United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
81440-2011-f-0381

August 3, 2011

Gail Youngblood, Environmental Coordinator
Department of the Army
Army Base Realignment and Closure, Fort Ord Office
P.O. Box 5008, Building #4463 Gigling Road
Monterey, California 93944-5008

Subject: Biological Opinion for the Former Fort Ord Vegetation Clearance Activities and Transfer of Parcel E29b.3.1 (8-8-11-F-39)

Dear Ms. Youngblood:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Department of the Army's (Army) proposed vegetation clearance activities and transfer of parcel E29b.3.1, and their effects on the federally endangered Contra Costa goldfields (*Lasthenia conjugens*), Monterey gilia (*Gilia tenuiflora* ssp. *arenaria*), Yadon's piperia (*Piperia yadonii*); the federally threatened California tiger salamander (*Ambystoma californiense*) and Monterey spineflower (*Chorizanthe pungens* var. *pungens*) and its critical habitat, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your June 17, 2011 request for formal consultation was received on June 20, 2011.

This biological opinion is based on information which accompanied your June 17, 2011 request for consultation, including: the biological assessment (Army 2011); the Parker Flats prescribed burn experiment on former Fort Ord report (Pierce et al. 2010), the biological assessment accompanying your June 5, 2009, request for consultation (Army 2009), the final Fort Ord vegetation clearance alternatives (Athna 2002), the installation-wide multispecies habitat management plan (HMP) for former Fort Ord, California (U.S. Army Corps of Engineers [Corps] 1997), and personal communications between our office and your staff. A complete record of this consultation can be made available at the Ventura Fish and Wildlife Office.

CONSULTATION HISTORY

The Army has been authorized by the Service to conduct and continue army cleanup activities in biological opinions 1-8-99-F/C-39R, 1-8-01-F-70R, and 1-8-04-F-25R (Service 1999, 2002, 2007a). Over multiple previous years, the Army has sought the Service's concurrence on expansion of fuel breaks widths not previously analyzed in the existing biological opinions. On June 5, 2009, the Army submitted a request to reinitiate consultation along with an updated

biological assessment (Army 2009) to address potential adverse effects to federally listed species as a result of Army actions at former Fort Ord. The 2009 biological assessment provides additional details on Army cleanup and transfer actions including changes to fuel break requirements necessary to support the prescribed burn program. In addition to the need for wider fuel breaks to protect fire fighters from explosive hazards and to contain prescribed burns, the assessment also provides an update to all other Army actions at former Fort Ord. This consultation will result in a new, programmatic biological opinion that addresses impacts to all listed species as a result of the Army's continued cleanup and property transfer actions at former Fort Ord, and is pending.

On May 2, 2011, the Service concurred with the Army's proposal to cut fuel breaks surrounding units 11 and 12 in preparation of the 2011 burn season (Service 2011), but determined that the ecological impacts of proposed cutting of units 4, 5A, and 9, to create additional buffers between the prescribed burn and residential and commercial areas directly adjacent to South Boundary Road had not been analyzed in the existing biological opinions and would need to be addressed separately in an informal consultation. Since the Service's 2011 concurrence, the Army has discovered high-explosive projectiles on the surface of units 11 and 12 and has determined the areas are unsafe to burn, instead requiring manual and/or mechanical cutting as an alternative. We have informed the Army that although consultation on the June 5, 2009 biological assessment is underway, the programmatic biological opinion would not be issued until well after the 2011 cleanup season; therefore, the current biological opinion will be issued in order for the Army to continue 2011 cleanup activities. The activities and impacts addressed in the current biological opinion will be incorporated into the pending programmatic biological opinion, as these activities may need to be repeated in the future if similar circumstances precluding execution of a safe burn plan prevail.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Manual/Mechanical Vegetation Clearance of 727 Acres

Although prescribed burning is the primary method of vegetation clearance in areas designated as habitat reserve and development with reserve areas or development with restrictions containing central maritime chaparral, manual and mechanical vegetation clearance methods may be used under very restrictive circumstances where they will not undermine the goals of species preservation described in the HMP (Corps 1997).

On May 13, 2011, the Department of the Army (Army) discovered an 8-inch high-explosive projectile and a 155-millimeter (mm) high-explosive projectile while conducting vegetation cutting within the primary containment lines in preparation for a prescribed burn in Unit 11 (273 acres). On May 19, 2011, the Army discovered a 155-mm high-explosive projectile while conducting vegetation cutting within the primary containment lines in preparation for a prescribed burn in Unit 12 (203 acres). These projectiles were not expected to be found on the

surface and have necessitated an increase in the safety set-back distances. The safety set-back distances for firefighters during a prescribed burn is the hazardous fragment distance (HFD) for the munitions expected in the burn area. The HFD for the 155-mm and 8-inch projectiles are 450 feet and 423 feet, respectively. While the horizontal distance could be mitigated by cutting wider fuel breaks, the vertical set-back for aerial ignition helicopters would be difficult or impossible to mitigate as they require a certain maximum height above vegetation (fuels), less than the HFD identified for these burn units, in order to maintain full control of the ignition torches. The potential for detonation of 8-inch or 155-mm projectiles during burns in units 11 and 12 (a total of 476 acres) poses an unacceptable risk to firefighting personnel; therefore, the Army is proposing that the units be cut. While the mechanical cutting of the vegetation still poses risks to equipment operators, the risks are manageable through the implementation of safety measures such as double cutting and ordnance escorts to identify possible munitions and explosives of concern (MEC) prior to the vegetation being cleared to 6 inches above the ground. This new MEC discovery does not preclude the future burning of these areas once surface MEC remediation has been completed and the vegetation has grown back enough to carry a fire. Following the vegetation cutting and subsequent MEC surface remediation, the Army would conduct periodic inspections of the units to ensure the surface remediation remains effective prior to burning.

The remaining 251 acres of the 727 acres that would be cut in 2011 are units 4, 5A, and 9, located along South Boundary Road. Unit 4 is included in the 750 acres to be cut as described in the June 5, 2009 biological assessment. The Army would also cut units 5A and 9 which are also located along the southern boundary. These units are within the 750 acres identified for cutting because of the severely restricted burn prescription in that portion of the installation. The Army has determined that these areas are not safe to burn in their current condition. Cutting the 251 acres of central maritime chaparral in these units would allow the MEC remediation of units 4, 5A, and 9 to proceed and also provides a valuable fuel break between residential areas and the units planned for burning in 2012 and the future. As stated above, once the MEC cleanup has been completed and vegetation has grown to a point to carry a fire, the Army would conduct prescribed burns in these cut units to facilitate the recovery of the rare and listed plant species found in this fire-adapted plant community.

Manual and mechanical vegetation removal methods would also be the primary methods used in grasslands, oak savannahs, and oak woodlands. Vegetation in and directly around ephemeral California tiger salamander breeding ponds at former Fort Ord are dominated by nonnative and native grasses, and wetland or facultative wetland herbaceous species. Mechanical mowing would only be needed in these areas where the vegetation is too dense to safely locate and remove the MEC.

Manual vegetation clearance methods consist of using hand tools such as mowers, weed whippers, loppers, and chain saws. In most cases, standing vegetation is cut at the base or pruned sufficiently to allow for access and improved visibility under canopies of trees and shrubs prior to cleanup actions. Grasses, herbaceous vegetation, and small shrubs are typically cut off at

the base, and larger shrubs and trees are typically pruned to allow access by MEC detection and removal technicians and equipment. Manually cleared vegetation is typically chipped and hauled offsite, and in some cases may be redistributed onsite in limited amounts. Mechanical vegetation clearance is conducted by an equipment operator using equipment such as a Brush Hog, Bobcat with treads and mowing deck, or similar machinery. The operator clears the standing vegetation down to a height of approximately 6 inches by making one or more passes over the vegetation and in a manner to keep ground disturbances, such as ruts, to a minimum. The mowing apparatus shreds woody vegetation in place leaving shredded material on the ground. The amount and size of the material depends on the type of cutting head or blade and the density of vegetation.

Transfer of Development Parcel E29b.3.1

Parcel E29b.3.1 located on the south side of South Boundary Road remains to be transferred to the City of Monterey. The 0.65 acre parcel contains a small population of Yadon's piperia that was discovered in 2004, after the final HMP was issued. This parcel has been identified in the HMP as an economic development conveyance parcel with no HMP resource conservation or management requirement; however, the HMP does not exempt future land owners of development parcels from complying with environmental regulations enforced by federal, state, and local agencies, such as complying with measures for conservation of state-listed threatened and endangered species and other special status species recognized by California Department of Fish and Game under the California Endangered Species Act, or California Environmental Quality Act; and, complying with local land use regulations and restrictions.

Minimization Measures

The following section describes measures designed to avoid and minimize impacts to listed HMP species during Army cleanup and property transfer actions. These measures were developed as part of the natural resource conservation and management requirements for the HMP and were later expanded to accommodate additional Army actions, new species listings, or changes in species status that were addressed in several biological opinions for the closure and reuse of former Fort Ord.

The first section describes the general minimization measures that are pertinent to every type of Army action expected to occur for the duration of the cleanup. The subsequent section describes specific measures that are specific to the Army actions addressed in this biological opinion. Implementation of the minimization measures described below will provide long term protection for the continued survival of listed HMP species as well as the many other rare HMP species and their habitats on former Fort Ord.

General Minimization Measures

Before any cleanup related activity begins, including vegetation clearance, all supervisors and field personnel will attend an environmental training program presented by a biologist familiar

with Fort Ord HMP plant and wildlife species. As the project proceeds, all new personnel also attend the environmental training before working on the site. Topics covered in the training include:

1. A habitat checklist or similar form to be completed, identifying the HMP species present on the site and measures to reduce and/or avoid impacts during the actions;
2. A description and photo presentation of HMP plant and wildlife species that could be encountered in the project area;
3. Environmental laws related to the conservation of these species;
4. Guidelines and specific minimization measures that personnel will follow to reduce or avoid impacts to HMP species or habitat. These include, but are not limited to: maps indicating locations of marked plants to avoid, instructions for replacing topsoil during digs in HMP-plant occupied areas, California tiger salamander-specific instructions (detailed below), and;
5. Appropriate points of contact to report unforeseen impacts on HMP species and encounters with California tiger salamanders.

Baseline surveys will be conducted before the start of work. Presence, abundance, and locations of HMP species, and the condition of critical habitat will be recorded using the protocols outlined in the most current vegetation monitoring protocols (Burleson 2006a, 2006b). In addition to the baseline habitat monitoring surveys, follow-up monitoring of HMP species will be conducted in accordance with the vegetation monitoring protocol (Burleson 2009) to ensure habitat recovery meets the established success criteria.

Baseline surveys and follow-up monitoring for the wetland HMP species, California tiger salamander, and Contra Costa goldfields, and their habitat, will be conducted following response actions in occupied wetlands to assess the recovery of wetland habitat for these species. Measurements include: wetland function, as measured by the parameters of hydrologic conditions (inundation area and depth, pH, dissolved oxygen levels); wildlife usage, specifically California tiger salamander larval and adult presence and abundance, and California linderiella presence and abundance; plant cover and wetland plant species diversity and dominance; and Contra Costa goldfields presence and abundance.

Specific Minimization Measures
The following specific minimization measures will be implemented to minimize disturbance and impacts to California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia within the 727 acres to be manually or mechanically cut.

1. The on-site biologist will oversee activities to ensure minimization measures identified in the checklist are implemented and are revised as necessary.
2. Flagging and/or mapping of populations of HMP plant species will occur to the extent possible to avoid and or reduce unnecessary disturbances.

3. The footprint of work areas, excavations, staging and road access areas will be restricted to the extent possible and access and work areas will be delineated to limit unnecessary impacts to HMP species and habitat.
4. Existing roads will be used wherever possible, and use of vehicles off-roads will be minimized.
5. Within wetlands and vernal pools, work will be conducted during the dry season (or when water is at its lowest limit).
6. Vegetation clearance will be avoided within occupied Contra Costa goldfield areas since the vegetation is typically low growing (less than 6 inches) and does not limit safe access. Work will be conducted during the dry season in Contra costa goldfields areas.
7. Follow-up visits will be conducted on all sites to identify potential erosion areas and apply weed free straw, straw wattle, or other corrective measures as necessary.
8. Baseline and follow-up habitat monitoring will occur in accordance with the approved vegetation monitoring protocol.
9. Survey, salvage, and relocation of larvae or adult California tiger salamanders will be conducted as appropriate.
10. Monitoring results will be presented in the annual monitoring reports to determine success of recovery.
11. Invasive weed and erosion control will continue until property transfer
12. Biologists authorized by the Service will record all relevant information, conduct California tiger salamander relocation in the event of California tiger salamander encounters during work activity, and report any injury or death.
13. For erosion control activities, work areas will be searched for California tiger salamander during rainy periods when migrating animals may be abroad.
14. For weed control, Roundup® will not be used within 100 feet of open water. Rodeo®, or a zero to low aquatic toxicity herbicide will be used if necessary in this zone.
15. The wetland restoration plan (Burleson 2006b) that addresses proper survey protocols consistent with the Service's aquatic survey guidelines, description of ponds that need to be measured during pre-work assessments, effective sampling protocols, and monitoring success criteria for California tiger salamander will be used.

Once these areas have re-grown for approximately 5 years or when vegetation has grown sufficiently to carry a fire, the Army will conduct a prescribed burn in the previously cut areas to stimulate the rare central maritime chaparral fire dependent species to recover. By burning these areas after the unexploded ordnance has been removed and the vegetation height has been reduced, the area will be able to be burned with significantly lower flame height that increases ability to contain the fire and reduces the threat of an escape into the adjacent wildland/urban interface. Although temporary impacts to HMP species are likely, the impacts would be minimized by burning of the areas in the future to facilitate habitat recovery.

Property Disposal Minimization Measures

The Army inserts HMP deed language in all property transfer documentation. Implementation of the HMP will result in the long-term conservation and management of approximately 16,595

acres and a portion of the 2,165 acres designated as development with reserve or development with restrictions. Although transfer of the 0.65 acres of development parcel E29b.3.1 may result in the loss of Federal protection of Yadon's piperia occurring on the parcel, implementation of HMP conservation and management requirements including implementation of minimization measures during Army cleanup activities on the remaining habitat reserve, habitat corridor, habitat corridor with development allowances, and development with reserves or development with restrictions (18,762 acres) will minimize the impacts to the species found in this small development parcel.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

The jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species,* which describes the range-wide conditions of the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia, the factors responsible for those conditions, and their survival and recovery needs; (2) the *Environmental Baseline,* which analyzes the conditions of the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia in the action area, the factors responsible for those conditions, and the relationship of the action area to the survival and recovery of the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia; (3) the *Effects of the Action,* which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia in the wild.

Adverse Modification Determination

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied on the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: (1) the *Status of Critical Habitat*, which describes the range-wide condition of designated critical habitat for the Monterey spineflower in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the *Environmental Baseline*, which analyzes the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated and interdependent activities on the PCEs and how that will influence the recovery role of the affected critical habitat units; and (4) *Cumulative Effects*, which evaluates the effects of future non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the critical habitat of the Monterey spineflower are evaluated in the context of the range-wide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the Monterey spineflower.

STATUS OF THE SPECIES

California Tiger Salamander

The Service recognizes three distinct populations of the California tiger salamander in Sonoma County, in Central California, and in northern Santa Barbara County. On September 21, 2000, the Service listed the Santa Barbara County distinct population segment of the California tiger salamander as endangered (Service 2000). On March 19, 2003, the Service listed the Sonoma County distinct population segment of the California tiger salamander as endangered (Service 2003a). On August 4, 2004, the Service published a final rule listing the California tiger salamander as threatened range-wide, including the previously identified Sonoma and Santa Barbara distinct population segments (Service 2004). On August 19, 2005, U.S. District Judge William Alsup vacated the Service's downlisting of the Sonoma and Santa Barbara populations from endangered to threatened. Thus, the Sonoma and Santa Barbara populations are listed as endangered, and the Central California population is listed as threatened.

The California tiger salamander is endemic to the grassland community found in California's Central Valley, the surrounding foothills, and coastal valleys (Fisher and Shaffer 1996). As noted previously, three distinct populations are recognized by the Service: in the coastal ranges of Sonoma County; in Central California including the San Francisco Bay area, the Central Valley, southern San Joaquin Valley, and the Central Coast Ranges; and in northern Santa Barbara County. The distribution of breeding locations of this amphibian does not naturally overlap with that of any other species of tiger salamander (Loredo et al. 1996, Petranka 1998, Stebbins 2003).

The California tiger salamander was first described as *Ambystoma californiense* by Gray in 1853, based on specimens that had been collected in Monterey, California (Grinnell and Camp 1917). Storer (1925) and Bishop (1943) also considered the California tiger salamander to be a distinct species. Dunn (1940), Gehlbach (1967), and Frost (1985) believed the California tiger salamander was a subspecies of the more widespread tiger salamander (*A. tigrinum*). However, based on studies of the genetics, geographic distribution, and ecological differences among the members of the *A. tigrinum* complex, the California tiger salamander has been determined to represent a distinct species (Shaffer and Stanley 1991, Jones 1993, Shaffer et al. 1993, Shaffer and McKnight 1996, Irschick and Shaffer 1997).

The California tiger salamander is a large and stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 8.2 inches, with males generally averaging about 8 inches total length, and females averaging about 6.8 inches in total length. For both sexes, the average snout-to-vent length is approximately 3.6 inches (Service 2000). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), larger tails, and larger overall size (Loredo and Van Vuren 1996).

Historically, natural ephemeral vernal pools were the primary breeding habitats for California tiger salamanders (Twitty 1941, Fisher and Shaffer 1996, Petranka 1998). However, with the conversion and loss of many vernal pools through farmland conversion and urban and suburban development, ephemeral and permanent ponds that have been created for livestock watering are now frequently used by the species (Fisher and Shaffer 1996, Robins and Vollmar 2002).

California tiger salamanders spend the majority of their lives in upland habitats and cannot persist without them (Trenham and Shaffer 2005). The upland component of California tiger salamander habitat typically consists of grassland savannah, but includes grasslands with scattered oak trees, and scrub or chaparral habitats (Shaffer et al. 1993, Service 2000). Juvenile and adult California tiger salamanders spend the dry summer and fall months of the year in the burrows of small mammals, such as California ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925, Loredo and Van Vuren 1996, Trenham 1998, Pittman 2005). Burrow habitat created by ground squirrels and utilized by California tiger salamanders suggests a commensal relationship between the two species (Loredo et al. 1996).

Movement of California tiger salamanders within and among burrow systems continues for at least several months after juveniles and adults leave the ponds (Trenham 2001). California tiger salamanders cannot dig their own burrows, and as a result, their presence is associated with burrowing mammals (Seymour and Westphal 1994). Active ground-burrowing rodent populations likely are required to sustain California tiger salamanders because inactive burrow

systems become progressively unsuitable over time (Service 2004). Loredo et al. (1996) found that California ground squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, the mammals.

California tiger salamanders have been found in upland habitats various distances from aquatic breeding habitats. In a trapping study in Contra Costa County, California tiger salamanders were trapped approximately 2,625 feet to 3,940 feet away from potential breeding habitat (Service 2004). During a mark and recapture study in the Upper Carmel River Valley in Monterey County, Trenham et al. (2001) observed California tiger salamanders dispersing up to 2,200 feet between breeding ponds between years. In research at Olcott Lake in Solano County, Trenham and Shaffer (2005) captured California tiger salamanders in traps installed 1,312 feet from the breeding pond.

Adults enter breeding ponds during fall and winter rains, typically from October through February (Storer 1925, Loredo and Van Vuren 1996, Trenham et al. 2000). Males migrate to the breeding ponds before females (Twitty 1941, Shaffer et al. 1993, Loredo and Van Vuren 1996, Trenham 1998). Males usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996, Trenham 1998).

Females attach their eggs singly or, in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris in the water (Storer 1925, Twitty 1941). In ponds with little or no vegetation, females may attach eggs to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). In drought years, the seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994). The eggs hatch in 10 to 14 days with newly hatched salamanders (larvae) ranging in size from 0.5 to 0.6 inch in total length (Petranka 1998). The larvae are aquatic. Each is yellowish gray in color and has a broad, fat head; large, feathery external gills; and broad dorsal fins that extend well onto its back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific tree frogs and California red-legged frogs (J. Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems.

The larval stage of the California tiger salamander usually lasts 3 to 6 months, because most seasonal ponds and pools dry up during the summer (Petranka 1998). Amphibian larvae must grow to a critical minimum body size before they can metamorphose to the terrestrial stage (Wilbur and Collins 1973). Larvae collected near Stockton in the Central Valley during April varied from 1.9 to 2.3 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch et al. 1988, Pechmann et al. 2001). The larvae perish if a

site dries before they complete metamorphosis (P. Anderson 1968, Feaver 1971). Pechmann et al. (2001) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians, including tiger salamanders.

Metamorphosed juveniles leave the breeding sites in the late spring or early summer. Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925, Shaffer et al. 1993) before settling in their selected upland sites for the dry, hot summer months. While most California tiger salamanders rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during upland migrations (Loredo et al. 1996). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998). Emergence from upland habitat in hot, dry weather occasionally results in mass mortality of juveniles (Holland et al. 1990).

We do not have data regarding the absolute number of California tiger salamanders due to the fact that they spend most of their lives underground. Virtually nothing is known concerning the historical abundance of the species. A typical breeding population in a pond can fluctuate due to random, natural processes, declining in some years to fewer than 20 adults plus juveniles (AmphibiaWeb 2007). At one study site in Monterey County, Trenham et al. (2000) found the number of breeding adults visiting a pond varied from 57 to 244 individuals. A Contra Costa County breeding site approximately 124 mi north of the Trenham et al. (2000) study site in Monterey County showed a similar pattern of variation, suggesting that such fluctuations are typical (Loredo and Van Vuren 1996). At the local landscape level, nearby breeding ponds can vary by at least an order of magnitude in the number of individuals visiting a pond, and these differences appear to be stable across years (Trenham et al. 2001).

Lifetime reproductive success for California tiger salamanders is typically low. Less than 50 percent breed more than once (Trenham et al. 2000). In part, this is due to the extended length of time it takes for California tiger salamanders to reach sexual maturity; most do not breed until 4 or 5 years of age. Combined with low survivorship of metamorphs (in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998)), low reproductive success limits California tiger salamander populations. Because of this low recruitment, isolated subpopulations can decline greatly from unusual, randomly occurring natural events as well as from human-caused factors that reduce breeding success and individual survival. Based on metapopulation theory (Hanski and Gilpin 1991), factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for migrating individuals to replenish the population further threaten the survival of a local population.

The California tiger salamander is threatened primarily by the destruction, degradation, and fragmentation of upland and aquatic habitats, primarily resulting from the conversion of these habitats by urban, commercial, and intensive agricultural activities (Service 2000, Service 2003a, Service 2004). Additional threats to the species include hybridization with introduced nonnative barred tiger salamanders (*A. tigrinum mavortium*) (Service 2000, Service 2004), destructive rodent-control techniques (e.g., deep-ripping of burrow areas, use of fumigants) (Service 2003a),

reduced survival due to the presence of mosquitofish (*Gambusia affinis*) (Leyse and Lawlor 2000), and mortality on roads due to vehicles (Service 2000).

Contra Costa Goldfields

Contra Costa goldfields was listed as a federally endangered species on June 18, 1997 (Service 1997). Critical habitat for this species was proposed on September 24, 2002, and the final rule to designate critical habitat for the Contra Costa goldfields was published on August 6, 2003 (Service 2003b). An evaluation of economic exclusions from the August 2003 final designation was published on August 11, 2005 (Service 2005a), and administrative revisions were published on February 10, 2006 (Service 2006). Information contained in this account was obtained primarily from the Contra Costa Goldfields 5-year review: Summary and Evaluation (Service 2008a).

Contra Costa goldfields is an annual flowering plant in the aster family (Asteraceae) that grows 4 to 12 inches tall and usually has a branched stem. The leaves are opposite, light green, and hairless. The lower leaves have smooth margins, but stem leaves have one or two pair of narrow lobes. The daisy-like flower heads are terminal, solitary, and all disk and ray flowers are golden-yellow (Greene 1888; Ornduff 1993). The phyllaries (bracts below the flower head in the aster family) are one-quarter to one-half fused; where all other species of *Lasthenia* have either free phyllaries or phyllaries fused more than two thirds of their length. The achenes (fruit) of Contra Costa goldfields are less than 0.06 inch long and always lack a pappus (the hair-like or scale-like structures attached to an achene, which assist in dispersal) (Ornduff 1969, Ornduff 1993). Contra Costa goldfields flower from March to June (Ornduff 1966, Ornduff 1976) and are self-incompatible. Habitat for Contra Costa goldfields includes vernal pools, swales, moist flats, and depressions within a grassland matrix (CNDDB 2011a).

The two most commonly reported associates are Italian ryegrass (*Lolium multiflorum*) and popcorn flower (*Plagiobothrys* spp.). Other plant species that occur at several Contra Costa goldfield sites include brass buttons (*Cotula coronipifolia*), valley downingia (*Downingia pulchella*), California eryngo (*Eryngium aristulatum*), smooth goldfields (*Lasthenia glaberrima*), common mousetail (*Myosurus minimus*), and California semaphore grass (*Pleuropogon californicus*). Other rare plants that co-occur with Contra Costa goldfields include alkali milk-vetch (*Astragalus tener* var. *tener*), few-flowered navarretia (*Navarretia leucocephala* ssp. *pauciflora*), and Greene's legenere (*Legenere limosa***)** (CNDDB 2007a). Contra Costa goldfields typically grow in vernal pools, swales, moist flats and depressions within a grassland matrix (CNDDB 2007a), and have been found in three types of vernal pools: northern basalt flow, northern claypan, and northern volcanic ashflow (Sawyer and Keeler-Wolf 1995). Landforms and geologic formations for sites where Contra Costa goldfields occur have not been identified. Elevations for this species typically range from 6 to 200 feet, but one occurrence in Napa County was recorded at 1,460 feet, and the Monterey occurrences are at 400 feet (CNDDB 2007a).

Contra Costa goldfields has been reported in ten counties, which include: Alameda, Contra Costa, Marin, Mendocino, Monterey, Napa, Santa Barbara, Santa Clara, Solano, and Sonoma.

The California Natural Diversity Database (CNDDB) reports 34 occurrences of this species; 8 that are extirpated, 4 that are potentially extirpated, and 22 that are presumed extant (CNDDB 2011a).

The status of the species is uncertain due in part to the difficulty of relocating sites and also because this species may reappear on a site after several years, even if it is absent during a given survey. Additionally, CNDDB occurrences have in some cases either been deleted or lumped, making tracking of the number of occurrences difficult. The majority of the location information used in the Service's 2008 5-year status review is from the CNDDB, which reports species locations as "occurrences" rather than populations. An "occurrence", which may represent a documented collection, observation, or museum specimen of a species, is defined by the CNDDB as a location occupied by a species separated from other locations by at least 0.25 mile, and may contain multiple records.

When Contra Costa goldfields was listed as endangered in 1997, the primary threats to its survival and recovery were activities that result in the direct destruction of the plants and their habitats or hydrologic changes in their vernal pool habitats. Such activities include urbanization, wetland drainage, industrial development, agricultural land conversion, ditch construction, off highway vehicle use, road widening, and trampling by cattle. We have no new information to suggest that these threats to the species have substantially changed since the time of listing in 1997. In addition, other factors, such as drought, vineyard conversion, competition from weedy invasive plants, inappropriate livestock grazing, and elimination of grazing may also threaten this species. The majority of the localities of Contra Costa goldfields do not have management plans, monitoring programs, or adequate funding to ensure that these localities are sustainable in perpetuity. Lack of management, monitoring, and funding are not, in themselves, threats to Contra Costa goldfields; however, without these components, the potential threats described above may not be identified and eliminated.

There are 8 occurrences within the range of the Contra Costa goldfields that are protected from development. Twelve occurrences of this species remain unprotected and all of these sites are on private lands. Other than habitat preservation, other criteria discussed within the recovery plan (Service 2005b) for the species have not been met, and in some instances, not initiated, including research, monitoring, management, and public participation and outreach. Contra Costa goldfields continues to be faced with threats of habitat loss due to urbanization, agriculture practices, invasive weeds, and intensive cattle grazing.

<u>Monterey Gilia</u>

Monterey gilia was listed as a federally endangered subspecies on June 22, 1992 (Service 1992). Critical habitat has not been designated for this subspecies. Information contained in this account was obtained primarily from the Monterey Gilia (*Gilia tenuiflora* ssp. *arenaria*) 5-Year Review: Summary and Evaluation (Service 2008b).

Monterey gilia is an annual herbaceous plant in the phlox family (Polemoniaceae), endemic to the Monterey Bay and Peninsula dune complexes. Individual plants are less than 6.7 inches tall, with a basal rosette of leaves and white and purple funnel-shaped flowers. Fifteen known natural occurrences are distributed in discontinuous populations from Spanish Bay on the Monterey Peninsula north to Moss Landing. Monterey gilia is typically associated with sandy soils of dune scrub, coastal sage scrub, and maritime chaparral vegetation types in the coastal dunes of Monterey County, California.

There are likely 24 currently extant occurrences of Monterey gilia; 7 occurrences were known at the time the subspecies was listed. Since listing, 11 additional inland occurrences of Monterey gilia have been located, 12 coastal occurrences have been located, and 5 occurrences have likely been extirpated. One occurrence was extirpated prior to listing. Although these inland occurrences may constitute a range extension from what was known at the time of listing, the overall range of the taxon is still limited. It is unclear as to where the range of the subspecies *Gilia tenuiflora* ssp. *arenaria* ends and the range of *Gilia tenuiflora* ssp. *tenuiflora* begins. There is an additional possibility that some cross-breeding is occurring on the boundary between these subspecies. Genetic analyses should be undertaken to confirm the range extents within this species.

The primary threats to Monterey gilia relate to habitat destruction due to development and an increase in cover by invasive, nonnative plant species which inhibits its ability to germinate and colonize. The interior sites are generally more at risk than coastal populations. The coastal populations of Monterey gilia on State Park lands are relatively more protected than interior sites at this time, although nonnative plant control is required at virtually all sites and repeated out-plantings have been necessary to maintain numbers and expand population areas. Because invasive species are a concern throughout the Monterey Bay region, it is likely that they pose a threat to Monterey gilia on private parcels in this area as well; however, little information is available regarding the status of occurrences on private lands along the coast. Other human-caused factors that could affect the inland occurrences at former Fort Ord are vegetation management activities that fail to create or maintain the open, sandy conditions necessary for continued survival and colonization by Monterey gilia. These include the elimination of fire from chaparral communities, poorly timed (e.g., wet season) prescribed fires, the use of pre-fire treatments that result in increases in nonnative species, and the use of mechanical vegetation clearing that leaves the chipped vegetation on the soil surface (Zander and Associates 2007).

The status of Monterey gilia since the time of listing has likely improved at some sites by virtue of current or planned management for conservation. Along the coast, acquisition of one private parcel by Big Sur Land Trust and management activities within the State Park units have been a benefit to the long-term conservation of the taxon. At inland sites, the current and future transfer of lands from former Fort Ord to the University of California and Bureau of Land Management (BLM) will also potentially benefit the long-term conservation of the taxon; however, planned losses of habitat along the western edge of former Fort Ord via land transfers to local agencies for development, and likely future development of other private lands along the coast, will result

in direct losses of populations, secondary impacts to a portion of the remaining populations, and increased fragmentation of remaining habitat particularly between the coastal and inland populations. For all remaining populations, both coastal and inland, threats due to invasive species will persist and will likely require management in perpetuity (Bossard et al. 2000).

Yadon's Piperia

Yadon's piperia was listed as a federally endangered species on August 12, 1998 (Service 1998), and 2,117 acres of critical habitat was designated for the species on November 23, 2007 (Service 2007b). Information contained in this account was obtained primarily from the *Piperia yadonii* (Yadon's Piperia) 5-Year Review (Service 2009a)

Yadon's piperia is a slender perennial herb in the orchid family (Orchidaceae). As in other orchids, germination of Yadon's piperia seeds probably involves a symbiotic relationship with a fungus. Following germination, orchid seedlings typically grow below ground for one to several years before producing their first basal leaves. Plants may produce only vegetative growth for several years, before producing flowers. In mature plants of Yadon's piperia, the basal leaves typically emerge sometime after fall or winter rains and wither by May or June, when the plant produces a single flowering stem. The blooming season of Yadon's piperia is fairly short; the first flowers are dependent on age and/or tuber size and will open in late June with blooming completed by early August and fruits maturing from August to early October. The plant is dormant until the winter rains stimulate root and leaf bud development. Pollinators include nocturnal moths, bumblebees, and infrequent midges and mosquitoes (Doak and Graff 2001).

Yadon's piperia has been found in two primary habitat types: Monterey pine forest with an herbaceous, sparse understory; and ridges in maritime chaparral growing beneath dwarfed Hooker's manzanita (*Arctostaphylos hookeri*) shrubs in shallow soils (Morgan and Ackerman 1990, Allen 1996, Doak and Graff 2001). In the Monterey pine forest habitat, the species grows through pine needle duff among sparse herbaceous vegetation. Yadon's piperia grows in filtered sun on soils (sandy, podzolic, or decomposed granite when associated with Monterey pine and manzanitas) with a shallow clay hard pan that becomes very dry during the flowering season. Overall, this species favors a well-drained sandy soil substrate with podzolic conditions; areas that retain moisture during the rainy season but are not subject to inundation (Yadon, in litt. 1997). In some Monterey pine forest locations, Yadon's piperia plants occur among dense stands of the nonnative annual quaking grass (*Briza maxima*) (Doak and Graff 2001). In maritime chaparral habitat in northern Monterey County, plants grow on sandstone ridges where soils are shallow. They are commonly found under the edges of prostrate mats of Hooker's manzanita. Yadon's piperia can occur in some locations where disturbance has occurred in the past 10 to 15 years and continue to be affected by limited recreation, development, and landscaping, such as abandoned dirt roads or cut slopes created by road construction (Allen 1996). Like other orchid species, Yadon's piperia does not appear to be an early successional species but is able to colonize trails and road banks within dwarf maritime chaparral or Monterey pine forest once a decade or more has passed and if light and moisture regimes are favorable (Allen 1996; Yadon, in litt. 1997).

The center of distribution for Yadon's piperia is the Monterey Peninsula where plants are found throughout the larger undeveloped tracts of Monterey pine forest. To the north, the range of Yadon's piperia extends to the Los Lomas area, near the border of Santa Cruz County (Allen 1996; Yadon, in litt. 1997). Since preparation of the listing rule, Yadon's piperia has been found at one location south of the Monterey Peninsula near Palo Colorado Canyon in maritime chaparral (Norman, in litt. 1995). Yadon's piperia has been found only 4 to 6 miles inland (Allen 1996; Yadon, in litt. 1997) despite searches of lands farther east (Allen 1996). The final recovery plan lists five geographic areas important for recovery of the species: Monterey Peninsula, the interior of Monterey Peninsula, north County/Elkhorn/Prunedale, Point Lobos, and Palo Colorado Canyon.

The Pebble Beach Company funded intensive surveys for Yadon's piperia, focusing on the Monterey Peninsula in 1995 and beyond the Peninsula in western Monterey County in 1996. Yadon's piperia plants have been counted at known sites, approximately 346 acres, throughout the range of this species since 1990 (Morgan, in litt. 1992; Uribe and Associates 1993; Norman, in litt. 1995; Allen 1996; Jones and Stokes 1996). During the 1995 surveys, the greatest concentrations of Yadon's piperia, approximately 57,000 plants, or 67 percent of all known plants, were found scattered throughout much of the remaining Monterey pine forest owned by the Pebble Beach Company and the Del Monte Forest Foundation on the Monterey Peninsula (Allen 1996). About 8,500 of these plants were in designated open space areas (Allen 1996). Another 2,000 plants, 2 percent of all known, occurred on remnant patches of Monterey pine forest in parks and open space areas of Pacific Grove and Monterey (Allen 1996; Jones and Stokes 1996). During a 2004 follow-up survey in known occupied habitat, 129,652 plants, a 240 percent increase from the previous surveys, were identified on lands owned by Pebble Beach Company (Zander Associates 2004).

East of the Monterey Peninsula, individuals were identified on or near the Monterey Peninsula Airport, but the population appears to have been greatly reduced in certain areas of the airport (Leitner, Environmental Science Associates, in litt. 2001; CNDDB 2009). More than 2,350 plants have been identified at the Naval Postgraduate School/Navy Golf Course in Monterey where they continue to be discovered and are expanding due to management efforts (Greening Associates 1999). At the former Fort Ord site, Yadon's piperia was only known to occur in the extreme northern and southern boundaries until surveys conducted in 2009 identified at least 340 flowering Yadon's piperia in 118 locations on approximately 47 acres (Service 2009a, Army 2011). The remaining populations occur on properties owned by the Pebble Beach Company, Del Monte Forest Foundation, U.S. Department of Defense, County of Monterey, City of Carmel, Monterey Peninsula Regional Park District, and an undetermined number of other private landowners (Jones and Stokes 1996). The largest populations occur on property owned and managed by the Pebble Beach Company (Jones and Stokes 1996). Several of the privately-owned populations continue to be threatened by development. Although some of the populations are protected from development, threats to their long-term survival include nonnative species and recreational activities.

Inland to the north of the Monterey Peninsula, about 18,000 Yadon's piperia plants, or 21 percent of all known plants, have been found on the chaparral-covered ridges north of Prunedale (Allen 1996). South of the Peninsula, about 7,500 plants have been found on California Department of Parks and Recreation properties at Point Lobos Ranch (Big Sur Land Trust, in litt. 1997) and in a smaller parcel that is in private ownership. Considering the current abundance of Yadon's piperia in the remaining large tracts of Monterey Forest, this species probably occurred throughout the Peninsula when Monterey pine forests were much more extensive before urbanization.

South of Carmel Highlands, near Palo Colorado Canyon, 38 plants were observed in 1995. Plants were identified but not quantified on a return visit to the site in 2004. This site, in private ownership, was noted to be high quality chaparral with a unique assemblage of species (CNDDB 2009).

At the time of listing in 1994, habitat fragmentation and development were named as threats to Yadon's piperia. Much of the habitat fragmentation occurred in the past and the resulting effects are still a threat. The potential for further fragmentation of the remaining populations continues to be a threat to the species. Other threats to habitat for Yadon's piperia at the time of listing, and that continue, include competition from nonnative plants, mowing of vacant properties, roadside maintenance and a fire directive allowing mowing within 6 to 8 inches of the ground surface of habitat along roadways in the Pebble Beach area (Yadon, in litt. 2002, Stromberg, in litt. 2002), the potential loss of viable habitat due to changes in vegetative structure within sites following fire suppression (Graff 2006), and loss of plants from potential improvement projects at the Monterey Peninsula Airport. Large portions of the existing population at the airport may be lost from proposed future projects. Since the time of listing, the threat of development and habitat fragmentation has been reduced somewhat; in particular, some of the densest populations of Yadon's piperia on Monterey Peninsula have been set aside in designated Open Space areas by Pebble Beach Company and will likely not be developed in the future. In addition, there are plans to acquire populations of Yadon's piperia in the near future for conservation and they will receive an additional level of protection through implementation of management plans. Since the time of listing, extensive surveys have detected an expanded known range, additional populations, and higher numbers of individuals; however, a number of factors have been shown to reduce the reproductive potential of the species. Recent research has shown high rates of herbivory have significantly affected the populations of Yadon's piperia over time by reducing the ability of individual plants to survive and reproduce (Doak and Graff 2001). Research has also elucidated the importance of pollinators to achieving viable seed set, which is also crucial for long-term persistence (Doak and Graff 2001). Therefore, although the range is greater and the number of populations and individuals now known is higher than at the time of listing, threats including herbivory, disease, and low rates of seed set may be decreasing the long-term persistence of the species.

Monterey Spineflower

The Monterey spineflower was listed as a federally threatened species on February 4, 1994 (Service 1994), and 11,055 acres of critical habitat was designated on January 9, 2008 (Service 2008c). Information contained in this account was obtained primarily from the Monterey Spineflower (*Chorizanthe pungens* var. *pungens*) 5-Year Review (Service 2009b).

Monterey spineflower is a prostrate annual species in the buckwheat family (Polygonaceae). It has long, somewhat wiry branching stems supporting aggregates of small white to pinkish flowers. Seeds typically germinate after the onset of winter rains and plants can be found above ground as early as December (Fox et al. 2006). Flowering occurs from late March to June, depending on weather patterns, and seed is dispersed in mid-summer.

At the time of listing, Monterey spineflower in the Monterey Bay area was known from scattered populations along the immediate coast, in the Prunedale Hills at Manzanita Park, in the coastal and inland areas of former Fort Ord, and from historical collections described as east of Watsonville and near Mission Soledad in the Salinas Valley. Since its listing, additional populations of Monterey spineflower have been discovered in the Prunedale Hills of Monterey County and interior areas of Santa Cruz County.

Monterey spineflower is currently known to be extant in southern Santa Cruz and northern Monterey Counties. The distribution of Monterey spineflower extends from Santa Cruz County south along the Monterey Bay to the Monterey Peninsula. Two historical collections were made farther south, in southern Monterey County in 1935 and in northern San Luis Obispo County in 1842. The CNDDB lists 29 extant occurrences of Monterey spineflower in this range (CNDDB 2011b). Populations also occur inland in Monterey County in the Prunedale Hills and at former Fort Ord. One population has also been located in the Soledad area of the Salinas Valley (Reveal and Hardham 1989, CNDDB 2011b).

As an annual species, Monterey spineflower responds strongly to annual precipitation patterns and amounts, resulting in large fluctuations in the population of plants visible above-ground from year to year. Many populations support large numbers of individuals (thousands or tens of thousands of plants) scattered in openings among the dominant perennial vegetation (CNDDB 2007b).

Researchers recently investigated the phylogenetic relationships of various members of the genus *Chorizanthe*, subsection *Pungentes*, including Monterey spineflower (Brinegar 2006, Baron and Brinegar 2007, Brinegar and Baron 2008). Results from the first phase of the molecular study, using ribosomal DNA internal transcribed spacer (ITS) sequencing, indicate that Monterey spineflower and robust spineflower appear to be more closely related to one another than to the other subspecific taxa in the *C. pungens* and *C. robusta* complex. In a second phase of analysis, researchers sequenced chloroplast DNA to determine if it was possible to further differentiate Monterey spineflower from robust spineflower based on these genetic techniques. Results indicated that: (1) there is a general agreement between the results of the ITS sequencing and the

DNA phylogenies for the *C. pungens/C. robusta* complex, while results for the other *Pungentes* taxa are often inconsistent with their position in the ITS-based phylogeny; (2) there is a general biogeographical pattern to this phylogeny with regard to the *C. pungens/C. robusta* complex; and (3) there is genetic diversity between populations of Monterey spineflower. While the researchers suggest that a taxonomic revision of the *Pungentes* complex may be in order, no changes are being proposed at this time (Baron in litt. 2008).

Monterey spineflower readily grows where suitable sandy substrates occur and, like other *Chorizanthe* species, where competition with other plant species is minimal (Harding Lawson Associates 2000; Reveal 2001). Studies of the soil requirements and shade tolerances of a related taxon, Scotts Valley spineflower (*Chorizanthe pungens* var. *hartwegiana*), concluded that this taxon is restricted to openings in sandy soils primarily due to its intolerance of shade produced by competing vegetation, rather than its restriction to the specific soil type (McGraw and Levin 1998).

Where Monterey spineflower occurs within native plant communities, along the coast as well as at more interior sites, it occupies microhabitats found between shrubs where there is little cover from other herbaceous species. In coastal dune scrub, shifts in habitat composition caused by patterns of dune mobilization that create openings suitable for Monterey spineflower are followed by stabilization and successional trends that result in increased vegetation cover over time (Barbour and Johnson 1988). Accordingly, over time there are shifts in the distribution and size of individual colonies of Monterey spineflower found in the gaps between shrub vegetation.

Human-caused disturbances, such as scraping of roads and firebreaks, can reduce the competition from other herbaceous species and consequently provide favorable conditions for Monterey spineflower, as long as competition from other plant species remains minimal. This has been observed at former Fort Ord, where Monterey spineflower occurs along the margins of dirt roads and trails and where it has colonized disturbances created by military training (Corps 1992, BLM 2003). However, such activities also promote the spread and establishment of nonnative species, can bury the seedbank of Monterey spineflower, and do not result in the cycling of nutrients and soil microbial changes that are associated with some large-scale natural disturbances, such as fires (Stylinski and Allen 1999, Keeley and Keeley 1989).

The primary threats to the Monterey spineflower identified at the time of listing were development for human uses, recreation, and encroachment of invasive nonnative species into its habitat. While these are still occurring and diminishing occurrences of Monterey spineflower, other lands that support this taxon have been purchased by conservation-oriented organizations and are preserved (e.g., Long Valley in the Prunedale Hills) or have the potential for long-term preservation (e.g., Caltrans lands). Within its range, numerous occurrences are on lands being restored or enhanced (e.g., State Beaches, Naval Post-Graduate School) or are planned for restoration and enhancement (e.g., former Fort Ord). A primary component of these programs is

the removal of nonnative invasive species that compete with Monterey spineflower. Monterey spineflower appears able to recolonize sites where nonnative species have been removed (Service 2009b).

Monterey Spineflower Critical Habitat

Critical habitat for Monterey spineflower was designated in a revised rule on January 9, 2008, designating a total of 11,055 acres within 9 critical habitat units in Santa Cruz and Monterey Counties, California (Service 2008c).

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas to designate as critical habitat within the geographical area occupied by the species at the time of listing, we consider the physical and biological features that are essential to the conservation of the species to be the PCEs laid out in the appropriate quantity and spatial arrangement for conservation of the species. These include, but are not limited to: space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing (or development) of offspring; and habitats that are protected from disturbance or are representative of the historic, geographical, and ecological distributions of a species.

The primary constituent element of critical habitat for Monterey spineflower is a vegetation structure arranged in a mosaic with openings between the dominant elements (e.g., scrub, shrub, oak trees, or clumps of herbaceous vegetation) that changes in spatial position as a result of physical processes such as windblown sands and fire and that allows sunlight to reach the surface of the following sandy soils: coastal beaches, dune land, Baywood sand, Ben Lomond sandy loam, Elder sandy loam, Oceano loamy sand, Arnold loamy sand, Santa Ynez fine sandy loam, Arnold-Santa Ynez complex, Metz complex, and Metz loamy sand (Service 2008c).

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) of the Act define the “action area” as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations 402.02). For the purposes of this biological opinion, we consider the action area to include all areas where people and equipment would be working within the project footprint as described in the description of proposed action section of this biological opinion.

Former Fort Ord is a former Army installation that served as a training and staging base for infantry soldiers from 1917 until its closure in 1994. The base was comprised of 27,827 acres on the central coast of California in northwestern Monterey County. Monterey Bay and the Santa Lucia Range occur from the western and southern boundaries of former Fort Ord, respectively. The cities of Marina and Seaside are northwest and southwest of former Fort Ord, respectively.

The range of topographic, climatic, and soil conditions at former Fort Ord have resulted in unique biological communities including diverse flora and many locally endemic species. Coastal fog affects the gently rolling hills of the near-shore communities while the inland areas, sheltered by steeper hills, are hotter and drier. Much of former Fort Ord is underlain by sand deposits of Pleistocene origin. The southeastern portion is dominated by clay pan soils on Paso Robles sandstone. Several of former Fort Ord's unique biological communities are associated with these substrates. There are more than 450 plant taxa at former Fort Ord that occur in four significant habitat types: central maritime chaparral, coastal oak woodlands, wetland and vernal ponds, and mixed species grasslands (Jones and Stokes 1992). Ten species of plants known from former Fort Ord are endemic to north coastal Monterey County and adjacent coastal Santa Cruz County, mostly in maritime chaparral and vernal pond habitats. Diverse habitat conditions at former Fort Ord support a broad array of wildlife species. Wildlife surveys have identified over 260 vertebrate species on former Fort Ord (Army 2011).

California Tiger Salamander

Wetland wildlife surveys were conducted for salamanders and other aquatic fauna in April 1992 as part of the Fort Ord flora and fauna baseline study (Jones and Stokes 1992). Surveys resulted in the identification of California tiger salamander larvae at 8 of the 26 surveyed locations. Results of wetland surveys since the initial baseline study have found California tiger salamander larvae present in two additional vernal pools where larvae were not found during the 1992 baseline surveys.

In 2003, students and faculty from the University of California Davis surveyed for California tiger salamanders at 14 locations on BLM public lands at former Fort Ord. Machine Gun Flats, Lower Machine Gun Flats, and Pool 36 were estimated to contain 318, 324, and 156 California tiger salamander larvae respectively (BLM 2003, Army 2011).

A total of 37 locations on approximately 91 acres of former Fort Ord are known California tiger salamander breeding sites. Of the locations known to support California tiger salamander populations, 10 of these areas which are in close proximity to each other may represent a metapopulation in the Hennekens Ranch Road area (Pools 5, 42, 56, 57, 58, 59, 60, Machine Gun Flats, 101 East and 101 West). The total acreage of potential California tiger salamander breeding habitat is 91 acres with approximately 11 acres occurring within units 4, 9 and 11 (Army 2011).

Contra Costa Goldfields

Baseline biological surveys conducted in 1992 found no Contra Costa goldfields populations on former Fort Ord. In June of 1998, BLM botanist, Bruce Delgado, and member of the California Native Plant Society, Vern Yadon, first discovered Contra Costa goldfields in vernal pond areas of former Fort Ord, and the Army conducted targeted surveys of potential Contra Costa goldfields habitat in June and July of 1998. A total of four populations of Contra Costa goldfields occupying approximately 5 acres have been identified on former Fort Ord. These populations occur within vernal pool habitats and in "mima mound" topography. Two of the

four populations are located within munitions response Site 10B and have been monitored by the Army to determine whether impacts to the Contra Costa goldfields populations have occurred as a result of munitions response actions. Another Contra Costa goldfields population occurs on munitions response Site 58, which is located just north of Eucalyptus Road adjacent to BLM Headquarters. The fourth Contra Costa goldfields population occurs adjacent to Trail 19 that is located on land already transferred to the BLM.

No populations of Contra Costa goldfields have been found in units 4, 5A, 9, 11, or 12. There are 1,987 acres containing suitable habitat that could potentially support populations of Contra Costa goldfields in the dry upland habitat portions of the vernal pool watersheds. Approximately 1,870 acres of the suitable habitat occur within areas that may be affected by vegetation clearance and munitions response activities. Approximately 108 acres of this suitable habitat occurs within units 4, 5A, 9, 11, and 12 (Army 2011).

Monterey Gilia

The first basewide survey including the Monterey gilia was conducted by Jones and Stokes Associates, Inc. (Jones and Stokes) in 1992 and 1993. The survey provided data on the general distribution and estimated abundance of Monterey gilia on former Fort Ord. The report estimates approximately 3,756 acres of Monterey gilia habitat occur on former Fort Ord. Since the Jones and Stokes survey, more than 860 acres of Monterey gilia has been mapped on former Fort Ord with more than 510 acres of Monterey gilia populations identified outside of the Monterey gilia habitat polygons mapped by Jones and Stokes in those years.

No Monterey gilia were found during the spring 2011 baseline surveys for units 4, 5A, and 9. Approximately 3 acres of Monterey gilia were discovered in units 11 and 12 during the spring 2011 baseline surveys.

Yadon's piperia

The first basewide biological survey that included Yadon's piperia was first conducted by Jones and Stokes in 1992. The survey identified Yadon's piperia on four parcels in the northwest corner of the installation (parcels E2a, E4.1, L7.1, and S4.1.3). These parcels occupy approximately 13 acres.

Since the 1992 survey, additional populations of Yadon's Piperia have been found in various locations. In 2004, approximately 12 flowering Yadon's piperia were discovered by local naturalists on the 0.65-acre development parcel, E29b.3.1. The area was surveyed again by volunteers in 2008, 2009, and 2010, resulting in 34, 50, and 70 flowering Yadon's piperia found, respectively. On July 1, 2009, a naturalist conducting plant inventories in areas approved for public access discovered one Yadon's piperia in full bloom along Eucalyptus Road just inside the Impact Area fence, east of the BLM headquarters. On June 2010, California Native Plant Society volunteers discovered 340 flowering Yadon's piperia in 118 locations on approximately 47 acres, primarily in the southern portion of the Impact Area along fuel break roads Nowhere Road, Orion Road, Evolution Road, Darwin Road, Mercury Road, and Wildcat Ridge Road. In

contrast to Yadon's piperia habitat found in the moist Monterey pine forests, nearly all of the Yadon's piperia located in the Impact Area were found in sparsely vegetated chaparral on rocky ridge tops. Many of the 70 plus plants in bloom along Wildcat Ridge Road grew where there appeared to be only a small amount of soil between the bare sandstone of the ridge top. Some of these populations occur in the fuel breaks surrounding units 11 and 12. The inventory was restricted to cleared access roads due to explosive risks, and it is likely that additional individuals and populations of Yadon's piperia occur outside of the cleared access roads. Currently there are approximately 60 acres of Yadon's piperia habitat on former Fort Ord. Populations of Yadon's piperia have been encountered within the 45- to 50-foot fuel breaks surrounding units 4, 5A, 9, 11, and 12 (Army 2011).

Monterey Spineflower

The first basewide biological survey that included Monterey spineflower was conducted by Jones and Stokes in 1992. The survey provided data on the general distribution and estimated abundance of Monterey spineflower throughout former Fort Ord. A total estimate of 10,456 acres of Monterey spineflower habitat was identified in this report.

Within grassland communities on former Fort Ord, Monterey spineflower occurs along roadsides, in fuel breaks, and in other disturbed sites, while in oak woodland, chaparral, and scrub communities, they occur in sandy openings between shrubs. In older stands with high shrub cover, it is limited to roadsides, fuel breaks, and trails that bisect these communities. At former Fort Ord, the highest densities of Monterey spineflower are located in the inland ranges where moderate disturbance has been the most frequent. Since the 1992 survey, additional data has been collected on all sites where Army remedial actions have been conducted. More than 886 acres of Monterey spineflower populations have been identified since the Jones and Stokes surveys were conducted in 1992, with more than 183 acres of Monterey spineflower occurring outside of the Jones and Stokes polygon (Army 2011).

Two populations totaling approximately 3 acres of Monterey spineflower were discovered in units 4 and 9 during the spring baseline surveys in 2011. Approximately 36 acres of Monterey spineflower were discovered in units 11 and 12 during the spring 2011 baseline surveys (Army 2011).

Status of Critical Habitat in the Action Area

The 727 acres proposed for manual and mechanical vegetation clearing contains approximately 584 acres of Monterey spineflower critical habitat (see Table 1 for acreages per unit).
Critical habitat on former Fort Ord (Unit 8) comprises 9,432 acres of grassland, maritime chaparral, coastal scrub, and oak woodland, and is entirely within former Fort Ord. Approximately 87 percent of this critical habitat unit is Federal land (8,172 acres) managed by BLM and the Army, 6 percent is State land (606 acres), and 7 percent is under local jurisdictions (654 acres). Portions of Fort Ord have been transferred to BLM; University of California, California State University at Monterey Bay; and local (city and county) jurisdictions. All of the lands included in this unit are designated as current or future habitat reserves under the Army's

habitat management plan (Corps 1997). About one-half of Unit 8 still must be cleaned of environmental contaminants by the Army before it can be transferred to BLM.

Unit 8 contains space for individual and population growth, including sites for seed dispersal and germination; provides the basic requirements for growth; and includes soils in the Arnold-Santa Ynez complex, Baywood sand, and Oceano loamy sand series (Soil Conservation Service 1978). Lands in this unit are intended to be managed at a landscape scale, using prescribed fire, as needed, to maintain a range of different-aged maritime chaparral stands (Corps 1997), and by doing so preserve substantial populations of rare maritime chaparral species in the Monterey Bay area. This unit was occupied at the time of listing (Service 1994) and is currently occupied. This unit is essential because it currently supports multiple large populations of Monterey spineflower, and it is one of only five units that include maritime chaparral and oak woodland habitats more representative of hotter, interior sites. The features essential to the conservation of the species may require special management considerations or protection in this unit due to threats from invasive species that crowd out Monterey spineflower, munitions cleanup methods on former ranges that remove and chip all standing vegetation, and recreational activities and road and trail maintenance that could trample plants (Service 2008c).

EFFECTS OF THE ACTION

The Effects of the Action in this biological opinion pertains to the proposed 727 acres of manual and/or mechanical vegetation clearing and the transfer of parcel E29b.3.1. Effects of the removal of munitions and explosives of concern and other cleanup actions on former Fort Ord have been addressed in the existing biological opinions 1-8-99-F/C-39R, 1-8-01-F-70R, and 1-8-04-F-25R.

Manual and/or Mechanical Vegetation Clearance

Plants

All manual and mechanical vegetation clearance activities may result in direct mortality or temporary loss of Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia. These effects would be avoided or minimized by (1) holding an environmental training that includes a description and photo presentation of HMP species, including federally listed plant and wildlife species that could be encountered in the project area and the environmental laws related to the conservation of these species, and guidelines and specific minimization measures that personnel must follow to reduce or avoid impacts to federally listed species or habitat; (2) the presence of an onsite biologist overseeing activities to ensure minimization and avoidance measures are implemented; (3) flagging and/or mapping of populations of HMP plant species including to the extent possible; (4) restricting the footprint of work areas, excavations, staging and road access areas to the extent possible, and delineating access and work areas; using existing roads wherever possible, minimizing use of vehicles off roads; and (5) avoiding vegetation clearance within occupied Contra Costa goldfields areas (vegetation in these areas is typically low growing and does not limit safe access for cleanup activities).

The manual and/or mechanical vegetation clearance may also reduce or eliminate seed reproduction and/or resprouting of species within central maritime chaparral habitat, as indicated in the study conducted by Athna Government Services Corporation (Athna) (2002). These effects would be greater for Monterey gilia, Monterey spineflower**,** and Yadon's piperia, which are seed reproducing species, if vegetation removal activities are conducted prior to seed set. Reproduction may also be reduced or inhibited if chipped material is left on the site. Leaving chipped material on the ground has been known to reduce cover of live vegetation, either by chemical or physical inhibition (Athna 2002) and has been identified as a threat to Monterey spineflower and Monterey gilia, as the chipped material eliminates open, sandy conditions necessary for these species (Zander and Associates 2007, Service 2008c). The potential effects of reduction of density and cover of central maritime chaparral due to manual and/or mechanical clearance of vegetation will be minimized through the planned use of prescribed burns in the cleared areas once cleanup activities have been completed and the vegetation has regrown for approximately 5 years or has grown sufficiently to carry a fire, and by limiting the amount of chipped material left on site. As vegetation clearance activities will not commence until immediately following the issuance of this biological opinion, the proposed vegetation clearance activities will not impede seed set for Monterey gilia, Monterey spineflower**,** and Yadon's piperia. Results of burning after cutting in the Parker Flats prescribed burn experiment on former Fort Ord (Pierce et al. 2010) demonstrate that though the cover of species that vegetatively regenerate (resprouters) has decreased, the cover of plant species that regenerate from seed (obligate seeders) at Parker Flats has increased, and species diversity in treated (cut, crushed, or chained) burned plots was greater than in untreated burned plots and double that of unburned plots. Overall, the study concludes that the 2005 prescribed burning post-vegetation treatment has enhanced the cover of obligate-seeding plant species, the diversity of plant species, and the densities of HMP plant species at Parker Flats in 2010 relative to pre-burn conditions (Pierce et al. 2010).

Table 1 outlines the number of acres of Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia that may be adversely affected by the proposed manual/mechanical vegetation clearance activities.

Table 1. Vegetation clearance impacts on federally listed plants (Army 2011, W. Collins, Fort Ord BRAC office, in litt. 2011).

Unit	Yadon's piperia (acres)	Monterey gilia (acres)	Monterey spineflower (acres)	Monterey spineflower critical habitat (acres)	Contra Costa goldfields* (vernal pool habitat (acres))
4	3.76	0	0.45	53.12	7.83
5a	0	0	0	22.23	0.22
9	0.68	0	2.17	32.95	0
11	9.41	0	199	272.88	2.60
12	7.29	2.52	181.48	203.06	0
Totals	**21.14**	**2.52**	**383.10**	**584.24**	**10.65**

*No Contra Costa goldfields individuals occur within the 2011 Army action areas

In summary, the proposed manual and mechanical vegetation clearance activities could adversely affect Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia due to their presence in the action area and the known reductive effects of cutting on central maritime chaparral species; however, the Army has proposed to implement avoidance and minimization measures during vegetation clearance activities, and will apply prescribed burning to the areas once cleanup actions have been completed and the vegetation has regrown for approximately 5 years or has grown sufficiently to carry a fire. Although burning is the preferred method of vegetation clearance prior to cleanup activities, the presence of large unexploded ordnance has precluded the ability to safely execute the 2011 burn plan. Prescribed burning after cutting and cleanup activities were shown to be a restorative tool after such activities were conducted in Parker Flats on former Fort Ord in 2005.

Effects on Monterey Spineflower Critical Habitat
Manual and mechanical vegetation clearance could adversely affect 584.24 acres of Monterey spineflower critical habitat (Table 2).

The 584.24 acres of Monterey spineflower critical habitat contain one or more of the PCEs for this species and the proposed manual and/or mechanical vegetation clearance could alter PCEs in the project area. Manual and mechanical clearing of vegetation could adversely affect Monterey spineflower critical habitat by altering the vegetation structure and openings that change in spatial position as a result of physical processes such as windblown sands and fire and that allow sunlight to reach the surface of sandy soils where Monterey spineflower occur. This impact will be minimized by limiting the amount of chipped material left on site and use of prescribed fire once cleanup activities have been completed and the vegetation has regrown for approximately 5 years, or has grown sufficiently to carry a fire.

Table 2. Monterey Spineflower Critical Habitat Affected by the Proposed Action (Collins, in litt. 2011)

Unit	Monterey spineflower critical habitat (acres)
4	53.12
5a	22.23
9	32.95
11	272.88
12	203.06
Total	**584.24**

California Tiger Salamander
All California tiger salamanders that occur in the action area could be adversely affected by manual and/or mechanical vegetation removal activities. Manual and/or mechanical vegetation removal activities within California salamander habitat could result in harassment to adult and/or subadult California tiger salamanders caused by disturbance from vegetation clearing and mortality or injury from crushing by equipment or vehicles and worker foot traffic. Work activities, including noise and vibration, may cause California tiger salamanders to leave the

work areas. This disturbance and displacement may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles on roadways. Limiting vegetation removal work in wetland and vernal pool areas to the dry part of the year, limiting mechanical mowing around ephemeral California tiger salamander breeding ponds to only where the vegetation is too dense to safely locate and remove MEC, and the presence of a Service-approved biologist overseeing activities and relocating individuals as necessary, would reduce these impacts.

Uninformed workers could disturb, injure, or kill California tiger salamanders. The potential for this to occur would be reduced by holding an environmental training that includes a description and photo presentation of HMP species, including federally listed plant and wildlife species, that could be encountered in the project area and the environmental laws related to the conservation of these species, guidelines and specific minimization measures that personnel must follow to reduce or avoid impacts to federally listed species or habitat; and appropriate points of contact to report impacts on listed species and/or encounters with California tiger salamanders.

Chemicals used for weed control could harm, injure, or kill California tiger salamanders and/or degrade their habitat. Prohibiting the use of Roundup® within 100 feet of open water and substituting with a zero to low aquatic toxicity herbicide (Such as Rodeo®) in those areas would minimize these impacts.

Although survivorship for translocated California tiger salamanders has not been estimated, survivorship of translocated wildlife, in general, is reduced due to intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, and increased risk of predation. Observations of diseased and parasite-infected amphibians are now frequently reported. Releasing amphibians following a period of captivity, during which time they can be exposed to infections of disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to localities containing species which have had little or no prior contact with such pathogens or parasites. Chytrid fungus is a water-borne fungus that can be spread through direct contact between aquatic animals and by a spore that can move short distances through the water. The fungus only attacks the parts of an animal's skin that have keratin (thickened skin), such as the mouthparts of tadpoles and the tougher parts of adults' skin, such as the toes. It can decimate amphibian populations, causing fungal dermatitis, which usually results in death in 1 to 2 weeks. Infected animals may spread the fungal spores to other ponds and streams before they die. Once a pond has become infected with chytrid fungus, the fungus stays in the water for an undetermined amount of time. Relocation of individuals captured from the project area could contribute to the spread of chytrid fungus. In addition, infected equipment or footwear could introduce chytrid fungus into areas where it did not previously occur.

Trash left during or after vegetation clearance activities could attract predators to work sites, which could, in turn, prey on California tiger salamanders. For example, raccoons (*Procyon*

lotor), coyotes (*Canis latrans*), and feral cats (*Felis catus*) are attracted to trash and also prey opportunistically on California tiger salamanders.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or upland habitat to a degree where California tiger salamanders are adversely affected or killed.

During erosion control activities, application of corrective measures could potentially harm, injure, or kill California tiger salamanders if plastic monofilament netting or similar material is used and California tiger salamanders become entrapped in the material.

Table 3 outlines the number of acres of California tiger salamander habitat that may be impacted, resulting in adverse effects to individuals occupying the habitat, by the proposed manual/mechanical vegetation clearance activities.

Table 3. Vegetation clearance impacts in California tiger salamander habitat.

	California Tiger Salamander	
Unit	**breeding habitat (acres)**	**upland habitat (acres)**
4	7.83	145.21
5a	0.22	31.26
9	0	75.12
11	2.6	272.88
12	0	203.06
Totals	10.65	727.53

Annual biological monitoring reports issued by the Army include reports of surveys and implementation of minimization measures. Table 4 outlines California tiger salamander encounters, circumstances of the encounters, and actions taken, between 2006 and 2010 (Army 2007; Shaw 2008a, 2008b, 2010, 2011).

Table 4: California tiger salamander encounters during Army cleanup activities.

Year	Number encountered/life stage	Circumstances	Action taken
2010	1 adult	Found alive and uninjured in excavation area	relocated
2009	none	N/A	N/A
2008	none	N/A	N/A
2007	2 (1 adult, 1 juvenile)	Both uninjured; adult was found crawling inside of a building after a rain event; juvenile was found under a log during preparation for MEC removal	all relocated
2006	3 adults	1 adult was found in a concrete maintenance bay approximately 1.9 km from the nearest known breeding pond. (No information available on the circumstances for the other 2 adults).	all relocated

In summary, the proposed action could adversely affect California tiger salamanders due to the occurrences of the species in the project area and the presence of breeding and upland habitat; however, the Army has proposed avoidance and minimization measures to reduce these impacts, and zero to three California tiger salamanders have been encountered and relocated during cleanup activities in 5 consecutive years; therefore, we anticipate that few, if any, California tiger salamanders are likely to be killed or injured during the proposed work.

Property Transfer

The transfer of the 0.65 acre parcel E29b.3.1 to the City of Monterey would result in the loss of Federal protection for Yadon's piperia population on the site, and could potentially result in extirpation of the population there; however, to offset these impacts the Army will continue to implement HMP conservation and management requirements on lands designated as habitat reserve, habitat corridor, habitat corridor with development allowances, and development with reserves or restrictions, comprising 18,762 acres on former Fort Ord.

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.

Currently, a habitat conservation plan (HCP) is in development for lands on former Fort Ord that have been or will be transferred to non-Federal entities. Table 5 outlines the acreages of listed species' habitat that may be affected by future land transfers. Effects of these land transfers could be both beneficial and adverse to federally listed species. Development parcels will have no resource management restrictions; though, habitat reserves will not be developed and will be

managed with the goal of conservation and enhancement of threatened and endangered species. Habitat corridors are lands between major reserve areas, to be managed to promote connections between conservation areas. Development with reserve areas or development with restrictions will be slated for development but will contain inholdings of reserve or require specific restrictions to protect biological resource values; management of reserve inholdings must match those for habitat reserves, while management in developable areas must proceed with certain specific restrictions identified in the HMP (Corps 1997).

Table 5. Acres of habitat on lands designated for transfer

Category	California tiger salamander		Yadon's piperia	Sand gilia	Monterey spineflower	Monterey spineflower critical habitat	Contra Costa goldfields
	breeding habitat	upland habitat					
Development	1	2,973	0.65	738	2,745	188	42
Development with Reserve or Restrictions	none	961	15.24	123	988	988	248
Habitat Corridor	none	252	none	30	153	252	27
Habitat Corridor with Development	none	144	none	35	48	144	none
Habitat Reserve	82	14,046	45.62	3,239	6,471	9,515	1,690

CONCLUSION

After reviewing the current status of the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia, the environmental baseline for the action area, the effects of the proposed vegetation clearance and property transfer, and the cumulative effects, it is the Service's biological opinion that the manual and mechanical vegetation clearance of 727 acres and the transfer of parcel E29b.3.1 on former Fort Ord, as proposed, is not likely to jeopardize the continued existence of the California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia, and is not likely to destroy or adversely modify designated critical habitat for Monterey spineflower.

We have based this conclusion on the following:

1. The Army has proposed avoidance and minimization measures to reduce impacts to California tiger salamander, Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia.

2. The Army will minimize the adverse effects of manual and mechanical vegetation clearance by limiting the amount of chipped material on site and applying prescribed burns to the cleared areas once cleanup actions have been completed and the vegetation has regrown for approximately 5 years or has grown sufficiently to carry a fire.

3. The Army will continue to implement HMP conservation and management requirements on lands designated as habitat reserve, habitat corridor, habitat corridor with development allowances, and development with reserves or restrictions, comprising 18,762 acres on former Fort Ord.

4. Few California tiger salamanders have been encountered and relocated during cleanup activities in the past 5 consecutive years.

5. Few, if any, California tiger salamanders are likely to be killed or injured during the proposed vegetation clearance activities.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Section 9 of the Act does not address the incidental take of listed plant species. Consequently, this biological opinion does not include an incidental take statement, reasonable and prudent measures, or terms and conditions for the Contra Costa goldfields, Monterey gilia, Monterey spineflower**,** and Yadon's piperia; however, protection of listed plants is provided in that the Act requires a Federal permit for the removal or reduction to possession of endangered or threatened plants from Federal lands. Furthermore, it is unlawful for any person to remove, cut, dig up, or damage or destroy a listed plant species in knowing violation of any law or regulation of any state or in the course of any violation of a state criminal trespass law [section9(a)(2)(B) of the Act].

The measures described below are non-discretionary, and must be undertaken by the Army so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Army has a continuing duty to regulate the activity covered by this incidental take statement. If the Army fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of

incidental take, the Army must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR 402.14(i)(3)]

The Service anticipates all California tiger salamanders in the action area would be subject to take as a result of project activities. Take would occur in the form of capture during relocation activities and in the form of harassment, harm, injury, or death if: California tiger salamanders are accidentally wounded during work activities or relocation; if they are unable to be collected for relocation and remain in active work areas; if pathogens and/or parasites are transferred during relocation; if a rain event occurs and California tiger salamanders are dispersing through the area during work activities; if opportunistic predators such as raccoons, coyotes, and feral cats, are attracted to trash left in work areas; or if accidental spills of hazardous materials or careless fueling or oiling occur in California tiger salamander habitat.

Incidental take of California tiger salamanders will be difficult to detect because of their small body size and use of aquatic habitat and underground burrows; therefore, finding a dead or injured specimen may be unlikely. California tiger salamanders injured or killed during translocation efforts are likely to be observed; however, mortality from other sources, including the indirect effects of translocation, would be difficult to observe. The observed number of California tiger salamanders taken may be lower than the actual number taken.

If two California tiger salamanders are found dead or injured, the Army must contact our office immediately so we can review the project activities to determine if additional protective measures are needed. Project activities may continue during this review period, provided that all protective measures proposed by the Army and the terms and conditions of this biological opinion have been and continue to be implemented.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the incidental take of the California tiger salamander.

1. The Army must ensure that the level of incidental take that occurs during project implementation is commensurate with the analysis contained herein.

2. Biologists must be authorized by the Service before they survey for, capture, and move California red-legged frogs and California tiger salamanders in the action area.

3. Effects to the California tiger salamander must be minimized in the project area.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Army must comply with the following terms and conditions, which implement the reasonable and prudent measures described

above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1:

   If two California tiger salamanders are found dead or injured during project activities, the Army must contact our office immediately so we can review the project activities to determine if additional protective measures are needed. Project activities may continue pending the outcome of the review, provided that all protective measures proposed by the Army, and the terms and conditions of this biological opinion, have been and continue to be fully implemented.

2. The following terms and conditions implement reasonable and prudent measure 2:

   a. Only qualified personnel authorized under this biological opinion may handle California tiger salamanders. William Collins and Shirley Tudor are hereby authorized to capture, handle, and relocate California tiger salamanders during 2011 vegetation removal activities on former Fort Ord as analyzed in this biological opinion. If the Army wishes to use other biologists to capture, handle, and relocate California tiger salamanders, as described, they must submit the credentials of the biologists who will conduct these activities to us for review and approval at least 30 days prior to the onset of any such activities. Please be advised that possession of a 10(a)(1)(A) permit for the covered species does not substitute for the implementation of this measure. A section 10(a)(1)(A) recovery permit is limited to any act otherwise prohibited by section 9 of the Act for scientific purposes or to enhance the propagation or survival of the affected species. Capture and relocation of listed species can only be authorized through the incidental take anticipated by this biological opinion or through the section 10(a)(1)(B) incidental take permitting process. Authorization of Service-approved biologists is valid for this project only.

   b. The authorized biologist must record all pertinent information when California tiger salamanders are relocated, including the number of individuals captured, site of capture, site of relocation, habitat at capture, and activity for which the relocation was implemented.

3. The following terms and conditions implement reasonable and prudent measure 3:

   a. Prior to the onset of any project related activities, the Service-approved biologist must identify appropriate locations to receive California tiger salamanders from the project area in the event that they need to be relocated. These locations must be in proximity to the capture site, contain suitable habitat, must not be affected by project activities, and be free of exotic predatory species (i.e., bullfrogs,

crayfish) to the best of the approved biologist's knowledge. Captured California tiger salamanders must be released as near as possible to the point of capture, in a manner that maximizes their survival. California tiger salamanders should be released into the mouth of a small mammal burrow or other suitable refugia that reduces the likelihood of desiccation and predation.

b. Handling must be done in an expedient manner with minimal harm to the individuals being handled. The hands and arms of all workers handling tiger salamanders should be free of lotions, creams, sunscreen, oils, ointment, insect repellent, or any other material that may harm California tiger salamanders.

c. When relocating California tiger salamanders, the possible spread of chytrid fungus or other amphibian pathogens and parasites must be minimized by following the Declining Amphibian Populations Task Force's Fieldwork Code of Practice (DAPTF 1998) (Appendix A).

d. If substantial rainfall (greater than 0.5 inch of rain in a 24-hour period) occurs, work activities must cease until the Service-approved biologist has searched the work area for dispersing salamanders. Work activities may resume once the Service-approved biologist has determined that California tiger salamanders that are likely to be killed or injured by work activities are no longer present in the work area.

e. Careful control of trash and other waste products must be practiced at all work sites to avoid attracting predators.

f. Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment that could degrade water quality or upland habitat must be avoided. The Army must inform workers of the importance of preventing hazardous materials from entering the environment, define fueling areas at appropriate distances away from wetland and vernal pool areas or other water bodies, and have an effective spill response plan in place.

g. For erosion control activities, plastic monofilament netting or similar material that could potentially entrap California tiger salamanders or other animals must not be used.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the Army must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement to the Service's Ventura Fish and Wildlife Office (2493 Portola Road, Suite B, Ventura, California 93003) within 60 days following completion of the proposed project. The report must describe all activities

that were conducted under this biological opinion, including activities that were described in the proposed action and required under the terms and conditions. The Army must provide reports of the number of California tiger salamanders relocated from the project area; killed or injured during project related activities; the dates and times of capture, mortality, or injury; specific locations of capture, mortality, or injury; approximate size and age of individuals; and a description of relocation sites.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured California tiger salamander, immediate notification must be made by telephone and in writing to the Ventura Fish and Wildlife Office ((805) 644-1766). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. Injured animals must be transported to a qualified veterinarian. Should any treated California tiger salamanders survive, the Service should be contacted regarding the final disposition of the animals. We recommend that dead California tiger salamanders identified in the action area be tested for amphibian disease and/or undergo genetic analysis for the purpose of investigating hybridization; however, this recommendation is discretionary and to be determined by the Army upon contacting the Ventura Fish and Wildlife Office at the discovery of a dead California tiger salamander. If the Army chooses not to submit dead California tiger salamanders for testing, they must be placed with the California Academy of Sciences (Contact: Jens Vindum, Collections Manager, California Academy of Sciences Herpetology Department, Golden Gate Park, San Francisco, California, 94118, (415) 750-7037).

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.

1. We recommend that the Service-approved biologist(s) relocate any other native reptiles or amphibians found within work areas, and remove nonnative fish and bullfrogs where they occur, using methods that will not adversely affect California tiger salamanders, if such actions are in compliance with State laws.

2. We recommend that dead California tiger salamanders identified in the action area be tested for amphibian disease and/or undergo genetic analysis for the purpose of investigating hybridization.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions, please call Lena Chang of my staff at (805) 644-1766, extension 302.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

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APPENDICES

APPENDIX A. The Declining Amphibian Populations Task Force Fieldwork Code of Practice

A code of practice, prepared by the Declining Amphibian Populations Task Force (DAPTF), provides guidelines for use by anyone conducting field work at amphibian breeding sites or in other aquatic habitats. Observations of diseased and parasite-infected amphibians are now being frequently reported from sites all over the world. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up unapparent infections of novel disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried in a variety of ways between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to novel localities containing species which have had little or no prior contact with such pathogens or parasites. Such occurrences may be implicated in some instances where amphibian populations have declined. Therefore, it is vitally important for those involved in amphibian research (and other wetland/pond studies including those on fish, invertebrates and plants) to take steps to minimize the spread of disease and parasites between study sites.

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 study site.

2. Boots, nets, traps, etc., should then be scrubbed with 70 percent ethanol solution (or sodium hypochlorite 3 to 6 percent) and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland.

3. In remote locations, clean all equipment as described above upon return to the lab or "base camp". Elsewhere, when washing machine facilities are available, remove nets from poles and wash with bleach on a "delicates" cycle, contained in a protective mesh laundry bag.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolates 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 and store them separately and the end of each field day.

5. When amphibians are collected, ensure the separation of animals from different sites and take great care to avoid indirect contact between them (e.g., via handling, reuse of containers) or with other captive animals. Isolation from un-sterilized plants or soils which have been taken from other sites is also essential. Always use disinfected/disposable husbandry equipment.

6. 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.

7. Used cleaning materials (liquids, etc.) 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 (DAPTF 1998).

*When implementing the Declining Amphibian Populations Task Force Code of Practice, the Service-approved biologist may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care must be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.