

This biological opinion was prepared using information contained in those documents cited in biological opinion #1-8-99-F/C-39R. Additional information was derived from Zander

Associates (2002), discussions between our staffs and reports in our files. A complete administrative record for this consultation is on file at the Ventura Fish and Wildlife Office.

CONSULTATION HISTORY

On September 18, 2001, you initially requested formal conferencing to address proposed critical habitat for Monterey spineflower and for robust spineflower (*Chorizanthe robusta* var. *robusta*). The final designation for critical habitat for robust spineflower did not include any lands on former Fort Ord, so we have not further addressed critical habitat for that taxon in this document. In addition, because we had not yet issued a conference opinion by May 29, 2002, when the final rule designating critical habitat for Monterey spineflower was published, you requested that your conference request then be considered a request for formal consultation (conversation between Bill Collins, Department of the Army, and Diane Steeck, U.S. Fish and Wildlife Service, May 30, 2002).

The existing biological and conference opinion, #1-8-99-F/C-39R, addressing the effects of closure and reuse of former Fort Ord on six listed species also included a conference opinion on the black legless lizard. We withdrew the proposal to list the black legless lizard as endangered on August 12, 1998, so that conference opinion will not need to be adopted as a biological opinion and no further consultation under section 7 of the Act is required.

In Spring 2002, the Fort Ord Reuse Authority and county entities involved in the reuse of former Fort Ord approached the U.S. Fish and Wildlife Service and other Federal and State agencies, with a proposal to modify the reuse boundaries and designations of certain parcels identified in the 1997 Habitat Management Plan (HMP). This proposal was developed to resolve land use conflicts associated with the presence of ordnance and explosives on certain land areas as well as address competing conveyance requests for surplus property at former Fort Ord. The goals, objectives, and overall intent of the HMP were not altered as a result of the modifications eventually agreed upon (D. Noda, USFWS, *in litt.* 2002). As a result of these reuse and boundary modifications, you sent a letter dated May 9, 2002, requesting that the Army's proposed action, as described in the HMP and in your September 18, 2001, conference request (Willison, *in litt.* 2001a), be modified to include the reuse changes described in Zander Associates (2002). The consultation history for the closure and reuse of former Fort Ord through March 1999 is described in biological and conference opinion 1-8-99-F/C-39R and is therefore not repeated here.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

This biological opinion evaluates only those actions associated with the closure and reuse that may affect critical habitat for Monterey spineflower. Furthermore, this analysis includes only those lands of former Fort Ord that remain under Army jurisdiction or which may be affected by

Army actions. Biological opinion #1-8-99-F/C-39R (Service 1999) addresses the effects of the closure and reuse of former Fort Ord on multiple species, including the Monterey spineflower.

Fort Ord is a formerly active Army installation in northern Monterey County, California. It occupies approximately 28,000 acres adjacent to the Monterey Bay. The Army was directed to close Fort Ord pursuant to the Defense Base Closure and Realignment Act of 1990. The Army consulted with us previously on the closure and reuse of former Fort Ord on several occasions as the proposed action was refined and additional species were discovered on the base or were listed under the Act. The Army's current proposed action is the disposal and reuse plan described in the April 1997 HMP. Pre-disposal actions and transfer of lands for reuse at the former Fort Ord, including those designated as critical habitat for Monterey spineflower, are likely to continue for at least another decade due, in part, to the complexity associated with the clean-up of contaminated sites and unexploded ordnance. The closure process is divided into two major categories in the April 1997 HMP: pre-disposal actions and disposal and reuse actions. The April 1997 HMP and other documents, where cited, contain full descriptions of these actions which are summarized below.

Pre-disposal Actions

Pre-disposal actions include placing the installation in a caretaker status, remediating contaminated sites, and supporting interim uses. After the 7th Infantry Division realigned from Fort Ord, the Army placed structures, utilities, and operation and maintenance systems into caretaker status until property disposal decisions were implemented. Caretaker status is defined by Army regulations as "the minimum required staffing to maintain an installation in a state of repair that maintains safety, security, and health standards" (U.S. Army Corps of Engineers (ACOE) 1997). The former Fort Ord supports approximately 11,267 acres of Monterey spineflower critical habitat. As of June 18, 2002, approximately 2,244 acres of Monterey spineflower critical habitat on former Fort Ord had been removed from caretaker status and transferred to other entities. Approximately 9,023 acres of Monterey spineflower critical habitat remains under Army jurisdiction in caretaker status (C. Stiebel, Harding ESE, *in litt.* 2002 and calculations from data provided by C. Stiebel *in litt.* 2002).

For lands remaining in Army jurisdiction during caretaker status, maintenance of dirt fire roads and fuelbreaks may affect Monterey spineflower critical habitat. Approximately 45 miles of fuelbreaks exist through and around the multi-range area (Department of the Army map, generated 7/10/2001). This is reduced from the 150 miles of roads that were maintained prior to base closure. These fuelbreaks typically consist of an existing 15-foot wide dirt road, bordered on both sides by about 15 feet of modified vegetation. This vegetation is kept to no more than 1-2 feet in height. In some cases, chaparral stumps are grubbed from the 15-foot areas on either side of the road (Willison 2001b). Vegetation is typically chipped during the cutting process and left on site (B. Collins, Army, pers. comm. 2001). Larger fuel breaks in excess of 100 feet are in place around Ranges 43 - 48 in the multi-range area (MRA), although the Army may not need to maintain them at such widths following ordnance and explosives (OE) clearance (J. Willison, Army, *in litt.* 2002; K. Siemann, Army, *in litt.* 2002). As part of their existing weed control

program, the Army identifies and removes nonnative pampas grass (*Cortaderia jubata*) and iceplant (*Carpobrotus edulis*) from these fuelbreaks and will add nonnative annual grasses to this control program (B. Collins, pers. comm. 2002).

The entire former Fort Ord installation is listed on the National Priorities List as a Superfund site. Thus, cleanup of contaminated sites is required in preparing lands for disposal. Cleanup activities associated with disposal began in the 1990s and are continuing. Cleanup activities that are likely to occur in Monterey spineflower critical habitat include investigation and excavation of contaminated soils, removal of lead and other heavy metals from the beach ranges, investigation and removal of ordnance and explosives, and investigation and remediation of contaminated groundwater plumes. In most cases, these activities occur throughout the year.

The majority of remediation of contaminated soils will take place in developed areas of the Main Garrison, outside of Monterey spineflower critical habitat. Approximately 75 acres of previously disturbed lands designated as Monterey spineflower critical habitat within the 8,000 acre inland multi-range area will be affected by the removal of contaminated soils (I. Mettee-McCutchon, Army, *in litt.* 1997). Excavation sites of varying sizes are scattered within the MRA and were formerly used as target sites for training soldiers. The HMP (ACOE 1997) and the Remedial Action Work Plan (I. Mettee-McCutchon, *in litt.* 1997) contain measures to minimize the effects of soil remediation activities on listed species and their habitat, which are summarized here:

1. After excavation, the Army will add uncontaminated fill to the excavated areas or recontour them into the landscape (ACOE 1997).
2. The areas will be allowed to revegetate naturally or will be actively restored using methods appropriate to each situation (ACOE 1997). This may include hydro-seeding to prevent erosion and the spread of nonnative species or selective replanting of locally occurring chaparral species (Army 2000). The Army will provide weed control to minimize the spread of pampas grass into the restoration area (Army 2000).
3. Access routes will be aligned to minimize habitat disturbance (I. Mettee-McCutchon, *in litt.* 1997).
4. The Army will use a process of multi-year monitoring, evaluating, and implementing corrective actions similar to that used to minimize the effects of ordnance and explosives removal (ACOE 1997).

At the beach firing ranges, the Army completed lead removal and dune recontouring of approximately 150 acres by the end of 1999 (Army 2000). The Army is now working with the California Department of Parks and Recreation (State Parks) to revegetate these areas with native plant species (Army 2000). No further soil excavation of these beach ranges is currently proposed.

The former Fort Ord has an approximately 8,000 acre multi-range area which contains OE, plus additional training areas that may contain OE. Clearance of OE may require selectively removing vegetation to clear the ground surface and the removal of individual OE anomalies through excavation and detonation in place. The Army is currently analyzing actions associated with OE removal under a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process. Under this process, several alternatives for the removal of vegetation are being analyzed, including prescribed burning, mechanical clearing, herbicide spraying, and the use of grazing animals. The Army is the lead agency for this process. The Record of Decision resulting from this base-wide analysis is expected in 2005 (J. Willison *in litt.*, 2001a). Since our initial consultation with the Army in 1993, we have analyzed prescribed burning as the method that will be predominantly used for vegetation clearance. Additionally, in its September 18, 2001, request for conference, the Army indicated that, although no decision regarding clearance methods can be made until the base-wide analysis is complete, based on the best currently available information it appears likely that the use of prescribed fire will be selected as a vegetation clearance method. Therefore, in this biological opinion we analyze prescribed burning as the method that the Army will use to clear vegetation in support of OE removal from those areas designated as Monterey spineflower critical habitat. Based on past correspondence with the Army (D. Noda, Service, *in litt.* 2001), we recognize that there may be a few cases where special circumstance exist such that prescribed burning cannot be implemented and manual or mechanical removal of vegetation in areas designated as habitat reserves will be used. Therefore, in this biological opinion we assume that manual or mechanical vegetation clearing would be used in areas less than 50 acres in size in the few cases where special circumstances exist (such as explosive risk, unburned patches within prescribed burns) and where it will not undermine the goals of the HMP. We expect that these areas (of less than 50 acres) will occur in large expanses of maritime chaparral that will eventually be burned. Should the Record of Decision from the CERCLA process result in selection of a different method of vegetation removal for OE clearance areas, the Army will need to reinitiate consultation as described later in this document.

Prescribed burning to clear vegetation from the ground surface will typically be conducted in areas of up to several hundred acres, from July through December 31, prior to the onset of substantial winter rains (ACOE 1997; I. Mettee-McCutchon, Army, *in litt.* 1997). Prescribed burning will require the use of fuelbreaks, as described earlier, and may involve the use of fire suppressant foams, retardants, and watering (Fire Stop 2002). Removal of individual OE anomalies may require excavation of soil, ranging from a single cubic foot to tens of cubic feet and may involve detonation in place. Prescribed burning, cutting in limited circumstances, and removal of OE anomalies will also require access routes and staging areas (ACOE 1997). Measures to minimize adverse effects to HMP species, which would also minimize adverse effects to Monterey spineflower critical habitat, are more fully described in the HMP and include: restricting OE removal sites to the smallest area possible, using existing roads for access whenever possible, implementing employee education programs, placing staging areas and facilities to avoid HMP species and their habitat, and implementing a process of multi-year monitoring, evaluation using success criteria, and corrective actions for each OE clearance site.

Lastly, the Army is remediating contaminated groundwater on lands that have been and will be transferred to the University of California Natural Reserve System's (UC/NRS) Fort Ord Natural Reserve. Activities associated with the proposed groundwater remediation include installing groundwater monitoring wells and piezometers, conducting hydropunches, conducting quarterly groundwater sampling, building new roads or widening existing ones for equipment access, and potentially constructing a groundwater remediation system. Research to gain information on contaminated groundwater movement would be conducted in conjunction with remediation activities. Activities associated with research would entail monitoring and installation of additional wells, hydropunches, and pipeline (J. Willison, *in litt.* 1998). In their letter and associated documents dated November 11, 1998, the Army proposes several measures to minimize potential effects to listed species and their habitats that would also minimize effects to Monterey spineflower critical habitat. Measures include having a biologist identify the least damaging location and configuration of access and work areas, educating workers about protective measures, having an approved biologist monitor implementation of minimization measures, conducting work seasonally to avoid flowering periods and minimize erosion, implementing appropriate erosion control, and monitoring and control of invasive nonnative vegetation.

According to the April 1997 HMP, interim uses at the former Fort Ord may involve public access to dunes and beaches. The Army would coordinate recreational uses with State Parks. Measures to control public access to minimize effects to listed species and their habitat would include installation of signs and barriers and the use of sufficient law enforcement. Criteria that would be used to determine if the minimization measures are successful and that relate to Monterey spineflower critical habitat are that no loss of potential or occupied habitat for these species will result from the public use of the beaches and dunes. An additional interim activity likely to occur prior to disposal is the restoration of dune habitat, which may include hand-pulling and spraying of iceplant with an herbicide.

Disposal and Reuse

As an installation-wide plan, the April 1997 HMP addresses all parcels to be disposed of by the Army at former Fort Ord. A primary goal of the April 1997 HMP is to promote preservation, enhancement, and restoration of habitats and populations of the HMP species while allowing development of selected properties to promote economic recovery. Management guidelines and specifications for reuse vary from parcel to parcel depending on future plans for each parcel and overall reuse planning. The former Fort Ord parcels that are designated as Monterey spineflower critical habitat and are still owned by the Army have one of the following four designations: (1) habitat reserve, (2) habitat corridor, (3) development with reserve areas or with restrictions, and (4) development. Another designation used in the HMP, "borderland development areas along the Natural Resource Management Area interface," is not given to any parcels in Monterey spineflower critical habitat, but is briefly discussed below because indirect effects from transferring lands with that designation may affect critical habitat.

Habitat Reserves and Habitat Corridors

Habitat reserves are lands that will be set aside from development with the primary management goal being conservation and enhancement of threatened and endangered species and protection of biologically important habitat for the HMP target species. Habitat corridors are to be managed to allow the movement of HMP species between habitat reserve lands. The April 1997 HMP describes specific management goals, procedures for enhancement and restoration, and entities responsible for appropriately managing each habitat reserve and habitat corridor. Approximately 90 percent of the Monterey spineflower critical habitat on former Fort Ord still owned by the Army is designated as habitat reserve or habitat corridor under the proposed action. Habitat reserve lands and corridors addressed in this section of the biological opinion are those designated as critical habitat for Monterey spineflower that are still owned by the Army: portions of the Natural Resource Management Area (NRMA), the Coastal Dune Zone, the East Garrison Reserve, portions of the Fort Ord Natural Reserve, and the Habitat Corridor/Youth Camp parcel.

Approximately 8,000 acres of the future 15,000-acre NRMA are still owned by the Army. About 7,000 acres have been transferred to the Bureau of Land Management (BLM). Land management consistent with the conservation of biological resources would be conducted in 98 percent of the NRMA. Up to two percent (about 300 acres) of the areas with natural vegetation could be converted to development-oriented uses for activities such as public access, grazing, police and fire training, and education and research. The BLM will develop and implement a Natural Resource Management Plan for the area.

The habitat reserve to be transferred to State Parks, referred to as the Coastal Dune Zone, is to be managed for the preservation of restored coastal dune habitat, with public access limited to hiking trails and beach access. Trail construction would involve minimal grading and the use of boardwalks, sand ladders, and guide railings for pedestrian control. These would be sited away from areas currently supporting native dune vegetation. Iceplant currently covers a substantial amount of the dune habitat in this and the adjacent coastal area designated as "development with reserve of development with restrictions."

The East Garrison reserve is to be transferred to an Economic Development Conveyance recipient (local entity or government) and is to be managed to maintain existing habitat values for HMP species, including maintaining areas with disturbed sandy soils to support Monterey spineflower habitat. A proposed road corridor along the northeast edge of this parcel will be realigned to avoid isolating habitat reserve lands. If realignment isn't possible, the isolated habitat reserve acreage will be designated for development; in exchange, developable land of comparable value and size, contiguous with other reserve lands, will be redesignated as habitat reserve (Zander Associates 2002).

The Army has already transferred the majority of the UC/NRS habitat reserve lands to the University of California. The remaining parcels to be transferred will receive the same management as the rest of the reserve. The UC/NRS will develop and implement a management plan for this reserve that focuses on the preservation of natural habitats and HMP species.

Development of up to one percent (about 60 acres) will be allowed in this reserve to support scientific research, teaching, and habitat management.

The Habitat Corridor/Youth Camp parcel designated as a corridor in the April 1997 HMP may be exposed to some land management practices other than those emphasizing conservation of biological resources, such as low-impact programs for youth, outdoor nature education, and trail creation. However, habitat values within this corridor parcel are to be retained at high levels to allow movement of HMP species between conservation areas. Except for small pockets of vegetation within the existing campground, no HMP species or sensitive biological resources will be removed by development (ACOE 1997).

Development with Reserves or Restrictions

The land designation "development with reserve or development with restrictions" is assigned to parcels that will include a mix of development and habitat reserve areas or that have restrictions on development to protect biological resources. Reserves that result from this land use category are subject to the same management practices as the other habitat reserves described above. The parcels of Monterey spineflower critical habitat that have this designation and that remain under Army authority are the Disturbed Habitat Zone (DHZ), a portion of the State Route 68 transportation easement, and a portion of Recreation Area Expansion #1. Approximately 10 percent of the Monterey spineflower critical habitat on former Fort Ord still under Army jurisdiction is designated as development with reserves or restrictions.

The majority of the almost 970-acre DHZ is currently covered with dense mats of nonnative iceplant. The DHZ is to be transferred to State Parks and used for the preservation of restored coastal dune habitats and for visitor service facilities. State Park's management and restoration of this site would include enhancing (through removal of nonnative species) the 310-acres of this site that is currently dominated by native vegetation and removing nonnative plant species and revegetating with native species (as necessary) the 390 acres that are currently dominated by nonnative iceplant. Up to 186 acres of the DHZ, including existing facilities, is available for development, which may include campgrounds and other visitor serving facilities.

The 80-acre portion of the Recreation Area Expansion #1 that is designated as Monterey spineflower critical habitat is to be managed by Monterey County and used for overflow parking during major events at the adjacent Laguna Seca Recreation Area. This area supports maritime chaparral, nonnative annual grassland, and coast live oak woodland. If native vegetation is removed for parking, grass is to be maintained over the site to prevent erosion. Following transfer, we expect this area will not be maintained to support the primary constituent elements necessary for Monterey spineflower critical habitat.

Caltrans State Route 68 transportation easement runs through the southern end of the future NRMA habitat reserve. This is a generally 1,000-foot-wide study corridor for a potential new route for State Route 68. This easement is to be managed as habitat reserve until such time as a new highway is planned. Because the likelihood of Caltrans choosing this alternative route is

undetermined, we are not analyzing the loss of Monterey spineflower critical habitat in this easement in this biological opinion. Planning and construction of this alternative would involve an action or funds by at least one Federal agency (Federal Highway Administration, BLM). If this alternative route is selected by Caltrans, the effects of this action on Monterey spineflower critical habitat will be addressed through consultation with the Federal action agency at that time.

Development areas

Based on the land use modifications proposed in 2002, which are part of the proposed action, approximately 147 acres of critical habitat for Monterey spineflower would be developed (Zander Associates 2002; C. Stiebel, *in litt.* 2002). This includes proposed residential development at East Garrison and a proposed firing range at Parker Flats that would border habitat reserve (Zander Associates 2002). We assume that these areas will eventually be entirely developed. In addition, the future BLM habitat reserve has development parcels adjacent to its boundary and the April 1997 HMP categorizes these as "borderland development areas along the NRMA interface." Although these areas are not designated as Monterey spineflower critical habitat, their development could affect the adjacent critical habitat if they provide unauthorized access routes into the habitat reserves. These development parcels have specific management requirements to protect the biological resources in the NRMA. These requirements include development of fire breaks, control of vehicle access, and control of nonnative plant species which could spread into the adjacent reserve.

After disposal is complete, lands at the former Fort Ord that support Monterey spineflower critical habitat would either be under Federal, State, local, or private management. Lands would be transferred to Federal agencies using memoranda of understanding. The Army will transfer lands to non-Federal agencies using deed restrictions, covenants, or conservation easements to ensure that entities acquiring parcels with habitat reserves, corridors, or development restrictions manage the land in a manner consistent with the HMP.

STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

Monterey spineflower

Monterey spineflower, a small, prostrate annual in the buckwheat family, was listed as threatened on February 4, 1994 (59 *FR* 5499). On February 15, 2001, we proposed critical habitat for the Monterey spineflower in Santa Cruz and Monterey counties, California, and on May 29, 2002, we designated final critical habitat for Monterey spineflower (67 *FR* 37498). Information contained in this account was obtained primarily from the final rule for listing, the Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly (Service 1998), the final rule for designation of critical habitat (67 *FR* 37498), and Reveal and Hardham (1989). Units H (Fort Ord Unit) and portions of Unit C (Marina Unit) of critical habitat for the Monterey spineflower include lands on former Fort Ord.

Monterey spineflower occurs in sandy soils within coastal habitats from the Monterey Peninsula (Monterey County) northward along the coast to southern Santa Cruz County, and inland to the coastal plain of the Salinas Valley. As of the 1998 recovery plan, 29 recorded extant populations occur on property managed by the U.S. Department of Defense, County of Monterey, City of Sand City, State Parks, the Pebble Beach Company and other private entities, with the largest populations thought to occur on the undeveloped areas of former Fort Ord.

At coastal sites ranging from the Monterey Peninsula north to Manresa State Beach, Monterey spineflower is found in active coastal dune systems and on coastal bluffs upon which windblown sand has been deposited. The distribution of suitable habitat is subject to dynamic shifts caused by patterns of dune mobilization, stabilization, and successional trends in coastal dune vegetation that increase in cover over time. Accordingly, individual colonies of Monterey spineflower, found in gaps between stands of scrub, shift in distribution and size over time. Other native plants associated with Monterey spineflower in these areas include beach bur (*Ambrosia chamissonis*), beach sagewort, mock heather, Monterey Indian paintbrush (*Castilleja latifolia*), and beach pea (*Lathyrus littoralis*). At some locations, Monterey spineflower occurs in close proximity to the endangered Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*), Menzies' wallflower (*Erysimum menziesii* ssp. *menziesii*), Smith's blue butterfly (*Euphilotes enoptes smithi*), and the threatened western snowy plover (*Charadrius alexandrinus nivosus*).

At more inland sites, Monterey spineflower occurs on sandy, well-drained soils in a variety of plant communities, most frequently maritime chaparral, valley oak woodland, and grassland. Within grassland communities, Monterey spineflower occurs along roadsides, in firebreaks, and in other disturbed sites, while in oak woodland, chaparral, and scrub communities, it occurs in sandy openings between shrubs. In older stands with a high cover of shrubs, the plants are restricted to roadsides, firebreaks, and trails that bisect these communities. Prior to the onset of human use of this area, Monterey spineflower may have been restricted to openings within these communities created by animal movement corridors, herbivory, and wildfires. The southwestern edge of Monterey spineflower habitat on the former Fort Ord was once likely continuous with habitat found in the community of Del Rey Oaks and at the Monterey Airport. Other inland sites that support Monterey spineflower are located in the area between Aptos and La Selva Beach in Santa Cruz County and near Prunedale in northern Monterey County. At some of these locations, Monterey spineflower occurs in close proximity with the federally endangered Yadon's piperia (*Piperia yadonii*) and robust spineflower (*Chorizanthe robusta* var. *robusta*).

Farther up the Salinas River, Monterey spineflower was recently found on a dune located within the river floodplain near Soledad, Monterey County (California Natural Diversity Data Base 2000). Two historic sites for Monterey spineflower occur near here; the plant has likely been extirpated from these sites due to conversion to agriculture and channelization activities along the Salinas River. The dune near Soledad is the only one of its size and extent between there and the river mouth.

Monterey spineflower is a short-lived annual species. It germinates during the winter months and flowers from April through June. Although its pollination ecology has not been studied, Monterey spineflower is likely visited by a wide array of pollinators; observations of pollinators on other species of *Chorizanthe* that occur in Santa Cruz County have included leaf cutter bees (megachilids), at least six species of butterflies, flies, and sphecid wasps. Each flower produces one seed; depending on plant vigor, dozens, if not hundreds, of seeds could be produced per individual. The importance of pollinator activity in seed set has been demonstrated by the production of seed with low viability where pollinator access was limited (Harding Lawson Associates 2000). The plants turn a rusty hue as they dry through the summer months, eventually shattering during the fall. Seed dispersal is facilitated by the involucrel spines, which attach the seed to passing animals. While animal vectors most likely facilitate dispersal between colonies and populations, the prevailing coastal winds undoubtedly play a part in scattering seed within colonies and populations.

The primary constituent elements of critical habitat for the Monterey spineflower have been defined as: 1) Sandy soils associated with active coastal dunes, coastal bluffs with a deposition of windblown sand, inland sites with sandy soils, and interior floodplain dunes; 2) Plant communities that support associated species, including coastal dune, coastal scrub, grassland, maritime chaparral, oak woodland, and interior floodplain dune communities, and have a structure such that there are openings between the dominant elements (*e.g.*, scrub, shrub, oak trees, clumps of herbaceous vegetation); 3) No or little cover by non-native species which compete for resources available for growth and reproduction of Monterey spineflower; and 4) Physical processes, such as occasional soil disturbance, that support natural dune dynamics along coastal areas. These attributes are considered essential to the conservation of the Monterey spineflower (67 FR 37498).

Several coastal dune restoration efforts within the last decade have included measures to eliminate non-native species and to propagate and reintroduce Monterey spineflower, notably at Moss Landing North Harbor, Pajaro Dunes, and the University of California's Moss Landing Marine Laboratory. Such efforts have contributed to our understanding that Monterey spineflower readily grows where suitable sandy substrates occur and competition with other plant species is minimal. Where Monterey spineflower occurs within native plant communities, along the coast as well as at more interior sites, it occupies microhabitat sites found between scrub and shrub stands with little cover from other herbaceous species. Where Monterey spineflower occurs within grassland communities, the density of Monterey spineflower may decrease with an increase of the density of other herbaceous species.

Residential development, agricultural land conversion, recreational use, sand mining, dune stabilization, and competition with non-native plants, such as European beach grass and iceplant, have all reduced the populations and habitat of the Monterey spineflower. Habitat loss and conversion from agricultural and residential development, activities at military institutions, and invasion by non-native plants were identified as the primary threats to Monterey spineflower at the time of listing (59 FR 5505). Hikers and equestrians may trample these plants at various

locations throughout its range. Most of the historical locations of the Monterey spineflower in the Salinas Valley have probably been extirpated by conversion of grassland and valley oak woodland habitats to agricultural fields.

ENVIRONMENTAL BASELINE

Monterey spineflower

Former Fort Ord supports approximately 60 percent (11,267 acres) of the total critical habitat (18,830 acres) designated for Monterey spineflower. About 9,020 of these acres are still under Army jurisdiction (C. Stiebel, *in litt.* 2002). Unit C (the Marina Unit) of Monterey spineflower critical habitat encompasses the coastal dunes extending both north and south of the coastal lands of former Fort Ord. Unit H (the Fort Ord Unit) is located on the interior lands of former Fort Ord. The western two-thirds of former Fort Ord lie on the Monterey Dune Complex, the largest dune mass in the Monterey Bay Area (Cooper 1967). No other inland areas of a size comparable to former Fort Ord that support appropriate habitat for Monterey spineflower remain undeveloped within its range.

The only base-wide surveys for Monterey spineflower on former Fort Ord were conducted in 1992. Survey methods involved dividing the base habitats into polygons of a few acres to several hundred acres in size and assigning the entire polygon as "occupied" if the species was found within it. These surveys determined that approximately 10,400 acres of polygons supported either low, medium, or high densities of Monterey spineflower. However, the coarseness of this mapping effort likely resulted in a substantial overestimate of Monterey spineflower density. For example, of the 7,200 acres that have since been transferred to BLM, 732 acres of polygons were mapped as supporting low density Monterey spineflower. However, using more detailed mapping, BLM estimates that Monterey spineflower populations currently occupy less than 2 of those 7,200 acres (Delgado 2001). On former Fort Ord lands that have been transferred to the University of California Reserve System, the 1992 mapping matches more closely what subsequent surveys found (M. Fusari, pers. comm. 2001). On lands still retained by the Army in the multi-range area (MRA), more recent Army surveys suggest that the status of Monterey spineflower there may also more closely resemble the 1992 surveys. In fact, in the multi-range area Monterey spineflower has been recently located in more polygons than were mapped as occupied in the 1992 surveys (B. Collins and C. Stiebel *in litt.* 2001). The 1992 surveys identified the multi-range area as containing the highest densities of Monterey spineflower on former Fort Ord. Much of the maritime chaparral included in the initial 1992 acreage estimates is dense, without the openings required by the spineflower for growth and reproduction; however, a seedbank may exist in these areas that would be expressed if fire or other activities create openings sufficient for its growth and reproduction.

Many areas mapped as Monterey spineflower critical habitat on former Fort Ord currently support maritime chaparral or coast live oak woodland with a relatively dense canopy. These areas would be suitable for the growth and reproduction of Monterey spineflower if openings are created where vegetation cover is removed and sandy soils are exposed. In the interior areas

where coast live oak woodland and chaparral provide relatively dense cover, the primary constituent elements of critical habitat for Monterey spineflower are transitory and likely created through natural processes of treefall, mammal herbivory, trailing by wildlife, wildfire, and through human-created openings at the edges of roads and other areas. While the Monterey spineflower itself needs open areas with sandy soils and low competition, a mosaic of vegetation successional stages is important to support the animals that pollinate Monterey spineflower and disperse its seeds. The longevity of Monterey spineflower seeds in the soil seedbank is unknown. When vegetation is removed after decades of high vegetation cover, the Monterey spineflower may emerge from seeds existing in the soil seedbank or recolonize sites from animal- or wind-dispersed seeds.

EFFECTS OF THE ACTION

Predisposal Activities

Predisposal activities considered during this consultation are those associated with the maintenance of fuelbreaks and administrative roads while former Fort Ord is in caretaker status; remediation of contaminated sites, including contaminated soils treatment, removal of lead and other heavy metals; ordnance and explosives removal; and interim uses of the dune and beach areas. We assessed the effects of these actions on critical habitat for Monterey spineflower while considering the beneficial effects of measures proposed to reduce the impacts of these actions.

Maintenance and use of dirt fire roads and fuelbreaks on former Fort Ord could both benefit and adversely affect the primary constituent elements of critical habitat for the Monterey spineflower. One element of Monterey spineflower critical habitat is openings within native plant communities where there exists little competition with other plant species. Because Monterey spineflower is able to colonize disturbed soils, removal of a roadside strip of dense maritime chaparral to bare mineral soil should create the appropriate elements of critical habitat for this species. These open fuelbreak strips are adjacent to more advanced successional vegetation stages which provide habitat for the pollinators, seed dispersers, and other native species which are important elements of Monterey spineflower critical habitat. While opening of the vegetation canopy benefits Monterey spineflower critical habitat, placing the vegetation chippings on-site can reduce habitat values when the chipped layer covers the soil surface and suppresses the germination and growth of annual species (Harding Lawson Associates 1999). Repeated or dense layers of chipped material may also eventually alter the nature of the sandy soils as the woody matter slowly decays. At former Fort Ord, vegetation in fuelbreaks is to be maintained at 1-2 feet in height; therefore, the chipped layer should be sparse and the adverse effects of coverage temporary. Monterey spineflower has been found growing in cut areas where the chipped material was sparse, but no direct comparisons of the species response to chipped and unchipped cut areas are available. Fuelbreak and road maintenance activity and use can also facilitate erosion and invasion by nonnative plant species, the seeds of which may be spread by vehicles and equipment. The Army proposes to minimize these impacts through their control program for nonnative species and by identifying and controlling erosion in fuelbreaks.

The majority of remediation of contaminated soils will take place in developed areas of the Main Garrison, which would not affect critical habitat for Monterey spineflower. Up to 75 acres of Monterey spineflower critical habitat within the inland range areas will be excavated for the removal of contaminated soils (I. Mettee-McCutcheon *in litt.* 1997). These areas will not be suitable for growth of Monterey spineflower during the excavation and soils may be lost to erosion. If nonnative grasses or other nonnative plant species colonize these areas in high densities they could be rendered unsuitable for Monterey spineflower. The Army's proposed measures, including recontouring, revegetating with native species where natural colonization is not likely, and the removal of nonnative species should minimize these effects. Use of roads and trails to access the remediation areas could also adversely affect Monterey spineflower critical habitat by continuously disrupting the soil surface, promoting soil erosion, and causing soil compaction. The Army's action includes measures that should minimize the effects of access routes on Monterey spineflower critical habitat, including using existing roads and trails whenever possible; controlling erosion; and monitoring site conditions which would trigger corrective actions, if necessary.

The Army is funding revegetation of the dunes (former beach ranges) where lead cleanup was completed in 1999 as part of their measures to minimize effects to listed and HMP target species. We expect that ongoing revegetation with native species in the 150-acre remediated and recontoured dune area will benefit Monterey spineflower critical habitat, because native dune plant communities contain those elements that benefit Monterey spineflower (e.g. open canopy, pollinator presence, etc.).

Monterey spineflower critical habitat could be affected in both adverse and beneficial ways from OE clearance activities, including prescribed burning, use of chemical fire suppressants and foams, cutting of the vegetation canopy, soil compaction or disruption from vehicles and equipment, and onsite ordnance detonation. The April 1997 HMP states that OE clearance could occur in areas supporting approximately 75 percent of the occupied habitat of Monterey spineflower at former Fort Ord, although the amount of habitat affected cannot be determined because the location and amount of OE is unknown. Because the net effect of ordnance clearance is expected to be beneficial or minimally adverse to Monterey spineflower critical habitat (see below), the unknown acreage and location of clearance activities is inconsequential.

Prescribed burning in support of OE clearance is expected to benefit Monterey spineflower critical habitat by providing necessary habitat openings, facilitating nutrient recycling, and by permitting the regeneration of the native plant community. The use of fire retardant chemical and fire suppressant foams which may occur during prescribed burning has been documented to cause temporary (less than one growing season) declines in plant species richness in other plant communities (Larson et. al. 2001) and in other cases to have a fertilizing effect which can promote the growth of nonnative grasses (Finger (undated)). Cutting areas up to 50 acres in size would have both the beneficial effects of reducing cover of shrub vegetation and the adverse effects of adding the chipped vegetation layer to the ground surface. However, we expect there to be few instances where this is necessary and that these areas will occur within larger areas

eventually prescribe burned. Both prescribed burning and cutting can result in erosion and provide open areas that can be invaded by nonnative plant species. Excavations to remove unexploded ordnance, and detonations, may also temporarily reduce the quality of Monterey spineflower critical habitat, however Monterey spineflower is able to colonize disturbed soils, so we expect these effects to be temporary and reduced by minimization measures the Army will employ. Detrimental effects to critical habitat would be reduced through the Army's post-treatment, multi-year process of monitoring OE clearance areas, evaluating monitoring results against success criteria, and taking necessary corrective actions. Additionally, OE removal sites will be restricted to the smallest area possible to limit habitat disturbance and employee education programs will be implemented. Through their post-treatment monitoring, infestations of nonnative plant species would be identified and controls implemented. To gather further information on the potential effects of fire suppressant foams and retardants, the Army is integrating into their post-treatment monitoring of at least one treatment area, the identification of foam and retardant applications and the comparative response of listed plant species in these areas (B. Collins, *in litt.* 2002b).

Contaminated groundwater remediation could cause long-term loss of critical habitat due to well installation and result in temporary soil disturbance and erosion during installation of wells, piezometers, and hydropunches. Approximately 25 square feet of habitat would be permanently lost and 30 to 50 square feet temporarily disturbed by each well installation. This effect would be minimized by the Army's proposal to locate wells outside of habitat for HMP species where possible. Hydropunches would result in temporary disturbance only. Adverse effects to Monterey spineflower critical habitat from construction and use of access roads would be minimized by locating roads away from habitat where possible. Burial of pipelines could temporarily adversely affect Monterey spineflower critical habitat from soil disturbance during the burial process. If a groundwater treatment system is necessary, effects to Monterey spineflower critical habitat would be minimized by using an existing system or installing a new system at the northern edge of the UC/NRS Reserve. Impacts to Monterey spineflower critical habitat from activities associated with groundwater remediation would also be minimized by salvaging and replacing topsoil in appropriate areas. Furthermore, small, temporary soil disturbances from groundwater remediation activities should have only temporary adverse effects on Monterey spineflower critical habitat, because the soils should function as suitable habitat once the actual excavation ceases.

According to the April 1997 HMP, interim uses at the former Fort Ord may involve restoration and public access to dunes and beaches. The HMP describes numerous measures designed to reduce these effects, including the use of signs, barriers, and enforcement patrols. With the implementation of these measures, Monterey spineflower critical habitat should not be adversely affected by these interim uses. We expect restoration activities in the dunes prior to transfer to have substantial beneficial effects on Monterey spineflower critical habitat. The existing condition of much of the Fort Ord dune areas, outside those sites excavated for the lead remediation, is of such dense cover by nonnative iceplant (*Carpobrotus edulis*), that the lands cannot function as habitat for Monterey spineflower except in scattered openings where native

vegetation persists. The glyphosate-based herbicide used for the removal of iceplant is applied directly to the foliage of the target nonnative plants and is relatively immobile in most soils (Schuette 1998), so we do not expect longterm effects to critical habitat from herbicide residue. We do not expect adverse effects to critical habitat on the dune areas due to access for restoration purposes.

Analysis of Effects for Disposal and Reuse

The potential impacts to Monterey spineflower critical habitat from disposal and subsequent reuse of the former Fort Ord were evaluated based on changes in land use and management from base operations and military activities to civilian uses for those lands which the Army has not yet transferred but for which transfer is planned under the HMP. Land reuse and management for all parcels at the former Fort Ord are described in the April 1997 HMP. Reuse of property at the former Fort Ord, which is an action to be undertaken by land recipients and not the Army, is considered an indirect or secondary effect of executing the proposed action. Of the approximately 11,267 acres of Monterey spineflower critical habitat located on former Fort Ord, approximately 9,023 acres are still owned by the Army.

For those parcels designated as habitat reserves and habitat corridors, management activities include restoration of old roadbeds and eroding sites, removal of nonnative species, prescribed burning, public access and access controls, research, and monitoring. These activities may have dispersed, temporary, adverse effects on Monterey spineflower critical habitat, however the net effect of transferring these areas for use as habitat reserves is expected to be positive for Monterey spineflower critical habitat. The same applies to the Disturbed Habitat Zone, designated as 'development with reserves or development with restrictions.' The future State Park's program that will remove nonnative iceplant and restore native dune vegetation will consequently restore constituent elements to an additional 390 acres of Monterey spineflower critical habitat.

The proposed action allows some lands in the habitat reserve areas to be converted to development for visitor access and management facilities. This includes up to two percent (approximately 300 acres) of BLM's future 15,000 acre NRMA and one percent (approximately 60 acres) of the UCNRS's approximately 600 acre reserve. In addition, we consider any critical habitat (up to 80 acres) that exists in the Recreation Expansion Area #1 parcel as lost, although as an unpaved overflow parking area it may intermittently support some elements of critical habitat. Up to 186 acres of the coastal Disturbed Habitat Zone parcel may eventually be developed, according to the HMP (ACOE 1997). This includes at least 7 acres of existing development not included within the final critical habitat designation for Monterey spineflower. Therefore, we expect up to approximately 180 acres of the area within the DHZ and Monterey spineflower critical habitat area may be eventually developed. The loss from development of the pockets of vegetation in the existing campground within the youth camp/habitat corridor parcel has not been quantified, nor has the loss from the road corridor that runs along the northeast edge of the East Garrison parcel, but we expect these to be minimal. Because the developed areas in habitat

reserves and corridors would include trails, parking areas, and other visitor access amenities, we expect that the acreage converted to developed areas would generally be dispersed throughout the habitat reserves rather than concentrated in just a few locations. In the absence of knowing where the developed areas will be located, we are assuming the loss would be from the parcels still in Army jurisdiction rather than from those already transferred.

For those parcels designated for development in the proposed action we evaluated complete loss of biological resources, although in some cases open space areas may be preserved. Under the proposed action, including the HMP and Land Use Modifications document (Zander Associates 2002), up to 147 acres of Monterey spineflower critical habitat is designated as development and could be permanently converted to development-oriented uses. Total permanent loss of Monterey spineflower critical habitat due to disposal and reuse could therefore be up to 767 acres.

If unrestricted, transfer and development of designated development parcels adjacent to habitat reserves could also adversely affect Monterey spineflower critical habitat within the reserve areas through unauthorized vehicle access, trash dumping, landscape waste dumping, and the spread of nonnative species. The HMP requires that development of these "borderland" parcels include barriers to unauthorized vehicle access, measures to prevent erosion, measures to prevent spread of nonnative species, and fuelbreak construction on the development side of the boundary, reducing the potential for adverse effects to Monterey spineflower critical habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Non-Federal activities having both beneficial and adverse effects on Monterey spineflower critical habitat are occurring or likely to occur in the former Fort Ord area. More than 500 acres of high-quality critical habitat for Monterey spineflower on the northern part of former Fort Ord have already been transferred to the UC/NRS and the City of Marina to be managed as habitat reserve or as mixed-use 'development with reserve' areas. These areas will be managed as described under the HMP and should continue to support high quality Monterey spineflower critical habitat. Several other actions that are ongoing or reasonable certain to occur within the southern portion of Monterey Bay may result in adverse effects to the Marina Unit of Monterey spineflower critical habitat of which former Fort Ord is a part. The Cities of Sand City and Marina are interested in developing parcels along their coastal strands for tourism facilities, such as hotels and resorts. This could lead to further habitat loss along this segment of the Monterey Bay, however a habitat conservation plan would likely be developed in these cases due to the potential for take of the western snowy plover. Also in Unit C (Marina Unit), which includes coastal former Fort Ord, State Parks is conducting dune restoration at Marina State Beach by

removing iceplant and outplanting native dune species, as needed. This will improve the quality of critical habitat for Monterey spineflower on these State lands.

CONCLUSION

After reviewing the current status of Monterey spineflower critical habitat, the environmental baseline for the action area, the effects of the proposed activities, and the cumulative effects, it is our biological opinion that the action, as described, is not likely to destroy or adversely modify critical habitat for the Monterey spineflower. We have reached this conclusion for the following reasons:

1. The adverse effects of pre-disposal activities on Monterey spineflower critical habitat are in most cases temporary and the Army has proposed measures that will reduce the adverse effects of the proposed action to Monterey spineflower critical habitat.
2. The proposed action will result in the permanent loss of up to 767 acres of Monterey spineflower critical habitat. This is about 8 percent of the Monterey spineflower critical habitat occurring on former Fort Ord lands currently owned by the Army and addressed in this biological opinion and about 6 percent of the total area of the two critical habitat units of which former Fort Ord is a part. The proportion of lost critical habitat is relatively minor in light of the conservation of habitat that will occur under the Fort Ord disposal and reuse process.
3. Several hundred acres of Monterey spineflower critical habitat will be restored or enhanced following transfer of lands to future managers of the habitat reserves.

REPORTING REQUIREMENTS

Reporting requirements for biological and conference opinion 1-8-99-F/C-39R suffice for Army actions associated with the disposal and reuse of former Fort Ord.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend the following conservation measures to promote conservation of the sensitive and listed species on former Fort Ord:

1. Conduct surveys for contra costa goldfields (*Lasthenia conjugens*) in all potential habitat not previously surveyed and define the watersheds of those vernal pools and grasslands in proposed critical habitat that may be affected by Army actions.

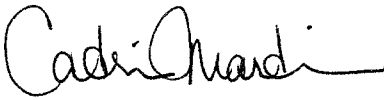
2. Conduct current surveys for California tiger salamander (*Ambystoma californiense*) on former Fort Ord lands that the Army still manages. This is particularly important during years of average or above-average precipitation.
3. Continue to promote the conservation of listed, proposed, candidate, and sensitive species on former Fort Ord to assist in the recovery of listed species and to help ensure that sensitive species do not decline to the point of needing listing in the future.
4. Implement the enclosed amphibian Code of Practice for field gear cleaning, or an equally protective cleaning method, when working in wetlands on former Fort Ord.

REINITIATION NOTICE

This concludes formal consultation on the effects the closure and reuse of Fort Ord will have on Monterey spineflower critical habitat. Reinitiation of formal consultation is required if: 1) new information reveals effects of the agency action that may adversely affect critical habitat in a manner or to an extent not considered in this biological opinion; 2) the agency action is subsequently modified in a manner that causes an effect to critical habitat that was not considered in this biological opinion; or 3) a new species is listed or critical habitat designated that may be affected by this action (50 CFR 402.16).

If you have any questions regarding this biological opinion, please contact Diane Steck of my staff at (805) 644-1766.

Sincerely,


for Diane K. Noda
Field Supervisor

Enclosure

REFERENCES CITED

- California Natural Diversity Data Base. 2000. California Department of Fish and Game, Natural Heritage Division. Sacramento, California.
- Collins, B. 2001. Communication during Fort Ord CRMP meeting, attended by Diane Steeck, U.S. Fish and Wildlife Service, on July 17, 2001.
- Collins, B. and Stiebel, C. 2001. Map of Monterey spineflower distribution presented by B. Collins at meeting on May 1, 2001. Map plot date April 30, 2001.
- Collins, B. 2002a. Telephone communication to Diane Steeck, U.S. Fish and Wildlife Service, September 3, 2002.
- Collins, B. 2002b. Electronic mail communication to Diane Steeck, U.S. Fish and Wildlife Service, dated August 23, 2002.
- Cooper, W.S. 1967. Coastal dunes of California. Memoir No. 104, Geol. Soc. of America, 131 pp.
- Delgado, B. 2001. Draft data presented at meeting on Fort Ord annual plant species, May 1, 2001.
- Finger, S. (ed.) undated. Toxicity of fire retardant and foam suppressant chemicals to plant and animal communities. Final report prepared for Interior Fire Coordination Committee, Boise, Idaho
- Fire Stop 2002. Draft final Ranges 43 - 48 prescribed burn plan . Report prepared for Army Corps of Engineers. August. Sacramento, California.
- Fusari, M. 2001. Communication at meeting on Fort Ord annual plant species, attended by Diane Steeck, U.S. Fish and Wildlife Service, May 1, 2001.
- Harding Lawson Associates. 1999. Draft evaluation of observed trends in central maritime chaparral habitat on unexploded ordnance sites at the former Fort Ord, Monterey County, California. Prepared for U.S. Army Corps of Engineers. November. Sacramento, California.
- Harding Lawson Associates. 2000. Planting and mitigation monitoring plan, Moss Landing Harbor District, North Harbor Property, Monterey County, California. Prepared for Moss Landing Harbor District. Novato, California.
- Larson, D., Newton W., Anderson, P. and S. Stein. 1999. Effects of fire retardant chemical and fire suppressant foam on shrub steppe vegetation in northern Nevada. International Journal of Wildland Fire 9 (2):115-127. Jamestown, ND: Northern Prairie Wildlife

Research Center Home Page.

<http://www.npwrc.usgs.gov/resource/2001/chemfoam/chemfoam.htm> (Version 30May2001).

- Mettee-McCutchon, I. 1997. Letter to Diane Noda, U.S. Fish and Wildlife Service, dated April 7, 1997, and enclosures.
- Noda, D. 2001. Letter to James Willison, Department of the Army, dated January 31, 2001.
- Noda, D. 2002. Letter to Colonel Kevin Rice, Department of the Army, dated May 28, 2002.
- Reveal, J.L. and C.B. Hardham. 1989. A revision of the annual species of *Chorizanthe* (Polygonaceae: Eriogonoideae). *Phytologia* 66(2):98-198.
- Schuette, J. 1998 (revised). Environmental fate of glyphosate. Review document from Environmental Monitoring and Pest Management Division, Department of Pesticide Regulation, Sacramento, California.
- Siemann, K. 2002. Electronic mail communication to Diane Steeck, U.S. Fish and Wildlife Service, dated August 16, 2002.
- Stiebel, C. 2002. Electronic mail communication to Diane Steeck, U.S. Fish and Wildlife Service, dated June 18, 2002.
- U.S. Army Corps of Engineers, Sacramento District. 1997. Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California. April. Sacramento, California.
- U.S. Department of the Army. 2000. Annual report to U.S. Fish and Wildlife Service, January 1999 (sic 2000). Presidio of Monterey, Monterey, California
- U.S. Fish and Wildlife Service. 1998. Recovery plan for seven coastal plants and the Myrtle's silverspot butterfly. Portland, Oregon.
- U.S. Fish and Wildlife Service. 1999. Biological and conference opinion on the closure and reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R).
- Willison, J. 1998. Letter to Diane Noda, U.S. Fish and Wildlife Service, dated November 11, 1998.
- Willison, J. 2001a. Letter to Diane Noda, U.S. Fish and Wildlife Service, dated September 18, 2001.
- Willison, J. 2001b. Fuelbreak project description provided to Diane Noda, U.S. Fish and Wildlife Service, during meeting on June 7, 2001.

Willison, J. 2002. Letter to Diane Noda, U.S. Fish and Wildlife Service, dated August 13, 2002

Zander Associates 2002. Assessment, East Garrison - Parker Flats land use modifications, Fort Ord, California. Report prepared for County of Monterey & Fort Ord Reuse Authority, Monterey County, California (May).

The Declining Amphibian Populations Task Force Fieldwork Code of Practice

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires, and all other surfaces. Rinse cleaned items with sterilized (e.g., boiled or treated) water before leaving each work site.
2. Boots, nets, traps, and other types of equipment used in the aquatic environment should then be scrubbed with 70 percent ethanol solution and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond, wetland, or riparian area.
3. In remote locations, clean all equipment with 70 percent ethanol or a bleach solution, and rinse with sterile water upon return to the lab or "base camp" Elsewhere, when washing-machine facilities are available, remove nets from poles and wash in a protective mesh laundry bag with bleach on the "delicates" cycle.
5. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean them as directed above and store separately at the end of each field day.
6. When amphibians are collected, ensure that animals from different sites are kept separately and take great care to avoid indirect contact (e.g., via handling, reuse of containers) between them or with other captive animals. Isolation from unsterilized plants or soils which have been taken from other sites is also essential. Always use disinfected and disposable husbandry equipment.
7. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.
8. Used cleaning materials and fluids should be disposed of safely and, if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

The Fieldwork Code of Practice has been produced by the Declining Amphibian Populations Task Force with valuable assistance from Begona Arano, Andrew Cunningham, Tom Langton, Jamie Reaser, and Stan Sessions.

For further information on this Code, or on the Declining Amphibian Populations Task Force, contact John Wilkinson, Biology Department, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK.

E-mail: DAPTF@open.ac.uk