



## United States Department of the Interior

### U.S. FISH AND WILDLIFE SERVICE

Ecological Services  
Ventura Fish and Wildlife Office  
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IN REPLY REFER TO:  
08EVEN00-2022-0079826-S7

January 30, 2023

Douglas Bryceson  
Conservation Program Manager  
California Army National Guard  
9800 Goethe Road – P.O. Box 269101  
Sacramento, California 95826-9101

Subject: Programmatic Biological Opinion for Multiple Activities at Camp Roberts, San Luis Obispo and Monterey Counties, California

Dear Douglas Bryceson:

This document transmits the U.S. Fish and Wildlife Service's (Service) re-initiated programmatic biological opinion (PBO) based upon our review of the California Army National Guard's (CA ARNG) proposed activities at Camp Roberts, located in San Luis Obispo and Monterey Counties, California, and its effects on the federally endangered California condor (*Gymnogyps californianus*) and San Joaquin kit fox (*Vulpes macrotis mutica*), and the federally threatened vernal pool fairy shrimp (*Branchinecta lynchi*) and purple amole (*Hooveria purpurea* [*Chlorogalum purpureum*]) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). We received your request for formal consultation, dated April 29, 2022, via electronic mail on May 2, 2022.

The purpose of this re-initiation is to evaluate CA ARNG's proposed new activities and an increase in the frequency of previous activities conducted under the original PBO for an additional 10 years (PBO, 1-8-08-F-24) (Service 2009).

This biological opinion is based on information that accompanied your request for consultation, the programmatic biological assessment (PBA) (Padre 2022), correspondence among Service and CA ARNG staff and consultants, and information in our files.

#### **Not Likely to Adversely Affect Determination**

The CA ARNG's request for consultation included the determination that the proposed activities may affect but are not likely to adversely affect the California condor. The CA ARNG will implement the following measures to avoid and minimize effects to the California condor.

1. The Camp Roberts Environmental (ENV) staff will brief troops, employees, tenants, contractors, and other installation users about the potential presence of the California condors at Camp Roberts. Briefings include prohibitions on approaching, harming, or otherwise intentionally disturbing condors.
2. The ENV staff will review all training activities for potential adverse effects on the California condor before they are implemented. If impacts that could result in take are recognized, ENV staff will work with the project proponent to avoid adverse effects by altering or moving the exercise or rescheduling it.
3. Prior to the onset of construction or modification activities or a prescribed burn, the ENV staff will review and survey the proposed locations for potential adverse effects on California condors. If impacts that could result in take are recognized, the ENV staff will work with the project proponent to avoid adverse effects to condors by altering or rescheduling construction activities or prescribed burns. If an increase in condor activity on Camp Roberts occurs, Camp Roberts will coordinate with the Service to ensure take is avoided. Pre-activity surveys prior to military training activities may be required if there is an increase in condor use of Camp Roberts. The ENV Office will determine the need for additional pre-activity surveys based on information obtained from implementation of measure 16 below.
4. All trash will be properly disposed of and removed from the training sites.
5. Water tanks and wildlife guzzlers will be covered or equipped to allow wildlife to escape.
6. The CA ARNG will continue to upgrade powerpoles and powerlines at every opportunity to eliminate electrocution risk to condors, raptors, and other large birds. Upgrades will be tracked and reported to the Service during annual reporting. No new powerlines are proposed for construction. If new powerlines are proposed during the lifespan of the PBO, the Service will be notified to determine if re-initiation of consultation or additional formal consultation will be required.
7. The Range Operations Office will ensure that weapons will not be fired when a condor is observed within 500 feet.
8. The CA ARNG will ensure that non-lead ammunition is used at all times.
9. Speed limits will be enforced to avoid accidental strikes with scavengers feeding on roadkill. The maximum speed limit is 35 miles per hour (mph).
10. Any carcass found within training areas that could potentially attract a foraging condor will be removed and transferred to a location where there is no threat of death or disturbance to condors from military training activities. Roadkill carcasses will be moved away from roads to avoid accidental strikes with scavengers feeding on roadkill.

11. Integrated Pest Management (IPM) plans will be submitted to the Camp Roberts ENV Office for review prior to management activities. If the ENV Office recognizes potential impacts that may result in take of a condor, ENV staff will work with the project proponent to ensure take is avoided.
12. Chemicals to control pests outside of the cantonment area will only be applied by a Department of Defense or California State Certified pest control applicator.
13. The Camp Roberts Fire Department will submit draft prescribed burn plans to the Environmental Directorate for environmental review.
14. If a condor is observed roosting or foraging on Camp Roberts, the prescribed burn in that area will be postponed until it has been determined the condor is safe from harm.
15. The ENV staff will be contacted when a condor is sighted on the installation. The ENV staff will maintain a database of condor sight observations and share the information with the Service.
16. Satellite Global Positioning System (GPS) studies of condor movement will be conducted every five years to evaluate changes in condor use or occurrence at Camp Roberts.
17. The CA ARNG will temporarily halt project or training activities if any condors are observed within the project or training areas prior to the start of work or training. The CA ARNG will allow the condors to depart on their own before project or training activities resume. The work project manager or unit commander will inform the ENV Office if condors are sighted in the work area, and that work or training is stopped.
18. If stopping work or training is not feasible, any condors that enter the project or training location would be hazed to discourage use of the area. Hazing would occur as detailed in the Service hazing guidance memo (Service 2014) and would include only the following: yelling, clapping, and stomping. Hazing will only occur as a last resort method and will be conducted by the ENV staff. If condor hazing is required and ENV staff are unavailable (i.e., after business hours), only the Environmental Compliance Officer (ECO) will conduct hazing activities. Environmental Compliance Officers will receive training on condor identification and hazing methods from the ENV staff. Hazing will only occur once it is determined by ENV staff or the ECO that there are no conditions present that may create a risk for collision by hazed condors taking flight to exit the area. If hazing occurs by the ECO, the ECO will notify the ENV Office of the event.
19. All project materials, tools, hardware, equipment, and all loose items will be stored in a manner that will prevent their removal or ingestion by condors and other wildlife.
20. All materials that are liquid, granular, or powder will be placed in sealed leak-proof containers and stored in a manner that prevents access by condors and other wildlife.

21. All parked vehicles and equipment will be free of leaks, particularly anti-freeze due to high level of wildlife fatality if ingested.
22. All ropes, cables, and lines will be secured in such a way that they do not present an entanglement hazard to condors and other wildlife.
23. All hunters will be provided an informational pamphlet that details the differences between wild turkey (*Meleagris gallopavo*) and condor. After their review, all hunters will be required to sign a statement that they understand the differences between the species. Records of signatures will be kept in the ENV Office.

Camp Roberts provides foraging and roosting habitat for California condors from the Central California Flock, managed by Ventana Wildlife Society and Pinnacles National Park. We used California condor GPS data from January 1, 2017, to December 31, 2021 to understand the level of California condor activity within the project area, which we define as the Camp Roberts boundary (J. Brandt, Service, pers. comm. 2022). During the five-year period, an average of 27 California condors wearing GPS transmitters were detected within Camp Roberts. Approximately half of the tagged flock has been detected at least once from 2017-2021. On average, tagged California condors were detected within Camp Roberts for 79.4 days per year, with 2 tagged condors detected per each day. In 2021, tagged condors were detected within Camp Roberts for 44 days. On average, 11 tagged condors were stationary within Camp Roberts for 15.8 days per year during the five-year period. Based on the above, we consider California condor activity to be moderately low and is predominantly in the form of flights through the project area (J. Brandt, Service, pers. comm. 2022).

Project activities may alter California condor behavior and cause individuals to vacate roosts due to disturbance or avoid the area temporarily while project activities are occurring. Project activities, for example structures or equipment left onsite, may also attract California condors to the project area. California condors that land on the ground during or after project activities could ingest micro-trash or other materials found in the area. California condors could become entangled in military training equipment. California condors allowed to approach humans and remain in their presence for prolonged periods could become habituated to humans, which would lead to other behavioral concerns including seeking out humans for food, endangering humans, and damaging property.

As previously described, the CA ARNG will implement measures to avoid and minimize effects to California condors. The CA ARNG will avoid disturbing condors by conducting environmental awareness briefings to all installation users about the potential presence of condors on Camp Roberts and prohibitions on harming or intentionally disturbing condors. The CA ARNG will conduct training activity reviews and pre-activity surveys to avoid negative effects to condors.

The CA ARNG will avoid disturbing California condors by suspending project activities if they observe California condors perched or on the ground prior to starting work or training in the

area. Work crews or military personnel will allow California condors to depart on their own before project activities resume.

The CA ARNG will haze California condors that enter the area only at the last resort when military training cannot be suspended. The Service provides guidance on hazing (see Service 2014), which CA ARNG will only employ when necessary to startle condors, so they leave areas where activities pose a risk of harm to the birds. The CA ARNG will ensure that ENV staff or a trained ECO uses hazing techniques that are low risk to California condors, such as yelling, clapping, and stomping. They will also take precautions to ensure that California condors are not at risk of collision prior to hazing activities. We consider the immediate effects of hazing California condors in this manner to be insignificant because they are of low intensity and do not rise to the level where we can meaningfully measure an impact (Service 1998a).

Work crews or military personnel will collect, remove, and properly dispose of all project-related trash on a daily basis to avoid effects that micro-trash ingestion has on California condors. All equipment and vehicles will be secured to prevent California condors from interacting with these items.

The CA ARNG will educate hunters about the presence of condors on Camp Roberts and condor identification to prevent harm. The CA ARNG will only allow non-lead ammunition to be used on Camp Roberts.

After reviewing the information provided, we concur with your determination that the proposed action may affect, but is not likely to adversely affect the California condor. Our concurrence is based on the following:

1. The CA ARNG proposes to implement the aforementioned minimization and avoidance measures;
2. California condor activity within the action area is moderately low;
3. The project area will continue to provide habitat for California condors in a manner similar to current conditions following the proposed project activities; and
4. Adjacent areas to the project area provides an abundance of California condor habitat that condors could continue to use during project activities.

Our concurrence with the determination that the proposed action is not likely to adversely affect the California condor is contingent on the measures outlined above being implemented by the CA ARNG. If the CA ARNG fails to implement these measures, we will consider our concurrence invalid. If the proposed action changes in any manner or if new information reveals the presence of listed species in the project area, you should contact our office immediately and suspend all project activities until the appropriate compliance with the Act is completed.

## **Consultation History**

We issued the original PBO in August 2009, which included a 10-year expiration date of August 21, 2019 (Service 2009, 1-8-08-F-24). However, in a letter dated October 2, 2018, the Service extended the PBO until August 21, 2021, with the consideration that take limits were not exceeded by the CA ARNG. During additional discussions, the deadline for submittal of the PBA was extended to April 1, 2022, to accommodate PBO completion by August 2022.

On May 2, 2022, the CA ARNG requested initiation of informal consultation on the effects of the proposed activities at Camp Roberts on the California condor, and re-initiation of formal consultation on the effects of the proposed activities at Camp Roberts on the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole. Included with the request was a biological assessment describing the effects of the proposed activities and conservation measures.

On August 19, 2022, the CA ARNG requested an extension of the PBO's expiration date of August 21, 2022 to January 31, 2023. The Service approved the extension on the basis that the CA ARNG was in compliance with the PBO's terms and conditions and reporting requirements. Additionally, take limits were not exceeded by the CA ARNG.

On December 2, 2022, Ventura Fish and Wildlife Office staff participated in a conference call with ENV staff to discuss the conservation measures listed in the programmatic biological assessment. On December 23, 2022, our office received updated conservation measures.

On January 6, 2023, the Service sent the draft PBO to CA ARNG for their review. CA ARNG communicated they had no comments on the draft PBO on January 27, 2023, by electronic mail.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

The CA ARNG proposes training, operation, and maintenance activities within Camp Roberts, Monterey and San Luis Obispo Counties, California, which are described below.

#### **Military Training Activities**

The CA ARNG proposes to continue military training and other activities similar to those that were analyzed under the original PBO, however they would shift from a stationary forward operating base (FOB) system (field command post used to support various tactical operations) towards a more mobile and covert system. While specific types of military training activities would remain the same (bivouacking, maneuvers, etc.), the overall employment of these activities would more closely resemble "shoot and scoot" Army tactics used in World War II; shooting at a target and then immediately moving away from where the shots were fired. This shift in training would focus on increased flexibility and agility and would result in more

adaptive maneuvers that would not be restricted to pre-defined roads and trails. The CA ARNG would also increase the creation and use of small- and large-scale subterranean defense structures and expand nighttime training operations.

Training would occur year-round, however every year from April through August, Camp Roberts would host several large training exercises, each lasting approximately two weeks. Most facilities and training areas would be used at maximum levels by varying military units during this period. A company is the most common military training unit (60-200 soldiers); however, training can occur with brigade size units (2,000-5,000 soldiers). Although most large-scale training occurs during annual training, overall training on the installation has steadily increased in the past several years. This trend is expected to continue within the next 10 years.

Proposed military training activities include bivouacking; live fire exercises; construction of fortifications, emplacements, and obstacles; subterranean bunker complexes; maneuvers; air operations; and Engineer Training Area use.

During field exercises, troops may bivouac in any of the Camp Roberts training areas. Bivouacking entails establishing temporary encampments that may be used during a single night and up to several weeks. Bivouacs vary in occupancy and complexity depending on the type of exercise. For more detail on bivouacking, refer to the PBA (Padre 2022, pp. 2-2 to 2-3). Bivouacking sites often include staging or parking areas for tactical vehicles or other military equipment. Re-fueling of vehicles may occur at bivouac sites and requires the use of containment structures to capture any fuel spills.

The CA ARNG would conduct live fire training during daylight hours and at night at the ranges and in the training areas. In order to facilitate night fire, lighting may be necessary and involves use of generator powered mobile lighting systems. Live fire exercises would occur in defined firing ranges located along the impact area and designated pre-approved firing points located throughout the training areas, as well as non-standard (undesigned) firing points primarily located along movement corridors (see Figure 1 below). The CA ARNG would occasionally fire artillery from locations other than pre-approved firing points and would only be permitted with prior coordination with Range Operations and approval from the ENV Office. As part of the move towards more flexible and mobile military tactics, the CA ARNG would increase the frequency of live fire exercises from non-standard firing points. Units will identify locations for non-standard live fire training and obtain approval from ENV staff prior to the training event. All military units would receive a range safety brief before live fire exercises requiring military units to cease fire and contact Range Control if wildlife is observed in the area.

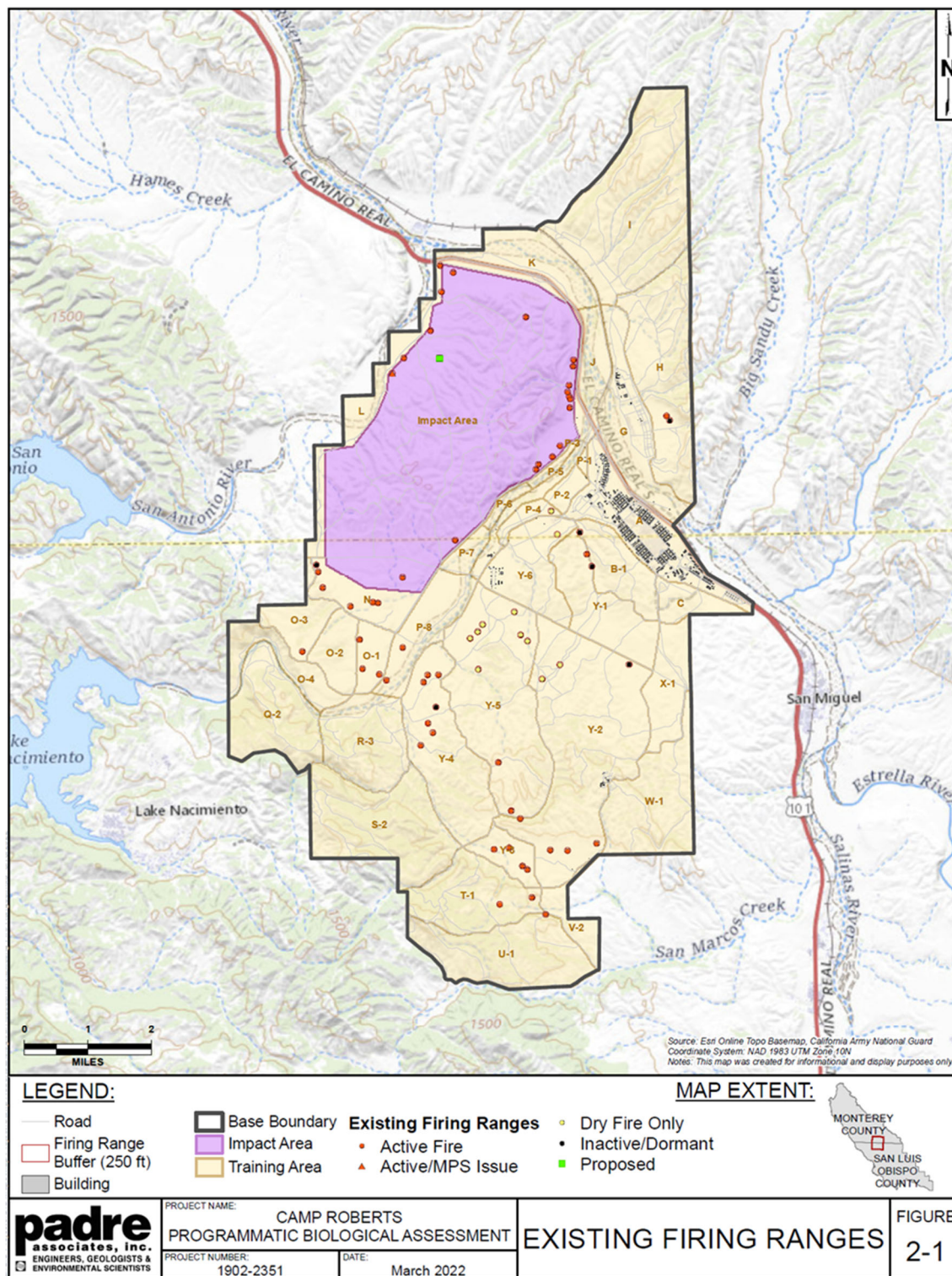


Figure 1. Map of Camp Roberts with Existing Firing Ranges (Padre 2022, Figure 2-1, p. 2-6).

The CA ARNG proposes to develop two command posts, which would be located in annual grassland habitat areas previously designated as forward operating bases (FOB). Each site would retain the original FOB footprint of approximately 10 acres in size and would function as a temporary tactical command facility. Subterranean bunker complexes would involve significant ground disturbance during creation and operation. Military units would dismantle and restore all training sites to their original condition upon completion of training.

Maneuvers would consist of mounted (vehicle) maneuvers or dismounted (foot) maneuvers. Military units would normally conduct maneuvers at the company level but may reach the brigade level. Mounted maneuvers would involve both on-road and cross-country travel by wheeled and tracked vehicles and would occur throughout Camp Roberts during training exercises. Maneuver training would be pre-planned, and courses of off-road travel would be reviewed and approved by ENV staff prior to the training event. Off-road maneuvers are not permitted unless specific travel routes are pre-planned and routed to avoid sensitive resources. Most mounted maneuver training occurs during daylight hours. As part of the shift towards enhanced mobility, the CA ARNG anticipates future training will involve maneuvers that are determined in the field at the time of training. This type of maneuver training supports the strategy of adaptability and agility and will involve off-road travel and night training operations. Proposed maneuver training would go through environmental review and approval from the ENV Office prior to the training event. The CA ARNG will identify sensitive resource areas and will designate them off-limits. The CA ARNG will provide unit commanders with maps of off-limit areas to be used in the field during maneuver training events.

Military personnel would conduct dismounted maneuvers on foot and would include marches, patrols, ambushes, and other simulated engagements. Troop units may excavate individual, group, and vehicle fighting positions and construct barriers using natural materials (earth and pre-approved dead wood), camouflage netting, and concertina wire. Dismounted maneuvers may occur in any of the training areas, and only occur in riparian and aquatic habitats with prior approval from the ENV Office.

The Land Rehabilitation and Maintenance staff would apply water for dust control along select maneuver trails to reduce safety hazards. Trails would be treated immediately prior to large scale maneuver training events. Approximately 20 miles of trails are scheduled for dust control annually.

Air operations would include the use of helicopters and fixed-wing and tilt-rotor airplanes as well as unmanned aerial vehicles (UAVs). Aviation training activities include the use of transport helicopters to ferry troops and equipment, helicopter gunships to conduct live-fire training, and fixed-wing aircraft to conduct simulated bombing runs. There are four designated drop zones where parachuted soldiers or supplies are permitted to land and three designated flight paths for fixed wing aircraft. Camp Roberts has several heliports and two designated airfields: East Garrison Assault Strip and McMillan Airfield.

The Engineer Training Area consists of a heavy equipment training area and an asphalt batch plant. Military personnel would use this facility several times throughout the year within the defined footprint.

#### Operations and Maintenance Activities

The CA ARNG would conduct operation and maintenance activities throughout the installation to ensure that infrastructure and training areas continue to facilitate military training. Proposed operations and maintenance activities include road, tank trail, and firebreak maintenance and improvement; facility maintenance; minor construction; integrated pest management; prescribed burns and wildlife fires; and training area land management.

Maintenance of paved roads includes pothole repair and general resurfacing and maintenance of gravel roads, which entail regrading, re-contouring, crowning, filling, scarifying, and recompacting. Maintenance would also involve mowing, tree trimming, vegetation removal, drainage armoring, and culvert cleaning and replacement. The CA ARNG would perform maintenance within the confines of established road rights of way, which encompasses drainage ditches, road shoulders, and culverts. Maintenance of firebreaks would consist of scraping to remove vegetation growth, and re-grading and gully repair to correct erosion problems.

The CA ARNG would conduct road and trail improvements that include road re-contouring and re-surfacing or placement of gravel or other substrate on existing dirt roads within the defined road footprint.

Construction activities may include but are not limited to constructing new water wells and waterlines, replacing and improving existing water tanks, constructing new sidewalks, expanding existing facilities such as enlarging or improving buildings or parking lots, constructing outbuildings or fences, replacing aboveground communications cables with underground cables, replacing underground storage tanks with aboveground tanks, adding targets to a range, constructing small obstacle-type courses (trails with associated obstacles), constructing short roads (dirt or paved) or dirt parking areas, or paving existing dirt parking areas within Camp Roberts.

The CA ARNG uses its statewide Integrated Pest Management Plan (IPMP) (CA ARNG 2020) as a framework for defining and implementing its pest management policies. The goal of the IPMP is to safely control invasive plants and pest animals in a manner that supports the military mission, promotes sustained ecosystem functionality, and favors native species. Elements of the CA ARNG IPMP include health and environmental safety, pest identification, and pest management, as well as pesticide storage, transportation, use and disposal. Pest management is a cooperative effort among the ENV Office, Integrated Training Area Management (ITAM), Camp Roberts Department of Public Works (DPW), and other outside agencies. The ENV Office will review and give special consideration to pest management requests and methods prior to conducting pest control activities in sensitive areas, including aquatic habitats, habitat for sensitive flora or fauna, and unique geographical and other natural features.

The CA ARNG would use mechanical, cultural, and chemical components of IPMP to manage invasive plant species. The CA ARNG would control a particular species using the best possible method or combination of methods available for effectiveness and avoidance of non-target species. Camp Roberts has prioritized the control of specific invasive plants based on their invasiveness, ability to disrupt habitat, and their impacts on sensitive species and training activities. The following invasive plants are (in order of priority) those whose control is of the highest priority: giant reed (*Arundo donax*); perennial pepperweed (*Lepidium latifolium*); stinkweed (*Dittrichia graveolens*); tamarisk (*Tamarix* sp.); purple star thistle (*Centaurea calcitrapa*); medusahead (*Elymus caput-medusae*); Russian thistle (*Salsola tragus*); yellow star thistle (*Centaurea solstitialis*); mustard (*Brassica tournefortii*, *Brassica nigra*, *Brassica rapa*, *Hirschfeldia incana*); blessed milk thistle (*Silybum marianum*); Italian thistle (*Carduus pycnocephalus*); and poison hemlock (*Conium maculatum*).

ITAM and ENV staff members would conduct periodic invasive plant surveys throughout the installation. Infestations and pioneer populations of invasive species are mapped, and monitoring is used to follow-up after a particular control method has been executed. Further control methods are adapted depending on the results observed through monitoring.

The CA ARNG would use chemical control to kill or prevent the growth of invasive plant species. Herbicides may be applied via the cut stump, backpack sprayer, or boom sprayer methods. For more detail regarding invasive plant treatment areas and a list of herbicides, refer to the PBA (Padre 2022, Figures 2-4A to 2-4C, pp. 2-24 to 2-26). All individuals who apply pesticides will hold a current applicator certification in the appropriate categories for the pests being treated unless the pesticide application is done under the Camp Roberts Housing Self-Help Program. The Self-Help Program provides over-the-counter baits for minor pests, and does not use anticoagulated rodenticides which could have incidental effects on wildlife. In-house applicators would be certified by the Department of Defense or the California Department of Pesticide Regulation (CDPR). All contractors who apply pesticides would be certified by the CDPR.

The CA ARNG would use chemical control during the spring and summer months. The CA ARNG will apply all herbicides as directed on the label and application of chemicals would not be permitted within 24 hours of a forecasted rain event or in wind speeds greater than 12 miles per hour. Applicators will avoid impacts to non-target organisms. To further reduce potential harmful effects of chemicals, the CA ARNG will follow guidelines presented in the California Invasive Plant Council and Pesticide Research Institute's Best Management Practices Handbook (Cal-IPC 2015). Herbicides will be applied at half the maximum rate as indicated on the product label and herbicide risk charts provided in the handbook will be consulted to determine potential risk to specific taxa. Additionally, use of glyphosate or glyphosate-based products will be done without polyoxyethylene tallow amine (POEA) surfactants. For more detail on proposed herbicide application, refer to the PBA (Padre 2022, pp. 2-22 to 2-26).

The CA ARNG proposes to control specific pest species based on their ability to disrupt habitat, their impact on sensitive species and training activities, and the potential risk they pose to human health. The ENV Office will give special consideration to pest control requests and methods

prior to conducting pest control activities in sensitive areas. Pest control actions at Camp Roberts would focus on the following animals: feral pigs (*Sus scrofa*); California ground squirrels and other rodents (*Otospermophilus beechyi*, various species); brown-headed cowbirds (*Molothrus ater*); feral cats (*Felis catus*); and coyotes (*Canis latrans*).

The CA ARNG would control feral pigs either through the Camp Roberts hunting program or under a depredation permit issued by the California Department of Fish and Wildlife (CDFW). The CA ARNG would focus pig depredation efforts in areas near purple amole as pig rooting damages purple amole plants and bulbs. Ground squirrel and burrowing rodent control consists of fumigation, trapping, or shooting. The CA ARNG would not use poison baits due to potential non-target poisoning. Coyotes that threaten the health and safety of Camp Roberts personnel would be shot with non-lead ammunition. Carcasses of pigs, ground squirrels, and coyotes would be disposed of in trash dumpsters or left for scavengers in areas away from active military training. The CA ARNG would permit shooting in training areas with prior authorization and with non-lead ammunition. For more detail about pest animal control, refer to the PBA (Padre 2022, pp. 2-26 to 2-27).

The CA ARNG would use prescribed burns to train firefighters, reduce fuel loads, and manage invasive plant species. Camp Roberts would burn up to 15,000 acres annually. Camp Roberts will develop a burn plan, which will include measures to avoid or minimize adverse effects as a result of prescribed burning for vernal pool fairy shrimp and purple amole in coordination with and approval from the Service. For more detail about prescribed burns on Camp Roberts, refer to the PBA (Padre 2022, p. 2-28).

The training areas on Camp Roberts are maintained through the ITAM program. This program involves rehabilitation and management of the natural landscape in the training lands to sustain lands for future military training. The following activities would be implemented when and where necessary: maintenance of existing bivouac sites; tactical concealment enhancement; on-demand maneuver trail maintenance and vegetation control; on-demand maneuver land rehabilitation; maneuver trail dust control; and invasive plant control. For more detail about the ITAM program, refer to the PBA (Padre 2022, pp. 2-28 to 2-29).

### Hunting Program

The CA ARNG Morale, Welfare, and Recreation (MWR) department administers hunting on Camp Roberts. The program is open to military personnel, dependents, civilian employees, and the public. Hunters are provided access only during special hunting days which are determined by the Camp Roberts MWR department. Hunt days are determined by military training operations and occur approximately one weekend per month from July to April. Hunts are species specific, to include dove, quail, turkey, pig, and deer. Hunters must have appropriate hunting license and tags from CDFW and a Camp Roberts hunting permit. All hunts are limited to the timeframe of 30 minutes before sunrise to 30 minutes after sunset. Hunting is not permitted in the Purple Amole Protection Area (PAPA) except for ENV staff conducting pig

depredation as an invasive pest control action. Hunting is also not permitted in vernal pool fairy shrimp habitat. For more information about the hunting program, refer to the PBA (Padre 2022, pp. 2-27, 2-29, 4-9).

### Natural and Cultural Resources Management

The CA ARNG would continue management of natural resources through implementation of the Camp Roberts Integrated Natural Resources Management Plan (INRMP) (CA ARNG 2022a). Natural resources discussed in the INRMP include San Joaquin kit fox management, vernal pool fairy shrimp management, purple amole management, habitat enhancement, wetlands delineations, and cultural resources management. The Camp Roberts INRMP provides a framework for natural resource management on Camp Roberts and describes management activities that are hereby incorporated into this document by reference (CA ARNG 2022a).

The CA ARNG proposes to use baited camera station surveys to monitor for San Joaquin kit fox. Twelve camera stations would be established in high-quality habitat locations on Main and East Garrisons. Each baited camera station would consist of a trail camera attached to a T-post with a food or scent lure secured to the ground in 3-4 feet in front of the camera. These baited camera stations would be deployed in fall and summer for a period of at least two weeks.

Since issuance of the 2009 PBO, the CA ARNG has protected vernal pools and designated vernal pool fairy shrimp mitigation areas as part of vernal pool fairy shrimp management. In 2021, the CA ARNG prepared a new vernal pool fairy shrimp monitoring protocol to update the overall vernal pool fairy shrimp monitoring program (Vollmar 2021). The protocol was developed in close coordination with the Service. Survey results of habitat conditions obtained during monitoring would guide vernal pool habitat management. The Service will approve the biologist's qualifications to ensure proper monitoring procedures would be implemented.

The CA ARNG proposes to conduct periodic prescribed burns or focused grazing in vernal pools to control overgrowth of vegetation as determined during monitoring efforts. The CA ARNG would expand burning and grazing efforts to include other vernal pool locations. The CA ARNG commits to developing a burning and grazing plan in coordination with and approval from the Service. Notifications of such activities as detailed in the plan will be submitted to the Service for review and approval 30 days prior to implementation.

The CA ARNG proposes to conduct annual surveys, vegetation management, and habitat protection for purple amole management. In 2020, the CA ARNG revised the purple amole monitoring protocol to update the overall purple amole monitoring program (Althouse and Meade 2020). Annual monitoring would include surveys of cryptogamic crusts, use of time-lapse cameras to track phenological conditions and associated vegetation growth patterns, use of seed traps, capturing data from a weather station with temperature and soil moisture probes. Monitoring would include an annual 10 percent census subsample in lieu of a complete census every 10 years. The CA ARNG proposes to implement various purple amole habitat management techniques to include grazing and burning. The CA ARNG will develop a prescribed grazing and burn plan in close coordination with and approval from the Service.

The CA ARNG proposes to implement habitat improvements that would occur throughout the installation on an as needed basis. Habitat improvements would include repair of erosion sites, invasive removal, revegetation using native seed mixes, propagation and planting of native oak trees, and riparian habitat restoration. Revegetation would occur with local native plant species.

The CA ARNG would delineate wetlands, including all vernal pools, every 5-10 years on the installation. Updated wetland delineation information is critical to effective management of these resources. Current delineation methods involve digging of soil pits to evaluate hydric soils. The amount of soil pits needed depends on the size of the wetland but are necessary in all wetlands, including vernal pools that contain vernal pool fairy shrimp. Soil pits are generally 12 inches wide and 16 inches deep located at the edge of wetland areas.

The CA ARNG would manage protections for archaeological sites, historical artifacts and documents, paleontological localities, historic buildings and structures, Native American sacred sites, and traditional cultural properties. Cultural resources management includes subsurface testing. Subsurface testing involves manual excavation of discrete areas (generally 1 square yard) to recover cultural materials. The location of subsurface testing is determined by surface indicators but may be flexible to allow avoidance of sensitive natural resources such as fairy shrimp pools, kit fox dens, and purple amole. For more detail about cultural resources management, refer to the PBA (Padre 2022, pp. 2-30 to 2-32).

### **Conservation Measures**

The CA ARNG will implement measures to avoid, minimize, and mitigate adverse effects to the aforementioned listed species.

#### **San Joaquin Kit Fox**

1. The ENV staff will brief troops, employees, tenants, contractors, and other installation users about the potential presence of the San Joaquin kit fox. Briefings will include prohibitions on approaching, harming, or otherwise intentionally disturbing kit fox.
2. Pre-activity surveys will be conducted for any ground-disturbing work (excluding maintenance of roads and firebreaks) greater than 54 square feet or stockpiling of soils or deposition of ground cover that exceeds an area of 269 square feet. Pre-activity surveys will be conducted within the project site and within a buffer zone (49 feet around project boundary) around the project area, no greater than 60 days prior to construction activities. Potential dens will be marked with pin flags and a 50 feet exclusion zone will be established to prevent damage to dens while den activity is being monitored. Potential dens will be monitored for three days via wildlife camera to confirm use. If a den is found to be active, work will be stopped, and the Service will be contacted for guidance.
3. Speed limits will be posted throughout the installation. Military training inherently poses a risk to San Joaquin kit fox; therefore, the speed limit will be enforced to minimize the potential for vehicle strike. The maximum speed limit is 35 mph.

4. Remote camera stations will be utilized in areas of suitable habitat. These surveys will provide current kit fox status and distribution information and can be used in future planning to avoid and minimize effects on kit fox, their habitat, and potential movement corridors.
5. Debris cleanup will be implemented on Camp Roberts to eliminate all concertina wire, communication wire, and other debris that might entrap San Joaquin kit fox.
6. All trenches and holes greater than 2 feet deep left open overnight (e.g., not backfilled or covered prior to the end of the workday) will be inspected for entrapped wildlife and then covered to preclude entry by wildlife; or escape ramps will be provided at no greater than 500-foot intervals to ensure no entrapment of animals. Escape ramps will be installed at an angle of no greater than 45 degrees.
7. All pipes over six inches in diameter will be covered in such a way as to exclude wildlife from entry. If this is not possible, straight pipes will be inspected for wildlife before moving or capping. Any pipes of this size that cannot be seen through completely must be covered if left overnight. If any such pipes are left overnight without being covered, they will be treated as potential San Joaquin kit fox dens and monitoring procedures described above will be implemented by a qualified biologist before the pipe is moved or capped.
8. Camp Roberts will implement the Camp Roberts Garrison Domestic Animal Policy to ensure that domestic dogs do not harm kit fox (CA ARNG 2022b).
9. Chemicals to control pests outside of the Camp Roberts cantonment area will only be applied by a Department of Defense or California Department of Pesticide Regulation certified pest control applicator.
10. Camp Roberts will restrict the use of fumigants (aluminum phosphide). The ENV Office will review and approve fumigation sites. Fumigants will only be used in dens that are observed to be actively in use by ground squirrels. They will not be used within 1.0 mile of an active San Joaquin kit fox den or used in dens with evidence of use by sensitive species.
11. Herbicides will not be applied within 300 feet of a potential San Joaquin kit fox den, to include dens located at the base of buildings or other structures until it is confirmed the den is not utilized by San Joaquin kit fox.
12. Live-trapping using fox-sized traps (Tomahawk traps) will only be conducted out of doors during daylight hours (1 hour after sunrise to 1 hour before sunset) by a qualified biologist. The traps will only be used in areas where pest animals are known to occur and have been observed. The traps will be checked at least every 2 hours. If a kit fox is captured, the biologist will inspect the fox for injuries and the Service will be immediately notified for further guidance. Only non-toxic bait will be used.

13. All food-related trash will be disposed of in closed containers or bags and regularly removed from the site.
14. Activities will be designed to minimize off-road vehicle traffic and limit it to the smallest possible area(s) of disturbance.
15. All hunters will receive an educational pamphlet describing San Joaquin kit fox appearance and behavior. The pamphlet will identify features of San Joaquin kit fox that distinguish it from coyote (*Canis latrans*) and gray fox (*Urocyon cinereoargenteus*). The pamphlet will also explain that it is illegal to shoot or otherwise harm kit fox.

#### Vernal Pool Fairy Shrimp

1. The ENV staff will provide information regarding vernal pool fairy shrimp and its habitat at presentations to troops, contractors, and employees. Environmental awareness training will also include a discussion of environmental protection measures for this species (including avoiding the placement of tents, latrines, and sumps and the locations of fortifications, emplacements, and obstacles in fairy shrimp habitat) and the penalties for not complying with the protection measures.
2. Ground-disturbing training, maintenance, and construction activities will be avoided during the wet season, with the exception of necessary emergency repairs or safety responses. The wet season is generally considered the timeframe of November 1 through April 30; however, this may vary depending on precipitation. Avoiding ground disturbance during this time period will minimize disturbance, degradation, and destruction of vernal pool fairy habitat and will minimize the potential for injury and mortality of this species during their growing and reproductive phase.
3. Consistent with Camp Roberts Regulation 350-1 regarding vehicle movement, all military personnel and visitors will be required to stay on established roads and trails. Cross-country travel during the wet season will be avoided. The wet season is generally considered the timeframe of November 1 through April 30; however, this may vary depending on precipitation. This information will be provided to troops, contractors, and employees during all environmental briefings.
4. Vernal pool fairy shrimp will be monitored as detailed in the Camp Roberts Vernal Pool Fairy Shrimp Monitoring Program (Vollmar 2021). Ongoing monitoring will provide information on the status of the species on Camp Roberts and will guide future management actions.
5. Herbicides and pesticides will not be used within 250 feet of potential or known fairy shrimp habitat. Personnel whose job description includes the application of herbicides and pesticides will receive training on identifying vernal pool fairy shrimp habitat and instruction on avoiding such application within 250 feet of potential habitat.

6. The CA ARNG will conduct prescribed burns and grazing to reduce fuel loads and control excess vegetation in potential and known fairy shrimp habitat. Prescribed grazing and burning will occur in various vernal pool fairy shrimp areas as described in a grazing and burning plan. A grazing and burning plan will be developed in coordination with the Service. Notification of such activities as detailed in the plan will be submitted to the Service for review and approval 30 days prior to implementation.
7. For activities that could result in increased sedimentation of vernal pool habitat, erosion control measures such as natural fiber (i.e., non-monofilament) rolls and just netting or coir netting will be installed if feasible to reduce sedimentation impacts.
8. The CA ARNG will ensure that a plan is in place for a prompt and effective response to accidental spills. All military personnel will be informed of the importance of preventing spills and of the appropriate measures should spills occur.
9. The CA ARNG will conduct all refueling, maintenance, and staging of equipment at least 60 feet from aquatic or riparian habitat and not in a location from where a spill would drain directly toward aquatic habitat. Drip pans will be used under parked vehicles to capture unintentional leaks.
10. No ground disturbing activities will occur within perennial or ephemeral wetland habitat without environmental review and wetland permitting.

### Mitigation

The CA ARNG will mitigate for permanent (formerly called direct impacts in the 2009 PBO) and temporary (formerly called indirect impacts in the 2009 PBO) impacts to vernal pool fairy shrimp by the protection of the species' habitat. Permanent impacts are mitigated at a 3:1 ratio and temporary impacts are mitigated at a 2:1 ratio. The CA ARNG considers temporary impacts to potentially occur later in time or occur within a 250-foot buffer of vernal pool habitat (Padre 2022, p. 4-7).

### Purple Amole

1. A qualified biologist will oversee the implementation of conservation measures for purple amole. All activities conducted within the PAPA will be subject to adaptive management for the conservation of the species. That is, management activities may shift over time based on outcomes. For example, if prescribed burning is used to remove competing vegetation in purple amole habitat and results in the increase of purple amole population numbers, implementation of that management activity may occur more regularly. If burning is shown to have adverse effects on purple amole (decreased population numbers, compromised growth/reproduction, etc.), then alternative vegetation management strategies will be employed.

Other activities such as grazing, feral pig control, survey and monitoring techniques would all be subject to modifications based on the species response to an action. Long-term monitoring will be conducted on all proposed activities and their effects on the purple amole population. Monitoring data will be utilized in future effects analysis and adaptive management decisions for the conservation of purple amole.

2. Camp Roberts Regulation 350-1 requires submittal of training plans and environmental review prior to all training events. Prior to approval, training requests within the PAPA will be subject to survey by a qualified biologist to ensure that purple amole plants are not in their growing and reproductive stages and that the soil is dry.
3. Bivouacking, driving off-road with wheeled vehicles, and dismounted maneuvers will not occur during the purple amole growing and reproductive period from approximately December (when vegetative growth begins to develop) until June (when flowering is complete, and soil is dry and hard). Vegetation management burns, road and tank trail improvements and maintenance activities will be conducted in the fall when purple amole plants are dormant, and soils are hard and dry. Signage and delineation markers will be installed and maintained during the period when purple amole plants are dormant. Sheep grazing will be limited to the period from September 1 until December 1, depending on phenology and hydrological conditions, to prevent grazing of purple amole inflorescences.
4. No military training related ground disturbance (digging) will be allowed within purple amole occupied habitat.
5. The number of troops training within the PAPA will be limited to company level or below. Ten or fewer individuals will be conducting pest control, natural and cultural resource management, or depredation hunting activities.
6. Use of tracked vehicles for maintenance and military training activities within the PAPA will be restricted to a single tank trail and no off-road use of tracked vehicles will be allowed. Fire vehicles used in vegetation management burns may only travel off-road during fire mop-up activities. Fire suppression vehicles may be used on and off roads only during emergency wildfire suppression activities necessary to protect public health and safety and to preclude fires from leaving the installation. Vehicles used in depredation hunting will be restricted to the minimum off-road travel required to recover pig carcasses. Travel by maintenance vehicles and equipment as well as cultural and natural resource vehicles will be restricted to existing roads and the tank trail.
7. Dismounted maneuvers will occur in a dispersed manner and through the narrowest areas of purple amole occupied habitat. Foot traffic during natural and cultural resource management activities will be kept at the minimum necessary to conduct the activities.
8. Designated roads and trails within the PAPA will be clearly marked by signage. Monitoring of signs in or near the PAPA will occur periodically by ENV staff prior to

ensure signs are in good condition. If additional signage needs to be installed or existing signage needs to be repaired, all work will be performed from the outside edge of the PAPA or from roads and the tank trail whenever possible.

9. Persons conducting military training; road, tank trail, and firebreak improvements; maintenance activities; and natural and cultural resource management within the PAPA will be given a briefing on applicable conservation measures prior to utilizing the area.
10. Road, trail, and firebreak improvement and maintenance activities as well as installation and maintenance of signage and delineation markers will be pre-surveyed and monitored by a qualified biologist. Recovery and transplanting activities will be conducted and/or supervised by a qualified biologist.
11. Purple amole plants excavated during road and tank trail improvements will be recovered and transplanted to suitable habitat nearby or made available for research. Bulblets will be split apart and planted in adjacent areas with suitable clay soils in the fall months. Prior to planting, thatch and other non-natives will be removed and the soils will be broken apart so the bulbs can be planted. If needed, bulbs can be stored in a refrigerator over the summer months. If recovered bulbs will be donated for research or to establish new off-post populations, the Service will be contacted ahead of time for approval and informed of what projects they will be used for.
12. A minimum of two monitoring events will be conducted per year, one during the vegetative stage, one during the flowering stage, and one during the seed stage. Two cultural monitoring events will take place per year, one in the spring and one in the fall. Personnel conducting the surveys will avoid purple amole plants to the maximum extent possible.
13. The tank trail and designated roads within the PAPA will be clearly marked by signage. Tank trail width within the PAPA will be kept at the existing 22 feet. All remaining roads will be maintained at a width of 12 feet.
14. Wildfire suppression activities may take place from established roads and the tank trail to prevent fires from leaving the installation. No new firebreaks will be created within purple amole occupied habitat. Vegetation management burns will be timed to occur once the purple amole plants are dormant and after seed has dropped and soil is dry and hard. Burns will occur as determined in a burn plan which will be developed in coordination with the Service. A burn plan will be submitted to the Service for review and approval 30 days prior to burning taking place.
15. Grazing to control excess vegetation in purple amole will occur as described in a grazing plan. A site-specific grazing plan will be developed in coordination with the Service. Notification of grazing activities as outlined in the plan will be submitted to the Service for review and approval 30 days prior to implementation.

16. Field dressing of feral pigs will be conducted outside the PAPA.

17. Herbicides will not be used in purple amole habitat.

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

### **Jeopardy Determination**

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the current rangewide condition of the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole, the factors responsible for these conditions, and their survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole; (3) the Effects of the Action, which determines all consequences to the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole, caused by the proposed action that are reasonably certain to occur in the action area; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole.

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 San Joaquin kit fox, vernal pool fairy shrimp, and purple amole, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole, in the wild by reducing the reproduction, numbers, and distribution of these species.

## STATUS OF THE SPECIES

### **San Joaquin Kit Fox**

#### **Legal Status**

The San Joaquin kit fox was listed as an endangered species on March 11, 1967 (Service 1967). The San Joaquin kit fox is the umbrella species for the Recovery Plan for Upland Species of the

San Joaquin Valley, California, indicating that measures used for recovery of the species would also benefit other species with overlapping ranges and habitat requirements (Service 1998b).

### **Life History**

The kit fox is the smallest canid species in North America, and the San Joaquin kit fox is the largest subspecies in skeletal measurements, body size, and weight. Adult males average 31.7 inches in total length, and adult females average 30.3 inches in total length (Grinnell et al. 1937, p. 630). All kit foxes have long slender legs and are approximately 12 inches high at the shoulder. The average weight of adult males is 5.0 pounds, and the average of adult females is 4.6 pounds (Morrell 1972, p. 170). General physical characteristics of kit foxes include a small, slim body, relatively large ears set close together, narrow nose, and a long, bushy tail tapering slightly toward the tip. The tail is distinctly black-tipped and typically carried low and straight.

Color and texture of the fur coat of kit foxes varies geographically and seasonally. The most commonly described colorations are buff, tan, grizzled, or yellowish-gray dorsal coats (McGrew 1979, p. 1). Two distinctive coats develop each year: a tan summer coat and a silver-gray winter coat (Morrell 1972, p. 170). The ear pinna (external ear flap) is dark on the back side, with a thick border of white hairs on the forward-inner edge and inner base. The tail is distinctly black-tipped.

Kit foxes prefer loose-textured soils (Egoscue 1962, p. 493) but are found on virtually every soil type. Dens are scarce in areas with shallow soils because of the proximity to bedrock (O'Farrell and Gilbertson 1986, p. 10), high water tables (McCue et al. 1981, p. 13), or impenetrable hardpan layers (Morrell 1972, p. 166). However, kit foxes will occupy soils with high clay content where they modify burrows dug by other animals (Orloff et al. 1986, p. 62). Sites that may not provide suitable denning habitat may be suitable for feeding or providing cover. Kit fox dens are commonly located on flat terrain or on the lower slopes of hills. Common locations for dens are washes, drainages, and roadside berms. Kit foxes also commonly den in human-made structures, such as culverts and pipes (O'Farrell 1982, B-1; Spiegel and Tom 1996, p. 64).

In the San Joaquin Valley, optimal habitats for San Joaquin kit foxes generally are those in which conditions are more desert-like, such as arid shrublands and grasslands (Service 1998b, p. 129). These areas are characterized by sparse or no shrub cover, sparse ground cover with patches of bare ground, short vegetative structure less than 18 inches tall, and sandy to sandy-loam soils.

Tall or dense vegetation generally is less optimal for foxes (Smith et al. 2005, p. 901). Such conditions make it difficult for foxes to detect approaching predators or capture prey. Kit foxes also tend to avoid rugged steep terrain; predation risk apparently is higher for foxes under such topographic conditions (Warrick and Cypher 1998, p. 712). In general, flat terrain or slopes less than 5 percent are optimal, slopes of 5 to 15 percent are suitable, and slopes greater than 15 percent are unsuitable. For this reason, the foothills of the Coast Ranges generally are considered to demark the western boundary for suitable kit fox habitat.

Ground disturbance from tilling, maintenance, and harvesting is frequent and can destroy dens. Also, most agricultural lands in the San Joaquin Valley are irrigated, which can flood and collapse dens. Agricultural lands also are subject to intensive chemical applications, including fertilizers, pesticides, defoliants, and weed suppression; these practices can result in a lack of prey availability for kit foxes. Use of rodenticides is common in some agricultural environments and is particularly problematic for kit foxes due to the potential for secondary poisoning.

San Joaquin kit foxes appear to be strongly linked ecologically to kangaroo rats. San Joaquin kit foxes are especially well adapted for preying on kangaroo rats, and consequently, San Joaquin kit fox abundance and population stability are highest in areas where kangaroo rats are abundant (Service 1998b, p. 96).

The diet of the San Joaquin kit fox varies geographically, seasonally, and annually, based on temporal and spatial variation in abundance of potential prey. Kangaroo rats, pocket mice, white-footed mice, and other nocturnal rodents can comprise about one-third or more of their diets. Kit foxes are also known to prey on California ground squirrels, black-tailed hares, San Joaquin antelope squirrels, desert cottontails, ground-nesting birds, and insects (Scrivner et al. 1987, pp. 15-19).

Adult San Joaquin kit foxes are typically solitary during late summer and fall. In September and October, adult females begin to excavate and enlarge natal dens (Morrell 1972, p. 167). The breeding season is in December and January and pups are born in March through August (Egoscue, p. 481). Mean litter sizes reported for San Joaquin kit fox range from 2.0 to 3.8 individuals at the Naval Petroleum Reserve (Spiegel and Tom 1996, p. 59). Pups appear above ground at about age 3 to 4 weeks and are weaned at age 6 to 8 weeks.

Estimates of fox density vary greatly throughout its range and have been reported as high as 1.2 animals per square kilometer in optimal habitats in good years (Service 1998b, p. 127). At the Elk Hills in Kern County, density estimates varied from 0.3 animal per square mile in the early 1980s to 0.03 animal per square mile in 1991 (Service 1998b). Kit fox home ranges vary in size and are generally approximately 1.0 square mile (Knapp 1979, p. 1; Service 1998b, p. 128). Individual home ranges overlap considerably, at least outside the core activity areas (Morrell 1972, p. 166).

Most young kit foxes disperse up to 5 miles, however dispersal distances of up to 20 miles have been documented for the San Joaquin kit fox (Scrivner et al. 1987). Dispersal can be through disturbed habitats, such as agricultural fields, and across highways and aqueducts. The age at dispersal ranges from 4 to 5 months (Service 1998b, p. 126). According to a study on dispersal patterns of San Joaquin kit fox on the Naval Petroleum Reserves, California, 209 juvenile kit foxes were monitored from 1980 to 1996. Approximately 33 percent dispersed from their natal territory. Significantly more males (49.4 percent) than females (23.8 percent) dispersed, and dispersal peaked in July (Koopman et al. 2000, p. 213). Among dispersing kit foxes, 87 percent did so during their first year. Some kit foxes delay dispersal and may inherit their natal home range.

San Joaquin kit foxes are primarily nocturnal, although individuals (mostly pups) are occasionally observed resting or playing near their dens during the day (Morrell 1972, p. 165). A mated pair of kit foxes and their current litter of pups usually occupy each home range. Other adults, usually offspring from previous litters, also may be present (Koopman et al. 2000, p. 218), but individuals often move independently within their home range. Average distances traveled each night range from 5.8 to 9.1 miles and are greatest during the breeding season.

Kit foxes maintain core home range areas that are exclusive to mated pairs and their offspring. This territorial spacing behavior eventually limits the number of foxes that can inhabit an area, owing to shortages of available space and per capita prey. Hence, as habitat is fragmented or destroyed, the carrying capacity of an area is reduced and a larger proportion of the population is forced to disperse. Increased dispersal generally leads to lower survival rates and, in turn, decreased abundance. This is because greater than 65 percent of dispersing juvenile foxes die within 10 days of leaving their natal range (Koopman et al. 2000, p. 216).

### **Rangewide Status**

In the San Joaquin Valley before 1930, the range of the San Joaquin kit fox extended from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side (Service 1998b, p. 124). Historically, this species occurred in several San Joaquin Valley native plant communities. In the southernmost portion of the range, these communities included Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. San Joaquin kit foxes currently inhabit some areas of suitable habitat on the San Joaquin Valley floor. They can be found in the surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi Mountains, from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties on the west, and near La Grange, Stanislaus County, on the east side of the valley. They also inhabit some of the larger scattered islands of natural land on the valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced Counties.

The largest extant populations of kit foxes are in western Kern County on and around the Elk Hills and Buena Vista Valley and in the Carrizo Plain Natural Area, San Luis Obispo County. The Ciervo-Panoche core area in eastern San Benito, western Fresno, and southern Merced Counties, while not one of the largest extant populations, includes over 52,000 acres of Bureau of Land Management (BLM)-administered land that offer some protection to the kit fox. Even so, much of the BLM-administered land in the core area is not suitable for kit fox due to its rugged character and shallow soils. Most suitable kit fox habitat in the core area is on private land in the valley floors (O'Farrell and McCue 1981, p. 14).

Though the central and northern portions of the range have not been continuously monitored, populations were recorded in the late 1980s at San Luis Reservoir, Merced County (Briden et al. 1987, p. 81); North Grasslands and Kesterson National Wildlife Refuge (NWR) on the valley floor, Merced County (Paveglione and Clifton 1988, p. 2); and in the Los Vaqueros watershed, Contra Costa County in the early 1990s (Service 1998b). Smaller populations are also known from other parts of the San Joaquin Valley floor, including Madera County and eastern Stanislaus County (Williams 1990, p. 5).

Kit foxes occur at varying densities in the areas between the core populations (e.g., Panoche-Coalinga and Kettleman Hills). These populations provide links between core populations and probably with smaller, more isolated populations in adjacent valleys (e.g., Panoche Valley) and in the Kreyenhagen Hills and Anticline Ridge around Coalinga and Avenal.

The distribution and abundance of the San Joaquin kit fox has decreased since its listing in 1967. This trend is almost certain to continue into the foreseeable future unless measures are implemented to protect, sustain, and restore suitable habitats and alleviate other threats to their survival and recovery.

Less than 20 percent of the habitat in the historical range of the San Joaquin kit fox remained when the subspecies was listed as endangered in 1967, and there has been a substantial loss of habitat since that time. Historically, San Joaquin kit foxes occurred throughout California's Central Valley and adjacent foothills. Extensive land conversions in the Central Valley began as early as the mid-1800s. By the 1930s, the range of the kit fox had been reduced to the southern and western parts of the San Joaquin Valley (Grinnell et al. 1937, pp. 399-420). The primary factor contributing to this restricted distribution was the conversion of native habitat to irrigated cropland, industrial uses (e.g., hydrocarbon extraction), and urbanization (Morrell 1975, p. 1). Approximately half the natural communities in the San Joaquin Valley were tilled or developed by 1958 (Service 1998b, p. 129).

This rate of loss accelerated following the completion of the Central Valley Project and the State Water Project, which diverted and imported new water supplies for irrigated agriculture (Service 1995, p. 92). From 1959 to 1969, an estimated 34 percent of natural lands were lost within the then-known kit fox range (Laughrin 1970, p. 1). Most of the documented loss of habitat has been the result of conversion to irrigated agriculture.

The conversion of natural lands to agriculture continues to be a threat on private lands on the western side of the San Joaquin Valley floor; here agriculture has been extended west to the base of the foothills since the 1960s (Kelly et al. 2006, p. 57). Large blocks of suitable habitat that support kit fox do remain in the Panoche and Pleasant Valleys in the foothills slightly to the west of the San Joaquin Valley (Cypher et al. 2007, p. 6). However, including both these areas and the western uplands of Fresno County, there were only 5,559 acres of suitable habitat and 20,543 acres of less than optimal habitat remaining by 2007 (Cypher et al. 2007, p. 6).

Land conversions contribute to declines in kit fox abundance through direct and indirect mortalities, displacement, prey population and denning site reduction, changes in the distribution and abundance of larger canids that compete with kit foxes for resources and carrying capacity reductions.

Extensive habitat destruction and fragmentation have contributed to smaller, more isolated populations of kit foxes (White et al. 2000, p. 209). Small populations have a higher probability of extinction than large populations because their low abundance renders them susceptible to random events, such as high variability in age and sex ratios, and catastrophes, such as floods, droughts, and disease epidemics (Lande 1988, pp. 1455-1460; Frankham and Ralls, 1998 pp.

441-442; Saccheri et al. 1998, pp. 491-494). Similarly, isolated populations are more susceptible to extirpation by accidental or natural catastrophes because the likelihood of recolonization has been diminished.

These stochastic events can adversely affect small, isolated populations with devastating results. Extirpation can even occur when the members of a small population are healthy, because whether the population increases or decreases in size depends less on the age-specific probabilities of survival and reproduction than on chance. Owing to the probabilistic nature of extinction, many small populations will eventually go extinct when faced with these random risks (Caughley and Gunn 1993, pp. 47-55).

Vehicles appear to be the primary cause of mortality for urban kit foxes, and most strikes occur on arterial roads, which have higher traffic volumes and speed limits (Bjurlin et al. 2005, p. vii; Cypher et al. 2005, p. 13). Two-lane roads may not be as dangerous for kit foxes as are major arterial roads (Cypher et al. 2005, p. viii). Kit foxes are more frequently struck near intersections between major roads and other linear rights-of-way, such as railroads, canals, and other roads. These most likely function as movement corridors for kit foxes, and the foxes do not appear to avoid roads for denning sites (Bjurlin et al. 2005, p. i).

The diets and habitats selected by coyotes (*Canis latrans*) and kit foxes living in the same areas are often quite similar (Cypher and Spencer 1998, p. 204). Hence, the potential for resource competition between these species may be quite high when prey resources are scarce, such as during droughts, which are quite common in semiarid central California. Land conversions and associated human activities have led to changes in the distribution and abundance of coyotes, which compete with kit foxes for resources.

Coyotes are the primary cause of mortality for kit foxes in most areas (Cypher and Spencer 1998, p. 204). The threat to kit foxes from red foxes (*Vulpes vulpes*) is still being evaluated, but the potential for both interference and exploitative competition is high (Cypher et al. 2001, p. 172). The red fox is a highly adaptable species, able to persist in agricultural lands; they do not depend on dens for cover, they are highly mobile, which facilitates avoiding dangers and locating food, and they are highly omnivorous. Coyotes occur in most areas with abundant populations of San Joaquin kit foxes. During the past few decades, coyote abundance has increased in many areas owing to a decrease in ranching, favorable landscape changes, and reduced control efforts (Orloff et al. 1986, p. 65). Although coyotes are common in both natural and agricultural landscapes, they pose a greater predation threat to the kit fox on agricultural lands because of the decreased availability or absence of escape dens and vegetative cover (Cypher et al. 2005, p. 20).

Coyotes may kill San Joaquin kit foxes in an attempt to reduce resource competition. Injuries from coyotes accounted for 50 to 87 percent of the mortalities of radio-collared kit foxes at Camp Roberts, the Carrizo Plain Natural Area, the Lokern Natural Area, and the Naval Petroleum Reserves (Cypher and Scrivner 1992, p. 45; Standley et al. 1992, p. 18; Ralls and White 1995, p. 726; Spiegel and Tom 1996, p. 10).

Some methods of pest and rodent control pose a threat to kit foxes through direct or secondary poisoning, and these threats are often encountered in agricultural settings. Kit foxes may be killed if they ingest rodenticide in a bait application, or if they eat a rodent that has consumed the bait. Even sub-lethal doses of rodenticides may lead to the death of these animals by impairing their ability to escape predators or find food. Pesticides and rodenticides may also indirectly affect the survival of kit foxes by reducing the abundances of their staple prey species. For example, the California ground squirrel, which is the staple prey of kit foxes in the northern portion of their range and on agricultural lands, was thought to have been eliminated from Contra Costa County in 1975, after extensive rodent eradication programs. Long-term use of ground squirrel poisons in this county severely reduced kit fox abundance through secondary poisoning and the suppression of populations of its staple prey (Orloff et al. 1986, p. 66).

Historically, kit foxes may have existed in a meta-population structure of core and satellite populations, some of which periodically experienced local extinctions and recolonization (Service 1998b, p. 132). However, today's populations exist in an environment drastically different from the historical one, and extensive habitat fragmentation has resulted in geographic isolation, smaller population sizes, and reduced genetic exchange among populations. This increases the vulnerability of kit fox populations to extirpation.

Populations of kit foxes are extremely susceptible to the risks associated with small population size and isolation because they are characterized by marked instability in population density. For example, the relative abundance of kit foxes at the Naval Petroleum Reserves, California, decreased ten-fold between 1981 to 1983, increased seven-fold between 1991 to 1994, and then decreased two-fold in 1995 (Cypher and Spencer 1998, p. 208).

The destruction and fragmentation of habitat could also eventually lead to reduced genetic variation in populations of kit foxes that are small and geographically isolated. Genetic assessments indicate that historical gene flow among populations was quite high, and that gene flow between populations is still occurring (Schwartz et al. 2005, p. 34). Kit fox dispersal likely maintains genetic variation throughout the range of the kit fox. However, disruption of kit fox dispersal abilities through habitat loss could result in an increase in inbreeding and a loss of genetic variation. These factors could increase the extinction risk for small, isolated populations of kit foxes by interacting with demography to reduce fecundity, juvenile survival, and lifespan (Lande 1988, p. 1456; Frankham and Ralls 1998, p. 441; Saccheri et al. 1998, p. 491).

## **Recovery**

The San Joaquin kit fox is included in the Recovery Plan for Upland Species of the San Joaquin Valley, California (Service 1998b). The primary goal of the recovery strategy for kit foxes identified in the plan is to establish a complex of interconnected core and satellite populations throughout the species' range. The long-term viability of each of these core and satellite populations depends partly on periodic dispersal and genetic flow between them. Therefore, kit fox movement corridors between these populations must be preserved and maintained.

The Service and cooperating public, nonprofit, and private stakeholders are working to conserve habitat by establishing preserves, conservation banks, and conservation easements. Threats to recovery of San Joaquin kit fox include loss of habitat to agricultural and urban development, effects of pesticide exposure, competitive exclusion by other canids, highly fluctuating population dynamics, isolation and loss of small subpopulations due to random events, habitat fragmentation, vehicle strikes, predation, and loss of prey. Specific effects from the extended drought in California and climate change to San Joaquin kit fox are unknown. However, anticipated effects include reduced prey availability due to a reduction in vegetative growth as forage for the prey species. If prey species are reduced, the habitat suitability for San Joaquin kit fox may be reduced.

## **Vernal Pool Fairy Shrimp**

### **Legal Status**

The Service listed the vernal pool fairy shrimp as threatened on September 19, 1994 (Service 1994, entire). The recovery plan for vernal pool ecosystems of California and southern Oregon addresses the vernal pool fairy shrimp (Service 2005a, entire), though information regarding populations in coastal San Luis Obispo County was not well-understood at the time of its preparation. The Service published its most recent 5-year review for the vernal pool fairy shrimp in 2007 (Service 2007).

### **Life History**

The vernal pool fairy shrimp is a small freshwater crustacean (0.12 to 1.5 inches long) belonging to the order Anostraca. Like other anostracans, it has stalked compound eyes and eleven pairs of phyllopods (swimming legs that also function as gills). The vernal pool fairy shrimp is genetically distinct from other Branchinecta species and is distinguished by the morphology of the male's second antenna and the female's third thoracic segment (Service 2007, p. 4)). It is a non-selective filter-feeder and, like other species of fairy shrimp, are a food source for a variety of wildlife, including beetles, insect larvae, tadpoles, frogs, salamanders, shorebirds, ducks, and even other fairy shrimp.

Vernal pool fairy shrimp occur only in cool-water seasonally inundated features. The majority of their life cycle is as a shelled embryo known as a resting egg, also referred to as a cyst. Female vernal pool fairy shrimp produce an unknown number of eggs per clutch and over their lifetime. These cysts fall to the basin bottom or remain in the brood sac until the female dies and sinks (Service 2003, p. 46687). Fairy shrimp cysts are capable of withstanding heat, cold, and prolonged desiccation and may persist in the soil for an unknown number of years until conditions are favorable for successful hatching (Service 2003, p. 46687).

Individuals hatch from cysts during cold-weather winter storms which provide water temperatures of 50°F (Eriksen and Belk 1999, p. 93). The time to maturity and reproduction is water temperature-dependent and varies between 18 days under optimal conditions (68°F) up to 139 days, with 41 days being typical when water temperatures are at 59°F (Eriksen and Belk

1999, p. 93). The ability to mature quickly allows this species to occur in short-lived shallow pools. Immature and adult shrimp typically die off when water temperatures rise to 75°F (Helm 1998, p. 137). Not all of the cysts are likely to hatch in a season, which provide a mechanism for survival if an inundation period is too short in a given year. Vernal pool fairy shrimp may also undergo multiple hatches in a single feature during one wet season if conditions are appropriate (Gallagher 1996, p. 323).

Adults and cysts disperse between suitable habitats passively by adhesion to waterfowl, migratory birds, cattle, and other wildlife and domestic animals as well as through the movement of water between suitable habitats or by cyst adhesion to wind-blown dust (Eriksen and Belk 1999, p. 62).

### **Rangewide Status**

The vernal pool fairy shrimp is endemic to California except for its presence in a disjunct population in the Agate Desert of southern Oregon. It has the widest geographic range of the federally listed vernal pool crustaceans, with California populations ranging from Riverside County and the Coast Ranges, north through Central Valley grasslands to Tehama County. Although wide-ranging, the vernal pool fairy shrimp is seldom abundant when it co-occurs with other fairy shrimp species (Eriksen and Belk 1999, p. 45; Service 2007, p. 4).

The California Natural Diversity Database lists 766 occurrences for the vernal pool fairy shrimp. In California, the range of the species is discontinuous and extends from Riverside County and the Coast Ranges, north through Central Valley to Tehama County (Service 2007, p. 5). On California's central coast, the species is known to occur in vernal pools and other features at the following locations: at least 55 features on Fort Hunter Liggett, at least 46 features at Camp Roberts, approximately 60 features at the Chevron Tank Farm in San Luis Obispo, at least 12 complexes on Vandenberg Space Force Base, at least 2 features on Santa Maria Airport, and 2 features in the Los Padres National Forest. Vernal pool fairy shrimp also occur in and around Soda Lake in the Carrizo Plain National Monument and in the City of Paso Robles. Some of these occurrences were unknown or undocumented at the time of the final listing and critical habitat rules and completion of the recovery plan.

Maintaining the integrity of surrounding upland habitat is essential to the proper ecological function of vernal pool fairy shrimp habitat. Habitat loss and fragmentation represent the largest threats to the survival and recovery of vernal pool fairy shrimp and other species restricted to vernal pools and other ephemeral ponded habitats. Analysis conducted in 2005 indicate that an overall 13 percent reduction in vernal pool habitat since 1995. The amount of loss was not distributed evenly, having up to counties in the central and western portion of the Great Valley (Colusa, Glenn, Sutter, and Yolo) experiencing high losses of vernal pool fairy shrimp habitat, ranging from 40-75 percent (Holland 2009, p. 1) with additional habitat lost in the Central Coast Mountain ranges (Holland 2003, p. 11). Continuing annual habitat loss is estimated to be between 2 and 12 percent, depending on the region (Holland 2003, p. 12). Habitat loss is generally a result of urbanization, agricultural conversion, and mining, although loss also occurs in the form of habitat alteration and degradation as a result of changes to natural hydrology,

competition from invasive species, incompatible grazing regimes(including overgrazing), energy development, infrastructure projects (e.g., roads, water storage and conveyance, utilities), recreational activities (e.g., off-highway vehicles, hiking), erosion, mosquito abatement activities, climatic and environmental change, and contamination (Service 2007, p. 46).

## **Recovery**

The Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon addresses 33 species, including the vernal pool fairy shrimp (Service 2005b). The goal of the recovery plan is to achieve and protect in perpetuity self-sustaining populations of vernal pool fairy shrimp throughout the species' range and delist the species. The decline of the vernal pool fairy shrimp is attributed primarily to habitat loss and fragmentation resulting from development and agricultural expansion, although invasive species and aquatic contaminants also have contributed to the species' decline. A primary component of the species' recovery is protecting vernal pool habitat in conservation areas and reserves.

The recovery plan specifies that the vernal pool fairy shrimp may be considered for delisting when:

1. At least 80 percent of occurrences and 85 percent of suitable habitat have been protected;
2. The species has been reintroduced to vernal pool regions and soil types where surveys indicate the species has been extirpated;
3. Appropriate long-term management and monitoring are secured;
4. Status surveys show that populations are stable or increasing and threats have been reduced or eliminated;
5. Research has been conducted on genetic structure, population viability, and additional recovery actions; and
6. Recovery teams and working groups are established to oversee recovery efforts and conduct outreach and incentive programs to develop partnerships.

The Service's 5-year review reported that delisting criterion 1 (reintroduction and protection of habitat) and 2 (habitat management and monitoring) have been partially met, including at least 13,000 acres of habitat protected; however, most recovery criteria have not been met (Service 2007, entire). The Service does not have information indicating population or abundance trends for the vernal pool fairy shrimp. Surveys for the species have increased the number of known occurrences, including occurrences in San Luis Obispo and Santa Barbara Counties; however, concurrent habitat loss and fragmentation has occurred around some populations. The 5-year review documents extensive habitat loss, including more than 50,000 acres lost between 1994 and 2005 as a result of human population expansion and conversion of vernal pool habitat to agriculture. The 5-year review also discusses future habitat loss from anticipated development

around quickly growing urban areas. The indirect effects of development (e.g., pesticides, altered hydrology) on remaining habitat increasingly compound the effects of habitat loss on the species. The status review acknowledges that the threats to the species have not decreased since listing and recommends that the Service maintain the species' threatened status (Service 2007, p. 47).

## Purple Amole

### Legal Status

The Service listed the purple amole as threatened on March 20, 2000 (Service 2000). A recovery plan was prepared on June 13, 2022 (Service 2022).

### Life History

The purple amole is composed of two subspecies, Santa Lucia purple amole (*Hooveria purpurea* var. *purpurea* [*Chlorogalum purpureum* var. *purpureum*]) and Camatta canyon amole (*Hooveria purpurea* var. *reducta* [*Chlorogalum purpureum* var. *reductum*]) separated from one another by approximately 38 miles. The Santa Lucia purple amole (purple amole) is endemic to clay soils in the south coast ranges of Monterey and San Luis Obispo Counties. The purple amole is a low-growing perennial herb with a rosette at its base comprised of linear and flat, bright green leaves. It is the only member of the genus with bluish-purple flowers that open during the day. The rosette is typically four to seven basal leaves that are 0.1 to 0.2 inch wide with wavy margins. The bulb is 1.0 to 1.2 inches in length and occurs in the upper few inches of soil. The flower cluster is a single stem with multiple branches. Most fruits produce between three and six seeds (Wilken 2001).

Purple amole is dormant during the summer, and the period that above-ground structures are not produced often exceeds 1 year and may extend to 4 years (Guretzky et al. 2005). Flowering and fruit development occurs during May and June. By the time of fruit maturation, the leaves wither and the flowers dry and turn light brown. Mortality rate per year, presumably by natural causes, was estimated at 10 percent (Guretzky et al. 2005). Reproduction is primarily by seed, and the seed set increases with insect pollination (Wilken 1998). Like other members of the lily family, the species is probably in a mycorrhizal relationship with a fungus, an association whereby the fungus aids the plant in nutrient and water uptake, which can alter growth and competitive interactions between species (Allen 1991). Mutualism has also been suggested (Guretzky et al. 2005).

The species has been observed to grow on undisturbed soils that are cryptogamic or with cryptogamic crusts (Service 2002; Guretzky et al. 2005). Cryptogamic crusts consist of nonvascular photosynthetic plants, primarily cyanobacteria, green algae, lichens, and mosses, that protect the soil from erosion, aid in water infiltration, augment sites for seed germination, aid in carbon and nitrogen fixation, and increase soil nutrients (Beymer and Klopater 1992; Belnap et al. 2001). Cryptogamic crusts may enhance the habitat conditions, such as retaining

soil moisture, reducing wind and water erosion, and contributing to soil organic matter, and increasing the likelihood of young bulbs surviving over the long term. Cryptogamic crusts also discourage annual weed growth by functioning as a living mulch (Belnap et al. 2001).

Known populations of the purple amole exist primarily in open grassland communities, with fewer individuals in scattered oak woodland communities and open areas in shrubland communities. Only little cover of herbaceous species is present, possibly reducing competition for resources. Cryptogamic crusts frequently occur with purple amole in areas that have had little to no disturbance (Service 2002). Guretzky et al. (2005) observed positive correlations of purple amole and cover of native plant species and cryptogamic crusts.

The cryptogamic crusts at Camp Roberts are composed primarily of cyanobacteria (Service 2002). At Camp Roberts, purple amole occupies sites in open grasslands or surrounded by scattered oak woodlands. Little cover by other grasses and forbs is present where purple amole occurs.

### **Rangewide Status**

Purple amole is endemic to Monterey and San Luis Obispo Counties in central California. Purple amole is known from 17 occurrences in four populations in the Santa Lucia Range in southwestern Monterey County (Fort Hunter Liggett) and north central San Luis Obispo County (Camp Roberts) (CNDDDB 2020). The purple amole currently occupied area consists of less than 1,230 acres.

### **Recovery**

The goal for purple amole recovery is survival and conservation of the species and its remaining habitat (Service 2022). Recovery of purple amole will be achieved by increasing population trends and reducing threats to the species. Purple amole may be considered for delisting when the following criteria are met:

1. At least four resilient populations display evidence of recruitment of new individuals and stable or increasing population trends averaged over 10 consecutive years;
2. Each of the four resilient populations is being managed in a way, currently and into the future, that will support continued existence of purple amole and its habitat, including management of non-native, invasive species, and anthropogenic disturbance and feral wildlife;
3. Management is effective as shown by monitoring over 10 consecutive years; and
4. An ex-situ permanent conservation seedbank is established in a Center for Plant Conservation-affiliated botanic garden that reflects the breadth of the taxon's genetic diversity.

The Service identifies four recovery actions that need to be taken to conserve, manage, restore, and enhance the current condition of purple amole and its habitat to meet the recovery criteria (Service 2022).

Recovery actions for purple amole:

1. Manage habitat that supports the taxon to reduce or eliminate threats (Priority 1);
2. Conduct annual census monitoring (Priority 2);
3. Collect seed and deposit accessions into the permanent conservation seedbank (Priority 3); and
4. Conduct experimental research projects (Priority 3).

## ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) (50 CFR 402.02) define the environmental baseline as “the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline.”

### Action Area

The implementing regulations for section 7(a)(2) of the Act (50 CFR 402.02) 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. The action area for this biological opinion includes all lands within the 42,784-acre Camp Roberts installation boundary as well as a three-mile buffer around the installation boundary. This buffer mirrors that of the Army Compatible Use Buffer (ACUB) which aims to mitigate noise, smoke disturbance, and other nuisances from military actions through land acquisition. For detailed mapping of the action area, refer to the PBA (Padre 2022, p. 1-5).

### Habitat Characteristics and Existing Conditions of the Action Area

The majority of the action area is Camp Roberts, which encompasses 42,784 acres. Of this, 2,514 acres make up the developed cantonment area, which includes roads, administrative offices, troop housing, and maintenance facilities. Outside the cantonment area, the Main and East Garrisons encompass a designated weapons impact area, training areas, live-fire ranges, and two

airstrips. The weapons impact area is comprised of 8,130 acres. The remaining acreage is used for maneuver training. The ACUB consists of privately owned lands with suspended development rights to ensure that development does not encroach on the military's ability to train.

The topography and Mediterranean climate of Camp Roberts produce a diversity of habitats including grasslands, oak woodland, coastal scrub, chaparral, and riparian zones and wetlands. Camp Roberts contains approximately 25,039 acres of suitable grassland habitat for San Joaquin kit fox. Grasslands with sandy to loamy soils provide cover, forage, and dispersal habitat for the species. Camp Roberts has 47 acres of suitable aquatic habitat for vernal pool fairy shrimp, with natural and artificially created vernal pools ranging in size from a few square feet to more than an acre. Vernal pools are present in grasslands with gently sloping terrain such as river terraces, benches, valleys, or swales. Natural vernal pools occur on stream terraces, alluvial fans, and alluvial terraces, while artificially created pools consist of borrow pits, shell craters, and vehicle tire ruts created during training activities. Camp Roberts contains approximately 300 acres of suitable purple amole habitat in the form grasslands and oak woodland with cryptogamic soils with a high concentration of pebbles or gravel underlain by hard-packed clay. The ACUB is composed of grasslands, oak woodland, coastal scrub, chaparral, and riparian zones and wetlands, however the majority of the ACUB has been converted to agriculture, including dry farming, vineyards, and livestock grazing.

### **Previous Consultations in the Action Area**

In 2000, the CA ARNG consulted informally with the Service on the effects of controlled burning and grazing of three vernal pool fairy shrimp protection areas on Camp Roberts. The Service issued an informal consultation on May 23, 2000. The CA ARNG did not implement grazing or burning as a regular management tool as described in the informal consultation. One of the vernal pool fairy shrimp protection areas was grazed in 2001 and 2002, but due to complications with the grazing lessee, grazing was not implemented after 2002. The same protection area was burned in 2001 and 2004, however the other two vernal pool fairy shrimp protection areas were not burned. After 2002, CA ARNG fenced the three protection areas to keep grazers out. In 2011, the fencing was removed to allow for elk and deer to access the areas.

In 2009, we issued the original PBO that included Camp Roberts' military activities (Service 2009). Since issuance of the 2009 PBO, no observed take of San Joaquin kit fox has occurred. Construction of the Engineer Training Area in 2012 resulted in the loss of 62 acres of San Joaquin kit fox habitat; however, this species has not been observed on Camp Roberts since 2007.

In the 2009 PBO, as a surrogate for take of vernal pool fairy shrimp, we issued take of 22 acres of vernal pool fairy shrimp habitat within a 10-year timeframe. As a result of CA ARNG activities described in the 2009 PBO, take of 12.48 acres of vernal pool fairy shrimp habitat occurred, with 1.91 acres from direct impacts and 10.57 acres from indirect impacts (Padre 2022, Table 4-2, p. 4-8). The 2009 PBO established a 3:1 mitigation ratio for direct impacts (immediate and permanent impacts to vernal pools) and a 2:1 mitigation ratio for indirect impacts (potential to occur later in time or occurring within a 250-foot buffer of a vernal pool). For the purposes of

this consultation, the CA ARNG confirmed that indirect impacts are considered temporary impacts, therefore direct impacts are interchangeable with permanent impacts and indirect impacts are interchangeable with temporary impacts. The CA ARNG mitigated for the take of 12.48 acres by designating 26.87 acres of vernal pool fairy shrimp habitat as protected conservation area to be preserved in perpetuity. In preparation for mitigation of the 22 acres of authorized take, the CA ARNG selected four seasonal reservoirs, totaling 48.6 acres, as the vernal pool fairy shrimp conservation area (Padre 2022, pp. 4-7 to 4-8).

The 2009 PBO also established the PAPA, comprised of 525 acres, including 216 acres of purple amole habitat and a 309-acre unoccupied buffer. Approximately 106 acres of the PAPA are designated off-limits to all activities. Activities within the remaining 419 acres are subject to restrictions. The 2009 PBO estimated that 1.27 acres would be permanently impacted by road, tank trail, and firebreak improvements and 2.3 acres would be temporarily impacted by natural resource management.

For more information on previous consultations in the action area, please refer to the PBA (Padre 2022, pp. 1-7 to 1-8), which is incorporated by reference into this document.

### **Condition (Status) of the Species in the Action Area**

#### **San Joaquin Kit Fox**

San Joaquin kit fox were confirmed through observations on Camp Roberts from 1960 to 2007. Surveys between 1986 and 1991 estimated that San Joaquin kit fox occupied approximately 25,000 acres of the installation in open low-lying grassland habitat and in the cantonment area. By early 2002, the known distribution of San Joaquin kit fox at Camp Roberts was reduced to a total area of 398 acres in the East Garrison and 6,091 acres on the Main Garrison. The most recent observations of San Joaquin kit fox at Camp Roberts were one individual documented in March 2003 and one individual in July 2007 during annual spotlighting surveys. San Joaquin kit fox likely occur in low densities in the Paso Robles area, approximately 5-8 miles from Camp Roberts (Service 2020, p. 43). Although kit fox have not been sighted on Camp Roberts since 2007, we cannot preclude that they do not use the action area, considering the detection of kit fox in Paso Robles, which is within dispersal distance from the action area, and the challenges of conducting surveys over large number of acres at Camp Roberts. Possible reasons for population decline of San Joaquin kit fox on Camp Roberts include disease such as rabies or canine distemper, predation and competition from coyotes and red foxes, military training activities, vehicle strikes, lack of dispersal corridors between Camp Roberts and the central San Joaquin Valley populations, and a low reproductive rate (Service 2009, pp. 37-38, 48; Service 2020, p. 40-44; Padre 2022, p. 3-9).

#### **Vernal Pool Fairy Shrimp**

The first surveys for vernal pool fairy shrimp were conducted in 1995 in which vernal pool fairy shrimp were detected in 61 pools. Annual monitoring of vernal pool fairy shrimp from 1997-2007 showed consistent population levels during that time. No monitoring was conducted

between 2007 and 2017. The most recent surveys for vernal pool fairy shrimp occurred in 2017, during which vernal pool fairy shrimp were found in 33 pools and 4 seasonal reservoirs. Activities such as elimination of sheep grazing resulting in increased thatch, drought due to climate change, road improvements and maintenance, firebreaks, trail maintenance, and training area or infrastructure improvements have occurred within an undetermined amount of vernal pool habitat and have negatively impacted vernal pool fairy shrimp.

Based on the results of the 2017 surveys, the CA ARNG ranked all vernal pools (survey plots and conservation areas) for its conservation value. The CA ARNG ranked 4 seasonal reservoirs totaling 13.98 acres as high conservation value totaling and designated them and additional buffer areas as vernal pool fairy shrimp mitigation areas totaling 48.6 acres, making them off-limits to activities and protected for perpetuity. The CA ARNG ranked eight habitat areas totaling 1.62 acres as high to moderate conservation value, making them off-limits to digging and ground disturbing activities in both wet and dry season and prohibiting activities that have potential to adversely impact habitat value. The CA ARNG ranked five habitat areas totaling 2.83 acres as low to minimal conservation value, restricting activities. In these areas, low impact activities (i.e., dismounted maneuvers) may be permitted by the ENV Office as determined by environmental review prior to the activity taking place. Please refer to the PBA (PBA 2022, Table 3-2, p. 3-11) for more information about conservation values of vernal pool fairy shrimp survey areas.

As stated in the Previous Consultations in the Action Area section, the 2009 PBO's project activities resulted in impacts to 12.48 acres of vernal pool fairy shrimp habitat. The CA ARNG mitigated for the impacts to 12.48 acres by designating 26.87 acres of vernal pool fairy shrimp habitat to be preserved in perpetuity. The CA ARNG selected four seasonal reservoirs, totaling 48.6 acres, as the vernal pool fairy shrimp conservation area (Padre 2022, pp. 4-7 to 4-8).

### Purple Amole

Purple amole was discovered on Camp Roberts in May of 2000. The CA ARNG conducted a thorough survey of suitable habitat in May and June of 2000, which found that the most extensive population of purple amole on Camp Roberts occurred over approximately 197 acres and was surrounded by 18 satellite populations, each with few plants. In total, the Camp Roberts populations occupied about 216 acres in the Oscar Training Area. In 2001, the population was censused, which resulted in a count of over 250,000 individuals (Althouse and Meade 2021, p. 4). The CA ARNG completed an updated census in 2021, which resulted in a count of 24,903 individuals. The population numbers in 2021 as compared to 2001 showed an 89 percent reduction in the population. For a map of the PAPA and a purple amole census comparison, refer to the PBA (Padre 2022, Figure 3-6 and Figure 3-7, pp. 3-17 to 3-18). In May 2016, a wildfire burned 288 acres of purple amole habitat. While the 2016 fire reduced thatch buildup, the timing of this fire may have destroyed purple amole seed produced in this area. The 2017 purple amole monitoring report provided evidence that burned plots might not be faring as well as the unburned plots.

Since 2000, the CA ARNG has restricted activities within occupied habitat, including prohibiting all sheep grazing and hunting. The 2009 PBO established the PAPA and provided further restrictions including no ground disturbing activities, no off-road vehicle use unless necessary for fire mop up or pig carcass retrieval, and seasonal pedestrian use and roadwork grading and maintenance activities only when plants are dormant. Prescribed burns have been used to manage vegetation cover within select areas of the PAPA. The decline in purple amole populations may be due to displacement from invasive annual grasses, lack of disturbance including grazing and prescribed burning, wildfires, pig predation and damage, rodent burrowing, military vehicle damage, and drought caused by climate change. Additional investigation into the methods and timing of management techniques such as prescribed burning and grazing is necessary to ensure population growth and persistence.

## **Recovery**

### **San Joaquin Kit Fox**

The action area does not occur within one of the three core populations identified in the recovery plan as important to recovery (Service 1998b). However, Camp Roberts provides foraging, denning, and dispersal habitat for the San Joaquin kit fox. Protecting existing foraging, denning, and dispersal habitat from development and other incompatible uses is an important part of the recovery plan strategy and necessary to re-establishing a self-sustaining population of kit foxes. The decline in the Camp Roberts kit fox population reduces the likelihood of recovery either within the nearest core area or rangewide without additional management actions.

### **Vernal Pool Fairy Shrimp**

The action area lies within the Carrizo vernal pool region and within the Central Coast Ranges core area defined in the recovery plan (Service 2005b). Vernal pool regions and core areas were defined through a multiple-species ecosystem-level approach rather than being based on recovery needs of listed fairy shrimp species, thus the recovery status of the vernal pool fairy shrimp within each vernal pool region and core area is not specified in the plan. Core areas were chosen to encompass viable populations of plan species or support habitat connectivity and dispersal between populations. The plan defines primary threats to all species as habitat loss and fragmentation due to various causes, and the principal recovery strategy for all species is habitat protection and management.

Recovery criteria for the vernal pool fairy shrimp like other species in the plan are defined in terms of rangewide population protection targets and core area-specific land protection targets. The vernal pool fairy shrimp may be delisted when 80 percent of all occurrences present at the time of the plan are protected, unless additional occurrences are found, and when defined percentages of suitable habitat are permanently protected within each core area. The CA ARNG contributes to this recovery goal by protecting 48.6 acres of vernal pool fairy shrimp habitat in perpetuity, monitoring vernal pools and fairy shrimp occupancy, managing habitat, and

restricting activities that would negatively affect fairy shrimp. In 2020, the ENV Office revised the vernal pool fairy shrimp monitoring plan and will begin annual monitoring in 2023 to obtain more accurate population and habitat occupancy trends and conditions.

### Purple Amole

The action area contains one of four populations of purple amole identified in the recovery plan (Service 2022). The recovery plan defines the primary threats to purple amole to be displacement from non-native invasive species, anthropogenic disturbance from ongoing military activities or wildlife species, fire (although it may have some species benefits), and climate change, including extended drought and increasing temperatures. The CA ARNG designated the PAPA to protect habitat and is managing the species to support continued existence and to reduce the identified primary threats. The ENV Office recently developed a new monitoring plan and will begin bi-annual monitoring in 2023 to obtain more accurate population estimates and an understanding of how disturbance positively and negatively affects purple amole. The CA ARNG is working toward achieving population resiliency by developing and implementing prescribed burning and grazing plans in coordination with the Service. The CA ARNG contributes to the recovery of the species by protecting, monitoring, and managing purple amole and 525 acres of its habitat.

## EFFECTS OF THE ACTION

The implementing regulations for section 7(a)(2) define effects of the action as “all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action” (50 CFR 402.02).

### Military Training Activities

Bivouacking or establishing temporary encampments used for a single night to several weeks could disturb San Joaquin kit foxes, causing displacement or temporary loss of habitat. Trash or waste products left during or after project bivouacking or other military training activities, if not disposed of properly, could attract San Joaquin kit foxes to training areas. CA ARNG will avoid attracting San Joaquin kit foxes to bivouacking and military training sites by careful control and properly disposing trash and waste products. Bivouacking has the potential to injure, bury, or kill vernal pool fairy shrimp adults and cysts, or indirectly injure or kill adults and cysts by reducing the quantity or quality of habitat in the vernal pool or adjacent watershed during tent setup, latrine and sump construction, and use of the encampment. The CA ARNG will reduce or avoid these potential impacts by requiring that military personnel avoid vernal pool fairy shrimp habitat for bivouacking activities. Bivouacking, including construction of latrines, sumps, and obstacles also could kill or crush purple amole and may increase non-native invasive plants which would degrade purple amole habitat. Bivouacking and off-road troop maneuvers could crush or kill purple amole and reduce the quality or quantity of habitat through soil compaction and removal of cryptogamic crusts. Bivouacking will not occur during the purple amole growing and

reproductive period to reduce or avoid activity impacts. The CA ARNG will restrict the number of troops training in purple amole habitat. Air operations are not anticipated to effect purple amole.

Live-fire exercises would be an ongoing military training activity on Camp Roberts and the proposed night-time live-fire training and use of non-standard firing points could incidentally injure, kill, or harm San Joaquin kit foxes, if present, as they are primarily a nocturnal species and could be in the area during night-time live-fire events. Although night-time live-fire training could adversely affect San Joaquin kit foxes, loss of this species from mortality or injury would be unlikely as all military units would be required cease fire and contact Range Operations if wildlife is observed in the area and the expansive landscape of Camp Roberts offers ample suitable habitat for escape or reprieve in the unlikely chance that San Joaquin kit fox are in the area during night-live-fire training. Live-fire exercises would not take place near vernal pool fairy shrimp habitat and would not affect vernal pool fairy shrimp. Live-fire exercises would not take place in purple amole habitat and would not affect purple amole.

San Joaquin kit foxes, if present, could become trapped or entangled in fortifications, emplacements, obstacles and subterranean bunker complexes. The CA ARNG proposes to either cover or provide escape ramps for any excavations left open to reduce these effects and will clean up debris that could entrap or entangle kit fox. Construction of fortifications, emplacements, and obstacles and creation of subterranean bunker complexes could injure, bury, or kill vernal pool fairy shrimp adults or cysts or indirectly injure or kill adults and cysts by reducing the quantity or quality of habitat in the vernal pool or adjacent watershed. The CA ARNG will reduce or avoid the effects of these impacts by ensuring that activities are pre-planned as part of training events and areas proposed for ground disturbing activities are determined prior to activities taking place to avoid vernal pool fairy shrimp habitat. The construction of fortifications, emplacements, and obstacles, and creation of subterranean bunker complexes would create ground disturbance that could kill, bury, or crush purple amole and reduce the quantity or quality of purple amole habitat. These activities could increase non-native invasive plants, compact soils, and disturb cryptogamic crust. The CA ARNG will prohibit ground disturbance in purple amole habitat to avoid the effects of these activities on the species.

Maneuvers that traverse training areas could disrupt hunting, collapse burrows, entrap burrowing kit foxes, injure, or kill San Joaquin kit fox, if they are present in the areas. The CA ARNG will plan maneuver activities to minimize off-road vehicle traffic and limit areas of disturbance to reduce or avoid the effects of these activities to kit fox. Air operations could startle San Joaquin kit fox if they are present but are unlikely to result in injury.

Maneuvers could occur in and near vernal pool fairy shrimp habitat and could injure, bury, or kill vernal pool fairy shrimp adults and cysts. The CA ARNG will schedule the majority of training events outside of the wet season to reduce or avoid the effects of these activities. Maneuvers could also indirectly injure or kill adults and cysts by affecting the hydrology of such areas and reducing the quantity or quality of habitat in the vernal pool or adjacent watershed. Mounted maneuver training during the dry season could impact the claypan of vernal pools if pools are driven through and thus, compromise their ability to hold water. Vehicles driving through dry

vernal pools could also pick up and transport vernal pool fairy shrimp cysts and could deposit invasive seed into pool habitat. Air operations utilizing helicopters could displace cysts from pools during landing. The CA ARNG will mitigate for impacts to vernal pool fairy shrimp by protecting vernal pool fairy shrimp habitat and restricting activities within the protected areas.

Maneuvers, including dismounted maneuvers and wheeled or tracked vehicles maneuvers, have the potential to injure, bury or kill purple amole and reduce the quantity or quality of purple amole habitat. Maneuvers could compact soils, disturb cryptogamic crust, and destroy purple amole habitat. The CA ARNG will reduce or avoid the effects of these activities by having a biologist review training plans to ensure that purple amole are not in their growing or reproductive stages and soils are dry, prohibiting the off-road use of tracked vehicles in the PAPA, and limiting the number of troops for dismounted maneuvers.

#### Operations and Maintenance Activities

Road, tank trail, and firebreak maintenance and improvement, facility maintenance, and minor construction activities could affect San Joaquin kit fox, if present, through accidental vehicle strikes, disruption of hunting, burrow collapse, and entrapment. The CA ARNG proposes to conduct pre-activity surveys prior to any ground-disturbing work to reduce or avoid these effects. If potential dens are found, they will be marked and avoided to prevent damage to dens and reduce the effects of kit fox being injured or killed. Potential dens will be monitored to confirm use and if a den is found to be active, work will be stopped. The CA ARNG will post speeding limits throughout the installation to reduce the chances of kit foxes being struck by vehicles. San Joaquin kit fox could be disturbed by the presence and use of heavy equipment during construction but will be able to leave the construction areas.

Road, tank trail, and firebreak maintenance could injure, bury, or kill vernal pool fairy shrimp adults and cysts, or indirectly injure or kill adults and cysts by reducing the quantity or quality of habitat in the vernal pool or adjacent watershed. Traffic or road and trail maintenance could impact vernal pool fairy shrimp and their habitat by altering surrounding topography, potentially resulting in altered hydroperiods. The CA ARNG proposes to reduce or avoid the impacts of these activities by conducting these activities within the existing road footprint. Maintenance activities that include ground disturbance could kill, bury, or displace vernal pool fairy shrimp adult and cysts or change the drainage patterns, altering the hydrologic regime of pools. An insufficient hydroperiod for vernal pool fairy shrimp development could reduce or eliminate the viability of the pool's population. The CA ARNG proposes to avoid ground-disturbing activities during the wet season to reduce or avoid impacts from these activities. Ground disturbing activities could also result in increased sedimentation of vernal pools, killing adults and cysts. The CA ARNG will implement erosion control measures to reduce or avoid sedimentation impacts. Dust control could trigger cyst development during periods with insufficient inundation. Unseasonal cyst development could kill cysts and impact the abundance of viable cysts.

Road, tank trail, and firebreak maintenance activities have the potential to reduce the quantity or quality of purple amole habitat. Ground disturbance could crush, bury, or kill purple amole, introduce non-native invasive plants, and cause the destruction of cryptogamic crusts. The CA

ARNG proposes that a qualified biologist will pre-survey and monitor any road, trail, or firebreak maintenance in purple amole habitat to reduce or avoid the effects of the activities. The CA ARNG will brief all personnel conducting road and trail maintenance about purple amole conservation measures prior to work.

The use of pesticides including poison baits could injure or kill San Joaquin kit fox or reduce prey abundance. Poison baits are no longer used on Camp Roberts due to the potential for non-target poisoning. Baiting of traps during kit fox monitoring and entrapment of potential kit fox prey could attract San Joaquin kit fox to areas with increased human and predator activity, potentially causing disturbance, injury, or death. Additionally, live trapping may be used for pest animals and kit fox, if present, could inadvertently be trapped instead. However, because of their low numbers in the action area, we consider the likelihood of inadvertently trapping kit fox to be low. The CA ARNG will reduce or avoid the effects of these activities by requiring a qualified biologist or certified pest control applicator to monitor their respective activities, restricting the use of fumigants and overseeing the approval of fumigation sites.

The proposed use of herbicides and pesticides chemicals can have a negative effect on vernal pool crustaceans through mortality or reduced fitness. Use of herbicides near vernal pool fairy shrimp habitat could enter the habitat and kill vernal pool fairy shrimp, reducing the population. The CA ARNG will not use herbicides and pesticides within 250 feet of potential or known fairy shrimp habitat to reduce or eliminate the effects of these actions. Use of herbicides in purple amole habitat could kill purple amole, however suppressing non-native invasive plants could benefit purple amole by reducing competition for resources. The CA ARNG will avoid these potential impacts by not using herbicides in purple amole habitat. Similarly, we do not expect herbicide use to negatively impact the San Joaquin kit fox; CA ARNG will prohibit herbicide application within 300 feet of potential kit fox dens.

Prescribed burns and wildfires could injure or kill San Joaquin kit fox, or cause displacement, temporary loss of habitat, and reduction of prey abundance. San Joaquin kit foxes, if present, will be able to disperse away from disturbances, reducing the effects of these activities. Prescribed burns could have beneficial effects to San Joaquin kit foxes by rehabilitating degraded grasslands through facilitating recolonization of native vegetation and subsequently small mammals. Prescribed burns and wildfires could damage native vernal pool habitat and vernal pools could experience an increase in sedimentation from rain events occurring soon after a fire. Sedimentation of vernal pools would result in burial of existing cysts and alter the hydroperiod of pools. However, prescribed burns have been shown to benefit vernal pool fairy shrimp habitat by removing thatch buildup. The CA ARNG will implement erosion control measures to reduce or avoid sedimentation impacts and develop a burn plan in coordination with the Service to reduce or avoid impacts and maximize benefits to vernal pool fairy shrimp. Prescribed burns and wildfires could impact purple amole if fires occur outside of plant dormancy. Purple amole could be injured or killed and purple amole habitat could be degraded by increased sedimentation and erosion during post-fire rainfall. The CA ARNG will develop a prescribed burn plan in coordination with the Service to avoid these impacts and maximize benefits to purple amole.

The ITAM program's rehabilitation and management of the training area involves localized land rehabilitation activities which could disrupt hunting, collapse burrows, entrap burrowing kit foxes, injure, or kill San Joaquin kit foxes during ground disturbing activities and vegetation control. The CA ARNG proposes to conduct pre-activity surveys prior to any ground-disturbing work to reduce or avoid these effects. If potential dens are found, they will be marked and avoided to prevent damage to dens and reduce the effects of kit foxes being harmed. Potential dens will be monitored to confirm use and if a den is found to be active, work will be stopped. Training area land management actions involve predetermined, localized land disturbing activities could crush, injure, or kill vernal pool fairy shrimp. Activities that occur near vernal pools could alter the hydrology of the area, impacting the ability of pool(s) to hold water. The CA ARNG will reduce or avoid the effects of these impacts by ensuring areas proposed for ground disturbing activities are determined prior to activities taking place and avoid vernal pool fairy shrimp habitat. Training area land management activities could crush, injure, or kill purple amole. Training area land management is focused in areas of heavy use and would infrequently occur in or near purple amole habitat. This activity is not anticipated to affect purple amole.

#### Hunting Program

Live fire from hunting activities could disturb, injure, or kill San Joaquin kit foxes if they are in the area. Entrails from field dressed game could attract San Joaquin kit fox and increase their exposure to predators or human disturbance, potentially causing disturbance, injury, or death. The CA ARNG proposes to reduce or avoid the effects of this activity by permitting hunting during daylight hours when San Joaquin kit foxes are less likely to be active. In addition, all hunters will receive an educational pamphlet describing San Joaquin kit fox appearance and prohibitions on shooting kit fox. Hunting is not permitted in vernal pool fairy shrimp habitat and will have no effect on vernal pool fairy shrimp. Hunting is not permitted within purple amole habitat except for pig depredation as an invasive pest control action. Pig rooting has been documented as a significant disturbance and results in destruction of purple amole habitat within the PAPA. Pig depredation activities outside of the PAPA are likely to benefit purple amole by reducing the number of pigs capable of uprooting purple amole habitat.

#### Natural and Cultural Resources Management

Natural and cultural resource management activities could displace San Joaquin kit foxes, if present, or cause them to avoid the area all together, and can alter habitat. The CA ARNG proposes to use camera stations to survey for kit fox to reduce the potential for disturbance. Pedestrian traffic from natural and cultural resource management activities could crush, injure, or kill vernal pool fairy shrimp. Biologists conducting fairy shrimp surveys could inadvertently crush, injure, or kill vernal pool fairy shrimp while conducting monitoring surveys. However, the Service would approve the biologist's qualifications to ensure proper monitoring procedures would be implemented. Habitat improvement actions involving invasive plant removal could crush, injure, or kill vernal pool fairy shrimp but could also provide beneficial effects by removing invasive species and enhancing native habitat near vernal pool areas. Prescribed fires and grazing could crush, injure, or kill vernal pool fairy shrimp cysts and alter vernal pool soil crusts. Prescribed burns and grazing will likely have beneficial effects by reducing vegetation

and maintaining adequate hydroperiods. The CA ARNG proposes to develop a burn plan and grazing plan in coordination with the Service to reduce or avoid impacts and maximize benefits to vernal pool fairy shrimp.

Excavation of wetland delineation soil pits have the potential to bury, crush, and displace vernal pool fairy shrimp and cysts. However, the effects of this activity are anticipated to be minimal as wetland delineations occur once every 5-10 years. Pedestrian traffic associated with natural and cultural resource surveys could crush, injure, or kill plants and degrade habitat by compacting soils and disturbing cryptogamic crusts. As stated in Operations and Maintenance Activities section above, prescribed fires may benefit purple amole by removing competing plants. Grazing could crush, injure, or kill purple amole and could degrade habitat by compacting the soil. Grazing could benefit purple amole by reducing vegetation competition. The CA ARNG proposes to develop a burn plan and grazing plan in coordination with the Service to reduce or avoid impacts and maximize benefits to purple amole.

## **Effects on Recovery**

### **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.

### **CONCLUSION**

The regulatory definition of “to jeopardize the continued existence of the species” focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole statuses as the basis to assess the overall effect of the proposed action on the species.

### **San Joaquin Kit Fox**

We expect no appreciable effects on San Joaquin kit fox reproduction, numbers, and distribution. Ground disturbing project activities such as maneuvers, or construction of fortifications and embankments could harm, injure, or kill kit foxes. However, effects on reproduction, numbers, and distribution are expected to be low because kit foxes have not been observed on Camp Roberts since 2007 (although could be present in low numbers or recolonize it in the future) and encounters with this species during activities is expected to be a low probability. The CA ARNG would implement measures including pre-activity surveys to detect individuals and dens to ensure impacts to the species are reduced or avoided for any ground-disturbing work excluding maintenance of roads and firebreaks. Additionally, Camp Roberts will implement a hunter education program that will include material about identifying San Joaquin kit fox and their

protected status. Therefore, we conclude that the proposed action will not appreciably reduce reproduction, numbers, and distribution of the San Joaquin kit fox locally or rangewide.

#### Recovery

We do not anticipate that the proposed action would appreciably affect recovery of the San Joaquin kit fox in the action area or rangewide. The project may affect a small area of suitable habitat relative to the species' range. The project would not increase the threats currently impacting the San Joaquin kit fox nor preclude the Service's ability to implement recovery actions. Therefore, we conclude that the proposed action would not appreciably reduce the likelihood of recovery of the San Joaquin kit fox.

#### Vernal Pool Fairy Shrimp

We expect minor effects on vernal pool fairy shrimp reproduction, numbers, and distribution. Ground disturbing project activities such as maneuvers or construction of fortifications could destroy individuals or degrade vernal pool habitat, potentially destroying resting cysts and reducing the carrying capacity of the habitat. However, effects on reproduction, numbers, and distribution are expected to be minor due to the protection and prohibition of military activities within vernal pool habitats that have been assessed as high conservation value. The CA ARNG will implement measures such as limiting activities in vernal pool fairy shrimp habitat to the dry season and will compensate for habitat loss by expanding the area of the vernal pool mitigation area at a 3:1 ratio for permanent impacts and a 2:1 ratio for temporary impacts. Therefore, we conclude that the proposed action will not appreciably reduce reproduction, numbers, or distribution of vernal pool fairy shrimp locally or rangewide.

#### Recovery

We do not anticipate that the proposed action would appreciably affect recovery of the vernal pool fairy shrimp in the Central Coast Ranges core area, Carrizo vernal pool region, or rangewide. The project may affect a small area of suitable habitat relative to the species' range and could injure or kill a small proportion of any individuals present locally. The project would not increase the threats currently impacting the vernal pool fairy shrimp nor preclude the Service's ability to implement recovery actions. The expansion of permanently protected vernal pool habitat on Camp Roberts will contribute to recovery goals in the Central Coast Ranges core area. Therefore, we conclude that the proposed action would not appreciably reduce the likelihood of recovery of the vernal pool fairy shrimp.

#### Purple Amole

We expect minor effects on purple amole reproduction, numbers, and distribution. Project activities such as bivouacking, driving off-road, and dismounted maneuvers could crush or kill purple amole. However, effects on reproduction, numbers, and distribution are expected to be low due to the minimization of activities in the PAPA and the incorporation of management activities to improve habitat and reproductive potential. The CA ARNG will implement

measures such as limiting activities in purple amole habitat to the dormant season (June to November), limiting the number of troops in purple amole habitat, and designating a portion of the PAPA as completely off limits to military activity. Therefore, we conclude that the proposed action will not appreciably reduce reproduction, numbers, and distribution of the purple amole locally or rangewide.

### Recovery

We do not anticipate that the proposed action would appreciably affect recovery of the purple amole in the action area or rangewide. Although the project activities may take place within approximately half of the Camp Roberts purple amole population, the CA ARNG proposes to minimize ground disturbing activities, limit off-road vehicle use, and allow seasonal pedestrian use and roadwork maintenance activities when plants are dormant. These activities may injure or kill a small number of any individuals present locally. The remaining half of the purple amole habitat is designated as off-limits to military and maintenance activities. The project would not increase the threats currently impacting the purple amole nor preclude the Service's ability to implement recovery actions. The permanent protection of purple amole habitat will contribute to recovery goals. Therefore, we conclude that the proposed action would not appreciably reduce the likelihood of recovery of the purple amole.

As described in the Effects of the Action section, the proposed action has been designed to minimize effects to San Joaquin kit foxes, vernal pool fairy shrimp, and purple amole by implementing a suite of conservation measures. Based on successful implementation of the conservation measures, we have determined that the effects to San Joaquin kit fox, vernal pool fairy shrimp, and purple amole and their habitat would not be substantial on either a local or rangewide basis. Therefore, the proposed action would not appreciably diminish the species' likelihood of recovery.

After reviewing the current status of the San Joaquin kit fox, vernal pool fairy shrimp, and purple amole, the environmental baseline for the action area, the effects of the activities, minimization and avoidance measures, and the cumulative effects, it is the Service's biological opinion that the proposed action, as described in this biological opinion, is not likely to jeopardize the continued existence of these species. We base these conclusions on the following:

1. The project activities would have a low effect on reproduction of the species and would not appreciably reduce their reproduction rangewide;
2. The project activities would cause a small decrease in the number of individuals of each of the species, if any, but would not appreciably reduce numbers of the species rangewide;
3. The project activities would not reduce the species' distribution rangewide; and
4. The project activities would not cause any effects that would preclude our ability to recover these species.

## 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 in the definition of “take” in the Act means an act which actually kills or injures wildlife. Such [an] act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose 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.

Regulations allow for incidental take statements to rely on the use of “surrogates” for estimating the amount of take that is reasonably certain to occur as a result of the proposed action in certain circumstances. To use a surrogate to estimate take, the following criteria must be met: (1) the incidental take statement must describe the causal link between the surrogate and the take of the listed species; (2) the incidental take statement must explain why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals of the listed species; and (3) the incidental take statement must set a clear standard for determining when the level of anticipated take of the listed species has been exceeded.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species; however, limited protection of listed plants is provided at section 9(a)(2) to the extent that the Act prohibits the removal and reduction to possession of federally listed plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of listed plants on non-Federal areas in violation of State law or regulation or in the course of a violation of a State criminal trespass law.

## AMOUNT OR EXTENT OF TAKE

We anticipate that San Joaquin kit fox and an indeterminable number of vernal pool fairy shrimp present in the action area could be taken as a result of the proposed action. For San Joaquin kit fox, we expect the incidental take to be in the form of injury or mortality as a result of project activities. For vernal pool fairy shrimp, we expect incidental take to be in the form of direct injury or mortality from destruction, burial, or removal of cysts during project activities, and indirect injury or death of cysts or adults resulting from a reduction in the quantity or quality of habitat in the vernal pool or its adjacent watershed.

We cannot quantify the precise number of San Joaquin kit fox or vernal pool fairy shrimp that may be taken as a result of the proposed action. San Joaquin kit fox occur in low numbers on Camp Roberts and are nocturnal; therefore, animals that may have been harmed or injured may have entered or departed the action area and go undetected. However, the protective measures proposed by CA ARNG will minimize the likelihood of take, if kit fox are present during project activities. Vernal pool fairy shrimp are difficult to detect and unevenly distributed in the

environment and their populations may vary in size between years and may not be observed at all in some years due to environmental conditions. Finding an injured or dead vernal pool fairy shrimp is unlikely due to their small size and their microscopic cyst are not detectable in the field. However, the protective measures proposed by CA ARNG are likely to limit injury or mortality to individuals present.

Consequently, we are unable to reasonably anticipate the actual number of San Joaquin kit fox or vernal pool fairy shrimp that would be taken by the proposed action; however, we must provide a level at which formal consultation would have to be reinitiated. We anticipate that take of San Joaquin kit fox and vernal pool fairy shrimp would be low and moderate, respectively. However, as indicated in the Environmental Baseline and Effects Analysis sections of this biological opinion, adverse effects to San Joaquin kit fox and vernal pool fairy shrimp would likely to be low, considering that CA ARNG has proposed compensatory mitigation for impacts to vernal pool fairy shrimp. We also recognize that for every San Joaquin kit fox found dead or injured or vernal pool fairy shrimp habitat impacted, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Therefore, if 1 adult or juvenile San Joaquin kit fox is found injured or dead, the CA ARNG must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9.

Due to the difficulty of detecting incidental take of vernal pool fairy shrimp, we quantify take by adopting impacts to their habitat as a surrogate. We anticipate that no more than 5 acres would be temporarily or permanently impacted as a result of the proposed action. As such, if CA ARNG's project activities result in impacting more than 5 acres, project activities that are likely to cause additional habitat loss and degradation should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take (using habitat acres as a surrogate) would not be exempt from the section 9 prohibitions.

## REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary, and must be undertaken by the CA ARNG, as appropriate, for the exemption in section 7(o)(2) to apply. The CA ARNG has a continuing duty to regulate the activity covered by this incidental take statement. If the CA ARNG fails to assume and implement the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the CA ARNG 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 believes the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the incidental take of San Joaquin kit fox and vernal pool fairy shrimp:

1. The CA ARNG must request the Service's review and approval of biologists' qualifications to conduct surveys and restoration work for vernal pool fairy shrimp.
2. The CA ARNG must allow project site access to Service personnel, upon request, to ensure conservation measures are implemented and the likelihood of take is minimized.

## TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the CA ARNG 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:
  - a. The CA ARNG must request our approval of any biologists that they or their contractors employ to conduct project activities associated with vernal pool fairy shrimp pursuant to this biological opinion. Such requests must be in writing and sent to fw8venturasection7@fws.gov at least 15 days prior to any such activities being conducted.
2. The following term and condition implements reasonable and prudent measure 2:
  - a. The CA ARNG will meet with the Service to discuss the status of the proposed action and conservation measures once every fiscal year. This meeting can take place with CA ARNG's annual INRMP meeting with the Service.

## REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the CA ARNG must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. The CA ARNG must submit an annual report to the Service's Ventura Fish and Wildlife Office via electronic mail by January 30 of the following year describing progress of the previous calendar year. The report should be sent to fw8venturasection7@fws.gov and must document the progress of each of the covered activities described above and any take of vernal pool fairy shrimp or San Joaquin kit fox that may occur. We also request that you provide us with any information on activities involving purple amole in the report. The annual reports will assist the Service and the CA ARNG in evaluating current and future measures for the conservation of the species considered in this biological opinion and the Camp Roberts INRMP. The report also must include the Service's file number for this biological opinion (2023-F-0079826) and the following information:

The number of San Joaquin kit fox, vernal pool fairy shrimp, and purple amole observed, and the number killed or injured during project activities, if any, and the dates and times of mortality or injury. A description of the temporary and permanent impacts to vernal pool fairy shrimp habitat

including the dates, time, location, nature of the impact, and an assessment of how the CA ARNG determined impacts to be temporary versus permanent. All reporting conditions in the INRMP will be followed.

The CA ARNG will also submit reports in accordance with the INRMP, which include the purple amole and vernal pool fairy shrimp survey reports.

Within 30 days of completing the annual report, the CA ARNG will fill out and submit California Natural Diversity Database (CNDDB) field survey forms for all federally listed species observed during the course of this project. For instructions on how to submit data, refer to <https://wildlife.ca.gov/Data/CNDDB/Submitting-Data>.

#### 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 San Joaquin kit fox, initial notification within 3 working days of its finding must be made to the Ventura Fish and Wildlife Office by electronic mail at [fw8venturasection7@fws.gov](mailto:fw8venturasection7@fws.gov). Please include the date, time, GPS coordinates of the injured or dead kit fox, a photograph, cause of injury or death, if known, and any other pertinent information.

The CA ARNG must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. The CA ARNG must transport injured animals to a qualified veterinarian. Should any treated San Joaquin kit fox survive, the CA ARNG must contact the Service regarding the final disposition of the animal(s).

The Service assumes that remains of any vernal pool fairy shrimp killed by project activities will be entombed and inaccessible or undetectable in the form of damaged or lost cysts. However, if the CA ARNG locates any dead or injured vernal pool fairy shrimp, the CA ARNG must contact the Service regarding further disposition of these specimens as part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v). Initial notification within 3 working days must be made to the Ventura Fish and Wildlife Office by electronic mail at [fw8venturasection7@fws.gov](mailto:fw8venturasection7@fws.gov). The report must include the date, time, GPS coordinates, a photograph, cause of death or injury, if known, and any other pertinent information.

#### 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. The conservation recommendations below 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 and can be used by the CA ARNG to fulfill their 7(a)(1) obligations.

1. We recommend that the CA ARNG coordinate with the Service and facilitate recovery of San Joaquin kit fox through the CA ARNG's INRMP natural resources program.
  2. We recommend that the CA ARNG restore or create vernal pool fairy shrimp habitat.
  3. We recommend that the CA ARNG coordinate with the Service and the U.S. Army Environmental Division to ensure that both Camp Roberts and Fort Hunter Liggett use comparable and consistent purple amole survey methods for collecting and analyzing data to determine population status and trends across the range of the species.
1. As a Federal agency, the CA ARNG should promote the conservation of all federally listed species under the Act. Mitigation that is intended to offset take of listed species or the loss of their habitat should not only offset the effects of the proposed action but promote the recovery of listed species. We are available to assist you in developing appropriate mitigation or you may use the Service's recovery plans and 5-year reviews where we outline actions needed to promote conservation of listed species. The Act defines "conservation" as "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary."

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

#### RE-INITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the re-initiation request. As provided in 50 CFR 402.16, re-initiation 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) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending re-initiation.

If you have any questions about this biological opinion, please contact Christine Fox of my staff by electronic mail at [christine\\_fox@fws.gov](mailto:christine_fox@fws.gov).

Sincerely,

Acting for Stephen P. Henry  
Field Supervisor

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#### Personal Communication

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