

APPENDIX C

Avoidance and Minimization Measures

ANTIOCH DUNES EVENING PRIMROSE (*Oenothera deltoides* spp. *howellii*)

HABITAT TYPE:

Sandy bluffs, river bluffs, and dunes on Brown's Island, Brannon Island, New York Slough, and on and near Antioch Dunes National Wildlife Refuge, Contra Costa County.

AVOIDANCE AND MINIMIZATION MEASURES:

Avoid known occupied habitat by at least 250 feet. If repair activities must come within 250 feet of the area, or if activities occur in suitable habitat within the range of the species, be careful not to directly or indirectly affect the habitat through changes in hydrology, sedimentation, or contamination of the habitat. Temporarily fence the plant or plants to be avoided so that it is obvious that it/they are not to be disturbed (e.g., bright orange construction fencing). Take appropriate measures to avoid and minimize adverse effects such as the temporary construction of berms or drains to protect the area. After the work is completed, restore the upland areas to their previous condition using non-invasive plant species.

If habitat cannot be avoided, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the number of acres that were excavated or otherwise affected, and
2. any listed, proposed, or other rare species that were observed in the affected areas, and
3. a general description of the area (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quad) clearly delineating the project area and the affected habitat.

BLUNT-NOSED LEOPARD LIZARD
(*Gambelia silus*)

HABITAT TYPE:

Habitat is located in Merced, Fresno, Madera, San Benito, Kings, Tulare, Kern, San Luis Obispo, Santa Barbara, and Ventura counties. The species occurs in the valley and foothill grasslands, saltbush scrub, alkali flats, large washes, and canyon floors.

AVOIDANCE AND MINIMIZATION MEASURES:

Before staging and construction, have a qualified biologist (someone having experience with reptiles) look for the presence of the habitat type used by this species. Look for the presence of abandoned badger dens and the burrows of squirrels, gophers, or kangaroo rats because the lizard lives within these dens or burrows. Adult leopard lizards prefer shallow burrows, while immature leopard lizards shelter under rock piles or brush.

AVOIDANCE:

Confine surface disturbance to areas that do not have the above burrow systems.

MINIMIZATION:

If the lizard habitat areas are disturbed, have the biologist stake and flag routes which result in the least amount of burrow disturbance or soil compaction by heavy equipment. Where impacts cannot be avoided, have the biologist estimate the square feet or acres of habitat disturbance. Provide a description of the habitat that is disturbed. Provide a map of the project areas where disturbance occurred. Determine if any lizard mortality has occurred.

BUTTE COUNTY MEADOWFOAM
(*Limnanthes floccosa* ssp. *Californica*)

HABITAT TYPE:

Vernal swales in Butte County.

AVOIDANCE AND MINIMIZATION MEASURES:

Stay at least 250 feet from the margin of the vernal pool/swale edge. Be careful not to indirectly affect the habitat by conducting activities beyond 250 feet which will eventually result in effects to the pool/swale through changes in hydrology, sedimentation, or contamination of the habitat.

If repair activities must come within 250 feet of the margin of any pool/swale, Be careful not to directly or indirectly affect the habitat through changes in hydrology, sedimentation, or contamination of the habitat or the surrounding area. Take appropriate measures to avoid and minimize adverse effects such as the temporary construction of berms or drains to protect pools/swales. After the work is completed, restore the upland areas to their original condition. When restoring upland areas to previous condition by seeding, use non-invasive species that will not compete with native plants.

If vernal pool/swale habitat cannot be avoided, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the number of wetted surface acres that were filled or otherwise affected, and
2. any listed, proposed, or other rare vernal pool species that were observed in the affected pools/swales or the near vicinity, and
3. a general description of the pools/swales (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quadrangle) clearly delineating the project area and the affected habitat.

The Corps will contact the Sacramento Field Office for any projects located within the Chico Urban Development Boundary for specific avoidance areas.

VERNAL POOL CRUSTACEANS
(see list below)

LISTED OR PROPOSED VERNAL POOL CRUSTACEANS:

CONSERVANCY FAIRY SHRIMP (*Branchinecta conservatio*)
LONGHORN FAIRY SHRIMP (*Branchinecta longiantenna*)
VERNAL POOL FAIRY SHRIMP (*Branchinecta lynchi*)
VERNAL POOL TADPOLE SHRIMP (*Lepidurus packardii*)

HABITAT TYPE:

Vernal pools and other seasonal wetlands that pond water for three weeks or more are potential habitat for these vernal pool crustaceans. Look for vegetation and hydrologic indicators typical of such wetlands. In some instances vernal swales can support these species.

NOTE: a lack of typical vernal pool plant species does not necessarily indicate a lack of suitable habitat for these species.

AVOIDANCE AND MINIMIZATION MEASURES:

Stay at least 250 feet from the margin of the pool/swale edge. Be careful not to indirectly affect the habitat by conducting activities beyond 250 feet which will eventually result in effects to the pool/swale through changes in hydrology, sedimentation, or contamination of the habitat.

If repair activities must come within 250 feet of the margin of any pool/swale, Be careful not to directly or indirectly affect the habitat through changes in hydrology, sedimentation, or contamination of the habitat or the surrounding area. Take appropriate measures to avoid and minimize adverse effects such as the temporary construction of berms or drains to protect pools/swales. After the work is completed, restore the upland areas to their original condition. When restoring upland areas to previous condition by seeding, use non-invasive species that will not compete with native vernal pool plants.

If vernal pool/swale habitat cannot be avoided, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the number of wetted surface acres that were filled or otherwise affected, and
2. any listed, proposed, or other rare vernal pool species that were observed in the affected pools/swales or the near vicinity, and
3. a general description of the pools/swales (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quadrangle) clearly delineating the project area and the affected habitat.

**VERNAL POOL PLANTS
(see list below)**

LISTED OR PROPOSED VERNAL POOL PLANTS:

GREENE'S TUCTORIA (*Tuctoria greenei*)
HAIRY ORCUTT GRASS (*Orcuttia pilosa*)
SACRAMENTO ORCUTT GRASS (*Orcuttia viscida*)
SAN JOAQUIN ORCUTT GRASS (*Orcuttia inaequalis*)
SOLANO GRASS (*Tuctoria mucronata*)
COLUSA GRASS (*Neostaphia colusana*)
FLESHY OWL'S CLOVER (*Castilleja campestris* ssp. *succulenta*)
HOOVER'S SPURGE (*Chamaesyce hooveri*)
SLENDER ORCUTT GRASS (*Orcuttia tenuis*)
CONTRA COSTA GOLDFIELDS (*Lasthenia conjugens*)

HABITAT TYPE:

Vernal pools and other seasonal wetlands that pond water for three weeks or more are potential habitat for these vernal pool plants. Look for vegetation and hydrologic indicators typical of such wetlands. In some instances vernal swales can support these species.

AVOIDANCE AND MINIMIZATION MEASURES:

Stay at least 250 feet from the margin of the pool/swale edge. Be careful not to indirectly affect the habitat by conducting activities beyond 250 feet which will eventually result in effects to the pool/swale through changes in hydrology, sedimentation, or contamination of the habitat.

If repair activities must come within 250 feet of the margin of any pool/swale, Be careful not to directly or indirectly affect the habitat through changes in hydrology, sedimentation, or contamination of the habitat or the surrounding area. Take appropriate measures to avoid and minimize adverse effects such as the temporary construction of berms or drains to protect pools/swales. After the work is completed, restore the upland areas to their original condition. When restoring upland areas to previous condition by seeding, use non-invasive species that will not compete with native vernal pool plants.

If vernal pool/swale habitat cannot be avoided, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the number of wetted surface acres that were filled or otherwise affected, and
2. any listed, proposed, or other rare vernal pool species that were observed

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- in the affected pools/swales or the near vicinity, and
3. a general description of the pools/swales (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quadrangle) clearly delineating the project area and the affected habitat.

HARTWEG'S GOLDEN SUNBURST
(*Pseudobahia bahiifolia*)

HABITAT TYPE:

Non-native grasslands. All sites are associated with mima mounds which are often found near vernal pools: bluffs east of Dry Creek, Upper Domenici Creek in Stanislaus County; near Friant water tank, west of Friant-Kern Canal, south of Friant, Fresno County; north of San Joaquin River at Friant Bridge, Madera County.

AVOIDANCE AND MINIMIZATION MEASURES:

Avoid known occupied habitat by at least 250 feet. If repair activities must come within 250 feet of the area, or if activities occur in suitable habitat within the range of the species, be careful not to directly or indirectly affect the habitat through changes in hydrology, sedimentation, or contamination of the habitat. Temporarily fence the plant or plants to be avoided so that it is obvious that it/they are not to be disturbed (e.g., bright orange construction fencing). Take appropriate measures to avoid and minimize adverse effects such as the temporary construction of berms or drains to protect the area. After the work is completed, restore the upland areas to their previous condition using non-invasive plant species.

If habitat cannot be avoided, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the number of acres that were excavated or otherwise affected, and
2. any listed, proposed, or other rare species that were observed in the affected areas, and
3. a general description of the area (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quad) clearly delineating the project area and the affected habitat.

PALMATE-BRACTED BIRD'S BEAK
(*Cordylanthus palmatus*)

HABITAT TYPE:

Alkaline soils in valley and foothill grasslands: Mendota Wildlife Area, Springtown Wetlands Reserve, Alkali Ecological Reserve, Colusa NWR, Delevan NWR, Colusa NWR, Sacramento NWR, Triangle T Ranch (1-2 miles e of San Joaquin River), Madera County.

AVOIDANCE AND MINIMIZATION MEASURES:

Avoid known occupied habitat by at least 250 feet. If repair activities must come within 250 feet of the area, or if activities occur in suitable habitat within the range of the species, be careful not to directly or indirectly affect the habitat through changes in hydrology, sedimentation, or contamination of the habitat. Temporarily fence the plant or plants to be avoided so that it is obvious that it/they are not to be disturbed (e.g., bright orange construction fencing). Take appropriate measures to avoid and minimize adverse effects such as the temporary construction of berms or drains to protect the area. After the work is completed, restore the upland areas to their previous condition using non-invasive plant species.

If habitat cannot be avoided, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the number of acres that were excavated or otherwise affected, and
2. any listed, proposed, or other rare species that were observed in the affected areas, and
3. a general description of the area (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quad) clearly delineating the project area and the affected habitat.

SAN JOAQUIN KIT FOX
(*Vulpes macrotis mutica*)

HABITAT TYPE:

Habitat located in the following counties: Contra Costa, Alameda, San Joaquin, Santa Clara, Stanislaus, Merced, San Benito, Madera, Fresno, Monterey, Kings, Tulare, Kern, San Luis Obispo, Santa Barbara.

Habitat Associations: San Joaquin valley floor satlbush scrub, valley and foothill grasslands, and agricultural lands adjacent to the above associations. The species is also seen in other sparsely vegetated shrubby habitats. The availability of den sites is a requirement for shelter and reproduction.

AVOIDANCE AND MINIMIZATION MEASURES:

Before staging and construction, have a qualified biologist (someone having experience with San Joaquin Valley mammals) look for the presence of dens that are used by this species. Dens may be excavated in friable soils, in hard clay soils, and are created by enlarging holes started by ground squirrels or badgers. Dens occur in flat terrain, hills, and roadside berms. Pupping dens may be littered with prey remains, scat, matted vegetation, and footprints in the soil. Non-pupping dens may not show evidence of use.

Avoidance: The biologist is to follow the U.S. Fish and Wildlife Service Standard Recommendations For Avoidance of The San Joaquin Kit Fox (1997).

Minimization: If the dens or area adjacent to dens is to be disturbed, have the biologist stake and flag den sites as per the standard recommendations, and flag routes which result in the least amount of den disturbance and soil compaction by heavy equipment. Dens in the construction zone need to be monitored for one week with tracking medium to determine if the den is actively being used by a kit fox. The Service is to be contacted if a den is going to be destroyed. Where impacts cannot be avoided, have the biologist estimate the square feet or acres of habitat disturbance. Provide a description of the habitat that is disturbed or lost. Provide a map of the project areas where disturbance occurred. Report any kit fox mortality that has occurred.

Den Definitions:

"Dens" - In the northern range, San Joaquin kit fox dens may be located in areas of low, moderate, or steep topography. Den characteristics are listed below, however, the specific characteristics of individual dens may vary and occupied dens may lack some or all of these features. Therefore, caution must be exercised in determining the status of any den. Typical dens may include the following: (1) one or more entrances that are approximately 5 to 8 inches in diameter; (2) dirt berms adjacent to the entrances; (3) kit fox tracks, scat, or prey remains in the vicinity of the den; (4) matted vegetation adjacent to the den entrances; and (5) manmade features such as culverts, pipes, and canal banks.

"Known den" - Any existing natural den or manmade structure that **is used or has been used at any time in the past** by a San Joaquin kit fox. Evidence of use may include historical records, past or current radiotelemetry or spotlighting data, kit fox sign such as tracks, scat, and/or prey remains, or other reasonable proof that a given den is being or has been used by a kit fox. The Service discourages use of the terms "active" and "inactive" when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens often, with the result that the status of a given den may change frequently and abruptly.

"Potential Den" - Any subterranean hole within the species' range that has entrances of appropriate dimensions for which available evidence is insufficient to conclude that it is being used or has been used by a kit fox. Potential dens shall include the following: (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, or ground squirrel) that otherwise has appropriate characteristics for kit fox use.

"Natal or Pupping Den" - Any den used by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt and/or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two, therefore, for purposes of this definition either term applies.

"Atypical Den" - Any manmade structure which has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

ALEUTIAN CANADA GOOSE
(*Branta canadensis leucopareia*)

HABITAT TYPE:

Agricultural lands (crop and pasture) along the north coast of California, and throughout California's Central Valley east of Colusa, northeast of Berkeley, and from Modesto south to Los Banos (see maps).

AVOIDANCE AND MINIMIZATION MEASURES:

Activities conducted in California from May 15 through September 30 will not result in harassment of the Aleutian Canada goose.

Avoid conversion of agricultural lands for other uses.

DELTA GREEN GROUND BEETLE
(*Elaphrus viridis*)

HABITAT TYPE:

Grasslands surrounding vernal pools, vernal lakes, and seasonally ponded areas in Solano County and southwestern Sacramento County (see map).

AVOIDANCE AND MINIMIZATION MEASURES:

Before staging and construction, have a person experienced in seasonal wetland delineation visit the site and identify any wetland areas in the vicinity.

Stay at least 250 feet from seasonal wetland features, even when they are dry, and avoid disturbing their watersheds. Beyond 250 feet, avoid activities which will eventually result in effects on the seasonal wetland through sedimentation, changes in hydrology (such as breaking through soil hardpan or claypan), or contamination of the habitat. Clearly fence or stake out areas to be avoided.

Confine ground-disturbing activities to upland parts of the site and to the smallest area needed. Limit project vehicles, especially heavy equipment, to existing roadways whenever possible, especially when soils are moist.

If seasonally wet areas cannot be avoided as described, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the numbers of acres of seasonally ponded area that were disturbed and filled, and
2. an estimate of the number of acres of grassland within 250 feet of seasonal wetlands that were disturbed, and
3. a general description of the wetland features (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quad--a labeled copy is sufficient) clearly outlining the project area and the affected habitat.

DELTA SMELT
(*Hypomesus transpacificus*)

SACRAMENTO SPLITTAIL
(*Pogonichthys macrolepidotus*)

HABITAT TYPE:

The delta smelt is found in:

1. Fresh water to 10 ppt.
2. Shallow water (<3 meters)
3. Emergent and submersed vegetation
4. Backwater/deadened areas
5. Slow-moving sections of rivers and sloughs.

The Sacramento splittail is found in:

1. Fresh water to 18 ppt.
2. Slow-moving sections of rivers and sloughs
3. Backwater/deadened areas
4. Suisun Bay and Marsh
5. Flooded vegetation

AVOIDANCE AND MINIMIZATION MEASURES:

1. Avoid in-water work from February 1-June 30.
2. Avoid placement of dredged material on aquatic vegetation.
3. Avoid removal of any aquatic vegetation or woody debris.
4. Use silt-trapping devices to minimize downstream sedimentation.
5. Avoid use of rock rip-rap.

GIANT GARTER SNAKE
(*Thamnophis gigas*)

HABITAT TYPE:

Marshes, sloughs, ponds, small lakes, low gradient streams, irrigation and drainage canals, and rice fields. Permanent aquatic habitat, or seasonally flooded during the snake's active season (early-spring through mid-fall), with herbaceous wetland vegetation, such as cattails and bulrushes, grassy banks (often salt grass), and uplands for refuge from flood waters during the snake's dormant season (winter). Ggs are absent from larger rivers and other water bodies that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates. Riparian woodlands do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of ggs prey.

AVOIDANCE AND MINIMIZATION MEASURES:

Construction activity within habitat should be conducted between May 1 and October 1. Other times would require a biologist on site, because ggs are occupying underground burrows or crevices and take is more likely to occur.

Construction personnel should receive worker awareness training by a Service approved biologist. This training instructs workers to recognize ggs and its habitat(s).

24-hours prior to construction activities, the project area should be surveyed for ggs and any sightings noted. A Service-approved biologist should be on-site during clearing and grubbing of wetland vegetation. Clearing should be confined to the minimal area necessary to facilitate construction activities. Survey of the project area should be repeated if a lapse in construction activity of two weeks or greater has occurred.

Movement of heavy equipment to and from the project site or between the borrow site(s) should be confined to existing roadways to minimize habitat disturbance. Equipment should stay at least 30 feet from the banks of ggs aquatic habitat.

Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.

If a snake is encountered during construction, activities should cease until capture and relocation have been completed by the Service-approved biologist. Report any incidental take to the Service immediately by telephone at (916) 979-2725.

VALLEY ELDERBERRY LONGHORN BEETLE
(*Desmocerus californicus dimorphus*)

HABITAT TYPE:

Primarily riparian habitat types; however, any elderberry plant, *Sambucus* sp., with one or more stems, measuring 1.0 inch or greater in diameter at ground level, are considered habitat for the beetle.

AVOIDANCE AND MINIMIZATION MEASURES:

Stay at least 20 feet from the dripline of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level. Temporarily fence the plant or plants to be avoided so that it is obvious that it/they are not to be disturbed (e.g. bright orange construction fencing).

If elderberry plants need to be removed, notify the Service in writing at the earliest possible convenience of the following:

1. the number of elderberry plants that were removed,
2. an estimate of the number of stems measuring 1.0 inch or greater in diameter at ground level on each plant that was removed, and
3. the number of plants removed that had valley elderberry longhorn beetle emergence holes.

Also, provide a map (U.S.G.S. 7.5 minute quadrangle) clearly delineating the project area and the affected habitat (specific type(s) and amount(s) of habitat removed or otherwise adversely affected).

More specific guidance can be found in the Service's "Mitigation Guidelines for the Valley Elderberry Longhorn Beetle," dated September 19, 1996.

SHOWY INDIAN CLOVER
(*Trifolium amoenum*)

HABITAT TYPE:

Currently known from open grassland sites in Sonoma and Marin Counties, may be extirpated from Solano County.

AVOIDANCE AND MINIMIZATION MEASURES:

Avoid known occupied habitat by at least 250 feet. If repair activities must come within 250 feet of the area, or if activities occur in suitable habitat within the range of the species, be careful not to directly or indirectly affect the habitat through changes in hydrology, sedimentation, or contamination of the habitat. Temporarily fence the plant or plants to be avoided so that it is obvious that it/they are not to be disturbed (e.g., bright orange construction fencing). Take appropriate measures to avoid and minimize adverse effects such as the temporary construction of berms or drains to protect the area. After the work is completed, restore the upland areas to their previous condition using non-invasive plant species.

If habitat cannot be avoided, notify the Service in writing at the earliest possible convenience of the following:

1. an estimate of the number of acres that were excavated or otherwise affected, and
2. any listed, proposed, or other rare species that were observed in the affected areas, and
3. a general description of the area (include any information available on vegetation, hydrology, soils, etc.).

Provide a map (U.S.G.S. 7.5 minute quad) clearly delineating the project area and the affected habitat.