BIOLOGICAL RESOURCES SURVEY

RESOURCE CONSERVATION ELEMENT UPDATE

KINGS COUNTY GENERAL PLAN

(Updated 2008)

Prepared for

KINGS COUNTY PLANNING AGENCY
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1. Introduction

Kings County Planning Agency (KCPA) is currently updating the Kings County General Plan. The KCPA intends to include information concerning native plant communities, special status species, and sensitive habitats found in Kings County as an expanded component of the updated Resource Conservation Element. In 1993, Hansen's Biological Consulting (Visalia, California) prepared a Biological Resources Survey (BRS) for the county. That survey and resulting report compiled and summarized biological resource information as a technical appendix to the Resource Conservation Element of the General Plan. This report updates the 15-year old BRS, and provides guidance to the county to assist with the protection and conservation of its biological resources.

1.1 Objectives of the Biological Resources Survey and Update

The BRS is intended to expand upon and enhance the existing Resource Conservation Element by providing up-to-date biological information and a practical planning protocol that will help conserve biological resources, assist the county with their legal requirements as noted in Sections 4.1 through 4.5, and minimizing public controversy and time delays in project permitting.

In addition to objective biological information, the BRS presents a range of goals, procedures, and implementation measures designed to guide decision-makers in addressing special status species and sensitive habitat issues in Kings County. The BRS offers a variety of mechanisms and strategies which can help guide future decisions by the county to help conserve biological resources. All of the goals, procedures, and implementation measures which are adopted as part of the Kings County General Plan will help shape the county's regulatory programs and other actions affecting biological resources.

The specific objectives of the BRS are five-fold:

1. To promote successful planning and biological resource conservation by preparing a clear, accurate, informative report on native plant communities, special status species, and sensitive habitats in Kings County as an expanded component of the Resource Conservation Element of the General Plan.

2. To help identify and establish strategies to provide for the protection of special status species and sensitive habitats in accordance with state and federal laws.

3. Consolidation of policies related to special status species and sensitive habitat management issues into one document.

4. Provision for special status species and sensitive habitat mitigation and management programs that allow for the continued growth of the county's economy.

5. Establishment of programs that acknowledge and enhance intergovernmental coordination between agencies responsible for managing special status species and sensitive habitats.

1.2 Need for the Survey and Update

The Kings County General Plan guides land use planning and regulation throughout the unincorporated territory of the county (see map, Appendix A1). All private projects (such as re-zoning, subdivision, and use permit) and county projects (such as transportation, waste management, and flood control) must be consistent with the General Plan in order to be approved. The General Plan sets long-term goals and policies that are used in day-to-day decisions by the county related to development. The General Plan is a dynamic document that is periodically updated as population, environmental, and economic conditions change in the county. By state law, it contains seven mandatory elements: land use, circulation, housing, conservation, open space, noise, and safety. Other elements can be added to the General Plan to meet specific planning needs of a county. Additional optional elements have the same force and effect as mandatory elements and must be internally consistent with the other General Plan elements and programs.

The BRS has been prepared because of the increasing number and intensity of land use conflicts with special status species and sensitive habitats in the county. These species receive varying levels of legal protection under state and federal law. Conflicts with the species occur primarily when native habitat is removed or disturbed due to land development, including residential, industrial, commercial, mineral, and energy projects. In addition, certain types of agricultural developments and practices may affect these species and sensitive habitats.

In recent years, these conflicts have become more frequent because additional species are being designated endangered, threatened, or sensitive. Resolution of these conflicts often requires extensive biological study and prolonged coordination with resource and regulatory agencies that have the responsibility to protect these species such as the California Department of Fish and Game (CDFG) and U. S. Fish and Wildlife Service (USFWS). Because these species have certain legal protection, adverse impacts on them must be avoided or reduced by mitigation as required by the Federal and State Endangered Species Acts (see Sections 4.1 through 4.3). The development of appropriate and feasible mitigation has often been difficult and challenging because there are no well-established mitigation standards. The mitigation is usually negotiated with the state and federal resource and regulatory agencies on a case-by-case basis for each project.

As a result of the above situation, the county is developing various policies to resolve special status species and sensitive habitat conflicts in a predictable and programmatic manner that will meet the state and federal requirements to protect these species, yet allow for the continued economic development of the county. The BRS is a primary tool in achieving this goal. As a part of the Resource Conservation Element, it can help establish a set of goals, procedures, and implementation measures to protect special status species and sensitive habitats in the county, and resolve conflicts through appropriate project planning and impact mitigation. The goals, objectives, policies, procedures, and implementation measures presented in the BRS may be applied to both private and public (i.e., county) projects. As such, it will guide county actions on discretionary permits (i.e., parcel maps, use permits, etc.), as well as on decisions on public works projects initiated by the county.

The goals, procedures, and implementation measures presented in the BRS are not intended to replace or supersede the state and federal laws and regulations protecting special status species and

sensitive habitats. Rather, the BRS aims to clarify the county's responsibility in observing these requirements, and set forth mechanisms and programs for the county, private developers, and general public to resolve conflicts with special status species and sensitive habitats in an efficient, reasonable, and timely manner.

Like all elements of the General Plan, the Resource Conservation Element (including the BRS), has direct applicability for county actions on lands under county jurisdiction. Its policies do not apply to state and federal lands, except to the extent that county actions on adjacent lands could indirectly affect special status species and sensitive habitats on state or federal land.

1.3 Regional Setting

In its pristine condition, Kings County comprised a region of diverse natural resources. Despite its relatively small size (35th in geographic size in California) and the generally flat terrain (approximately 180-3,500 feet elevation) the county originally encompassed a combination of natural communities that was unique in North America. The county had a lake flanked by desert, forest, and prairie. Tulare Lake, a large shallow freshwater lake, was surrounded by extensive tule marshes and a "bathtub ring" of alkali scrub vegetation. This large (covering 700-1,000 square miles) elliptical lake had a number of small islands near its south shore where American white pelicans and other fish-eating birds nested. This lake was watered by runoff from Sierra-borne streams to the east of Kings County and from arroyos out of the arid foothills of the Coast Ranges. Along the largest of these streams (the Kings River, Cross Creek, and Kern River) luxuriant hardwood forests, riparian woodland, willow scrub, and marsh vegetation flourished. Outside of the influence of these wetland ecosystems, drier upland communities such as grasslands and various types of shrublands (desert scrub) grew along subtle gradients of rainfall, soil texture, and soil alkalinity, to provide a rich mosaic of habitat for a myriad of native plants, animals, and indigenous peoples. In the foothills to the west of the lake basin are found dense chaparral vegetation and on the highest slopes, a woodland of oak and pine. Although Tulare Lake no longer exists as a natural wetland ecosystem due to agricultural conversion, most of the original plant communities of Kings County are still present (although in much reduced acreages). These natural landscapes (plant communities) and their resident plants and animals, both rare and commonplace, are valuable natural resources of Kings County. These natural resources support and are ecologically intertwined with all of the agricultural and commercial productivity that have enabled the county to rise to its position of world-wide prominence in agricultural productivity (Preston1981, Werschkull 1984).

1.4 Plant Communities in Kings County

Associations of plant species that grow in assemblages under similar ecological conditions are called plant communities (natural communities or habitats). Generally, they are named for the dominant species found in the association. Definition of plant communities is important not only because it identifies types of plants that are present, but also because it indicates habitat types and animal species which may be found in the community.

Kings County covers approximately 890,600 acres (1,392 square miles). While the majority of the land in the county has been extensively modified by agricultural, urban, energy, and military-related development, uncultivated plant communities are present on approximately 220,000 acres

(343 square miles) or about 25% of the county. Remnant plant communities on those 220,000 acres can be broadly classified into nine categories. The following descriptions of the nine plant communities are based on descriptions in the CNDDB and Holland's Preliminary Descriptions of the Terrestrial Natural Communities of California (1986). Most of the regional biological surveys conducted in the southern San Joaquin Valley follow the plant community classification system developed by Holland (1986). Element Codes follow the numbering system used by CDFG's California Natural Diversity Data Base (CNDDB). The nine plant communities mapped by the CNDDB are (listed in order of decreasing acreage in Kings County):

- Valley and Foothill Grassland. CNDDB's Non-native Grassland (CNDDB Element Code 42200).

- Blue Oak-Foothill Pine Woodland. CNDDB's Digger Pine-Oak Woodland (CNDDB Element Code 71410), Blue Oak Woodland (CNDDB Element Code 71140), Open Digger Pine Woodland (CNDDB Element Code 71310), and Juniper-Oak Cismontane Woodland (CNDDB Element Code 71430).

- Chaparral. CNDDB's Northern Mixed Chaparral (CNDDB Element Code 37110).

- Interior Coast Range Saltbush Scrub. (CNDDB Element Code 36320).

- Riparian Forest, Woodland, and Scrub. CNDDB's Great Valley Valley Oak Riparian Forest (CNDDB Element Code 61430), Great Valley Cottonwood Riparian Forest (CNDDB Element Code 61410), Mule Fat Scrub (CNDDB Element Code 63310), Valley Willow Scrub (CNDDB Element Code 63410), and Tamarisk Scrub (CNDDB Element Code 63810).

- Valley Sink Scrub. (CNDDB Element Code 36210).

- Valley Saltbush Scrub. (CNDDB Element Code 36220).

- Valley Freshwater Marsh. (CNDDB Element Code 52410).

- Northern Claypan Vernal Pool. (CNDDB Element Code 44120).

These plant communities often integrate and co-occur with one another.

VALLEY AND FOOTHILL GRASSLAND

The most widespread plant community in Kings County, Valley and Foothill Grassland is dominated by introduced, annual Mediterranean grasses and native herbs (see map, Appendix A2). On most sites the native species, such as needle grass (*Stipa*) species, have been largely or entirely supplanted by introductions. Those few remnant grassland habitats which are still rich in native grasses (including perennial bunchgrasses) and showy native herbs (wildflowers) are usually found on unusual substrates, such as serpentine or somewhat alkaline soils (Smith and Berg 1988). With the arrival of settlers, natural valley grasslands underwent such rapid change that their former condition will always be open to debate (Wester 1981). Most experts agree that dry interior valleys like the Tulare Basin, had only scattered perennial grasses including bunchgrasses.

Holland (1986) classifies this community as Non-native Grassland (CNDDB Element Code 42200). Found throughout most of California primarily below 3,000 feet in elevation, Non-native Grassland is dominated by exotic (non-native) annual grasses in association with many species of showy-flowered native herbs. Characteristic non-native species in this plant community are red brome (*Bromus rubens*), soft chess (*Bromus mollis*), ripgut brome (*Bromus diandrus*), hare barley (*Hordeum leporinuin*), wild oats (*Avena* spp.), Italian ryegrass (*Lolium multifloruin*), Arabian schismus (*Schismus arabicus*), rat-tail fescue (*Vulpia myuros*), filaree (*Erodiuin*) species, and bur-clover (*Medicago polymorpha*). Native plant species found in the non-native grassland include few-flowered fescue (*Vulpia microstachys*), fiddleneck (*Amsinckia*) species, goldfields (*Lasthenia*) species, peppergrass (*Lepidium*) species, tarweed (*Hemizonia*) species, lupine (*Luninus*) species, gilia (*Gilia*) species, owls clover (*Castilleja*) species, and phacelia (*Phacelia*) species. Originally, all the grassland species, including wildflowers and other broadleaf forbs, were natives. Today, non-native grasses and forbs (mostly species of Mediterranean origin) are the dominant species and, together with occasional clumps of native bunchgrasses, they comprise the non-native grassland areas of the Valley. These grasses and flowers germinate with the onset of late fall and winter rains. Growth, flowering, and seed-set occur from winter through spring. Most plants in this community die by summer yet these annual species persist as seeds until the winter rains return.

Some of the grassland in the Kettleman Hills, Tar Canyon and other parts of Kings County would probably have qualified originally as Wildflower Field (CNDDB Element Code 42300) where wildflowers and annual grasses occupied the spaces between the perennial grasses, fluctuating in abundance with the years and the seasons (Bartolome 1981). Holland (1986) describes Wildflower Field as an amorphous grab bag of herb-dominated plant community types noted for conspicuous annual wildflower displays. Dominance varies from site to site and from year to year at a particular site.

Wildflower Field usually occurs on fairly poor sites associated with grasslands or oak woodlands on surrounding, more productive sites. Characteristic species in this plant community are California poppy (*Eschscholzia californica*), gilia, lupine and owl's clover. Grasslands, formerly more extensive in the Tulare Valley (southern San Joaquin Valley), are now much reduced in extent. This conversion is largely due to both intentional and accidental introduction of non-native grasses and forbs (like filaree and bur-clover). Most of these plants are annual species of Mediterranean origin. Once established in California, these aggressive non-native plants proliferated as herds of nomadic grazers and browsers (the native Tule Elk, Pronghorn, and Mule Deer) gave way to the increased grazing pressure of domestic livestock that feed, often year-round, in fenced pastures. Like most of the remnant examples in the Tulare Valley, the natural character of Kings County's original grassland has been impacted by decades of cattle and sheep grazing. Perennial bunchgrasses were adapted to some level of grazing by the native ungulates of the Valley, but most modern sites display an abundance of non-native Mediterranean annual grasses and a relative absence of perennials and other native grasses.

BLUE OAK - FOOTHILL PINE WOODLAND

This is the highest elevation plant community in Kings County. Because it occurs primarily on private ranch land in the Kreyenhagen Hills on the border of Fresno and Monterey Counties (see map, Appendix A2). This habitat is described as medium tall, dense to open broad-leaved deciduous

woodland with an admixture of needle-leaved evergreen trees. Low broad-leaved evergreen trees and/or shrubs are common. Near grasslands, the canopy opens up, the grasses form a continuous ground cover, and the woodland changes into a savanna. Inclusions of chaparral may be numerous. Dominant plants are foothill pine and blue oak (*Quercus douglasii*). Other characteristic components of this community are buckeye (*Aesculus californica), manzanita (Arctostaphylos) species, buckbrush (Ceanothus cuneatus), toyon (Heteromeles arbutifolia*), California juniper (*Juniperus californica*), interior live oak (*Quercus wislizenii*) on north facing slopes and at higher elevations, California coffeeberry (*Rhamnus californica*), redberry (*Rhamnus crocea*), and poison-oak (*Rhus diversiloba*). Foothill pine (or gray pine) is now the preferred common name of *Pinus sabiniana* which was formerly called digger pine. Holland (1986) would classify this community as either Digger Pine-Oak Woodland (CNDDB Element Code 71410), Blue Oak Woodland (CNDDB Element Code 71140), Open Digger Pine Woodland (CNDDB Element Code 71310), or Juniper-Oak Cismontane Woodland (CNDDB Element Code 71430).

Digger Pine-Oak Woodland. -This habitat (CNDDB Element Code 71410) is a climax woodland with a mixture of foothill pine and blue oak (Holland 1986). Pure stands of either tree do not occur, but mixed stands are much more common. Foothill pine usually towers over the oaks in undisturbed stands. Understories usually are dominated by introduced annuals. Most digger pine-oak woodland occurs on well-drained sites with Mediterranean climate, usually in rocky, or exposed sites along ridges or canyons with poor or shallow soils. Intergrades on more mesic sites with scrubby, dense stands of blue oak woodland. Frequent fires favor blue oak over foothill pine. Characteristic species in this plant community are foothill pine, buckeye, coast live oak (*Quercus agrifolia*), canyon oak (*Quercus chrysolepis*), scrub oak (*Quercus duinosa*), interior live oak, woodland star (*Lithophragma* sp.), California saxifrage (*Saxifraga californica*), Henderson's shooting-star (*Dodecatheon hendersonii*), Chinese houses (Collinsia heterophylla), mottled locoweed *(Astragalus lentiginosus idriensis*), oak gooseberry (*Ribes quercetoruin*), and yucca (*Yucca whippleyi caespitosa*).

Blue Oak Woodland. -This habitat (CNDDB Element Code: 71140) is a highly variable climax foothill woodland in which blue oak (*Quercus douglasii*) occupies at least 85% of the tree canopy (Holland 1986). Associated trees are usually individuals of several other species of oak including interior live oak. Stands vary from open savannas with annual grass and forb understories (usually at lower elevations) to fairly dense woodlands with scattered patches of shrubby understory. Most blue oak woodland occurs on well-drained soils in Mediterranean California, usually below 3,000 to 4,000 feet. Frequent fire is an important component of this habitat. This woodland interdigitates on more mesic sites at lower elevations with Valley and Foothill Grasslands where it is largely confined to north slopes and canyons. Characteristic species in this plant community are buckeye, whiteleaf manzanita (*Arctostaphylos viscida*), mariposa manzanita *(Arctostaphylos iuariposa*), other Manzanita species, buckbrush, other Ceanothus species, mountain mahogany (*Cercocarpus betuloides*), Hansen's delphinium (*Delphinium hansenii*), yerba santa (*Eriodictyon californicum*), woodland star (*Lithophragma affine*), baby blue-eyes (*Nemophila menziesii*), Eastwood's Nemophila (*Nemophila puichella*), slender popcorn flower (*Plagiobothrys tenellus*), blue oak, scrub oak, black oak (*Quercus kelloggii*), interior live oak, California coffeeberry, redberry, Pacific snakeroot (*Sanicula crassicaulis*), and mountain violet (*Viola quercetorum*).

CHAPPARAL

This plant community is found in the southern portion of the Kreyenhagen Hills in southwestern Kings County and extends south into Kern County (see map, Appendix A2). This habitat is described as a dense community of needle-leaved and broad-leaved evergreen sclerophyll shrubs, varying in height from 1 to 3 meters, rarely to 5 meters. An understory is usually lacking. Dominant plants are chamise (*Adenostoma fasciculatum*), manzanita (*Arctostaphylos*) species, and California lilac (*Ceanothus* spp.). Other characteristic components of this community are California sagebrush (*Artemisia californica*), mountain mahogany, wild buckwheat (*Eriogonum fasciculatum*), flowering ash (*Fraxinus dipetala*), silk tassel (*Garrya*) species, toyon, twinberry (*Lonicera*) species, holly-leaved cherry (*Prunus ilicifolia*), scrub oak, Rhamnus species, Rhus species, gooseberry (*Ribes*) species, and sage (*Salvia*) species. Holland (1986) would probably classify this plant community as Northern Mixed Chaparral (CNDDB Element Code 37110).

Northern Mixed Chaparral. -This habitat (CNDDB Element Code 3712.0) is a foothill habitat comprising broad-leaved sclerophyll shrubs, 2 to 4 meters tall. This dense, often nearly impenetrable vegetation is dominated by scrub oak, chamise, and any one of several species of manzanita and Ceanothus. Tree cover if any, is less than 10 percent. Plants are typically deep-rooted. There is usually little or no understory vegetation; often considerable accumulation of leaf litter. Growth may occur throughout the year, but is highest in spring and much reduced during the late summer to fall dry season or during the winter at higher elevations. The flowering season extends from late winter to early summer. Chaparral is adapted to repeated fires, to which many species respond by stump sprouting. A dense cover of annual herbs may appear during the first growing season after a fire, followed in subsequent years by perennial herbs, short-lived shrubs and re-establishment of dominance by the original shrub species. Most chaparral occurs on dry, rocky, often steep slopes with little soil. Slopes are typically south-facing in northern California but are north-facing in the south. Often adjacent to, but on rockier soils than Oak Woodland or Valley and Foothill Grassland. Characteristic species in this plant community are chamise, buckeye, whiteleaf manzanita, buckbrush, chaparral whitethorn (*Ceanothus leucodermis*), tobacco brush (*Ceanothus velutinus*), redbud, mountain, yerba santa (*Eriodictyon californicuni*), flowering ash, flannel bush (*Fremontodendron californica)*, silk tassel (*Garrya fremontii*), toyon, twinberry (*Lonicera involucrata*), *Malacothamnus fremontii*, chaparral-pea (*Pickeringia montana*), canyon oak, scrub oak, interior live oak, sugar bush (*Rhus ovata*), squaw bush (*Rhus trilobata malacophylla*), and poison oak.

INTERIOR COAST RANGE SALTBUSH SCRUB

This habitat (CNDDB Element Code 36320) is moderate to dense, shoulder-high scrub community is dominated by Valley saltbush (*Atriplex polycarpa*), other saltbush species (*Atriplex* spp.), Mormon tea (*Ephedra californica*), and bladderpod (*Isomeris arborea arborea*), usually with a grassy understory dominated by red brome (Holland 1986). Most Interior Coast Range Saltbush Scrub occurs on rolling to hilly dissected alluvial fans and uplands with sandy to loamy, non-alkaline soils. Summers are hot and rainless; winters are cool with scant rainfall and no tule fog. This plant community changes abruptly to Valley Saltbush Scrub (CNDDB Element Code 36220) where soils become alkaline. Other characteristic species in this plant community are mottled locoweed, other locoweed species (*Astragalus* spp.), wild buckwheat, California snakeweed (*Gutierrezia bracteata*), and pale-leaf goldenbush (*Haplopappus acradenius bracteosus*). This natural community is found

only along the base of the inner south Coast Ranges of California from near Pacheco Pass south to around Maricopa, from the top of the tule fog up to about 2,000 feet in elevation (see map, Appendix A2). Holland (1986) feels that this community is rare enough to merit inclusion in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California due to its limited range and since much of it has been type-converted to Non-native Grassland by year-round grazing. Wildfires can have a devastating effect on the perennial shrubs in this plant community. Historically, the relatively sparse herbaceous understory in saltbush scrub was probably not adequate to carry fire to the scattered shrubs in this desert plant community. Unlike chaparral, saltbush scrub is not a fire-adapted shrub community. The spread of non-native Mediterranean annuals, chiefly red brome (*Bromus rubens*), has produced a more continuous carpet-like understory in this community; a situation where fire (especially frequent fire) now poses a significant threat to saltbush scrub. There are extensive areas in the Kettleman Hills where this grazing and fire-induced type-conversion has occurred.

RIPARIAN FOREST, WOODLAND, AND SCRUB

Riparian vegetation, by definition, occurs along streamsides where there is an abundant source of water (see maps, Appendices A2 and A3). Unlike grassland or desert areas, riparian habitat can not thrive if supplied only with the precipitation that falls in the immediate area. Riparian habitat in the Central Valley, for example, flourishes only along stream channels that carry runoff from melting snow that has fallen many miles to the east in the high Sierra Nevada (see map, Appendix A2).

Riparian forests are dynamic systems that experience major disturbances every time flooding occurs. Tremendous volumes of high velocity snowmelt are capable of scouring vegetation off islands, sandbars, and stream levees. This is part of a natural process that creates forest openings where grasses, shrubs, and young riparian trees (willows, cottonwoods, sycamore, valley oak, alder, ash, and buttonbush) become established on areas where their seeds fall on bare moist soil. Such annual flood events helped maintain a diverse array of species with a vigorous range of age classes, and a healthy reproducing forest.

In the arid Central Valley, water-rich riparian communities provide ideal conditions for a flora rich in species. Streamside vegetation provides food and cover for many aquatic animals from invertebrates, like water striders and dragonflies, to vertebrates, like fish, frogs, and ducks. By growth in layers, riparian plants provide cooling and reduced moisture-loss for all other vegetation growing in their shade. The diversity of plants creates a range of temperature and humidity which affords cover and food for a myriad of plant-eating animals including insects and small mammals. This abundant plant and animal food sustains a tremendous variety of birds as well. Riparian habitat supports a higher species diversity of birds and greater bird populations than any other habitat in California. Acre for acre, riparian habitat supports the most abundant flora and fauna in this region.

Before becoming mature forest, riparian vegetation passes through several seral (successional) stages. Some of the riparian communities in Kings County (because they have been modified by flooding, and clearing) are characteristic of the early seral stages where shrubs and small trees are beginning to form a shady layer of foliage above the herbaceous ground cover plants. Mature riparian forest, often described as a gallery forest, consists of vegetation in different layers; tree

canopy, shrub understory, and herbaceous ground cover. Lianas (climbing vines) communicate with vegetation in every strata. When this kind of forest reaches a mature stage, the canopy may be dominated by valley oak or cottonwood. The shrub understory consists of elderberry and blackberry with mule fat, buttonbush, Oregon ash, and shrubby willows growing nearest the streams. The herbaceous understory consists of wildrye, mugwort, ragweed, goldenrod, sedge, and nettle. Lianas include wild grape and virgin's bower.

Riparian communities in Kings County are quite diverse and can be classified into one of five categories depending on the dominant tree and shrub species. Archival photographs and written historical accounts from the county document a wide band of riparian forest along the lower Kings River.

Great Valley Valley Oak Riparian Forest. -Wherever the riparian forest is dominated by Valley oaks (*Quercus lobata*), such as at Burris Park, this particular kind of riparian forest is called Great Valley Valley Oak Riparian Forest (CNDDB Element Code 61430). Valley oak is the dominant tree species in this streamside (riparian) forest which is indigenous to California's Great Valley (Central Valley). Great Valley Valley Oak Riparian Forest is a medium to tall (rarely to 100 feet) broadleaved, winter deciduous closed canopy riparian forest dominated by Valley oak. Understories include scattered Oregon ash, Western sycamore, as well as young Valley oak. Lianas (such as wild grape) often are conspicuous, quickly occupying wind-throw generated light gaps. They also are more scattered throughout the shady understory (Holland 1986).

Most Great Valley Valley Oak Riparian Forest is restricted to the highest parts of floodplains, most distant from or higher above active river channels and therefore less subject to physical disturbance from flooding, but still receiving annual inputs of silty alluvium and subsurface irrigation. Characteristic species in this plant community are Western virgin's bower (*Clematis ligusticifolia*), creeping wildrye (*Elymus triticoides*), Oregon ash (*Fraxinus latifolia*), valley oak, southwestern elderberry (*Sambucus mexicana*), and California blackberry (*Rubus procerus*). This type of riparian forest was formerly extensive on low-gradient, depositional reaches of the major streams of the Sacramento and northern San Joaquin Valleys; it was more scattered in the San Joaquin watershed and on the floodplains of the Kings and Kaweah Rivers [and the Tule River]. High quality remnants of this plant community have been virtually eliminated by agriculture and fire wood harvesting.

Great Valley Cottonwood Riparian Forest. -This habitat (Element Code 61410) is the plant community that characterized much of the Kings River channel and flood plain under historical conditions. This forest type occurs on fine-grained alluvial soils near perennial (or nearly perennial) streams that provide subsurface irrigation even when the channel is dry. Spring flooding originally provided an annual input of nutrients, soil, and new germination sites that produced a dense, broad-leaved, winter deciduous streamside forest dominated by Fremont's cottonwood (*Populus fremontii*) and Goodding's black willow (*Salix gooddingii*). When stream flow is adequate, understories are dense and reproduction of canopy dominants is largely by means of abundant wind-borne seed that takes root in moist mineral soil scoured bare by the action of flood water (Holland 1986). Within much of Kings County, the hydrology of this runoff-dependent system has been so drastically altered by agricultural water development and flood control that the resulting riparian community has been reduced to scattered, highly degraded remnant stands where vigorous mature trees are outnumbered by snags and mistletoe-infested specimens. Under current conditions, stands of cottonwoods and willows are dominated by younger trees that reproduce chiefly by vegetative reproduction. Species

characteristic of the Great Valley Cottonwood Riparian community include Fremont's cottonwood, Valley willow, sandbar willow (*Salix hindsiana*), other willow (*Salix*) species, mule fat (*Baccharis viminea*), southwestern elderberry, California sagebrush (*Artemisia douglasiana*), cocklebur (*Xanthium strumarium*), and sweet clover (*Melilotus*) species.

Great Valley Willow Scrub. -Great Valley Cottonwood Riparian Forest in Kings County includes components of Great Valley Willow Scrub (Element Code 63410). This community is quite similar to the cottonwood riparian system except that tall trees, especially cottonwoods, are absent. This riparian scrub community is characterized by an open to dense broadleaved, winter-deciduous shrubby streamside thicket dominated by one of three or four willow species (*Salix* spp.). Dense stands usually have little understory or herbaceous component. More open stands, such as the community that is present along much of Cross Creek, have grassy understories, usually dominated by introduced species. Characteristic species of this community include Valley willow, Bermudagrass (*Cynodon dactylon*), ripgut brome, and Mexican-tea (*Chenopodium ambrosioides*).

Cattle grazing impacts both the age structure and the species composition of this riparian community. Grazing prevents seedling willows from becoming established so most of the surviving willows are mature or senescent trees. This means that there has been and will continue to be a gradual decline in the number of trees in this community as long as current grazing practices continue. There is historical evidence to confirm this decline. The earliest description of the local willow scrub riparian community noted it as a narrow fringe of willows grew along its banks, with occasional bare breaks. Today, the opposite situation exists; only grass grows along the creek banks with occasional trees. There are long stretches where one finds it difficult to even classify this degraded plant community as riparian habitat. Sandbar willow, absent from much of this community today, would probably grow here under an alternate cattle grazing regime. Reduced stream flow resulting form irrigation diversions has increased drought stress on the trees that remain in this community, especially those growing along channels which ave been isolated from their drainages sources. Many standing trees are dead snags, other are nearly dead, and many have major mistletoe infestations. Healthy willows are important habitat trees for nesting and roosting birds, especially during drier months.

Mule Fat Scrub. -This habitat (CNDDB E1ement Code 63310) is an early successional riparian community maintained by regular flooding (Holland 1986). The dominant plant in this herbaceous riparian scrub community is mule fat, a tall woody shrub in the sunflower family. In the absence of frequent flooding, most stands succeed to cottonwood and willow dominated riparian forest communities. Mule Fat Scrub occurs along intermittent stream channels (such as some of the lower portions of Cross Creek near the Corcoran Irrigation District Reservoir) with fairly coarse substrate and moderate depth to the water table. Characteristic species are mule fat, willows, stinging nettle (*Urtica holosericea*), and members of the Sedge family (Cyperaceae).

Tamarisk Scrub. -This habitat (CNDDB Element Code 63810) is a weedy, virtual inonoculture of any of several Tamarisk species (*Tamarix* spp.), usually supplanting native vegetation following flooding or other major ecological disturbance (Holland 1986). Tamarisk scrub occurs on sandy braided washes or intermittent streams, often in areas where high evaporation increases the stream's saltiness. Tamarisk is a strong phreatophyte and a prolific seeder, attributes which predispose the species to be aggressive competitors in disturbed riparian corridors. Characteristic species in this plant community are quailbush (*Atriplex lentiformis*), saltgrass, and Tamarisk (*Tamarix ramosissjma*). This community is widely scattered in the drier parts of California and is

increasing its range. In Kings County, this riparian scrub community occurs along the Kern River channel and within the flood basins north and south of Sand Ridge (at the southern edge of the Tulare Lake Basin).

Riparian communities have been eliminated or seriously altered throughout much of their original extent in Kings County. The most significant changes in the riparian communities have resulted from the following modifications to the local hydrology:

- Construction of Pine Flat Dam, Success Dam, and Terminus Dam and the subsequent changes in seasonality of instream flows.

- Decades of irrigation diversions which have reduced the volume of instream flows.

- Lowering of groundwater levels in portions of the floodplains.

Such changes have not eliminated valley oaks or other tree species from the riparian community, but the growth rate of these trees has declined since the coming of irrigation to the Valley. The width of annual growth rings on valley oaks in Tulare County began to decline measurably after 1870 (Jepson 1910), but at least the riparian community with its associated wildlife remains.

Some of the other man-made disturbances which have brought about a decline of riparian habitat include: removal of trees and understory with ax, saw, fire, and dozer; years of livestock grazing (which prevents seedling trees from becoming established); and introduction of aggressive non-native plants such as giant reed (*Arundo donax*), known locally as false bamboo, and various Tamarisk (*Tamarix*) species.

The quality of the riparian habitat declines as one travels west and south along the Kings River and Cross Creek (downstream) in the county. It has been most seriously degraded in those channels which have been colonized by giant reed. A native of the Old World, giant reed was introduced by settlers to many parts of California and was common in some areas as early as 1820 (Robbins 1951). Besides their ability to seriously reduce the water-carrying capacity of irrigation channels, giant reed and Tamarisk are aggressive colonizer of riparian habitat. Once established, they tend to outcompete and completely suppress native vegetation. Because they propagate so rapidly, these weedy riparian plants can form rather pure stands, often at the expense of willows and other native species (Wells et al. 1980). The Kern River Channel is one location where this has occurred.

As much as the local hydrology has changed, the Kings River, Cross Creek, the Kern River channel, and other lesser streams still support riparian vegetation; vegetation that is quite rich and vigorous where it has not been greatly disturbed. The best remaining examples of relatively undisturbed riparian forest in the county occur along the Kings River and on smaller channels within the Kings River floodplain. The evidence suggests that even with decreased flows, reduced deposits of new flood-borne alluvial material, and the stress-inducing lack of instream water for months at a time, the banks of these streams are still receiving adequate water in some areas to keep this kind of habitat alive and vigorous.

VALLEY SINK SCRUB

This habitat (CNDDB Element Code 36210) is a low to dense succulent shrubland dominated by alkali-tolerant members of the Goosefoot family (*Chenopodiaceae*), especially iodine bush (*Allenrolfea occidentalis*) or several seepweed (*Suaeda*) species. Understories usually are lacking, though sparse herbaceous cover dominated by red brome develops occasionally. The annuals are most active from January to April; the perennials from March to September (Holland 1986). Valley Sink Scrub occurs on heavy, saline and/or alkaline clays of lakebeds or playas. High ground water supplies provide capillary water for the perennials. Iodine bush and other succulent perennials in this community require periodic flooding for reproduction. Soil surfaces often have a brilliant white salty crust over dark, sticky clay. This scrub community includes some playas (also called alkali balds or alkali scalds) which are so highly alkaline that they are entirely devoid of vegetation. Summers are hot and dry; winters are damp with long periods of tule fog. Characteristic species in this plant community are iodine bush, the endemic perennial, recurved larkspur (*Delphinium recurvatum*), goldfields species, Nitrophila (*Nitrophila occidentalis*), alkali sacaton, and seepweed species. Valley sink scrub formerly surrounded Tulare Lake and other Lakes in the Tulare Valley and extended north along the trough of the San Joaquin Valley through Merced County to the gooselands of the Sacramento Valley, but this plant community is essentially extirpated due to flood control, agricultural development, and ground water pumping.

VALLEY SALTBUSH SCRUB

This habitat (CNDDB Element Code 36220) is generally found in the southwestern San Joaquin Valley on dissected alluvial fans with flat to gently rolling relief. Soils are sandy and loamy without surface alkalinity. This community is dominated by gray-green or blue-green shrubs of the Goosefoot family (*Chenopodiaceae*) with a sparse understory of short, annual herbaceous vegetation. Stands of Valley Saltbush Scrub range from open to more dense (10 to 40 percent shrub cover). Characteristic perennial shrub species of Valley Saltbush Scrub include valley saltbush, spiny saltbush (*Atriplex spinifera*), alkali heath (*Frankenia grandifolia campestris*), and pale-leaf golden bush. Except for spiny saltbush, most of these perennials flower from May to September. Saltbush Scrub understory typically consists of annual species such as common tarweed, birds-eye gilia, red brome, goldfields species, filaree species, fescue species, peppergrass species, and alkali larkspur. These annuals (and spiny saltbush) flower from January to April. Valley Saltbush Scrub is as susceptible to grazing pressure and wildfire as is Interior Coast Range Saltbush Scrub.

VALLEY FRESHWATER MARSH

This habitat (CNDDB Element Code 52410) is a wetland community where emergent grass-like vegetation (cattails, tules, rushes, etc.) grows in seasonally or permanently saturated soils (see maps, Appendices A2 and A3). Marshes are usually shallow enough to be vegetated throughout or they may contain patches of open water. Of the nine different marsh communities identified by Holland (1986) in California, the one which occurs in most of Kings County is Valley Freshwater Marsh. Valley Freshwater Marsh is dominated by perennial, emergent monocots such as tule or bulrush (*Scirpus*) species and cattail (*Typha*) species. These plants often grow in dense stands

forming completely closed canopies up to 13 to 16 feet tall. This plant community occurs on quiet (lacking significant currents) wetland sites seasonally or permanently flooded by fresh water. Prolonged saturation permits accumulation of deep, peaty soils. Characteristic species in this plant community are sedge (*Carex*) species, nutgrass (*Cyperus*) species, rush (*Juncus*) species, spikerush (*Eleocharis*) species, tule or bulrush, and cattail.

Valley Freshwater Marsh is now much reduced in area throughout its range. The Tulare Basin, site of the historical Tulare Lake, is named after "tule" a Spanish term which is applied to all marshland plant species. Today, "tule" is used to describe the native bulrush (*Scirpus*) species. Historical accounts describe marsh habitat surrounding Tulare Lake and at the mouth of the Kings River, Cross Creek, Tule River, and Kern River where they entered Tulare Lake. Many of the same hydrological changes that have impacted local riparian habitat are responsible for the loss of most of the area's marshes. In Kings County today, marsh habitat is present primarily in slow-moving sloughs, river oxbows, man-made ponds and basins, and in irrigation district reservoirs and groundwater recharge areas. Many of these temporary marshes do not last long enough to attract and support viable populations of marsh animal life. In flood years and after storms, temporary marshes develop in the deeper water of the larger, intermittently flooded basins such as South Wilbur Flood Area, West-, Mid-, and East-Hacienda, and Corcoran Irrigation District Reservoir. Even though they are not plant communities, these large flood basins (see map, Appendix A3) support live and dead willow and Tamarisk trees and patches of marshy vegetation. Colonial nesting waterbirds, such as cormorants, herons, egrets, and ibises are attracted to these areas in substantial numbers during wetter years when conditions are right.

NORTHERN CLAYPAN VERNAL POOL

This habitat (CNDDB Element Code 44120) is a term used to describe the ephemeral wetlands that form when winter and spring rains fill the depressions in what are commonly called hogwallow or mima mound areas. Of the seven different vernal pool communities in California, the one which occurs in Kings County is known as Northern Claypan Vernal Pool. Northern Claypan Vernal Pool is a low-elevation, amphibious, herbaceous community dominated by annual herbs and grasses. Plant germination and growth begin with winter rains, often continuing even when inundated. Rising spring temperatures evaporate the pools, leaving concentric bands of vegetation that colorfully encircle the drying pool. These pools may be small (a few square yards) or quite large (covering several acres). Northern Claypan Vernal Pools are similar to the Northern Hardpan Vernal Pools that occur on old alluvial terraces on the east side of the Central Valley, but these claypan pools have lower micro-relief and usually lower overall cover. Northern Claypan Vernal Pools are also located on lower elevation drainages toward the Valley trough compared to Northern Hardpan Vernal Pools.

Northern Claypan Vernal Pools occur on fairly old, circum-neutral to alkaline, Silicon-cemented hardpan soils. These pools are often more or less saline. Winter rainfall perches on the claypan, forming pools in the depressions. Evaporation (not runoff) empties the pools in spring. Some of the pools have clayey bottoms which support no vegetation; others are carpeted with saltgrass, annual grasses, and more typical vernal pool species. Characteristic species in this plant community are slender popcorn flower (*Plagiobothrys leptocladus*), alkali plant (*Cressa truxulensis vallicola*), Downingia (*Downingia*) species, goldfields species, mousetail (*Myosorus minimus*), wooly

marbles (*Psilocarphus brevissimus*), and clover fern (*Marsilea vestita*). These seasonal wetlands, once present along most of the floodplains in the Valley, have nearly been eliminated in Kings County. In terms of total acreage, this is the least widespread native plant community in the county so it is not marked on the habitat or wetland maps (Appendices A2 and A3).

Vernal pools are known to occur in Kings County and some are located in the grasslands along Cross Creek just west of Highway 99, near the town of Goshen, west of Guernsey, and north of the town of Waukena. Other pools may also be present in the grasslands along Cottonwood Creek just north of Corcoran Irrigation District Reservoir. Critical habitat for vernal pool habitat occurs along Cross Creek just west of Highway 99 and just east of Kings County in Tulare County near Blanco.

2. Special Status Species and Habitat Issues in Kings County

Kings County contains a wide variety of native plant communities, sensitive habitats, and other important wildlife habitats (Appendices A2-A4) due to the size of the county and its diverse geographic, topographic, and hydrological features. The county encompasses riparian habitat (along the Kings River, Cross Creek, the Kern River channel, and several lesser streams), freshwater marsh, seasonal wetlands, and periodically flooded areas at the southern end of the Tulare Lake Basin, grasslands in the Kettleman Hills and along Cross Creek, oak and conifer forests in the Kreyenhagen Hills, alkali scrub near Guernsey and Lemoore, and desert scrub on the margins of the Tulare Lake Basin and in the hills west of the California Aqueduct.

There is a similar diversity of land uses and economic activity in the county that could affect special status species and sensitive habitats. The valley floor is dominated by irrigated agriculture, with localized urban areas. Hanford is a growing and diverse urban center with residential, commercial, and industrial developments. Smaller urbanized areas include Lemoore, Corcoran, Avenal, Armona, Kettleman City, and Stratford (see map, Appendix A1). In general, future land development in the valley floor is likely to be concentrated in the Hanford-Armona area and in Lemoore, Corcoran, and Avenal where there is an infrastructure and incentives for development. Agriculture in the valley floor is expected to remain constant, or possibly become curtailed as the availability of water decreases (Dames and Moore 1991). The Kettleman Hills and some portions of the valley floor also contain extensive areas of petroleum development. The petroleum industry has been a major economic force in Kings County for decades. The hilly and mountainous portions of the county which lie west of the California Aqueduct (Kettleman Hills, Kreyenhagen Hills, Pyramid Hills, and Reef Ridge) are sparsely developed, due in part to the limited access and infrastructure, lack of water, and because some of the land is managed by U. S. Bureau of Land Management.

Conflicts with special status species occur when human activities affect the habitat, behavior, or health of the species. Major types of adverse impacts include the following:

- Removal or destruction of habitat.
- Disturbance or modification of habitat.
- Disruption of animal movement patterns.

- Disruption of animal breeding activities.

- Exposure to toxic substances that affect animal or plant physiology.

- Direct mortality.

These impacts can occur through a variety of human activities. The most common activity that results in adverse impacts to special status species and sensitive habitats is land development, i.e., clearing and grading of land for improvements. The latter includes agricultural, commercial, residential, and industrial uses. Such activities can remove and destroy habitat used by special status species. In addition, the land development may alter animal movement patterns, as well as cause off-site disturbance to adjacent wildlife populations that could affect behavior or breeding activities.

Activities that cause indirect effects on special status species include the application of pesticides, herbicides, and rodenticides. These substances can cause poisoning of animals that ingest contaminated prey, as well as destruction of insect pollinators. Industrial and petroleum-related activities can also cause indirect effects by exposure of chemicals to the environment where special status species may inadvertently encounter them. Some special status species may also be indirectly affected by exposure to certain chemical that accumulate in their tissue because the compounds are biologically amplified in the aquatic food chains of evaporation basins. Finally, a common indirect effect of development projects on the endangered kit fox (and other animals) is the increase in traffic and the potential for increased road kills.

Based on the above considerations, future land use conflicts with special status species in the county are likely to continue in the following areas for the near future:

- The fringes of agriculture lands adjacent to native lands within the valley floor.

- Within and adjacent to oilfields on the westside.

- Undeveloped native lands west of the California Aqueduct and along the edge of the Tulare Lake Basin (in the vicinity of Sand Ridge and Dudley Ridge).

- Urban, residential, and industrial expansion in growth areas on the outskirts of Avenal and Kettleman City.

In addition to the above conflicts, there are several other important issues related to special status species that have contributed to the need for this BRS, as listed below (in no particular order):

1. Need to clarify when a biological survey and biological assessment report is required and what is the appropriate scope or level of study. For example, should the level be a one-day biological reconnaissance survey or a protocol, multi-day survey.

2. Project-by-project mitigation development is costly and inefficient; there is a need for more predictable, timely, and equitable mitigation guidelines and process.

3. Funds for expensive biological surveys could be used for mitigation purposes, and therefore achieve more effective, direct benefit for the county's habitat and wildlife resources.

4. How can the various special status species protection programs by local, state, and federal parties become more coordinated and complimentary?

3. Overview of Special Status Species and Sensitive Habitats in Kings County

3.1 Species Decline and Habitat Degradation: What does it Matter?

Kings County's threatened, endangered, and other special status species are indicators of the county's overall environmental health. The quality of natural habitats that sustain these species is ultimately tied to the health of all county citizens. The rate at which these plants and animals are declining is an indicator that the habitat we all share - the air, water, and other life-sustaining resources - has been altered to a point where it can no longer support some forms of life. Thousands of acres of native grasslands, marshes, desert scrub, and riparian forests have already been converted in the pursuit of food, shelter, livelihood, and recreation.

The issue is how to balance the needs and activity of an increasing human population with protection for the county's unique and exhaustible natural resources. Steps can be taken to ensure that Kings County's irreplaceable biological resources survive in ways that sustain both the county's rich natural heritage and its economy. By waiting, conflicts will only accelerate and biological resources could be lost forever.

Loss of habitat due to human activity is the most direct cause of species extinctions and endangerment. Several species that were once abundant in this area, such as the thick-tailed chub (fish), have already been eliminated from the county. Some examples that dramatically illustrate the situation are the loss of grasslands, needle grass, wildrye, bluegrass, and a multitude of wildflowers.

Today, a tiny fraction remains-perhaps only one tenth of one percent. This represents one of the greatest losses of indigenous natural diversity in America (Jones and Stokes 1987). Riparian Woodlands are one of the richest wildlife habitats in the state. Today, less than 5 percent remains of this habitat; much has been severely degraded (Jones and Stokes 1987). Less than one percent of the Central Valley's riparian vegetation is in natural, high quality condition (Jones and Stokes 1987). Vast areas of wetlands (such as the historical Tulare Lake) once occurred in the county. This vast area supported an unimaginable abundance of wildlife-Tule Elk, Pronghorn, Grizzly Bears, wading birds, furbearers, pond turtles, frogs, native fishes, and huge numbers of breeding and wintering wildfowl. Today, less than four percent remains. Valley Oak Woodland habitat has been serious impacted by agricultural conversion. These oak woodlands, once miles wide, have been largely reduced to scattered giant, relict trees remaining on the immediate riverbanks and as shade trees around farmhouses and parks.

Extinction is irreversible. No way exists to reconstitute a species once all of its individuals have vanished. The most obvious value of natural diversity results from the material resources provided by certain species. Worldwide, thousands of plant and animal species provide food, drink, fuel and energy, fabrics, medicines, building materials, and industrial products. Medicines derived

from naturally evolved plant compounds provide the most striking examples of human dependence on biological diversity. For example, seeds of the Baker's meadowfoam (a rare California vernal pool flower) contain an oil whose viscosity is sought after for industrial uses. The majority of grapes in agricultural production in the world are grafted onto root stocks of the native grape species, (*Vitus californicus)*, because of its resistance to disease.

Also extremely valuable are the "ecological services" provided by diverse natural communities. These services include protection of watersheds and floodplains, moderation of climate, abatement of water and air pollution, biological control of pest populations, and maintenance of habitat for wild pollinators of agricultural crops. Maintaining ecological services through protection of natural ecosystems is very inexpensive compared to the technological alternatives. Technologies to control floods, abate pollution and control pests can be expensive, hazardous, and often ineffective. They can have far-reaching adverse side effects.

One of the most effective ways to preserve and sustain the county's natural heritage is to assemble, evaluate, and distribute basic biological information to educate the general public, planners, and decision makers. The outlook often looks bleak and time is short, but the information contained in this BRS can provide a positive motivation to identify solutions that can help reverse these trends, continue having a prosperous economy, and conserve biological resources.

3.2 Descriptions of Special Status Species Designations

Special status species are plants and animals (including invertebrates and fish) that have highly restricted distribution or are few in number, such that they are vulnerable to population reductions and possible extinction due to human activities. Many such species occur in Kings County (see Sections 3.3 to 3.5). Most special status species are protected in some manner by state and/or federal law or regulation. Certain activities, that may affect these species may be prohibited or subject to regulation. Special status species are an integral part of the natural ecosystem, contributing to the productivity and diversity of the natural world, upon which we depend for resources and amenities. In addition, they enrich the natural heritage of Kings County and California as a whole.

For the BRS, "special status species" are defined broadly to include the following categories of plants and animals:

1. State and/or Federal Listed Species. These are species that have been formally designated "threatened or endangered" under the state or federal Endangered Species Acts.

2. Candidates for Listing by the State or Federal Governments. These species have been officially identified as candidates for listing as threatened or endangered due to their rarity under the provisions of the state and federal Endangered Species Acts. These species could become listed in the future if their status worsens.

3. Animals listed as "fully protected" in the Fish and Game Code of California (Sections 3511, 4700, 5050, and 5515).

4. Plants and animals defined as endangered or rare under the California Environmental Quality

Act (CEQA) (Section 15380).

5. Species that have been Identified as Rare or Otherwise Sensitive, yet are not Listed or Candidate Species. These species have been identified as rare or vulnerable by conservation groups or agencies (such as the California Native Plant Society) through scientific study. However, they have not yet received any official status under the state and federal Endangered Species Acts. For the BRS, these species are identified as "other special status species". Plants and animals that are legally protected or proposed for protection under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA).

The level of rarity and vulnerability of special status species in Kings County varies greatly, and each species is given a "Listed Status" code to describe their rarity. The codes are described below.

Federal

These are Federal categories per the Federal Endangered Species Act and are administered by the USFWS.

FE Listed as Federal Endangered under the Federal Endangered Species Act. In danger of extinction throughout all or a significant portion of its range.

FT Listed as Federal Threatened under the Federal Endangered Species Act. Likely to become an endangered species within the foreseeable future.

FC Candidate for listing as a threatened or endangered species by the USFWS.

FSC Federal Species of Concern as identified by the USFWS. These are potential candidates for listing under the Federal Endangered Species Act in the future. These species are declining, but insufficient data exists to support an official listing.

BLM-S Sensitive by the U. S. Bureau of Land Management.

State

These are State categories per the California Endangered Species Act and are administered by the CDFG.

SE Listed as State Endangered under the California Endangered Species Act. Prospects for survival and reproduction are in immediate jeopardy from one or more causes.

ST Listed as State Threatened under the California Endangered Species Act. No presently threatened with extinction, but likely to be endangered in the foreseeable future in the absence of species protection and management efforts.

SSC Species of Special Concern as identified by the CDFG. These are potential candidate species for listing under the California Endangered Species Act in the future. These species are declining, but insufficient data exists to support an official listing.

DFG-WL Watch list species by the CDFG.

DFG-FP Fully protected by the CDFG.

CDF-S Sensitive by the California Department of Forestry and Fire Protection.

The World Conservation Union

IUCN-LC A species of "least concern" by The World Conservation Union.

California Native Plant Society

1A Plant species that are presumed extinct in California.

1B. Plant species that are rare, threatened, or endangered in California and elsewhere. Fairly endangered in California (20-80 of occurrences threatened).

2 Plant species that are rare, threatened, or endangered in California, but are more common elsewhere.

3 Plant species that lack the necessary information to assign them to a listing status.

4 Plant species that have a limited distribution or that are infrequent throughout a broader area in California. This is a watch list of plants for possible listing in the future.

Threat Extension Codes:
.1 - Seriously endangered in California. .2 - Fairly endangered in California. .3 - Not very endangered in California.

In general, listed species have the most restricted distribution and sensitivity to impacts, followed by candidate species, then other special status species. The state and federal requirements for protecting special status species also varies accordingly, that is, the most protection is afforded listed species, followed by candidate species and other special status species.

A list of the 18 threatened or endangered wildlife species which are included in this BRS is provided in Section 3.3. These species include popular and commonly known species such as the Blunt-nosed Leopard Lizard, California Condor, American Peregrine Falcon, Tipton Kangaroo Rat, San Joaquin Kit Fox, Valley Elderberry Longhorn Beetle, Swainson's Hawk, San Joaquin Antelope Squirrel, and Vernal Pool Fairy Shrimp. A list of the two threatened or endangered plant species which are included in the BRS is provided in Section 3.4. Other special status species of plants and wildlife are listed in Section 3.5.

In the 15 years since the 1993 BRS, the number of special status species has increased from 67 species to 92 species. This is an increase of approximately 35 percent. Since the 1993 BRS, one of the plant species in the Kings County area (Hoover's Eriastrum) has been removed from the threatened and endangered species list. The special status species are described in more detail below in Sections 3.3 to 3.5.

3.3 Federal and State Threatened and Endangered Wildlife

Eighteen (18) threatened or endangered wildlife species have been recorded in the county and they are listed below. Since the 1993 BRS, several species have been added to the Kings County list such as the California Tiger Salamander, Vernal Pool Tadpole Shrimp, Conservancy Fairy Shrimp, and Delta Smelt.

Mammals	**Listed Status**
Fresno Kangaroo Rat (*Dipodomys nitratoides exilis*)	FE, SE
Giant Kangaroo Rat (*Dipodomys ingens*)	FE, SE
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	FSC, ST
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Tipton Kangaroo Rat*(Dipodomys nitratoides nitratoides*)	FE, SE
Birds	
California Condor (*Gymnogypus californianus*) *	FE, SE, CFP
Golden Eagle (*Aquila chrysaetos*)	DFG-FP
Swainson's Hawk (*Buteo swainsoni*)	ST
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	FT, SSC
Fish	
Delta Smelt (*Hypomesus transpacificus)* *	
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	SE, FE
Giant Garter Snake (*Thamnophis gigas*) *	ST, FT
Amphibians	
California Tiger Salamander (*Ambystoma californiense*)	FT, SSC
California Red-legged Frog (*Rana aurora draytonii*)	FT, SSC
Arthropods	
Conservancy Fairy Shrimp (*Branchinecta conservatio*) *	
Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)	FT
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT
Vernal Pool Tadpole Shrimp (*Lepidurus packardi)*	FE

* - These species are noted by the USFWS on their sensitive species lists, but they do not occur in Kings County.

For each of these species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive wildlife CNDDB locations (Appendix A6).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B2). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendices F2-F7).

3.4 Federal and State Threatened and Endangered Plants

Two (2) federal listed plant species have been recorded in the county and they are listed below. One plant, the Hoover's Eriastrum was taken off and delisted from the threatened and endangered species list in 2003.

Plants	Listed Status
California Jewel-flower (*Caulanthus californicus)*	SE, FT
San Joaquin Woolythreads (*Monolopia congdonii*)	FE
Hoover's Eriastrum (*Eriastrum hooveri)*	Federally Delisted

For each of these species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive plant CNDDB locations (Appendix A5).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B1). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendix F1).

3.5 Other Special Status Plants and Wildlife

A wide variety of non-listed special status species also occur in the county and they are listed

below. Most of these seventy-two (72) species are Species of Concern by the CDFG, USFWS, and CNPS. Some of these species, though having a Listed Status, may be common, occur in common and widely dispersed habitats, and occur throughout the county and San Joaquin Valley. Some of these species are known to occur in Kings County, even though no records have been included or reported in the CNDDB for them.

Mammals	**Listed Status**
American Badger (*Taxidea taxus*)	
Buena Vista Lake Shrew (*Sorex ornatus relictus*)	SSC
Hoary Bat (*Lasiurus cinereus*)	FSC, SSC
Pallid Bat (*Antrozous pallidus*)	SSC
San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*)	FSC
Short-nosed Kangaroo Rat (*Dipodomys nitratoides brevinasus*)	FSC
Townsend's Western Big-eared Bat (*Plecotus townsedii townsendii)*	SSC
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	FSC, SSC
Western Mastiff Bat (*Eumops perotis californicus)*	SSC
Birds	
American Peregrine Falcon (*Falco peregrinus anatum)*	SE, Federally Delisted
American White Pelican (*Pelecanus erythrorhynchos)*	SSC
Black-crowned Night Heron (*Nycticorax nycticorax*)	BLM-S
Black Skimmer (*Rynchops niger)*	SSC
Burrowing Owl (*Athene cunicularia*)	FSC, SSC
California Yellow Warbler (*Dendroica petechia brewsteri)*	SSC
Caspian Tern (*Sterna caspia)*	IUCN-LC
Cooper's Hawk (*Accipiter cooperi)*	DFG-WL
Double-crested Cormorant (*Phalacrocorax auritus)*	DFG-WL
Ferruginous Hawk (*Buteo regalis)*	DFG-WL
Forster's Tern (*Sterna forsteri)*	IUCN-LC
Fulvus Whistling-duck (*Dendrocygna bicolor*)	SSC
Great Blue Heron (*Ardea herodias)*	CDF-S
Great Egret (*Casmerodius albus*)	CDF-S
Greater Sandhill Crane (*Grus canadensis tabida)*	ST, DFG-FP
Least Bell's Vireo (*Vireo bellii pusillus*)	FE, SE
Least Bittern (*Ixobrychus exilis)*	SSC
LeConte's Thrasher (*Toxostoma lecontei)*	SSC
Loggerhead Shrike (*Lanius ludovicianus*)	SSC
Long-eared Owl (*Asio otus)*	SSC
Merlin (*Falco columbarius*)	DFG-WL
Mountain Plover *(Charadrius montanus)*	SSC
Northern Harrier (*Circus cyaneus)*	SSC
Prairie Falcon (*Falco Mexicanus*)	DFG-WL
Short-eared Owl (*Asio flammeus)*	SSC
Snowy Egret (*Egretta thula)*	IUCN-LC
Snowy Plover (*Charadrius alexandrinus nivosus)*	FT, SSC
Tricolored Blackbird (*Agelaius tricolor*)	FSC, SSC

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis)*	SE, FC
White-faced ibis (*Plegadis chihi*)	DFG-WL
White-tailed Kite (*Elanus caeruleus)*	DFG-FP
Willow Flycatcher (*Empidonax traillii)*	SE
Yellow-breasted Chat (*Icteria virens)*	SSC
Reptiles	
California Horned Lizard (*Phrynosoma coronatum frontale)*	SSC
San Joaquin Whipsnake (*Masticophis flagellum ruddocki*)	FSC, SSC
Western Pond Turtle (*Actinemys marmorata*)	FSC, SSC
Amphibians	
Western Spadefoot (*Spea hammondii*)	FSC, SSC
Fish	
Hardhead (*Mylopharadon conocephalus)*	SSC
Arthropods	
Doyen's trigonoscuta dune weevil (*Trigonoscuta sp.)*	FSC
Molestan Blister Beetle (*Lytta molesta)*	FSC
San Joaquin Dune Beetle (*Coelus gracilis*)	FSC
San Joaquin Tiger Beetle (*Cicindela tranquebarica n. ssp.*)	FSC
Plants	
Brittlescale (*Atriplex dipressa*)	1B.2
Cottony Buckwheat (*Eriogonum gossypinum)*	4.2
Earlimart Orache (*Atriplex erecticaulis*)	1B.1
Forked Fiddleneck (*Amsinckia furcata)*	4.2
Heartscale (*Atriplex cordulata)*	1B.2
King's Gold (*Twisselmannia californica*)	1B.1
Lemmon's Jewelflower (*Caulanthus coulteri var. lemmonii*)	1B.2
Lesser Saltscale (*Atriplex miniscula)*	1B.2
Lost Hills Crownscale (*Atriplex vallicola*)	1B.2
Mason's Neststraw *(Stylocline masonii)*	1B.1
Oval-leaved Snapdragon (*Antirrhinum ovatum)*	4.2
Pale-yellow Layia (*Layia heterotricha*)	1B.1
Panoche pepper-grass (*Lepidium jaredii ssp.*)	1B.2
Recurved Larkspur (*Delphinium recurvatum*)	1B.2
Round-leaved Filaree (*California macrophyllum*)	1B.1
Showy Madia (*Madia radiata*)	1B.1
Slough Thistle (*Cirsium crassicaule*)	1B.1
Subtle Orache (*Atriplex subtilis*)	1B.2
Temblor Buckwheat *(Eriogonum temblorense)*	1B.2

For each of these species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive species' CNDDB locations (Appendices A5 and A6). Note that some species do not have records in the CNDDB and therefore, a map is not provided for those species.

b. A table showing the species' habitat and quad map occurrences (Appendices B1 and B2). Note that some species do not have records in the CNDDB and therefore, a map is not provided for those species.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendices F1 thru F7).

3.6 Critical and Sensitive Habitats

Five critical habitats and eleven sensitive habitats are recorded or known to occur in the county and are listed below.

Critical Habitats
California Tiger Salamander
California Red-legged Frog (adjacent to Kings County in San Luis Obispo County)
Vernal Pool Tadpole Shrimp
Vernal Pool Fairy Shrimp
Vernal Pool Habitat

Sensitive Habitats
Floodplain
Intermittent Drainages
Lakes & Ponds
Northern Hardpan Vernal Pool
Raptor Nest Trees
Riparian Habitat (including Sycamore Alluvial Woodland & Great Valley Valley Oak Riparian Forest)

River, Creeks, & Streams (including Central Valley Drainage Hardhead/Squawfish Stream)
Valley Sink Scrub
Valley Saltbush Scrub
Valley Sacaton Grassland
Wetlands

Critical habitats are designated and regulated by the USFWS for specific endangered or threatened species or habitats. Sensitive habitats are designated and regulated by a variety of local,

state, and federal agencies. Some of the sensitive habitats have been recorded in the CNDDB and specific sites are known. For other sensitive habitats, such as creeks, ponds, and wetlands, they may occur throughout the county.

For habitats, the following information is provided in the BRS's Appendices.

a. A table showing the habitat type and quad map occurrences in the county (Appendix B3). This table is used to determine which of the 35 quad maps to view to see the precise locations of the habitat in the county.

b. A habitat map of the county showing the location of large areas of sensitive habitats (Appendix A2).

c. A map showing the Critical Habitat in and adjacent to Kings County (Appendix A3).

d. A map of Kings County showing the major wetlands and waters in the county (Appendix A3).

e. Quad maps showing the locations of streams, creeks, rivers, lakes, and large ponds in the county (Appendix A7).

f. A table of sensitive habitats and potential permits required by resource and regulatory agencies (Appendix B5).

4. Existing Protection for Special Status Species and Sensitive Habitats

4.1 Regulatory Overview

To ensure the long-term protection of the environment and natural resources, laws and regulations have been implemented through multiple environmental protection Acts, which include:

Section 404 of the Clean Water Act (33 U.S.C. 1251-1376);
Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.);
Executive Order 11990, Protection of Wetlands (May 24, 1977);
National Environmental Policy Act (42 U.S.C. 4321 et seq.);
Federal Endangered Species Act (16 U.S.C. 1531-1543);
Fish and Wildlife Coordination Act (16 U.S.C. 661-666);
California Environmental Quality Act (P.R.C. 21000 et seq.);
California Endangered Species Act (California Fish and Game Code 2050 et seq.);
Native Plant Protection Act (California Fish and Game Code 1900-1913);
Fish and Wildlife Protection and Conservation (California Fish and Game Code);
Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711); and
Bald and Golden Eagle Protection Act (16 USC 668).

Implementation and regulation of these Acts has been delegated to several state and federal agencies. The following section briefly describes the regulation and which, if any, agency governs.

Wetlands and Other Waters of the United States

United States Army Corps of Engineers

Waters of the United States, including wetlands and creek channels are subject to Federal and State agency regulations in the State of California. The U. S. Army Corps of Engineers (Corps) has jurisdiction over Waters of the United States under Section 404 of the Clean Water Act. Waters of the United States may include interstate lakes, rivers, streams, mudflats, natural ponds, tributaries to Waters of the United States, and adjacent wetlands. Wetlands under Corps' jurisdiction are determined using technical criteria for hydrology, soil, and vegetation described in the Corps' Wetland Delineation Manual (1987).

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water filled depressions (33 CFR, Part 328).

Lands including pasture as defined by the U. S. Natural Resource Conservation Service (NRCS) are subject to regulation under Section 404 if the land use changes from agricultural to some other form, such as commercial or residential. Although regulatory authority under Section 404 rests with the Corps, in the past responsibility for determination of jurisdictional status on agricultural land was shared with NRCS throughout the United States. However, in 2000, the NRCS withdrew from its participation in delineating agricultural wetlands to be converted to some other form of land use than agricultural.

Construction activities within jurisdictional waters are regulated by the Corps. Placement of fill into jurisdictional waters requires issuance of a permit by the Corps as well as state water quality certification pursuant to Section 401 of the Clean Water Act. The Regional Water Quality Control Board is the state agency charged with implementing water quality certification in California.

California Department of Fish and Game Streambed Alteration Agreement

Any project-related activity with the potential to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake designated by the CDFG, or use material from the streambed requires that prior notification be provided to the CDFG and may require issuance of a Streambed Alteration Agreement pursuant to Sections 1600-1616 of the Fish and Game Code.

Special-Status Species

Special-status plant and wildlife species are species that have been afforded special recognition and protection by federal, state, or local resource conservation agencies and organizations. These species are generally considered rare, threatened, or endangered due to declining or limited populations. Special-status species include:

Plants and animals that are legally protected or proposed for protection under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA);

Plants and animals defined as endangered or rare under the California Environmental Quality Act (CEQA) (Section 15380);

Animals designated as species of special concern by the U. S. Fish and Wildlife Service (USFWS) or CDFG;

Animals listed as "fully protected" in the Fish and Game Code of California (Sections 3511, 4700, 5050, and 5515); and

Plants listed in the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants of California.

Federal Endangered Species Act

The Federal Endangered Species Act of 1973 (Act) recognized that many species of fish, wildlife, and plants are in danger of or threatened with extinction and established a national policy that all federal agencies should work toward conservation of these species. The Secretary of the Interior and the Secretary of Commerce are designated in the Act as responsible for identifying endangered and threatened species and their critical habitats, carrying out programs for the conservation of these species, and rendering opinions regarding the impact of proposed federal actions on endangered species and specifies civil and criminal penalties for unlawful activities.

Biological assessments are required under Section 7 of the Act if listed species or critical habitat may be present in the area affected by any major construction activity conducted by, or subject to issuance of a permit from, a federal agency as defined in Part 404.02. Under section 7(a)(3) of the Act, every federal agency is required to consult with the USFWS or U. S. National Marine Fisheries Service on a proposed action if the agency determines that its proposed action may affect an endangered or threatened species.

Section 9 of the Endangered Species Act prohibits the "take" of any fish or wildlife species listed under the FESA as endangered or threatened. Take, as defined by the FESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such action." However, Section 10 allows for the "incidental take" of endangered and threatened species of wildlife by non-federal entities. Incidental take is defined by the FESA as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Section 10(a)(2)(A) requires an applicant for an incidental take permit to submit a "conservation plan" that specifies, among other things, the impacts that are likely to result from the taking and the measures the permit applicant will undertake to minimize and mitigate such impacts. Section 10(a)(2)(B) provides statutory criteria that must be satisfied before an incidental take permit can be issued.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711) makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21).

Bald and Golden Eagle Protection Act

Specifically protects Bald and Golden Eagles from harm or trade.

California Endangered Species Act

The California Endangered Species Act (Fish and Game Code Sections 2050-2098) established a State policy to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat. The Fish and Game Commission is charged with establishing a list of endangered and threatened species. State agencies must consult with the Department of Fish and Game to determine if a proposed project is likely to jeopardize the continued existence of any endangered or threatened species.

Section 2081 of the Fish and Game Code allows the "take" of a species listed as threatened or endangered by the California Endangered Species Act. Take is defined as any act that involves direct mortality or other actions that may result in adverse impacts when attempting to take individuals of a listed species. Under Section 2081, the state Department of Fish and Game may issue a permit to authorize take for scientific, educational or management purposes, or take that is incidental to otherwise lawful activities.

California Fish and Game Code Native Plant Protection Policy

The goals described in Chapter 10 of the California Native Plant Protection Policy are as follows:

> The intent of the Legislature and the purpose of this chapter is to preserve, protect, and enhance endangered or rare plants of this state (Section 1900). For purposes of this Chapter, a "native plant" means a plant that grows in a wild uncultivated state that is normally found native to the plant life of this state (Section 1901).
>
> The commission may adopt regulations governing the taking, possession, propagation, transportation, exportation, importation, or sale of any endangered or rare native plants. Such regulations may include, but shall not be limited to, requirements for persons who perform any of the foregoing activities to maintain written records and to obtain permits, which may be issued by the department (Section 1907).
>
> No person shall import into this state, or take, possess, or sell within this state, except as incident to the possession or sale of the real property on which the plant is growing, any native plant, or any part or product thereof, that the commission determines to be an endangered native plant or a rare native plant, except as otherwise provided in this chapter (Section 1908).
>
> All state departments and agencies shall, in consultation with the department, utilize their authority in furtherance of the purposes of this chapter by carrying out programs for the conservation of endangered or rare native plants. Such programs include, but are not limited to, the identification, delineation, and protection of habitat critical to the continued survival of endangered or rare native plants (Section 1911).

California Fish and Game Code

> Section 3503. It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.
>
> Section 3503.5. Protects all birds-of-prey and their eggs and nests.

Section 3513. Makes it unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act.

Other Special-Status Species Classifications

Impacts on federal and California species of special concern (FSC and SSC, respectively), and species included on CNPS lists shall be considered significant if one of the following would result: a) direct mortality; b) permanent loss of existing habitat; c) temporary loss of habitat that may result in increased mortality or lowered reproductive success; or d) avoidance of biologically important habitat for substantial periods that could increase mortality or cause lowered reproductive success (Section 15065, CEQA Guidelines and CDFG Code Sections 1900-1913).

Title 14, California Code of Regulations, Sections 670.2 and 670.5

Lists animals designated as threatened or endangered in California. California Species of Special Concern (SSC) is a category designated by CDFG for species considered to be indicators of regional habitat changes, or candidate species for future state listing. SSC do not have special legal status, but are used by CDFG as a management tool when considering the future use of any land parcel.

Kings County General Plan

Kings County contains important wetland, riverine, and wildlife habitats. These areas support many specialized plant and animal species. Policies in the General Plan seek to protect natural areas and to preserve the diversity of habitat in the county. Open Space and Conservation elements of the plan contain policies that pertain to the preservation and protection of biological resources.

Significance Criteria

The CEQA Guidelines in its Appendix G provides guidance for assessing the significance of potential environmental impacts. Relative to biological resources, a project will normally have a significant effect on the environment if it will:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

4.2 Federal Law and Regulation

The federal Endangered Species Act was established in 1973, and has been amended periodically. The basic policy of the Act is that all federal agencies must seek to conserve threatened and endangered species through their actions. The law provides for a listing process for "threatened and endangered" status, as well as an administrative process for identifying candidate species. It also mandates that recovery plans be prepared by USFWS for all species.

A key element of the Act is the Section 7 endangered species consultation process. The Act requires that all federal agencies must, in consultation with USFWS, ensure that their actions do not jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Federal actions include permitting, funding, and entitlements for both federal projects, as well as for private projects facilitated by federal actions. The consultation process involves the preparation of a Biological Assessment by the federal agency, followed by the preparation of a Biological Opinion by USFWS with a determination of jeopardy or no-jeopardy. The Opinion will contain alternatives and mitigation necessary to avoid jeopardy. The federal agencies have the discretion to utilize the findings in the Opinion in whatever manner they chose as long as they comply with the Act. That is, they must ensure that their actions would not jeopardize the species.

The Act has a prohibition against taking of listed wildlife species under any circumstances. The prohibition against taking of listed plant species only applies to federal lands, or on private lands when the taking occurs while simultaneously violating any state law. The Act contains a very broad definition of take, including "harass" (such as significant disruption of behavior), harm (includes significant habitat modification), pursue, hurt, shoot, wound, kill, trap, capture, collect, or attempting this conduct. This take prohibition applies to individuals, business entities, local and state governments, and federal agencies alike. There are civil and criminal penalties for unauthorized take.

In recognition that take could occur incidental to the conduct of otherwise legal activities, the Act contains a provision to acquire a Section 10(a) incidental take permit. This permit allows a private individual, business, or local government to take listed species if the take is incidental to, and not the purpose of, carrying out otherwise lawful activities. In order to acquire the permit, an applicant must prepare a Habitat Conservation Plan (HCP) and Implementing Agreement which describes the method in which the applicant will minimize the impacts to the species. A permit can be granted if a number of stringent conditions are met, including a finding of no jeopardy

4.3 State Law and Regulation

In 1984, the state passed the California Endangered Species Act (Fish and Game Code Section 2050). The basic policy of the Act is to conserve and enhance endangered species and their habitats. As such, state agencies should not approve private or public projects under their jurisdiction that would jeopardize threatened or endangered species or destroy habitat essential to their continued

existence if reasonable and prudent alternatives are available. However, the Act allows approval of projects resulting in jeopardy if there are overriding social and economic factors.

The Act provides for a listing process for threatened and endangered species, similar to the federal process. The CDFG must also maintain a candidate species list. The Act also requires that the CDFG develop recovery plans and 5-year status reports for all listed species. The Act requires that all state lead agencies (as defined under CEQA) must conduct an endangered species consultation with CDFG if their actions could affect a state listed species. This process is similar to the federal Section 7 consultation. The state lead agency must provide information on the project and its impacts to CDFG (i.e., the equivalent of a federal Biological Assessment), which in turn, will prepare written findings (i.e., equivalent of a federal Biological Opinion) on whether the proposed action would jeopardize the listed species or destroy essential habitat. If necessary, the CDFG will recommend reasonable and prudent alternatives to avoid jeopardy. As noted above, the state lead agency must accept these alternatives to avoid jeopardy unless there are overriding considerations. Notwithstanding the above, the state lead agency cannot approve a project that would result in a species extinction.

The Act does not require local lead agencies to consult with CDFG for projects involving state listed species, nor does the Act require that local agencies avoid jeopardy to listed species. Instead, the Act encourages local jurisdictions to conduct an "informal consultation" with CDFG when the local lead agency has a project that may affect a listed species, and that the agency accept the recommendations of CDFG in their written findings. If a local lead agency does not consult with CDFG, the agency must still ensure that their actions would not result in "take" of a state listed species, an action prohibited by the Act (see below), and subject to civil and criminal violations.

The California Endangered Species Act prohibits taking of listed wildlife species. Take is more narrowly defined compared to the federal law. The state definition includes hunt, pursue, capture, or kill, or attempting this conduct. As such, the Act does not specifically include the disturbance of habitat or disruption of behavior as take, activities which are defined as take in the federal law. The Act does not prohibit the taking of listed plant species. Instead, the Act invokes the provisions in the Native Plant Protection Act which prohibits take of plants, except incidental to the "possession or sale of the real property on which the plant is growing..." This provision allows landowners to pursue the use of their land and adversely affect listed plants if the take of the plants is clearly incidental to the use of the land. However, this law requires that a landowner who is notified that a listed plant is on his property, must allow the CDFG 10 days to salvage the plants prior to any use that could adversely affect the plants. The act contains a provision (Section 2081) for the CDFG to issue permits or memorandums of understanding to individuals, public agencies, and private entities to take listed species for management purposes (among others). This provision is used in the same manner as the federal Section 10(a) incidental take permit in that the CDFG will issue a Section 2081 permit of management agreement for public and private projects that cause incidental take, provided there is sufficient mitigation and that jeopardy would not occur. These incidental take authorizations have been issued to various local governments and private parties

4.4 County Requirements and Procedures

The primary manner in which the county has traditionally addressed special status species and

sensitive habitats is evaluating impacts of development during the environmental review process mandated by the California Environmental Quality Act (CEQA). During the preparation of Initial Studies, Negative Declarations, and Environmental Impact Reports, the county must evaluate if the proposed discretionary actions could result in a significant impact on the environment, including special status species and sensitive habitats. CEQA also requires that the county, as lead agency, must seek ways to avoid or mitigate such impacts.

A significant impact is defined in CEQA as a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project", including effects on flora and fauna (Section 15382). Section 15065 of the CEQA Guidelines requires a finding of significance if a project has the potential to "reduce the number or restrict the range of a rare or endangered plant or animal." "Rare and endangered" species are defined in CEQA as those species which are actually rare and endangered throughout all or a significant portion of its range, even if the species is not officially listed as rare, threatened, or endangered by the state or federal government (Section 15380).

Appendix G of the CEQA Guidelines also states that a project "will normally have a significant effect on the environment if any of the criteria are satisfied below.

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

CEQA requires that the lead agency seek mitigation for all significant impacts. The CEQA Guidelines (Section 15370) define mitigation as: (a) avoiding the impact altogether by not taking a certain action or parts of an action, (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) rectifying the impact by repairing, rehabilitating, or restoring the impacted environment, (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, or (e) compensating for the impact by replacing

or providing substitute resources or environments."

The Planning Agency is the CEQA lead agency for the county. It conducts the environmental review for all discretionary land use actions for private projects such as conditional use permits. As noted earlier, the CEQA environmental review process has been the traditional mechanism to resolve special status species and sensitive habitats issues. The CEQA review process involves routine coordination with CDFG when a project could affect a special status species and sensitive habitats. During this coordination, the county and/or the private applicant shall seek guidance from CDFG on appropriate mitigation and on whether a biological assessment will be required (see Section 8.0 Project Applicant Protocol).

4.5 County General Plan Policies

The county General Plan contains numerous policies and implementation measures that address the need to protect important biological resources including special status species and sensitive habitats. These policies and measures are used by the county in its land use planning and development review, and therefore assist in the resolution of special status species conflicts. Specific policies of the General Plan that provide protection to special status species and sensitive habitats are listed in the Resource Conservation Element in the following sections: water, soil, threatened and endangered species, freshwater recreational fishing, plant and animal habitats, wetlands, and riparian environments.

4.6 Conservation Program - Tulare Basin Wildlife Parnters

The Tulare Basin Wildlife Partners (TBWP) is a private, non-profit charitable organization working to protect and restore natural communities in the Tulare Basin. Their mission is to protect, enhance, and restore wildlife and their habitats in the Tulare Basin. The TBWP is featured here because they are the only organization currently working in the Kings County and southern San Joaquin Valley to focus on creating integrated land and water management solutions and large-scale conservation plans in the Tulare Basin.

A new focus came to the Tulare Basin in spring 2003 when public agencies, private organizatons, and individuals met to discuss concerns about conservation, agriculture, economid development and quality of life in the Tulare Basin. From an initial meeting, more than 40 partners now gather under the auspices of the Tulare Lake Basin Working Group, including representatives from local, state, and federal agencies; businesss, industry, non-profits, universities, ranchers, farmers, and other private citizens. This alliance meets quarterly to share information, coordinate new opportunities, and collaborate on conservation project led by the participant organization.

Two years later, members of the Tulare Lake Basin Working Group participated in a visioning and leadership workshop to determine how to most effectively ahieve conservation goals in the Tulare Basin. This resulted in a consensus agreement to form a private, non-profit organization to coordinate existing and future projects among agencies and conservation organizations. In May 2005, the TBWP obtained their 501 (c)3 status and has acted as a catalyst for protecting and restoring natural communities and their biological resources in the Tulare Basin.

The TBWP have worked on a variety of successful conservation plans and projects. Their accomplishments and be viewed at www.tularebasinwildlifepartners.org. Some of the highlights are three regional plans in 2006 for the Tulare Basin: Sand Ridge-Tulare Lake, Goose Lake, and Buena Vista Lake-Kern Lake. The plans are known as CAPs or Conceptional Areas Plans. They are a standard land planning tool, cover large areas of land with sensitive habitats and biological resources, and are approved by the California Department of Fish and Game. A fourth plan underway and to be complete in 2008 focuses on riparian and wildlife corridors that connect these floodplain areas to the Sierra, Tehachapi, and Coast Range watersheds and ultimately to the San Joaquin Valley to the north. The TBWP produced thes conservation plans in collaboration with the California Department of Fish and Game, U. S. Bureau of Reclamation, U. S. Natural Resources Conservation Service, and the Tulare Lake Basin Working Group participants. Conservation tools such as these plans provide a roadmap for agencies, elected officials, landowners, and agricultural associations to make informed decisions about land and water challenges in the Tulare Basin. Concerning Kings County, the Sand Ridge-Tulare Lake CAP included large areas in the southeastern portions of the county. Also, the TBWP is working on a riparian-wildlife corridor study along major rivers, creeks, and waterways in Kings County.

Kings County staff should continue to participate in the TBWP and the Tulare Lake Basin Working Group to ensure that county ordinances and measures are included in the planning process, that the county's sensitive habitats and biological resources are protected and preserved, and that individual landowner rights and public resources are preserved.

5. Goals

Below are some major goals concerning the protection and preservation of special status species and sensitive habitat resources in Kings County while allowing for the orderly development and continued economic growth in the county.

1. To provide for the long-term protection of habitats, wildlife, and, in particular, special status species and sensitive habitats in Kings County (and reduce the likelihood of additional special status species being designated), while allowing for the orderly development and continued economic growth in the county.

2. To ensure that county land use planning, development review, land use permitting, and public works development comply with the state and federal laws and regulations protecting special status species and sensitive habitats.

3. To minimize significant adverse impacts to special status species and sensitive habitats due to new developments, particularly through the use of long-term habitat-based conservation plans.

4. To seek cooperative efforts with the private development community, conservation groups, and state and federal land management agencies to protect special status species and sensitive habitats.

5. To facilitate more timely and cost-effective methods to evaluate impacts on special status species and sensitive habitats and to develop appropriate, timely, and equitable avoidance measures and mitigation.

6. To increase public awareness of the special status species and sensitive habitat issues in the county and the need for non-governmental entities to assist in the long-term conservation of such resources in the county.

7. To cooperate with local, state, and federal agencies with land management responsibilities in Kings County in their efforts to protect special status species and sensitive habitats under their jurisdiction.

8. To establish a "no net loss" policy for wetland (including, but not limited to riparian, marsh, and vernal pool) habitat in the county. Inherent in this goal is the intent to maintain riparian habitat as continuous corridors since this is consistent with the corridor nature of this habitat and the needs of its resident wildlife.

6. Recommended Strategies to Achieve Goals

The stated objective of the BRS and this update are to provide current biological information and practical planning protocol that will help conserve biological resources, assist the county with their legal requirements, and minimizing public controversy in project permitting. With this objective in mind, and since it is not the role of this BRS and update to establish planning policy, the following strategies are recommended . Should any of these strategies prove effective or appear to have practical merit, county decision makers can exercise the option to establish any of these strategies as policy. The potential strategies are listed within three subheadings as follows: General Strategies (6.1), Planning and Environmental Review (6.2), and Conservation and Mitigation (6.3).

6.1 General Strategies

1. Whenever possible, the county should use multi-species, habitat- based conservation programs that apply to a large area and a number of developments in order to resolve major conflicts with special status species and sensitive habitats, rather than solutions based on an individual, project-by-project evaluation of impacts and development of mitigation. The county should seek to implement a hierarchy of mechanisms to address special status species and sensitive habitats in the following order of preference: (1) regional habitat conservation plans with programmatic and uniform mitigation requirements; (2) interim habitat conservation programs; (3) a county-wide wetland protection policy; and (4) traditional agency coordination and mitigation through the CEQA process.

2. The county should encourage cooperative efforts with local, state, and federal agencies, and private entities, to protect special status species and sensitive habitats, particularly involving long-term habitat management or preservation.

3. The county should use various methods to increase public awareness of habitat and special

status species issues, and educate the development community about applicable local, state, and federal policies concerning special status species and sensitive habitats.

4. Under the provisions of the CEQA, the county as a local lead agency should solicit comments from the CDFG during the environmental review of discretionary projects involving impacts to special status species and sensitive habitats that are not officially designated as state threatened or endangered.

5. The county should consult with the CDFG during the environmental review of discretionary projects that may involve impacts to special status species and sensitive habitats.

6. The county should consult with the USFWS during the environmental review of discretionary projects that may involve impacts to federal special status species and sensitive habitats.

7. The county should consult with the Corps and CDFG during the environmental review of discretionary projects that may involve impacts to wetlands, waters, or riparian habitats.

6.2 Planning and Environmental Review

1. The Planning Agency should continue to use the thresholds of significance for impacts to special status species and sensitive habitats as noted in the CEQA Guidelines (see Sections 4.1 and 4.4). These thresholds will not represent official determinations of "jeopardy" that are provided by CDFG and USFWS in their respective sensitive species and sensitive habitats consultation processes.

2. The Planning Agency should continue to provide the state and federal survey guidelines on the need, timing, and scope of biological surveys and reports for use by project applicants, biological consultants, and other county departments during the planning and permitting of proposed projects that may involve impacts to special status species and sensitive habitats. See Appendices C and D for examples of state and federal survey protocols for sensitive wildlife and plants. The applicants and their biological consultants are responsible for using the appropriate and most up-to-date guidelines in their surveys.

3. The Planning Department should assist private developers and other county agencies with the early identification of potential conflicts with special status species and sensitive habitats during the review of land development projects and public and public service facilities, respectively. Such developers and other county agencies should be forewarned about the potential lengthy and costly process for conducting required protocol surveys, preparing reports, negotiating mitigation, and obtaining permits from the state and federal resource and regulatory agencies.

4. Mitigation for special status species and sensitive habitats developed in a CEQA review process should be monitored by the county, and be part of a required mitigation monitoring plan to ensure compliance and the effective implementation of the required mitigation.

5. The county recognizes that many activities on private lands that do not require a discretionary

approval, such as a certain grading, mineral development, and agricultural activities, could have an effect on special status species and sensitive habitats. The county should explore and encourage feasible methods to reduce these impacts on a cumulative, regional, basis, rather than on an individual project basis.

6. The responsibility for funding the biological studies, preparing the biological reports, negotiating mitigation requirements, and going through the permits process should reside entirely with the private developers.

6.3 Conservation and Mitigation

1. The Planning Agency should use and update mitigation guidelines for special status species and sensitive habitats that have been approved by the CDFG and USFWS. These guidelines should apply to all discretionary projects, and should be applied in a reasonable, timely, and equitable manner during the development of conditions of approval for discretionary projects.

2. For all discretionary actions by the county that could affect special status species or sensitive habitats, the county should seek to mitigate impacts in the following order: (1) avoid impacts by project design, layout, or timing, to the extent feasible and consistent with the project objectives and private property rights; (2) reduce the magnitude of impact through changes in project design and implementation; and (3) compensate for impacts using on-site or off-site replacement habitat in accordance with existing laws and procedures.

3. Mitigation measures for special status species and sensitive habitats developed during the environmental review and agency consultation(s) should be economically and logistically feasible, timely, and commensurate with the: (1) level of impact; (2) level of rarity or sensitivity of the species involved; and (3) legal protection afforded the species involved.

4. The responsibility for funding and ensuring the implementation of required mitigation for private projects should reside entirely with the private developer interest. County funds should not be used to mitigate for private sector projects.

5. When compensatory mitigation is required to offset significant impacts, the county should encourage the acquisition and permanent protection of the intact habitat (by fee, management agreement, or easement) at or near an established preserve as the preferred approach.

7. Recommended Implementation Measures for Strategies

Specific measures designed to implement the strategies in Section 6 are described below. For each strategy, there is one or more implementation measures. The numbering of the implementation measures corresponds directly to the strategies numbered in Section 6. These again, are listed within three subheadings as follows: General Strategies (7.1), Planning and Environmental Review (7.2), and Conservation and Mitigation (7.3).

7.1 General Strategies

la. Consider the preparation of a Habitat Conservation Plan (HCP) and a Section 10(a) incidental take permit from the USFWS for portions of Kings County with a high level of species- and habitat-related development conflicts (the Avenal/Kettleman Hills/Kettleman City area, for example).

lb. Seek a Memorandum of Understanding or Management Permit from CDFG under the provisions of Fish and Game Code Section 2081 for incidental take of state special status species and sensitive habitats for Kings County where there are major conflicts with state listed species.

1c. Use setbacks or buffer zones established by the CDFG, USFWS, and Corps for all wetland, waters, and riparian habitats in the county. The setbacks would prohibit the construction of any permanent structures within the setback or buffer zones. Standard setbacks for the Kings River is 200 feet; 50 feet for smaller streams, sloughs, and marshes; 25 feet for intermittent drainages, and 250 feet for vernal pools. Riparian setbacks should be measured from the outer edge of their riparian trees or vegetation. If no vegetation is present, the measurement should be made outward from the upper bank of the channel. Marsh setbacks should be measured from the outer edge of its hydric vegetation (such as tules, cattails, rushes, and spikerush). Likewise, the setbacks for vernal pools should be measured from their outer edge. The setbacks are designed to protect and preserve the habitat resource and to minimize conflicts with special status species in wetland and riparian ecosystems. The setbacks may be negotiated with the state and federal resource and regulatory agencies and in specific situations, may be modified.

2a. Seek cooperative efforts with the Bureau of Land Management (BLM), Department of Water Resources, Bureau of Reclamation, Resource Conservation Districts, and the Nature Conservancy to establish and/or manage habitat preserves for use in mitigating impacts of county-related actions. Encourage private landowners to participate in habitat protection and preservation efforts by providing tax and/or development rights incentives.

3. Prepare an informational handout for the public and for project permit applicants summarizing the state and federal laws and regulations, as well as the BRS component of the County Resource Conservation Element and its strategies and implementation measures.

4. County agencies should send all Notices of Preparations, Negative Declarations, and Environmental Impact Reports concerning private or public projects that may affect special status species or sensitive habitats to the State Clearinghouse for distribution to CDFG for comment under the provisions of CEQA. A record of the request for comment and any response should be included in the environmental documents circulated for public review. The county should give full consideration to the comments provided by CDFG on the results of the environmental review of potential impacts to special status species and sensitive habitats.

5. As part of the CEQA process, county agencies should consult with CDFG during the environmental review of public and private projects that may affect special status species or sensitive habitats prior to the final certification of a CEQA document. The consultation should consist of providing CDFG with the following: (1) a biological report that describes the occurrence of listed species; (2) an evaluation of potential impacts to such species; (3) a request for a written and timely determination of jeopardy or no-jeopardy due to the proposed project; and (4) a request for a written and timely recommendation of mitigation or project alternatives to prevent jeopardy (if necessary). The county should give full consideration to the response of the CDFG and the take prohibitions in the California Endangered Species Act.

6. As part of the CEQA process, county agencies should consult with USFWS during the environmental review of public and private projects that may affect federal special status species or sensitive habitat prior to the final certification of a CEQA document. The consultation should consist of providing USFWS with the following: (1) a biological report that describes the occurrence of listed species; (2) an evaluation of potential impacts to such species; (3) a request for a written and timely determination of jeopardy or no-jeopardy due to the proposed project; and (4) a request for a written and timely recommendation of mitigation or project alternatives to prevent jeopardy (if necessary). The county should give full consideration to the response of USFWS and the take prohibitions of the Federal Endangered Species Act.

7. As part of the CEQA process, county agencies should consult with the Corps and CDFG during the environmental review of public and private projects that may affect federal wetlands or waters prior to the final certification of a CEQA document. The consultation should consist of providing Corps and CDFG with the following: (1) a biological report that describes the occurrence of the wetlands or waters; (2) an evaluation of potential impacts to such habitats; (3) a request for a written and timely determination of jurisdiction on the proposed project; and (4) a request for a written and timely recommendation of mitigation or project alternatives to prevent impacts (if necessary). The county should give full consideration to the response of the Corps and the CDFG.

7.2 Planning and Environmental Review

1. The Planning Agency should develop thresholds of significance for impacts to special status species and sensitive habitats to be used in CEQA impact evaluations. These thresholds should follow the guidance provided in CEQA's Appendix G Guidelines. A discussion of the significance threshold for special status species and sensitive habitats under CEQA is provided in Sections 4.1 and 4.4 of this BRS.

   Significance thresholds should be based to a large degree on biological criteria, whenever feasible. At a minimum, they should include consideration of the legal status of the species; amount, location, and value of habitat to be affected; nature, longevity, and severity of impact; vulnerability of the species to human impacts; and conflicts with any endangered species act prohibitions. The thresholds should be circulated to the interested public and should be updated every year, as necessary. The thresholds should be used in all CEQA impact evaluations by the county, including Initial Studies, Negative Declarations, and

Environmental Impact Reports.

The thresholds for significance for state or federal listed species should not represent official determinations of jeopardy or no-jeopardy. Such findings are reserved by the CDFG and USFWS during their respective special status species and sensitive habitats consultations. However, the county should apply the significance thresholds to endangered species impacts as an initial "screening' of the impacts of the proposed action during the CEQA process in order to alert the county that a consultation with CDFG and/or USFWS is required to evaluate a potential jeopardy finding.

2. The Planning Agency should develop utilize state and federal guidelines on the preparation of biological surveys and reports for all projects that could affect special status species or sensitive habitats. Where practical, the surveys should follow the progression of an one-day reconnaissance level biological survey, protocol or detailed level survey(s) requiring several days of effort, and then preparation of a Biological Assessment Report following the USFWS's report format for use in consultation with them. The guidelines should include the following items at a minimum:

(a) Map of the present geographic range of endangered and other sensitive species in the county (when such data are available). This map should be used, in conjunction with other information, to determine the appropriate level of surveys and if a formal Biological Assessment Report is required for the environmental review of a discretionary project by the county or a private applicant.

For example, if the project is located within the known distribution of the Blunt-nosed Leopard Lizard, contains native habitat, and is contiguous with other similar native habitat, the county should require that protocol level surveys be conducted and that a formal Biological Assessment Report be completed using appropriate investigation methods for this species and the USFWS's report format. Note: a Biological Assessment Report should only be required if the project applicant does not agree to project changes that avoid all impacts or to standardized mitigation measures to avoid or reduce impacts.

(b) Description of the types of field surveys and methods that are recommended by the county or by resource and regulatory agencies for various special status species or sensitive habitats (when available). These field methodologies should represent guidelines to be used at the discretion of the county and private applicants. The exact methodologies to be used will be dependent on the project site, species involved, and type of project or impacts. When feasible, these guidelines should specify such items as the appropriate time of year for field surveys, transect widths, and special techniques (such as live-trapping). Current guidelines issued by resource agencies (see Appendices C and D) should be used in the development of the county guidelines. Many of the guidelines are standard requirements by state and federal resource and regulatory agencies.

(c) Descriptions of the minimum qualifications of the biologists preparing biological surveys and reports to be used by the county in the CEQA process, as well as the special status species and sensitive habitats consultation process. The descriptions should include minimum academic qualifications and experience of professional biologists preparing surveys and reports in order

to increase the level of accuracy and uniformity in biological process.

(d) Recommended outline for the biological survey and report. All biological surveys and reports submitted to the county for incorporation in the CEQA impact evaluation for discretionary projects should follow the general outline presented below:

1. Introduction and Study Objectives
2. Overview of Proposed Project and Location of Project Site
3. Study Methods and Qualifications of Investigators
4. Existing Habitat Conditions such as Plant Community Type(s), Dominant Species, and Wildlife Species and Usage
5. Background Information on Special Status Species and Historic Records
6. Occurrence of Special Status Species
7. Potential Impacts of the Project

3a. The Planning Agency should periodically update range maps and occurrence data on the distribution of special status species and sensitive habitats in the county through the compilation of data from biological studies, HCPs, and the CNDDB.

3b. The Planning Agency should maintain a file of completed biological reports associated with permit applications and CEQA reviews. The reports should be available for review by prospective permit applicants, biological consultants, and other county agencies.

3c. The Planning Agency should maintain and update maps and other data on the current distribution of special status species and sensitive habitats in the county so they are available for review by prospective permit applicants, biological consultants, and other county agencies during the planning of projects.

4. County lead agencies responsible for preparing a mitigation monitoring plan pursuant to AB 3180 should incorporate procedures to monitor the successful implementation of any biological mitigation imposed by the county as a condition of approval. This may include (among others) the inspection of construction and restoration sites, recordation of deeds and easements for habitat preservation, and documentation that the appropriate coordination with CDFG and/or USFWS has occurred. Monitoring of biological mitigation required by CDFG and/or USFWS, independent of the county's conditions of approval, should not be the responsibility of the county.

5. Through public education and other similar means, the county should seek methods to mitigate for impacts on special status species and sensitive habitats due to legally authorized activities in the county that do not require formal county review.

7.3 Conservation and Mitigation

1. The Planning Agency should continue to provide the state and federal survey guidelines on mitigation for use by project applicants, biological consultants, and other county departments during the planning and permitting of proposed projects that may involve impacts to special

status species and sensitive habitats. They should be used when developing specific mitigation measures for discretionary projects during the CEQA review process. The intent of these guidelines is to provide a predictable, timely, and uniform framework for mitigating for impacts to special status species and sensitive habitats. Examples of mitigation guidelines are provided in Appendix E.

2. Certified CEQA documents should contain findings that impacts to species of special concern and sensitive habitats have been mitigated in the following order: (1) avoid impacts by project design, layout, or timing, to the extent feasible and consistent with the project objectives and private property rights; (2) reduce the magnitude of impact through changes in project design and implementation; and (3) compensate for impacts using off-site replacement habitat. If this finding cannot be made, a statement should be provided in the CEQA document on the rationale for developing mitigation in an alternate sequence (for example, feasibility of a mitigation measure may have required a deviation from the above sequence.)

3. Certified CEQA documents should contain a finding that the recommended mitigation measures appear feasible based on the staff's analyses, and are commensurate with the level of impact, rarity or sensitivity of the species or habitat involved, and legal protection provided to the species or habitat.

4. During the CEQA environmental review of private projects requiring mitigation for special status species or sensitive habitats, the county staff should ensure that all costs of implementing and monitoring the mitigation will not require un-reimbursed county services or funds.

5. The county guidelines for mitigation should indicate that land acquisition or other habitat protection approaches should focus first on undeveloped lands with intact habitat at or adjacent to established preserves, federal lands with habitat value, and/or other non-federal open space with habitat value that is not expected to be subject to future land development.

8. Biological Review Criteria (Applicant Project Evaluation Protocol)

This BRS update identified 92 special status wildlife and plant species that occur in Kings County. To date, 381 records for special status species and sensitive habitats are known from the county (CNDDB 2008). Some of the records in the CNDDB are old, and the species and its habitat may have become locally extinct. However for many of the records, they indicate a viable population and habitat for the specific species. Many of those species (such as Valley Elderberry Longhorn Beetle, Blunt-nosed Leopard Lizard, Swainson's Hawk, San Joaquin Antelope Squirrel, three different kangaroo rats, and San Joaquin Kit Fox) are federally or state listed, will likely require protocol or detailed biological surveys, may require a Biological Assessment Report for consultation with the USFWS, and mitigation may be required for impacts to the species or its habitat. Most of the sensitive plants, and all of the sensitive wildlife inhabit or forage in grassland and/or scrub habitats. This means that in Kings County, there is a fairly simple way to determine whether a biological survey will be required for a project, and what level or types of surveys may be required. The recommendations key in Section 8.1 below provides guidance on when and what surveys should be conducted.

8.1 Recommendations for Biological Review Criteria

1. Does the project site fall within or adjacent to quad maps with known special status species or sensitive habitats as determined by a review of the county's Sensitive Resources Maps (Appendix A7) and Sensitive Resources Lists (Appendix B4) ? This review should include the project site quad and the 8 surrounding maps and lists for potential sensitive resources in the project area.

   NO..... Biological reconnaissance survey not required on an Initial Study

   YES .....Conduct reconnaissance-level biological survey (Go to #2).

2. What habitat types are present on the project site?

   Agriculture, fallow agricultural land, or dry-land farmed .....Go to #3.

   Other such as grassland, wetlands, scrub habitats, & other sensitive habitats.....Go to #5.

3. Is project site within 10 miles of a Swainson's Hawk (SWHA) nest ?

   NO.....Go to #4.

   YES ..... Conduct protocol SWHA and nesting raptor surveys and consult with consult with CDFG about SWHA foraging impacts and Go to #7.

4. Large trees present on or adjacent to project site for potential raptor nesting..... ..... Conduct protocol SWHA and nesting raptor surveys (Go to #7)

   Large trees absent on or adjacent to project site .....No raptor surveys required.

5. What habitat types are present on the project site?

   Wetland, riparian, marsh, vernal pool & other sensitive habitats.....Go to 6.

   Grassland and scrub habitats.....Go to 7.

6. Will applicant agree to project changes or to standardized mitigation to avoid or reduce impacts to wetlands, riparian habitat, marsh, vernal pools, or sensitive habitats ?

   NO..... Applicant must conduct protocol biological surveys for species and habitats, prepare biological report(s), and prepare a Biological Assessment Report. If the surveys and assessment indicates that there will be potentially significant impacts on special status species or sensitive habitats, then applicant, county, CDFG, and other applicable state and federal resource and regulatory agencies will negotiate appropriate changes or mitigation. In lieu of a Biological Assessment Report, an EIR may be required. If

applicant disputes finding of significance or mitigation requirements, applicant may appeal requirements to Board of Supervisors. Applicant must obtain permits from applicable state and federal agencies for special status species and sensitive habitat impacts prior to county approval of the project.

YES... Protocol biological surveys and a Biological Assessment Report are not required. Applicant will negotiate project changes or mitigation (including mitigation monitoring) with county, CDFG, and other applicable state and federal resource and regulatory agencies. Applicant must obtain permits from applicable state and federal agencies for special status species and sensitive habitat impacts prior to county approval of the project. The project can then be scheduled for a hearing and approval by the planning commission .....Go to #7.

7. Will applicant agree to project changes or to standardized mitigation to avoid or reduce impacts to sensitive species and their habitat ?

NO..... Applicant must conduct protocol biological surveys for special status species and sensitive habitats, prepare biological reports, and prepare a Biological Assessment Report. If the surveys and assessment indicates that there will be potentially significant impacts on special status species or sensitive habitats, then applicant, county, CDFG, and other applicable state and federal resource and regulatory agencies will negotiate appropriate changes or mitigation. In lieu of a Biological Assessment Report, an EIR may be required. If incidental take of endangered or threatened species is likely, permits must also be obtained by the USFWS and CDFG. If applicant disputes finding of significance or mitigation requirements, applicant may appeal requirements to Board of Supervisors. Applicant must obtain permits from applicable state and federal agencies for special status species and sensitive habitat impacts prior to county approval of the project.

YES... Protocol biological surveys and a Biological Assessment Report are not required. Applicant will negotiate project changes or mitigation (including mitigation monitoring) with county, CDFG, and other applicable state and federal resource and regulatory agencies. Applicant must obtain permits from applicable state and federal agencies for special status species and sensitive habitat impacts prior to county approval of the project. The project can then be scheduled for a hearing and approval by the planning commission. .....Go to #8.

8. Is project within one (1) mile of a known San Joaquin Kit Fox (SJKF) den?

NO.....No foraging impacts.

YES .....Consult with CDFG and USFWS about SJKF foraging impacts.

When a Biological Assessment Report or an EIR is completed and reviewed, KCPA will attach appropriate mitigation to the project and will schedule the project for hearings or action by the director. KCPA will monitor the project for compliance with required mitigation.

9. Special Status Plants in Kings County

This BRS found that 2 threatened or endangered plants and 19 species of concern are recorded to occur in Kings County. These species are listed in Section 3.3. For each species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive plant CNDDB locations (Appendix A5).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B1). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendix F1).

10. Special Status Arthropods of Kings County

This BRS found that 4 threatened or endangered arthropods and 4 species of concern are recorded to occur or are known to occur in Kings County. These species are listed in Sections 3.3 and 3.5. For each species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive wildlife CNDDB locations (Appendix A6).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B2). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendix F2).

11. Special Status Fishes of Kings County

This BRS update found that 1 threatened or endangered fish and 1 species of concern are recorded to occur or are known to occur in Kings County. These species are listed in Sections 3.3 and 3.5. For each species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive wildlife CNDDB locations (Appendix A6).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B2).

This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendices F3).

12. <u>Special Status Amphibians of Kings County</u>

This BRS found that 2 threatened or endangered amphibians and 1 species of concern are recorded to occur or are known to occur in Kings County. These species are listed in Sections 3.3 and 3.5. For each species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive wildlife CNDDB locations (Appendix A6).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B2). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendices F4).

13. <u>Special Status Reptiles of Kings County</u>

This BRS found that 2 threatened or endangered reptiles and 3 species of concern are recorded to occur or are known to occur in Kings County. These species are listed in Sections 3.3 and 3.5. For each species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive wildlife CNDDB locations (Appendix A6).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B2). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendices F5).

14. Special Status Birds of Kings County

This BRS update found that 4 threatened or endangered birds and 33 species of concern are recorded to occur or are known to occur in Kings County. These species are listed in Sections 3.3 and 3.5. For each species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive wildlife CNDDB locations (Appendix A6).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B2). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendices F6).

15. Special Status Mammals of Kings County

This BRS found that 5 threatened or endangered mammals and 9 species of concern are recorded to occur or are known to occur in Kings County. These species are listed in Sections 3.3 and 3.5. For each species, the following information is provided in the BRS's Appendices.

a. A map of Kings County showing the sensitive wildlife CNDDB locations (Appendix A6).

b. A table showing the species' habitat and quad map occurrences in the county (Appendix B2). This table is used to determine which of the 35 quad maps to view to see the precise locations of that species in the county.

c. Quad maps showing the species' precise CNDDB locations in the county (Appendix A7).

d. Basic life information including a description and natural history information, habitat affinities, current status in Kings County, and Potential threats, management concerns, or special considerations (Appendices F7).

16. Literature Consulted

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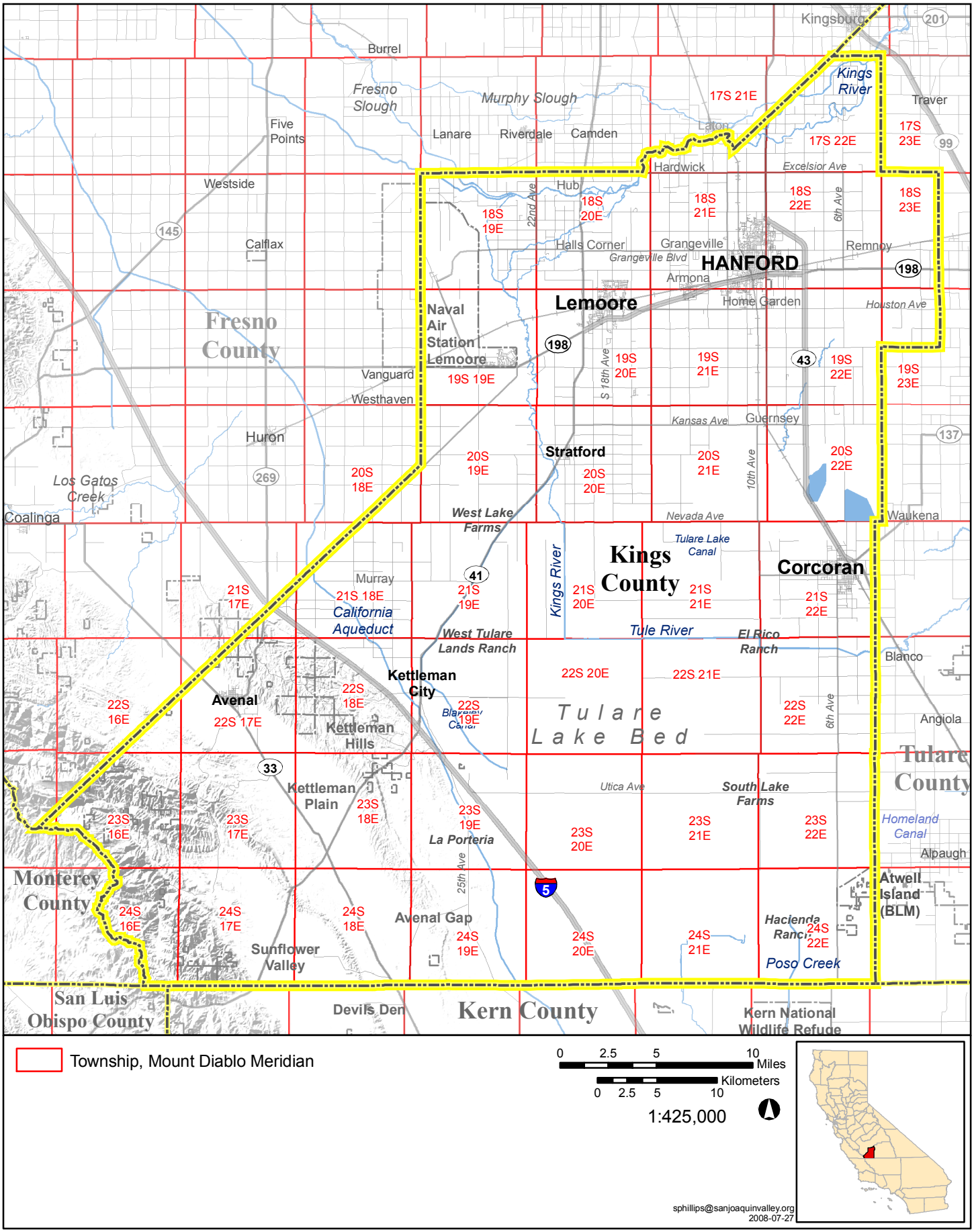
APPENDIX A

MAPS

APPENDIX A1

Base Map of Kings County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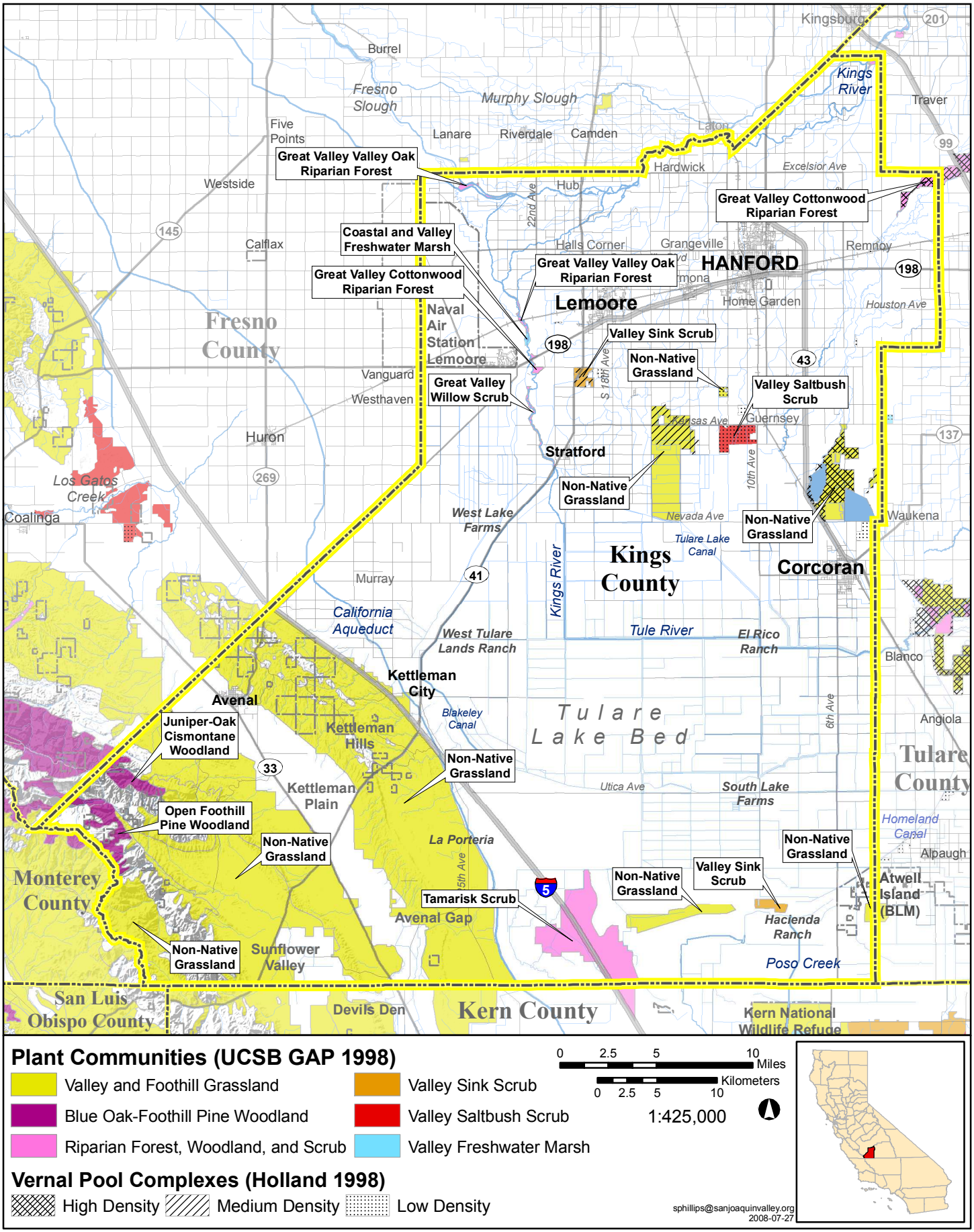
Burrel
Fresno Slough
Murphy Slough
Kings River
Traver
17S 21E
17S 22E
17S 23E
99
Five Points
Lanare
Riverdale
Camden
Laton
Hardwick
Excelsior Ave
Westside
Hub
18S 19E
22nd Ave
18S 20E
18S 21E
18S 22E
6th Ave
18S 23E
145
Calflax
Halls Corner
Grangeville
Grangeville Blvd
Remnoy
HANFORD
198
Armona
Home Garden
Houston Ave
Fresno County
Naval Air Station Lemoore
Lemoore
198
S 18th Ave
19S 20E
19S 21E
43
19S 22E
19S 23E
Vanguard
19S 19E
Westhaven
Kansas Ave
Guernsey
Huron
Stratford
20S 19E
20S 20E
20S 21E
10th Ave
20S 22E
137
Los Gatos Creek
269
20S 18E
Coalinga
West Lake Farms
Nevada Ave
Waukena
Tulare Lake Canal
Kings County
Corcoran
41
Murray
21S 17E
21S 18E
21S 19E
Kings River
21S 20E
21S 21E
21S 22E
California Aqueduct
West Tulare Lands Ranch
Tule River
El Rico Ranch
Blanco
Kettleman City
22S 20E
22S 21E
22S 16E
Avenal
22S 17E
22S 18E
22S 19E
Blakeley Canal
Tulare Lake Bed
22S 22E
6th Ave
Angiola
Kettleman Hills
33
Tulare County
Kettleman Plain
Utica Ave
South Lake Farms
23S 16E
23S 17E
23S 18E
23S 19E
23S 20E
23S 21E
23S 22E
Homeland Canal
La Porteria
Alpaugh
Monterey County
25th Ave
5
Atwell Island (BLM)
24S 16E
24S 17E
24S 18E
Avenal Gap
24S 19E
24S 20E
24S 21E
Hacienda Ranch
24S 22E
Sunflower Valley
Poso Creek
San Luis Obispo County
Devils Den
Kern County
Kern National Wildlife Refuge
Township, Mount Diablo Meridian
0 2.5 5 10 Miles
0 2.5 5 10 Kilometers
1:425,000
sphillips@sanjoaquinvalley.org
2008-07-27

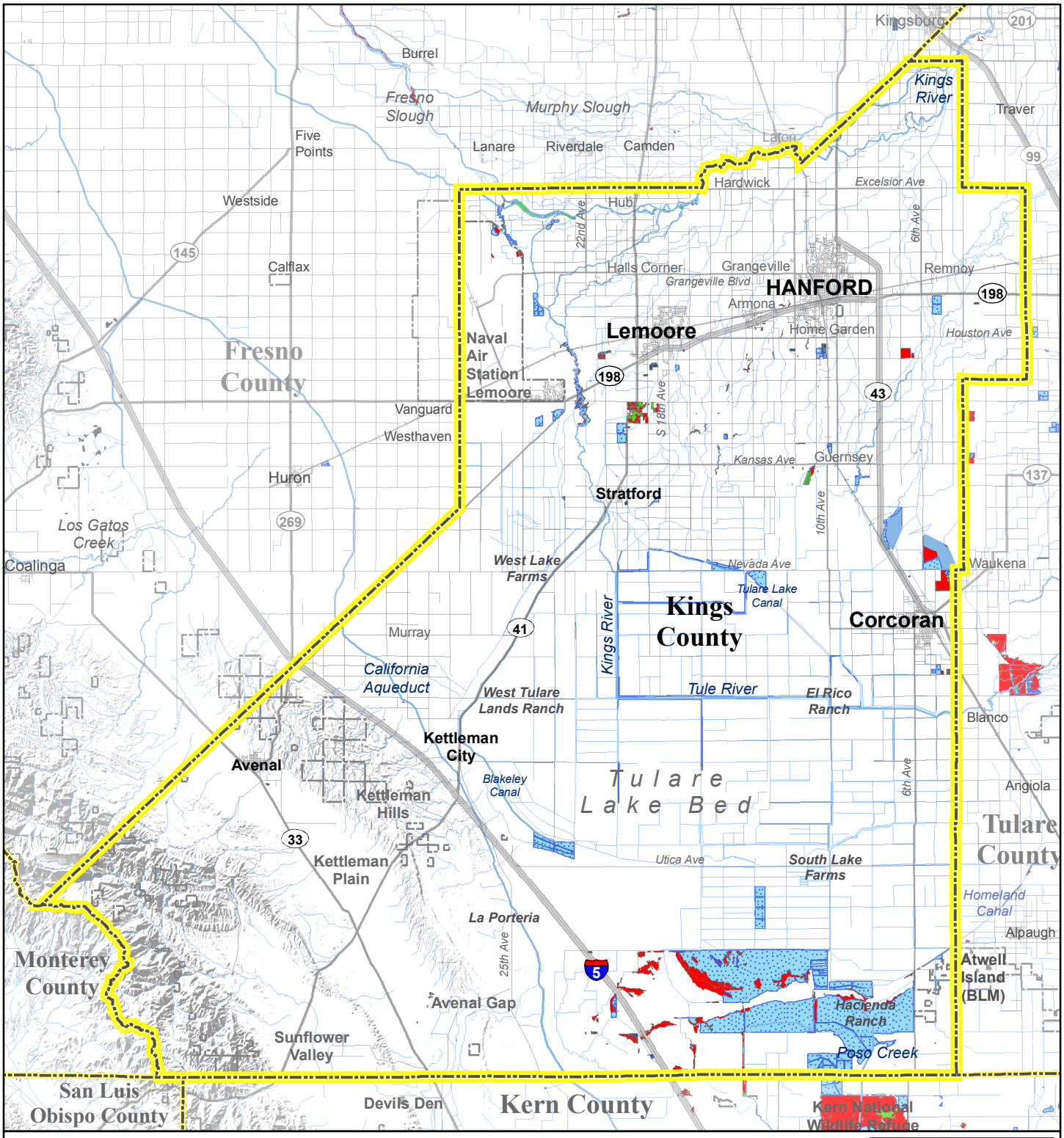
APPENDIX A2

Plant Community / Habitat Map of Kings County


Great Valley Valley Oak Riparian Forest
Coastal and Valley Freshwater Marsh
Great Valley Cottonwood Riparian Forest
Great Valley Valley Oak Riparian Forest
Great Valley Cottonwood Riparian Forest
Valley Sink Scrub
Non-Native Grassland
Great Valley Willow Scrub
Valley Saltbush Scrub
Non-Native Grassland
Non-Native Grassland
Non-Native Grassland
Juniper-Oak Cismontane Woodland
Open Foothill Pine Woodland
Non-Native Grassland
Non-Native Grassland
Tamarisk Scrub
Non-Native Grassland
Valley Sink Scrub
Non-Native Grassland
Non-Native Grassland
Kingsburg
Burrel
Fresno Slough
Murphy Slough
Kings River
Traver
Five Points
Lanare
Riverdale
Camden
Laton
Hardwick
Excelsior Ave
Westside
Hub
22nd Ave
Calflax
Halls Corner
Grangeville
Remnoy
HANFORD
Lemoore
Home Garden
Houston Ave
Fresno County
Naval Air Station Lemoore
Vanguard
Westhaven
S 18th Ave
Kansas Ave
Guernsey
Huron
Stratford
10th Ave
Los Gatos Creek
Coalinga
West Lake Farms
Nevada Ave
Tulare Lake Canal
Waukena
Kings County
Corcoran
Murray
Kings River
California Aqueduct
West Tulare Lands Ranch
Tule River
El Rico Ranch
Blanco
Kettleman City
Avenal
Blakeley Canal
Tulare Lake Bed
6th Ave
Angiola
Kettleman Hills
Tulare County
Utica Ave
South Lake Farms
Kettleman Plain
Homeland Canal
La Porteria
Alpaugh
Monterey County
5th Ave
Atwell Island (BLM)
Avenal Gap
Hacienda Ranch
Sunflower Valley
Poso Creek
San Luis Obispo County
Devils Den
Kern County
Kern National Wildlife Refuge
Plant Communities (UCSB GAP 1998)
Valley and Foothill Grassland
Blue Oak-Foothill Pine Woodland
Riparian Forest, Woodland, and Scrub
Valley Sink Scrub
Valley Saltbush Scrub
Valley Freshwater Marsh
Vernal Pool Complexes (Holland 1998)
High Density
Medium Density
Low Density
0 2.5 5 10 Miles
0 2.5 5 10 Kilometers
1:425,000
sphillips@sanjoaquinvalley.org
2008-07-27

APPENDIX A3

Wetlands and Waters Map of Kings County



National Wetlands Inventory (FWS)

- Freshwater Pond
- Lake/Flood Basin
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Streams/Canals (USGS National Hydrography Dataset)

0 2.5 5 10 Miles

0 2.5 5 10 Kilometers

1:425,000

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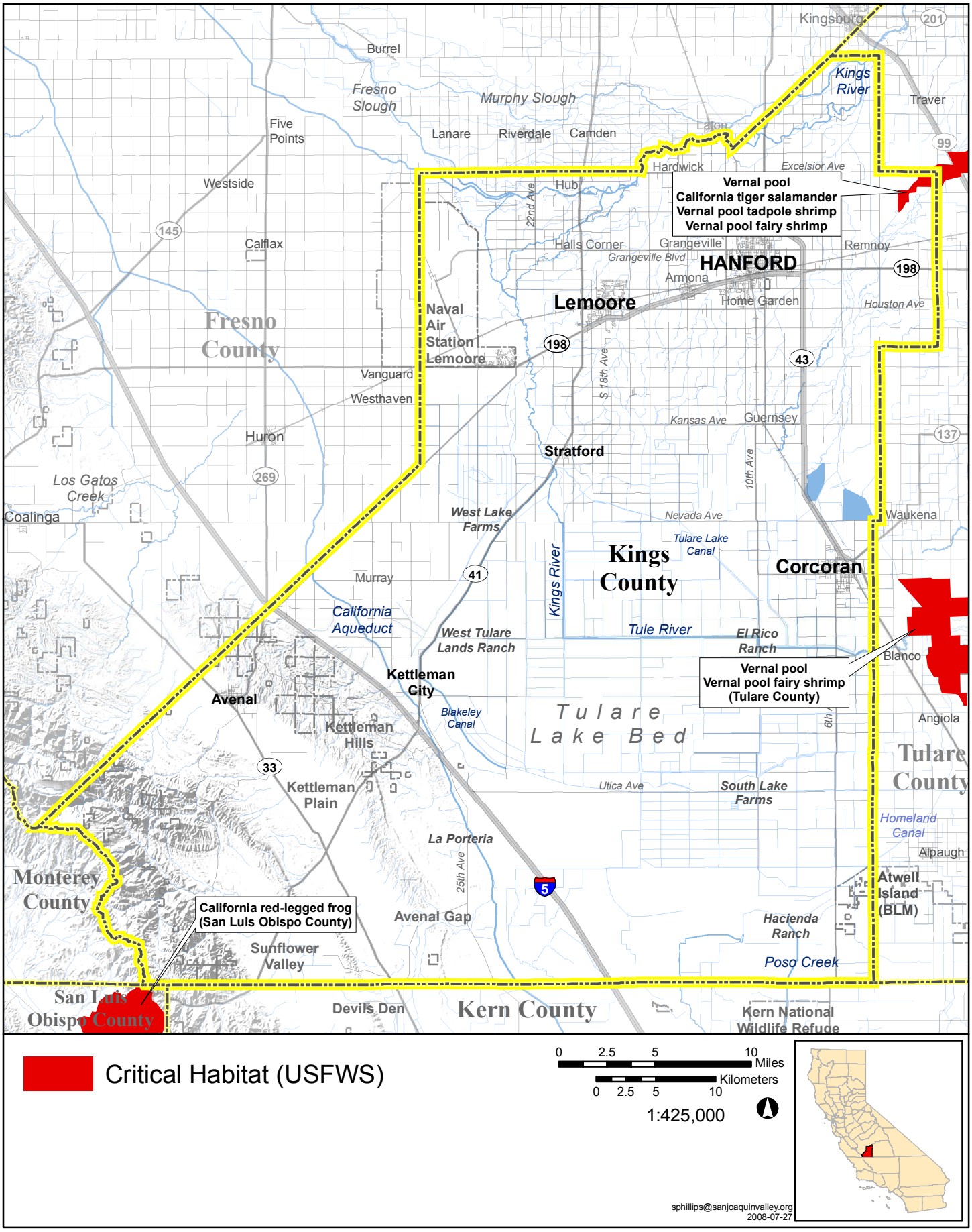
APPENDIX A4

Critical Habitats in and Adjacent to Kings County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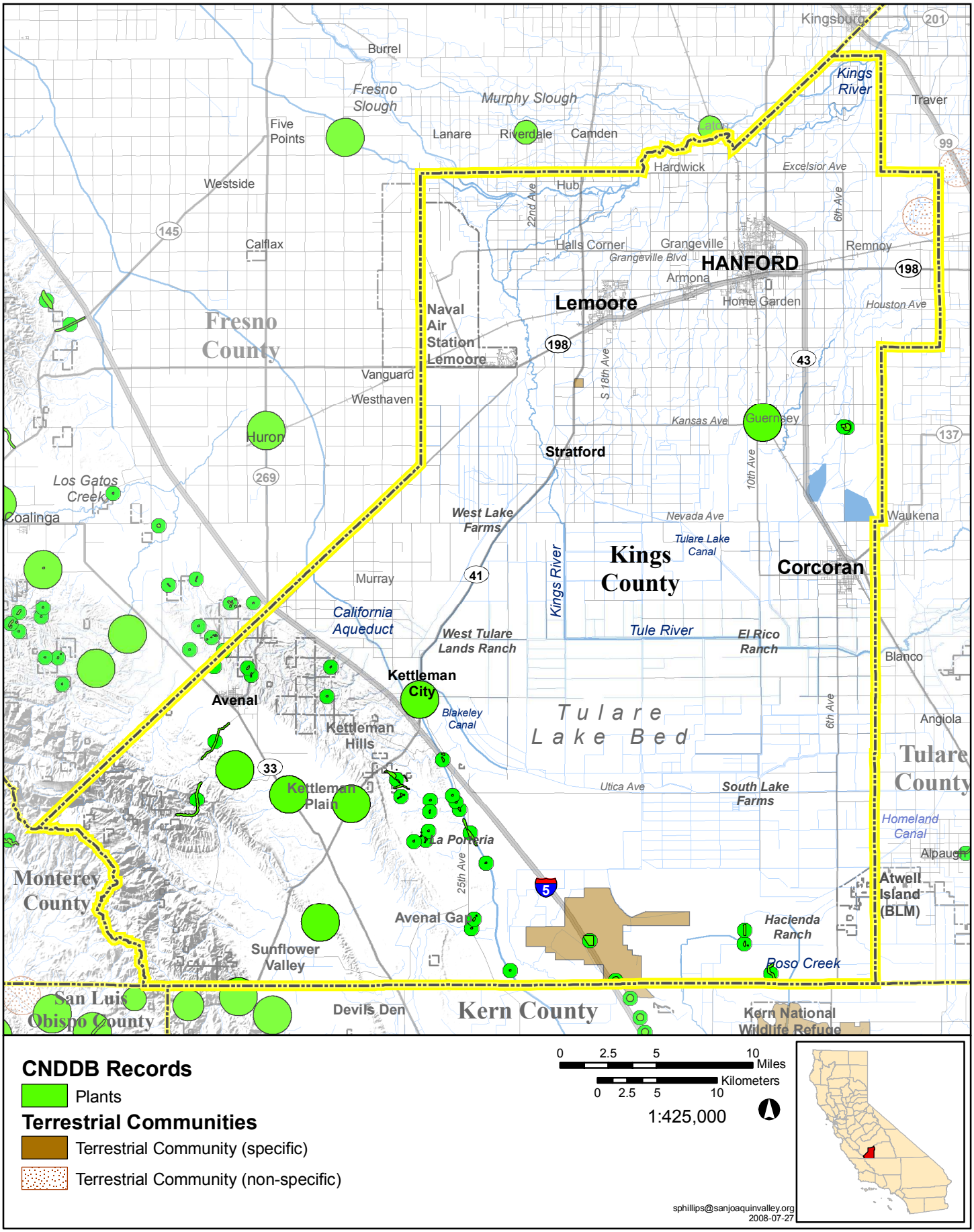
201
Burrel
Fresno Slough
Murphy Slough
Kings River
Traver
Five Points
Lanare
Riverdale
Camden
Laton
99
Hardwick
Excelsior Ave
Westside
Hub
22nd Ave
Vernal pool
California tiger salamander
Vernal pool tadpole shrimp
Vernal pool fairy shrimp
145
Calflax
Halls Corner
Grangeville
Remnoy
Grangeville Blvd
HANFORD
198
Armona
Lemoore
Home Garden
Houston Ave
Fresno County
Naval Air Station Lemoore
198
43
Vanguard
S 18th Ave
Westhaven
Kansas Ave
Guernsey
Huron
137
Stratford
269
Los Gatos Creek
10th Ave
Coalinga
West Lake Farms
Nevada Ave
Waukena
Tulare Lake Canal
Kings County
Corcoran
Murray
41
Kings River
California Aqueduct
West Tulare Lands Ranch
Tule River
El Rico Ranch
Blanco
Vernal pool
Vernal pool fairy shrimp
(Tulare County)
Kettleman City
Avenal
Blakeley Canal
Tulare Lake Bed
6th
Angiola
Kettleman Hills
33
Kettleman Plain
Utica Ave
South Lake Farms
Tulare County
Homeland Canal
La Porteria
Alpaugh
25th Ave
Monterey County
5
Atwell Island (BLM)
California red-legged frog
(San Luis Obispo County)
Avenal Gap
Hacienda Ranch
Sunflower Valley
Poso Creek
San Luis Obispo County
Devils Den
Kern County
Kern National Wildlife Refuge
Critical Habitat (USFWS)
0 2.5 5 10 Miles
0 2.5 5 10 Kilometers
1:425,000
sphillips@sanjoaquinvalley.org
2008-07-27

APPENDIX A5

Sensitive Plant Location Maps for Kings County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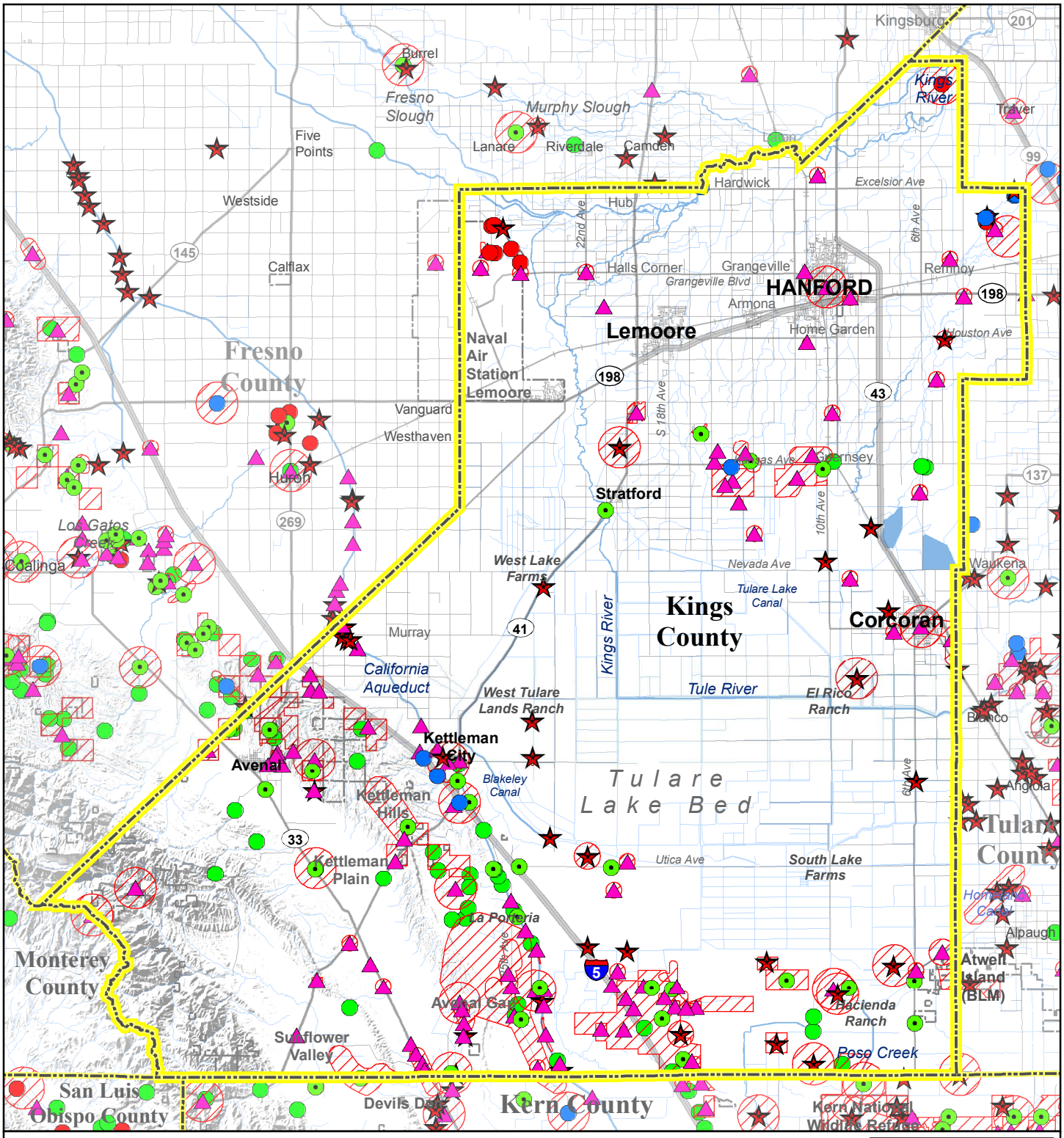
201
Burrel
Fresno Slough
Murphy Slough
Kings River
Traver
Five Points
Lanare
Riverdale
Camden
Laton
99
Hardwick
Excelsior Ave
Westside
Hub
22nd Ave
6th Ave
145
Calflax
Halls Corner
Grangeville
Remnoy
Grangeville Blvd
HANFORD
198
Armona
Lemoore
Home Garden
Houston Ave
Naval Air Station Lemoore
Fresno County
198
43
S 18th Ave
Vanguard
Westhaven
Kansas Ave
Guernsey
137
Huron
Stratford
10th Ave
269
Los Gatos Creek
Coalinga
West Lake Farms
Nevada Ave
Waukena
Tulare Lake Canal
Kings County
Corcoran
Murray
41
Kings River
California Aqueduct
West Tulare Lands Ranch
Tule River
El Rico Ranch
Blanco
Kettleman City
Avenal
Blakeley Canal
Tulare Lake Bed
6th Ave
Angiola
Kettleman Hills
33
Kettleman Plain
Utica Ave
South Lake Farms
Tulare County
Homeland Canal
La Porteria
Alpaugh
Monterey County
25th Ave
5
Atwell Island (BLM)
Avenal Gap
Hacienda Ranch
Sunflower Valley
Poso Creek
San Luis Obispo County
Devils Den
Kern County
Kern National Wildlife Refuge
CNDDB Records
Plants
Terrestrial Communities
Terrestrial Community (specific)
Terrestrial Community (non-specific)
0 2.5 5 10 Miles
0 2.5 5 10 Kilometers
1:425,000
sphillips@sanjoaquinvalley.org
2008-07-27

APPENDIX A6

Sensitive Wildlife Location Maps for Kings County



CNDDB Animal Records

Occurrence Record Area

Occurrence Type

- Mammal
- Amphibian
- Invertebrate
- Bird
- Reptile

0 2.5 5 10 Miles

0 2.5 5 10 Kilometers

1:425,000

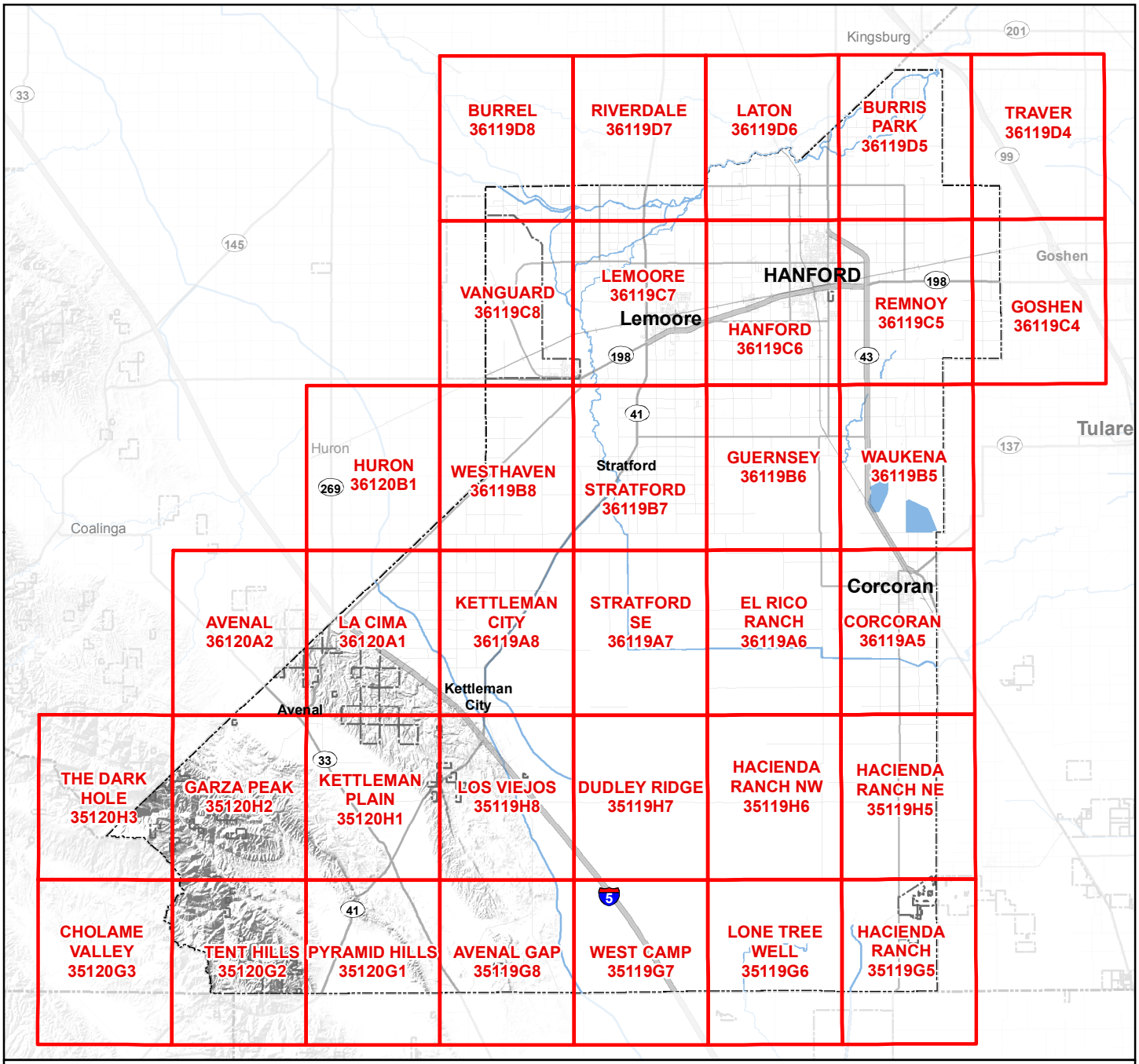
sphillips@sanjoaquinvalley.org
2008-07-27

APPENDIX A7

Sensitive Resources Maps - Quadrangle Maps

of

Sensitive Species and Habitats in Kings County



USGS 7.5-Minute Series

0 2.5 5 10 15 20 Miles

0 2.5 5 10 15 20 25 Kilometers

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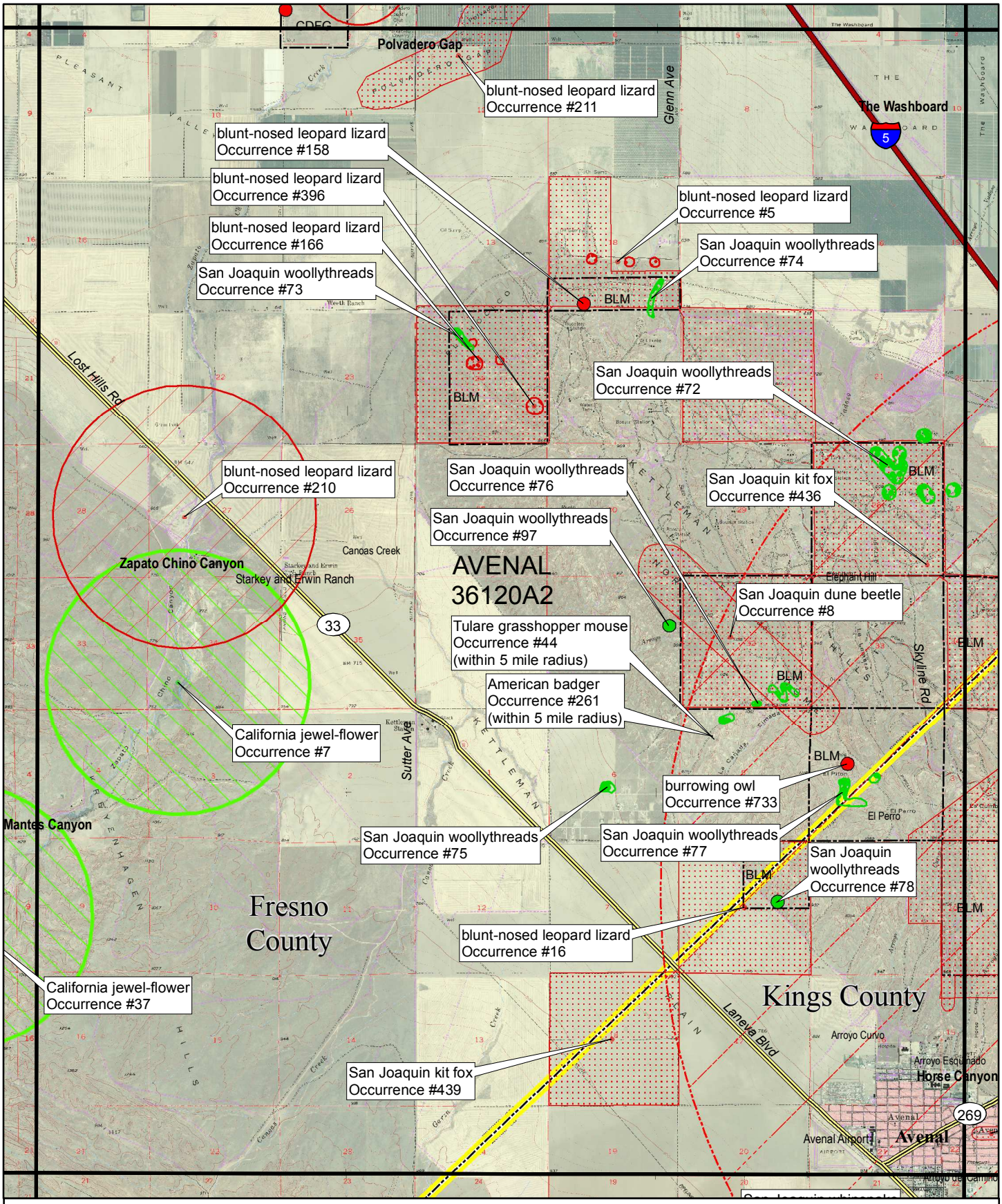
sphillips@sanjoaquinvalley.org
2008-07-27



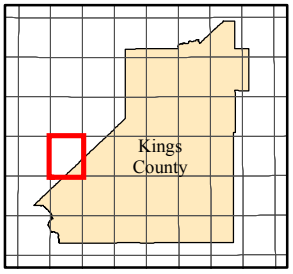
AVENAL (36120A2)

California Natural Diversity Database (CNDDB) records

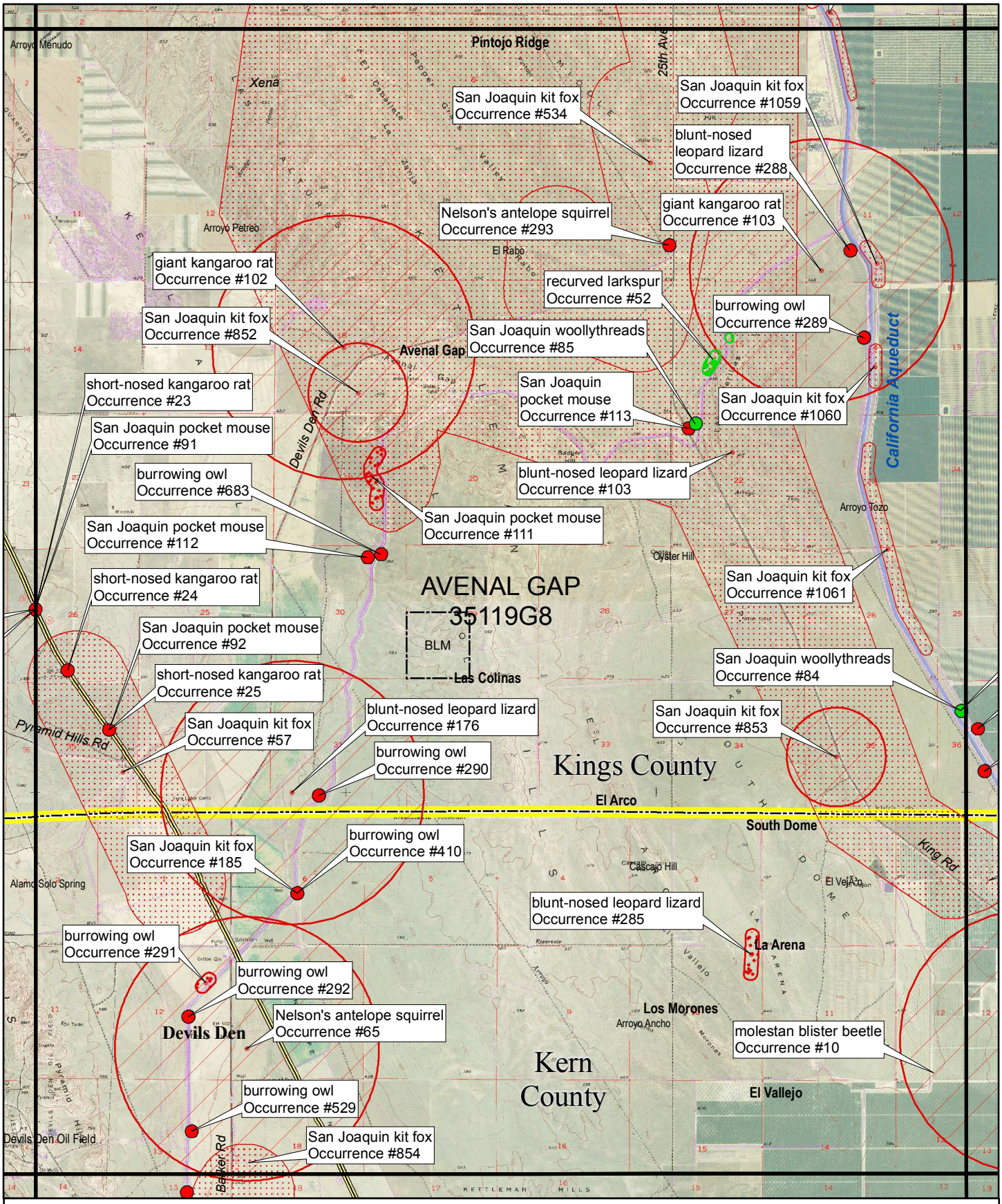
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25



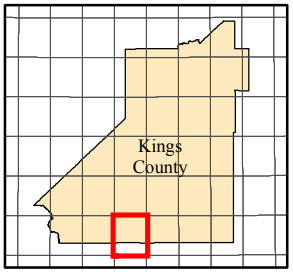
AVENAL GAP (35119G8)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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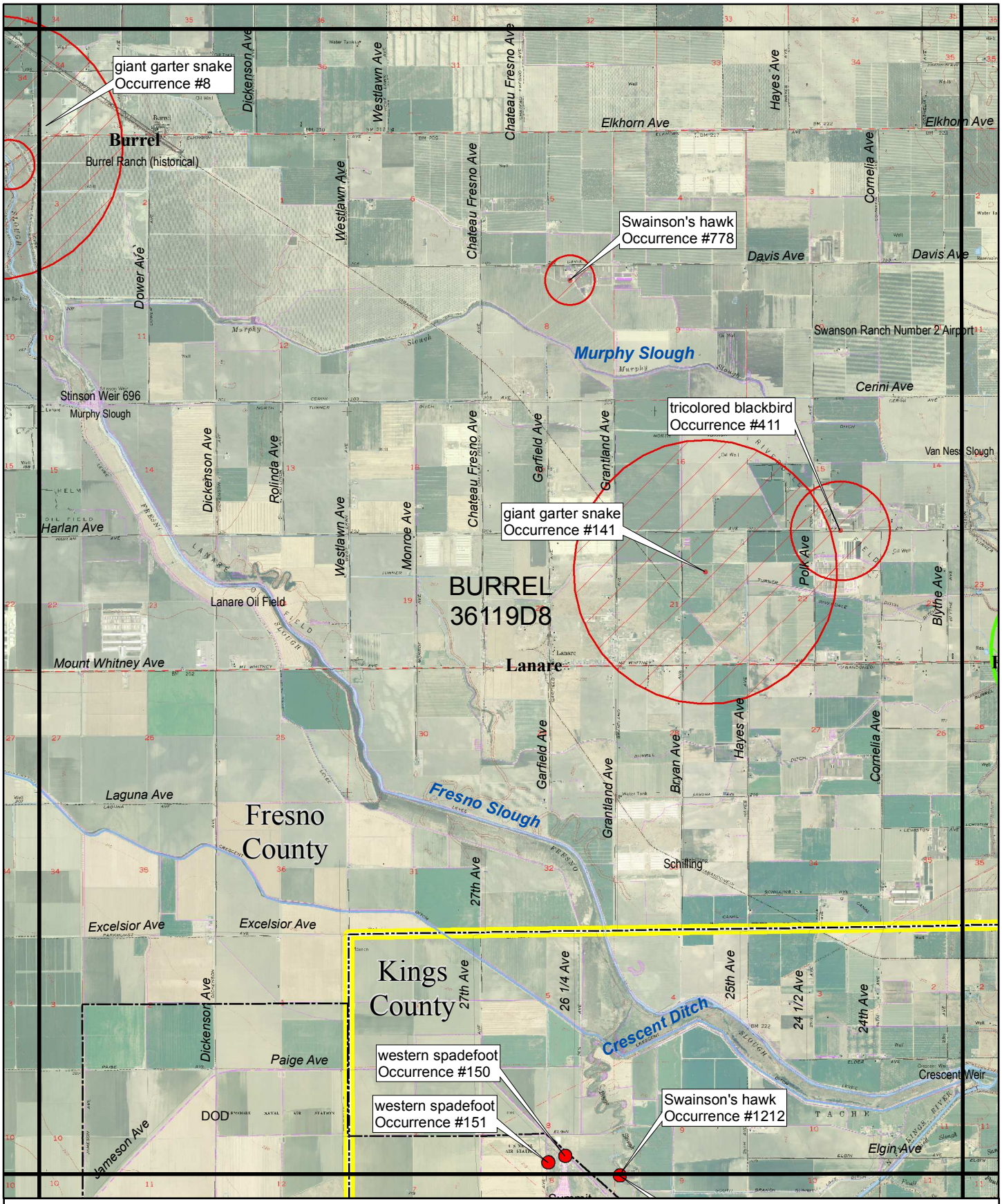
2008-07-25



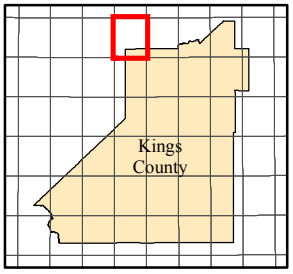
BURREL (36119D8)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



sphillips@sanjoaquinvalley.org
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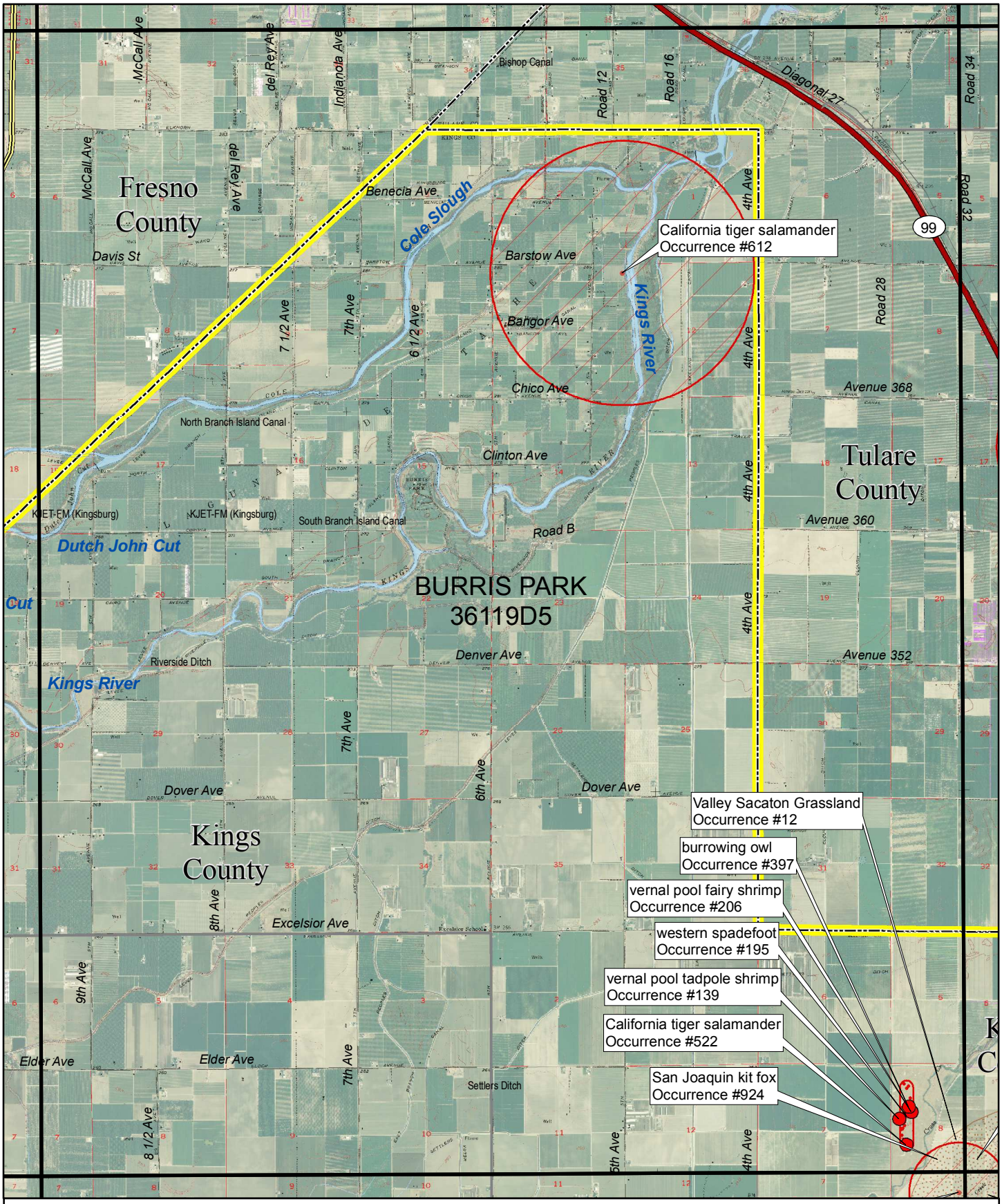


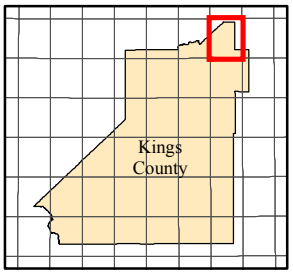
BURRIS PARK (36119D5)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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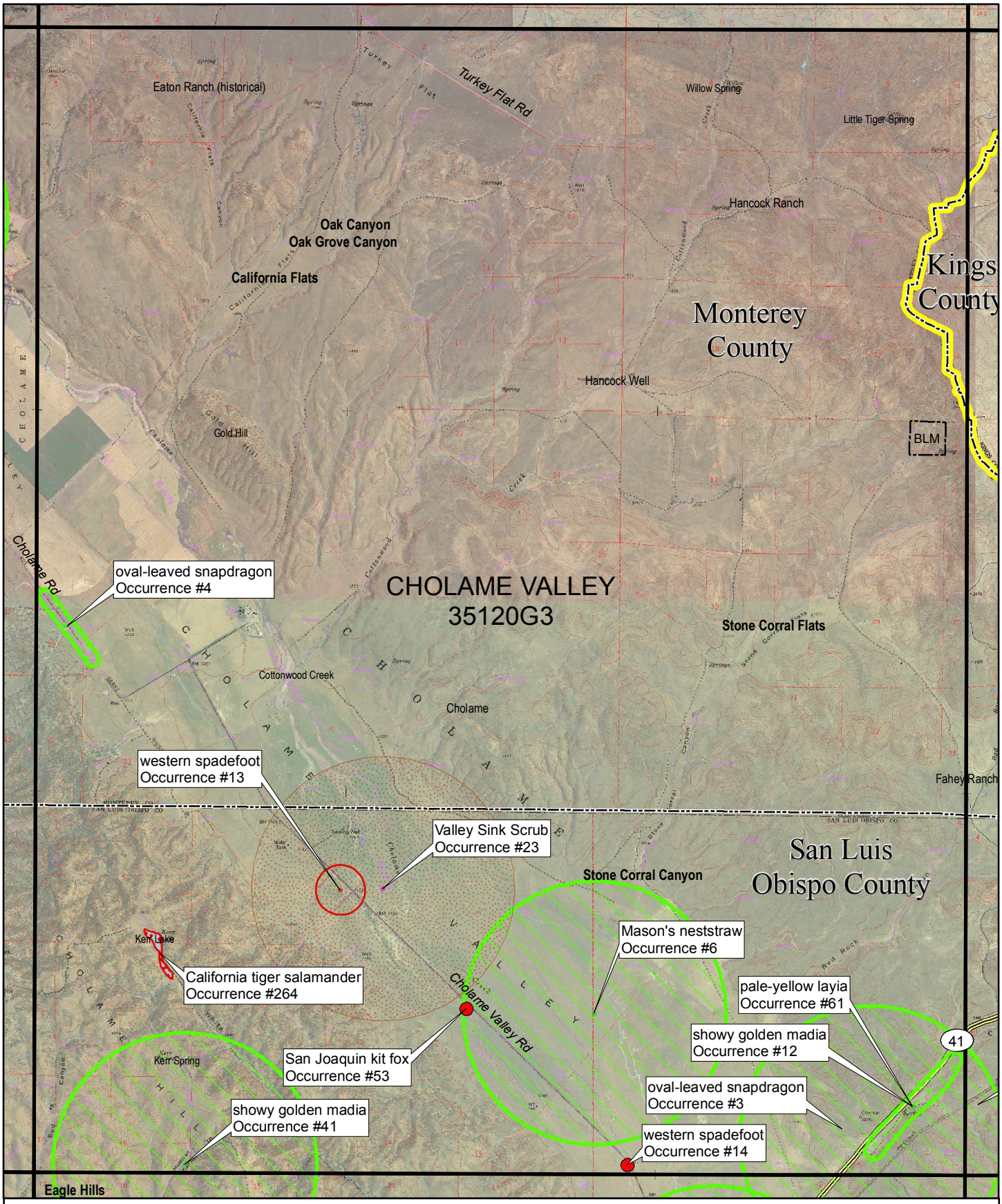
2008-07-25



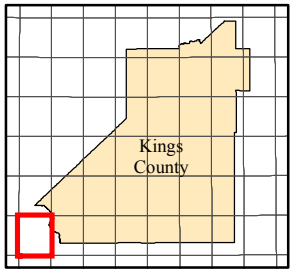
CHOLAME VALLEY (35120G3)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



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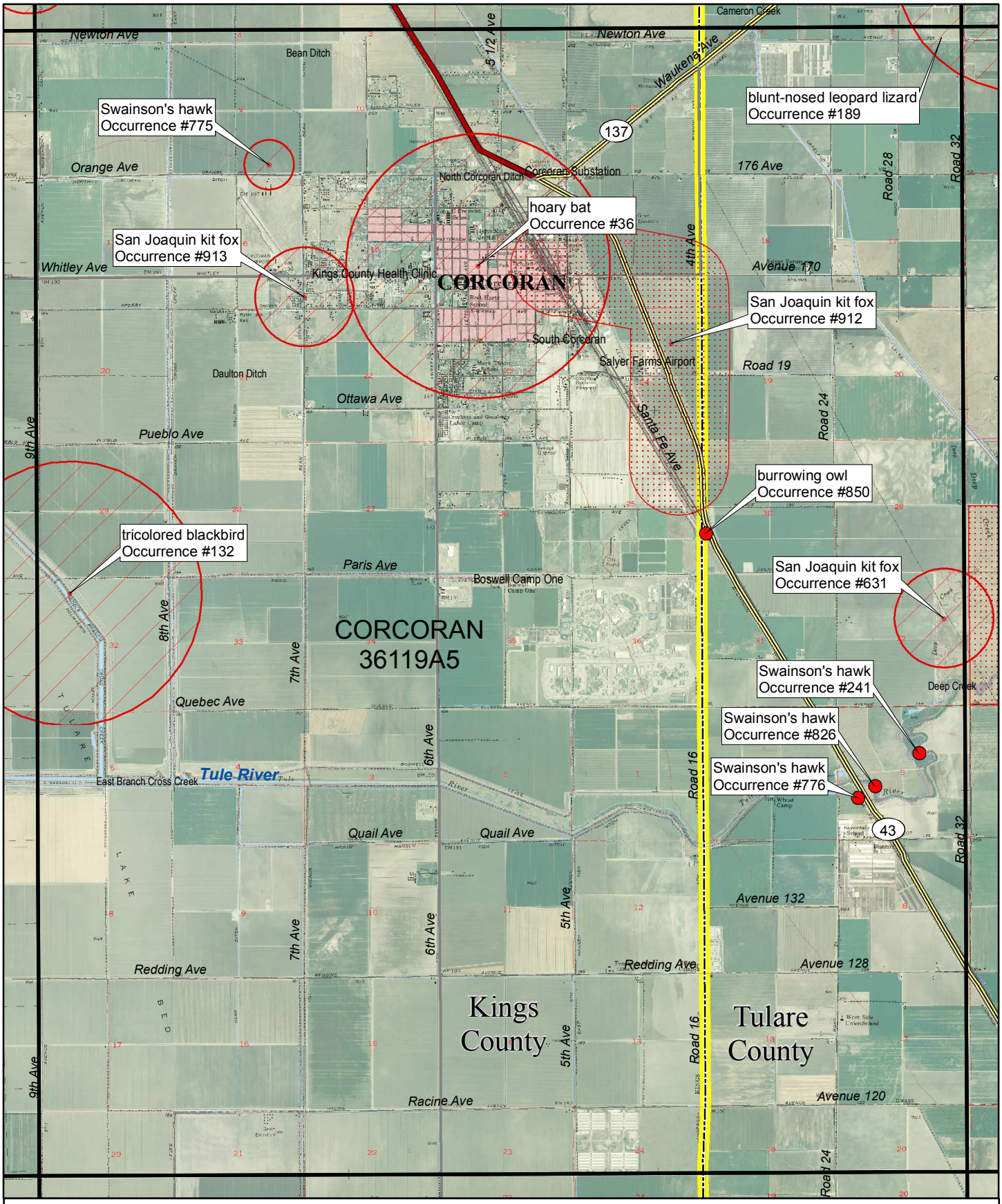


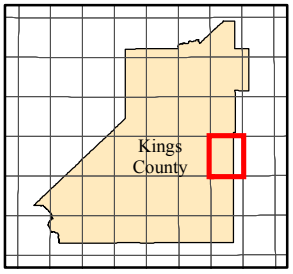
CORCORAN (36119A5)

California Natural Diversity Database (CNDDB) records

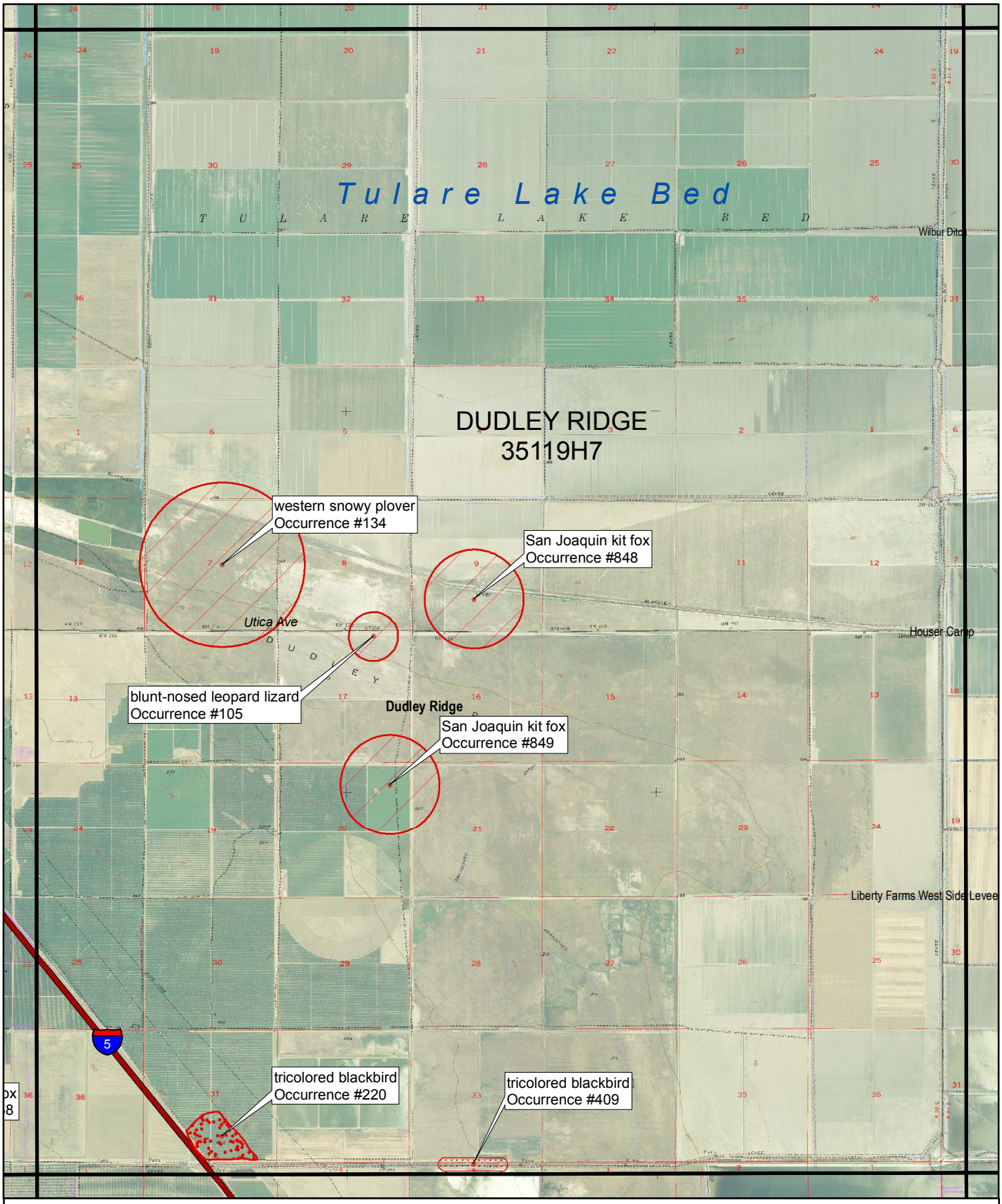
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25



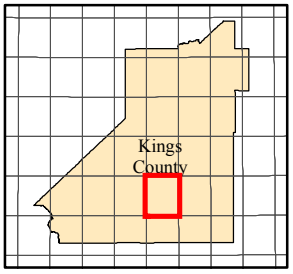
DUDLEY RIDGE (35119H7

California Natural Diversity Database (CNDDB) records

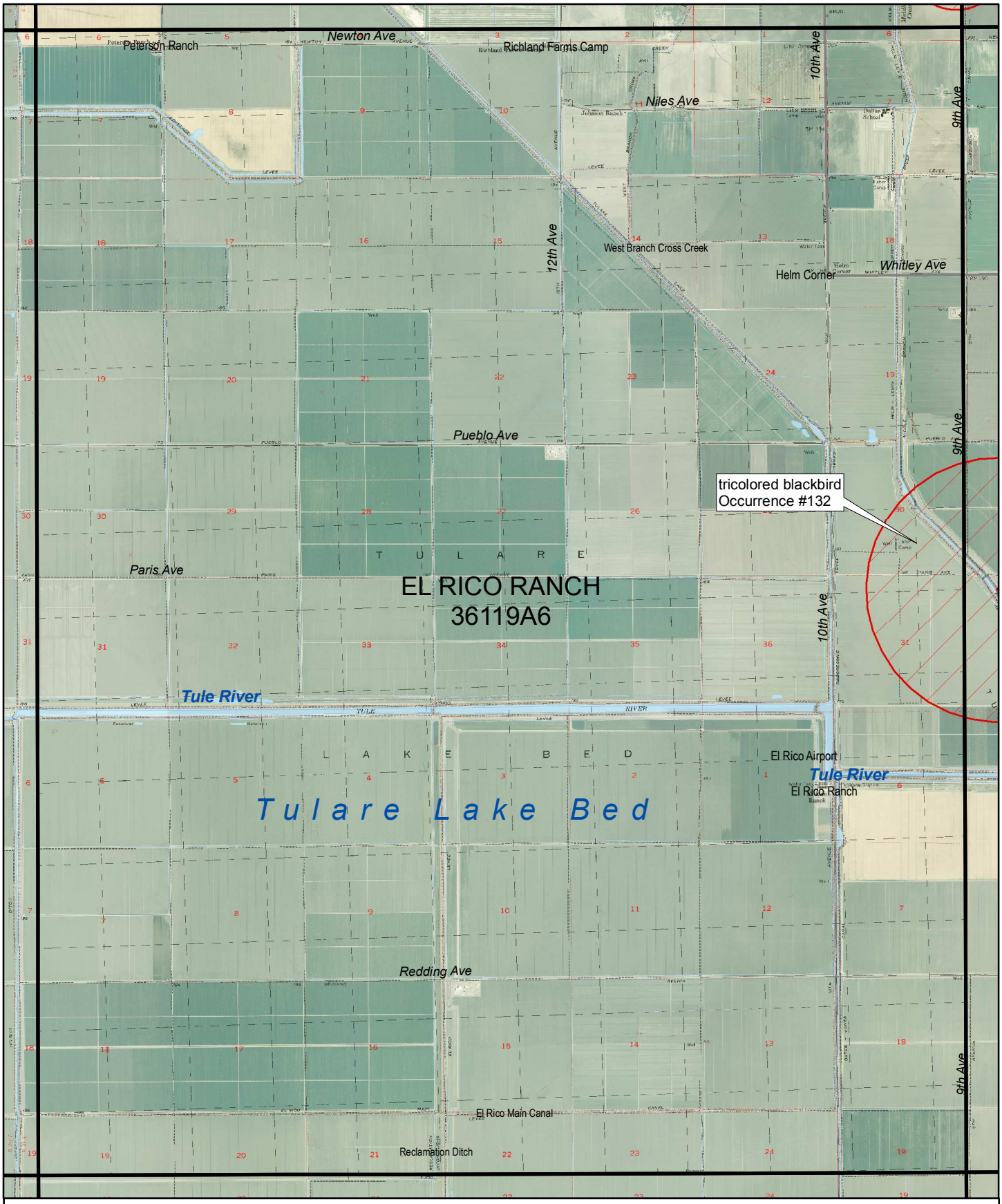
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25



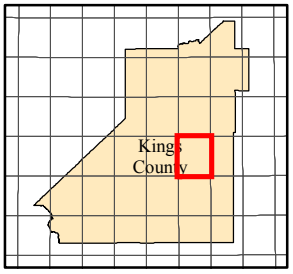
EL RICO RANCH (36119A6)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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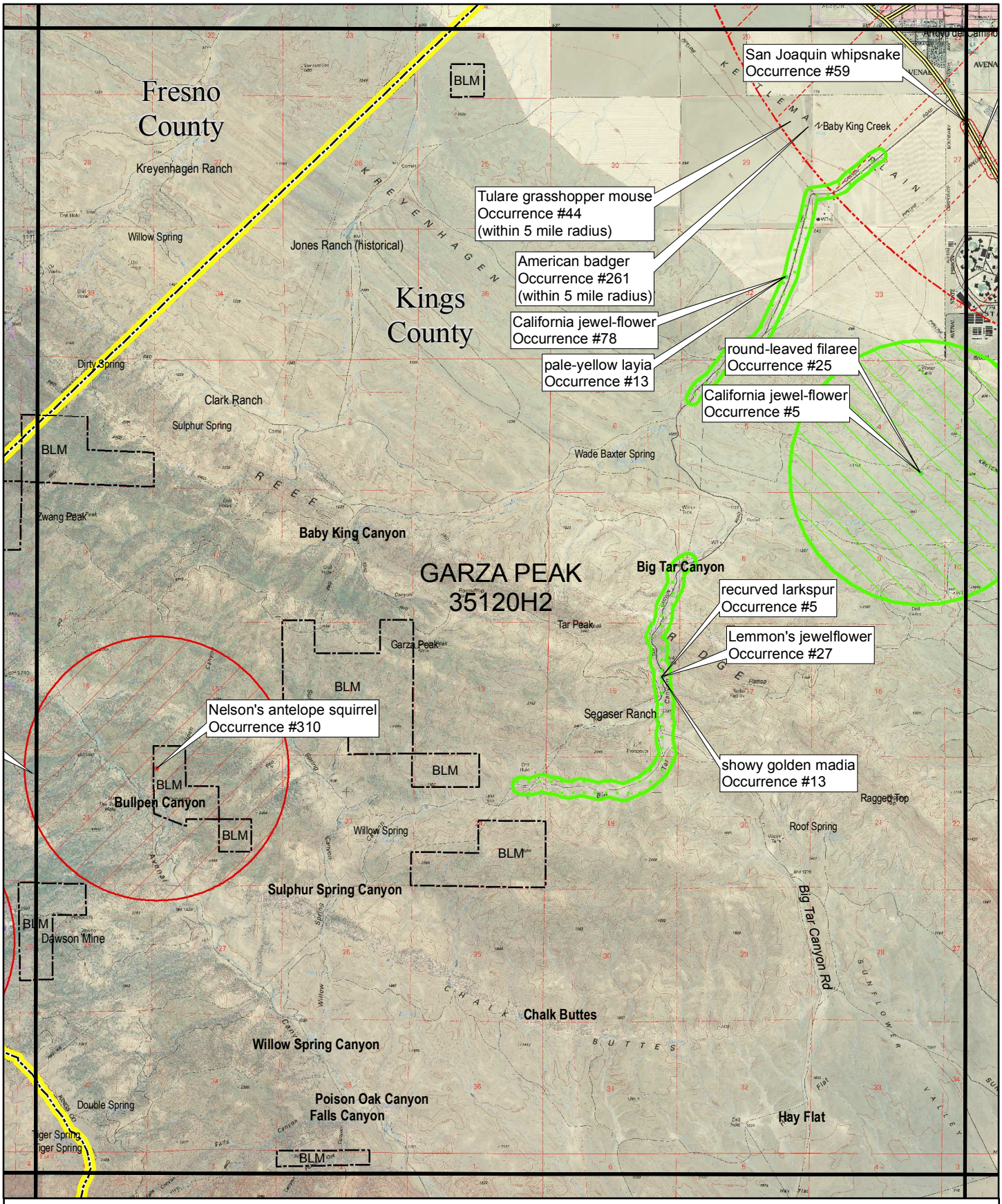
2008-07-25



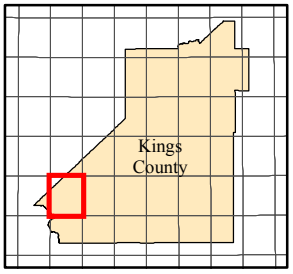
GARZA PEAK (35120H2)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



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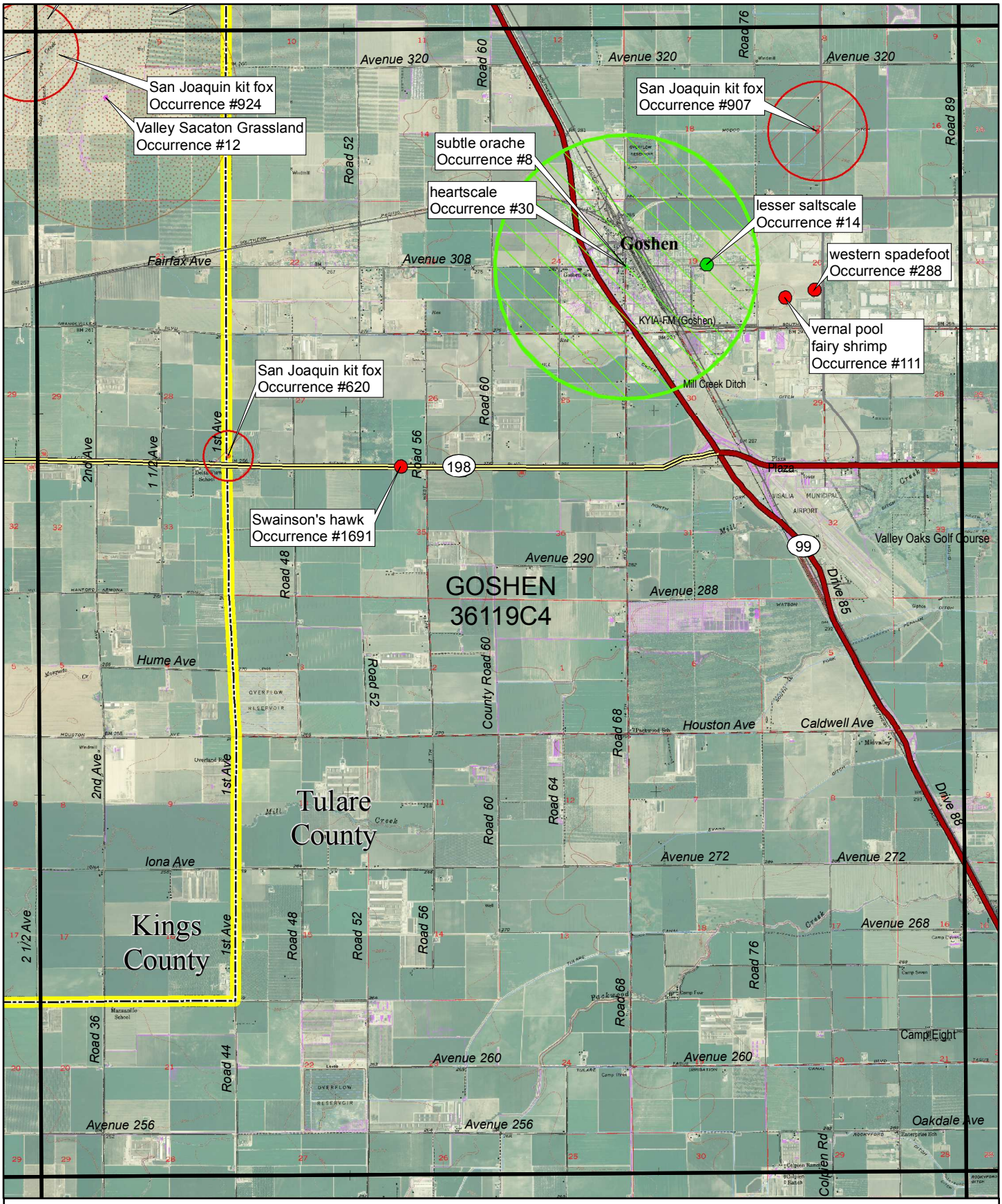
2008-07-25



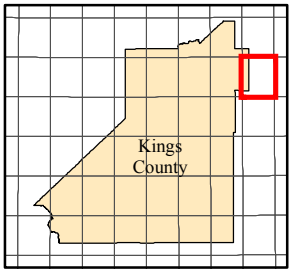
GOSHEN (36119C4)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
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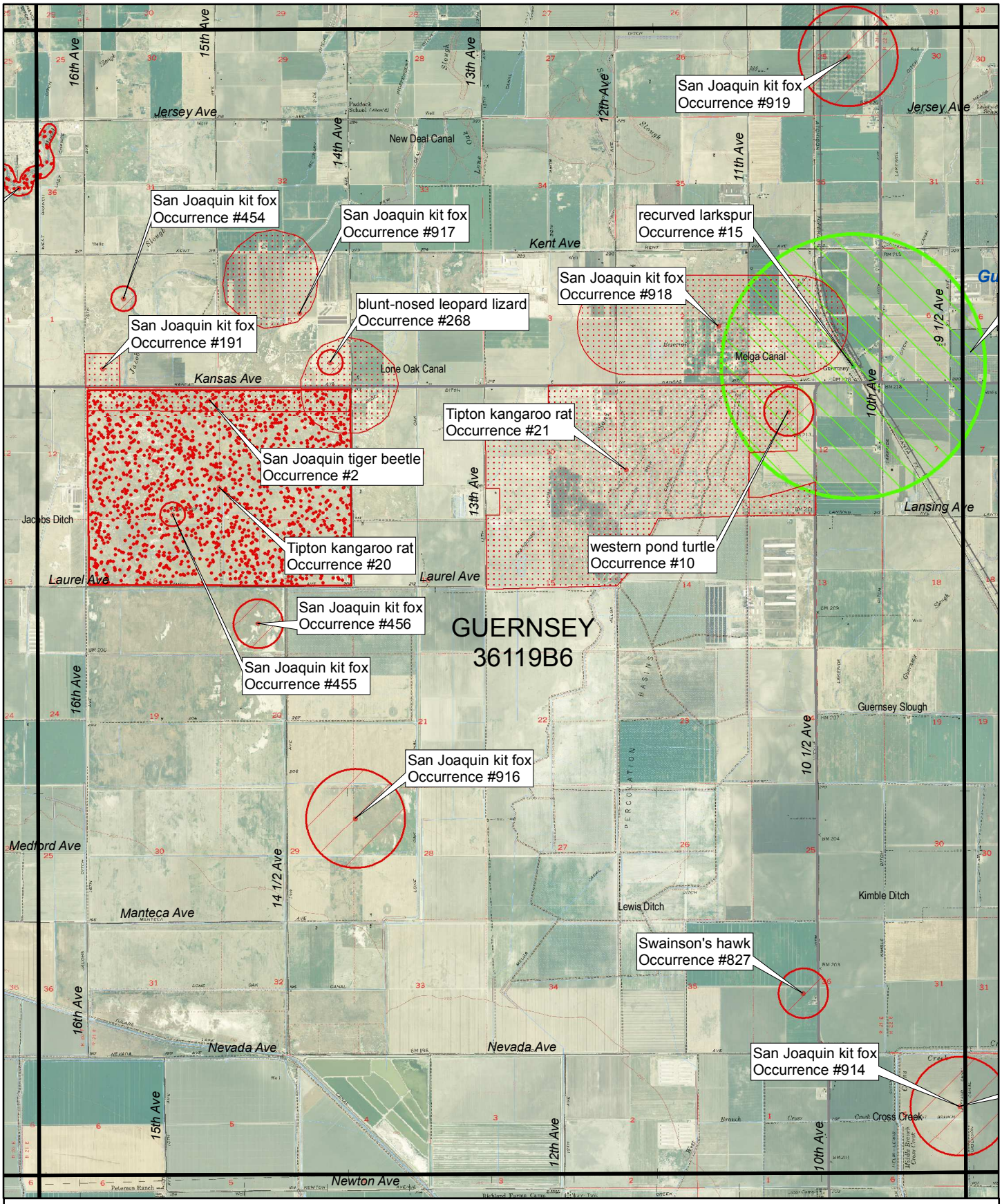


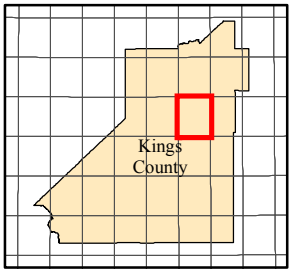
GUERNSEY (36119B6)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



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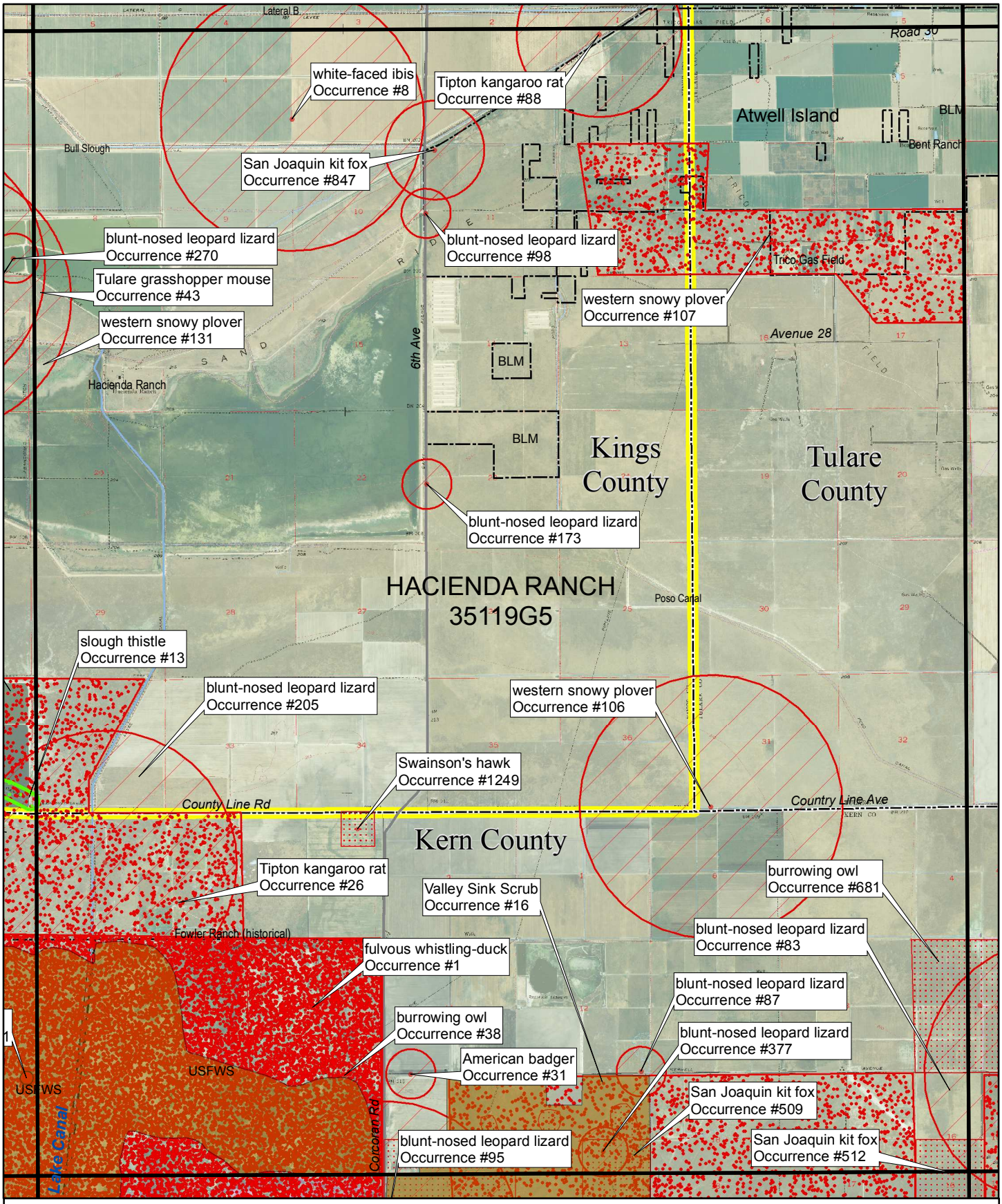


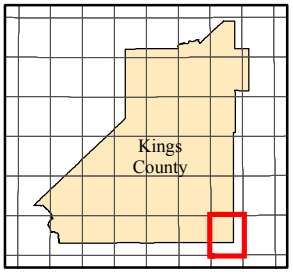
HACIENDA RANCH (35119G5)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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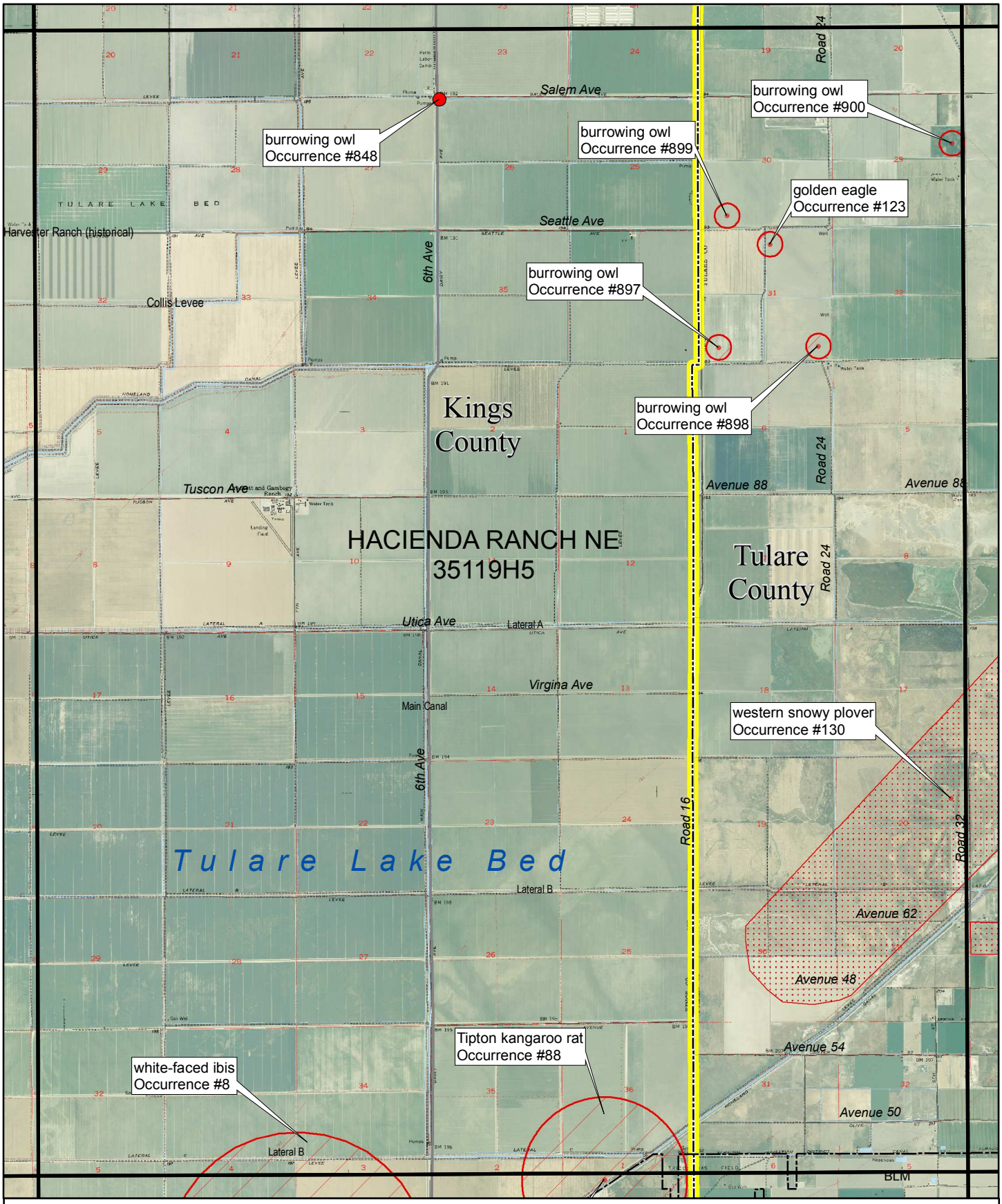
2008-07-25



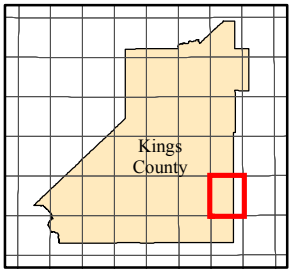
HACIENDA RANCH NE (35119H5)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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2008-07-25

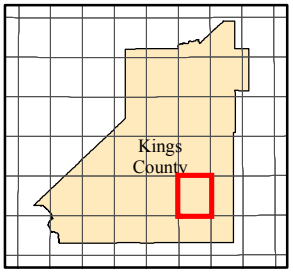
HACIENDA RANCH NW (35119H6)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
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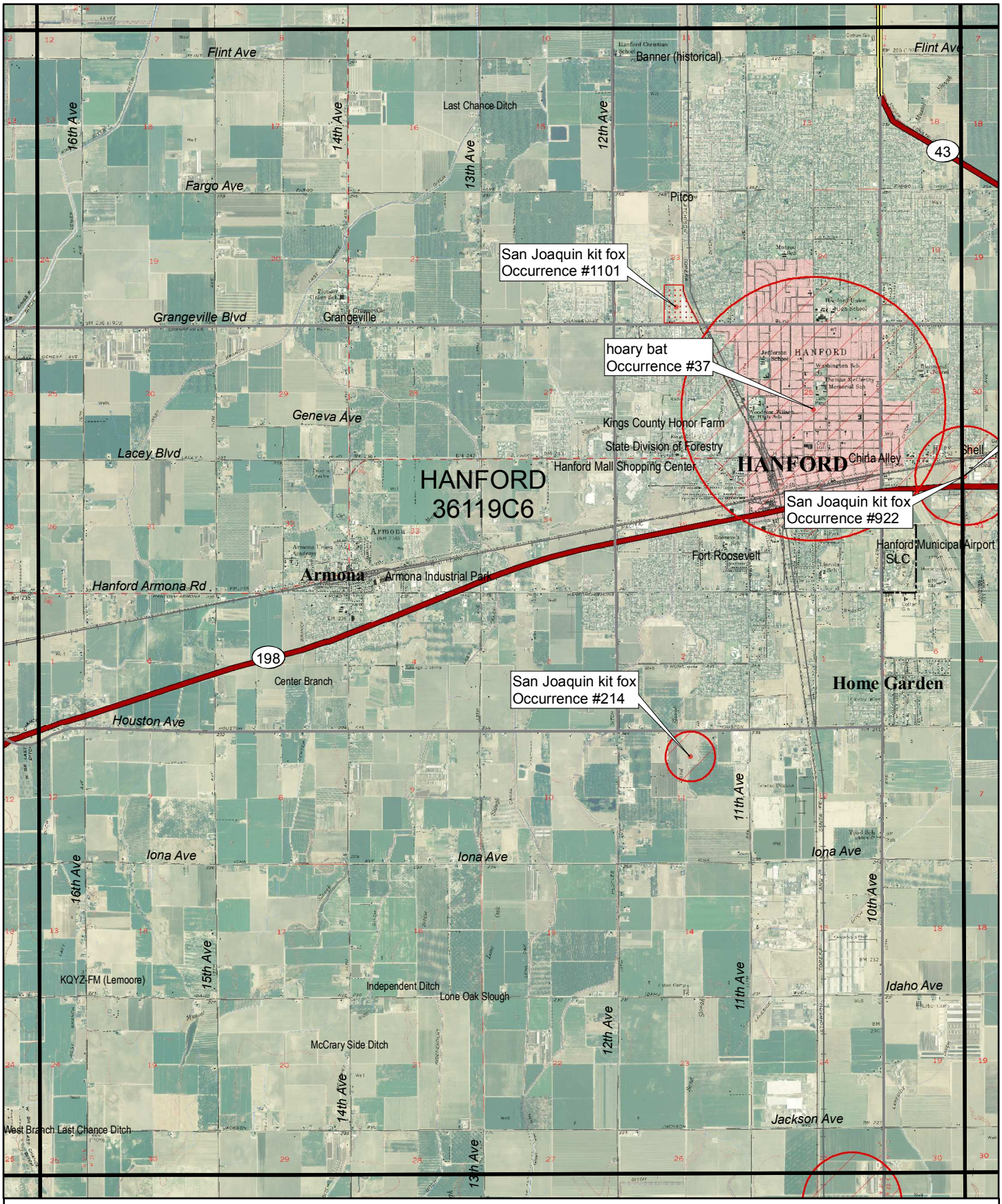


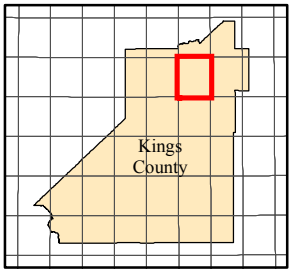
HANFORD (36119C6)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



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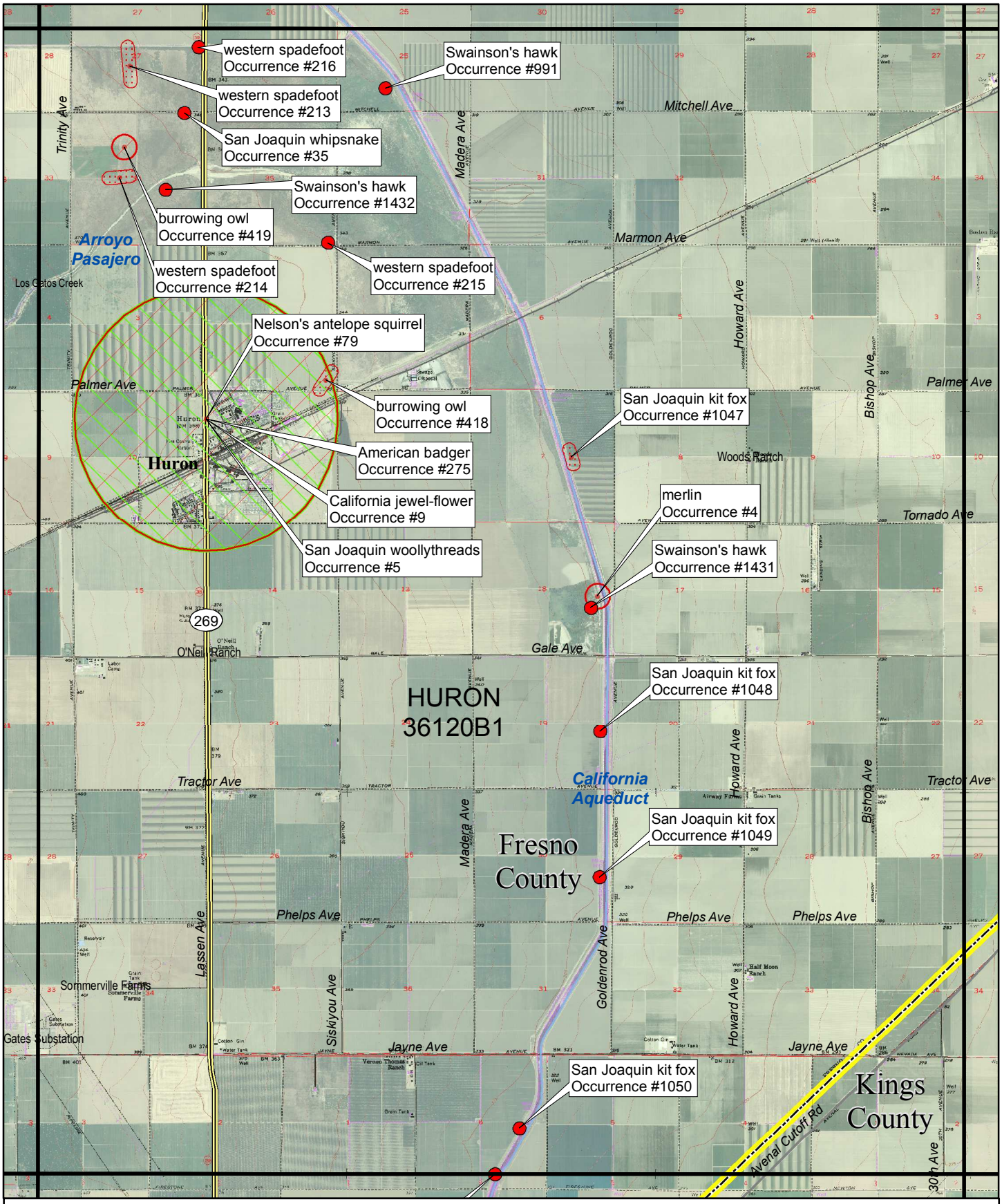
2008-07-25



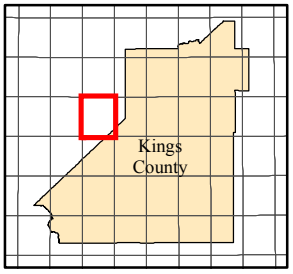
HURON (36120B1)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



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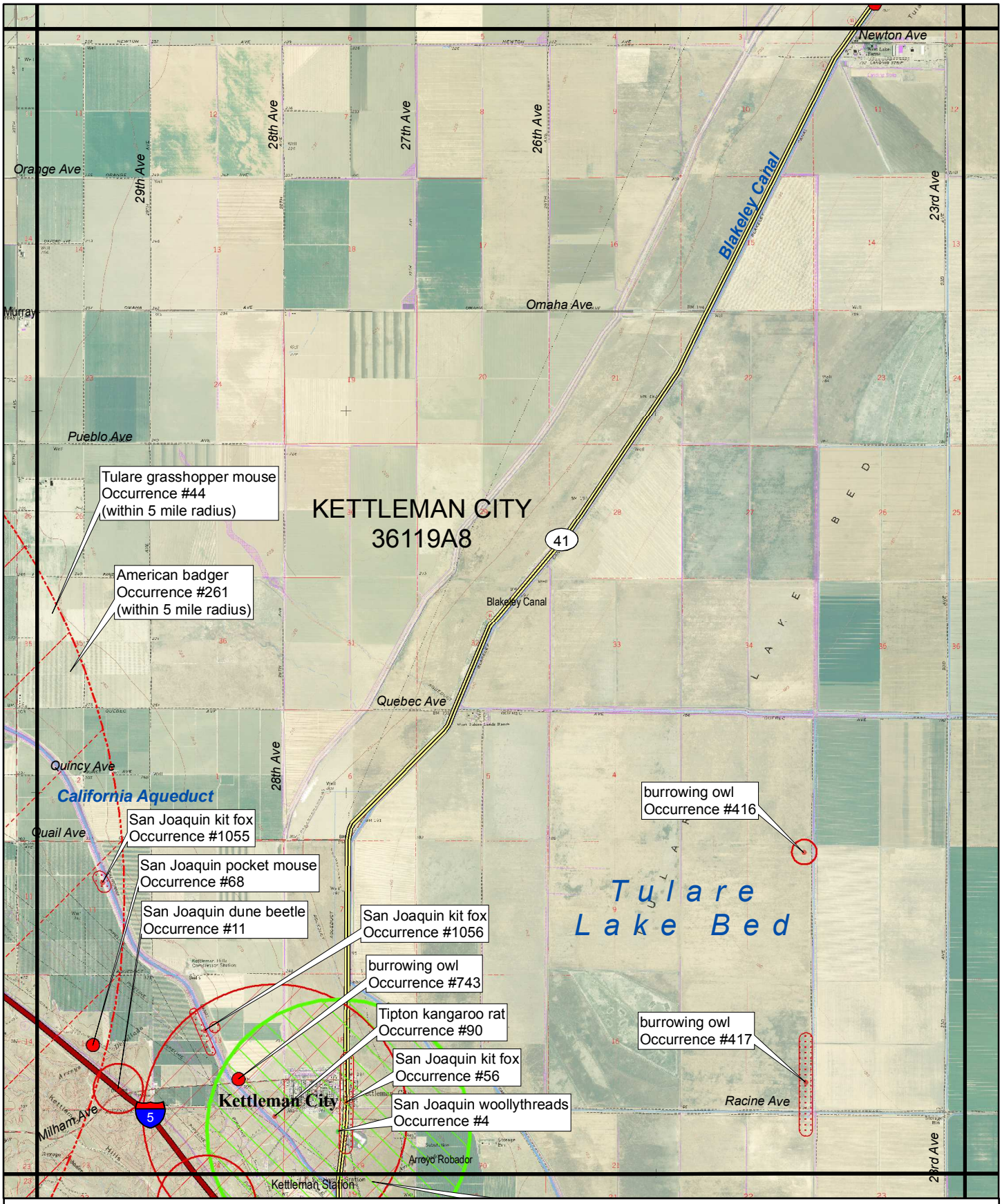


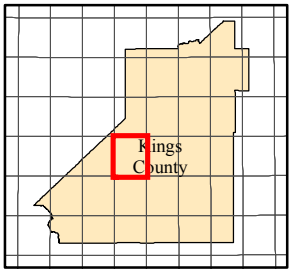
KETTLEMAN CITY (36119A8)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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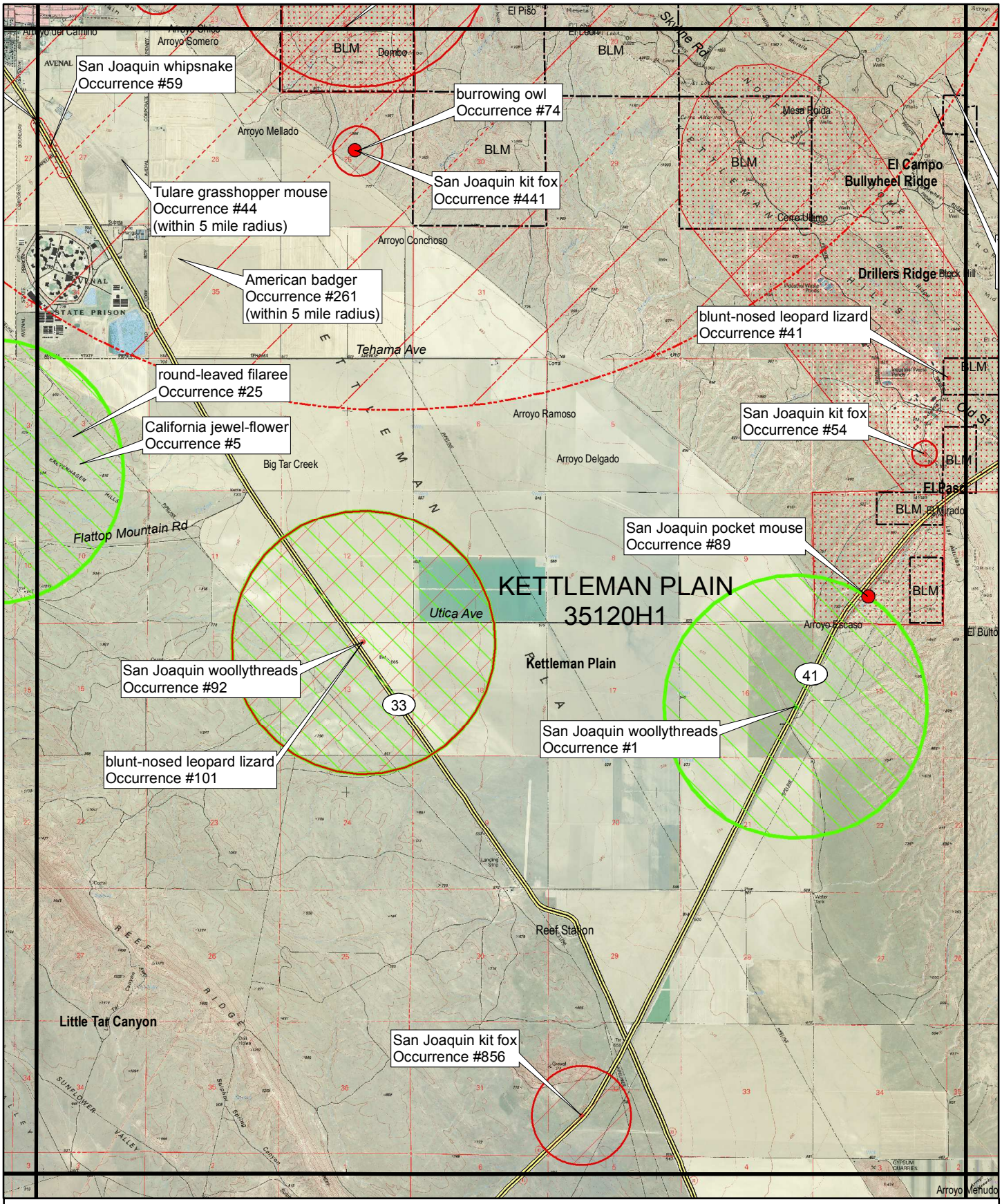


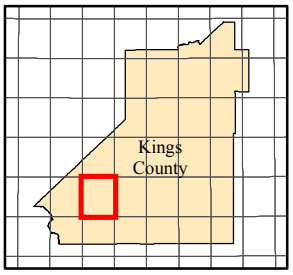
KETTLEMAN PLAIN (35120H1)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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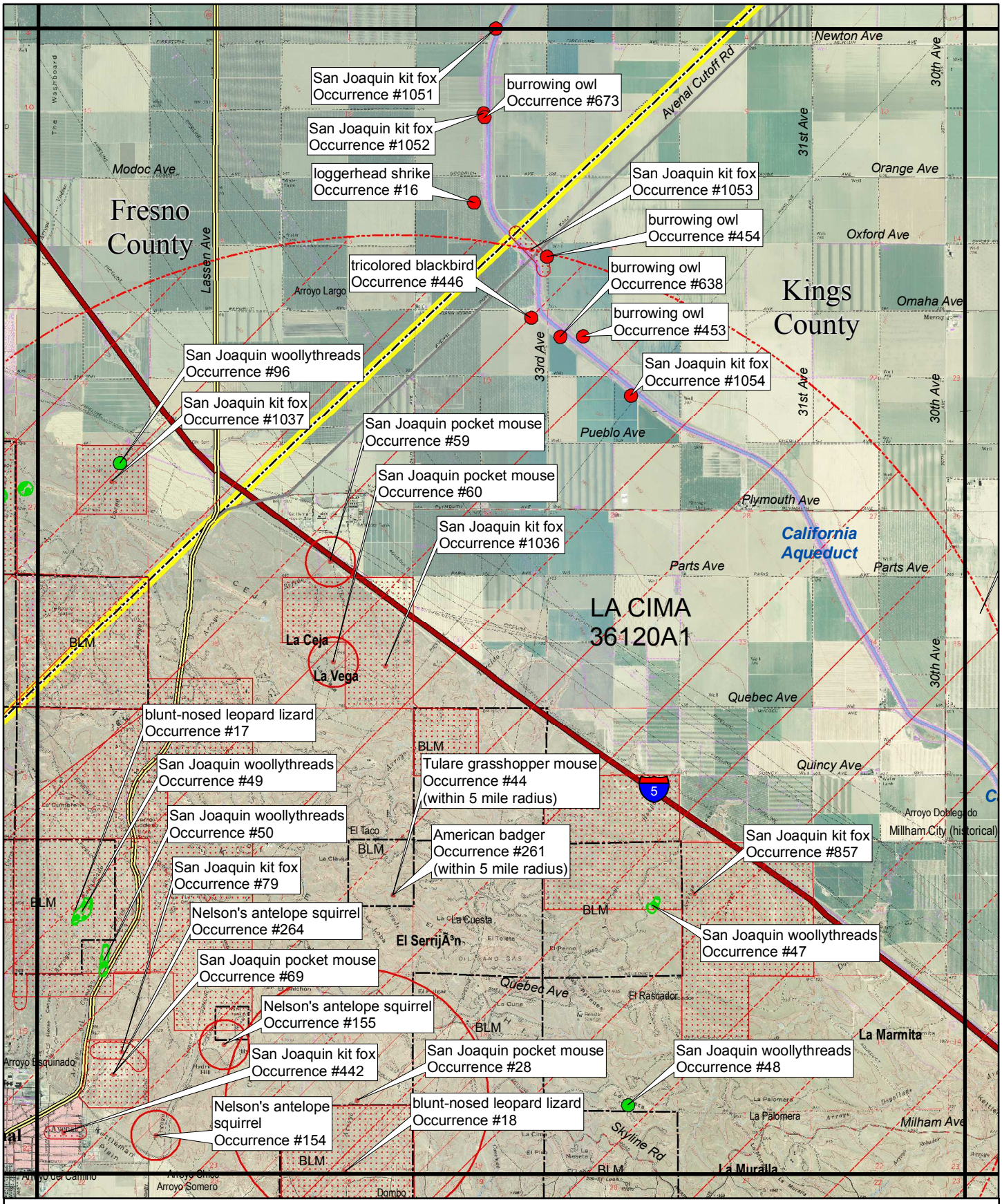
2008-07-25



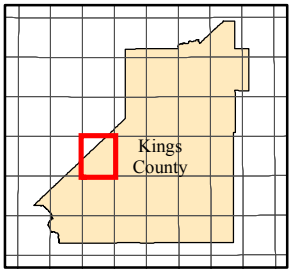
LA CIMA (36120A1)

California Natural Diversity Database (CNDDB) records

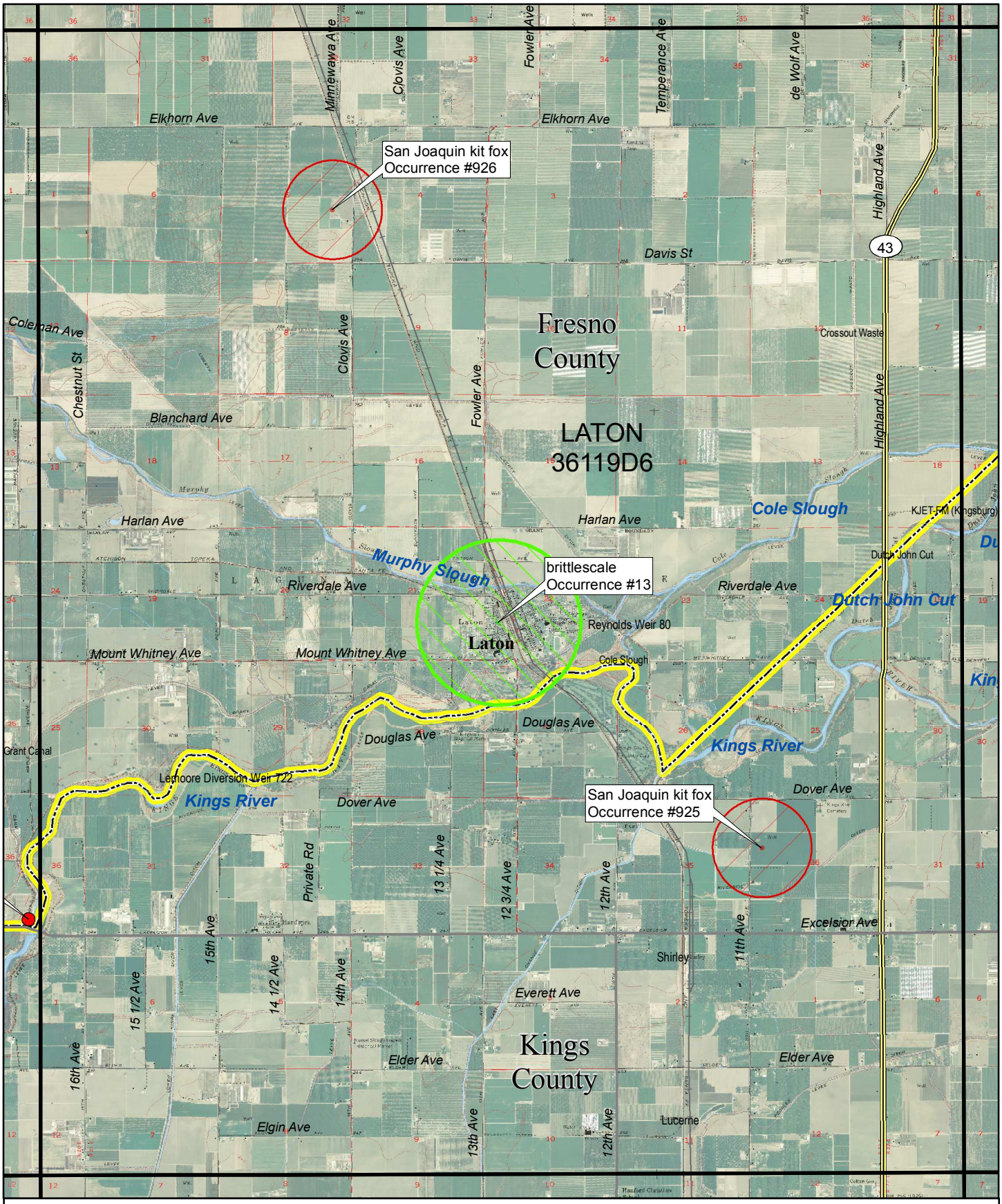
Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



sphillips@sanjoaquinvalley.org
2008-07-25



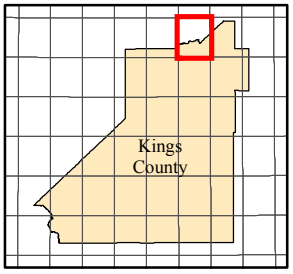
LATON (36119D6)

California Natural Diversity Database (CNDDB) records

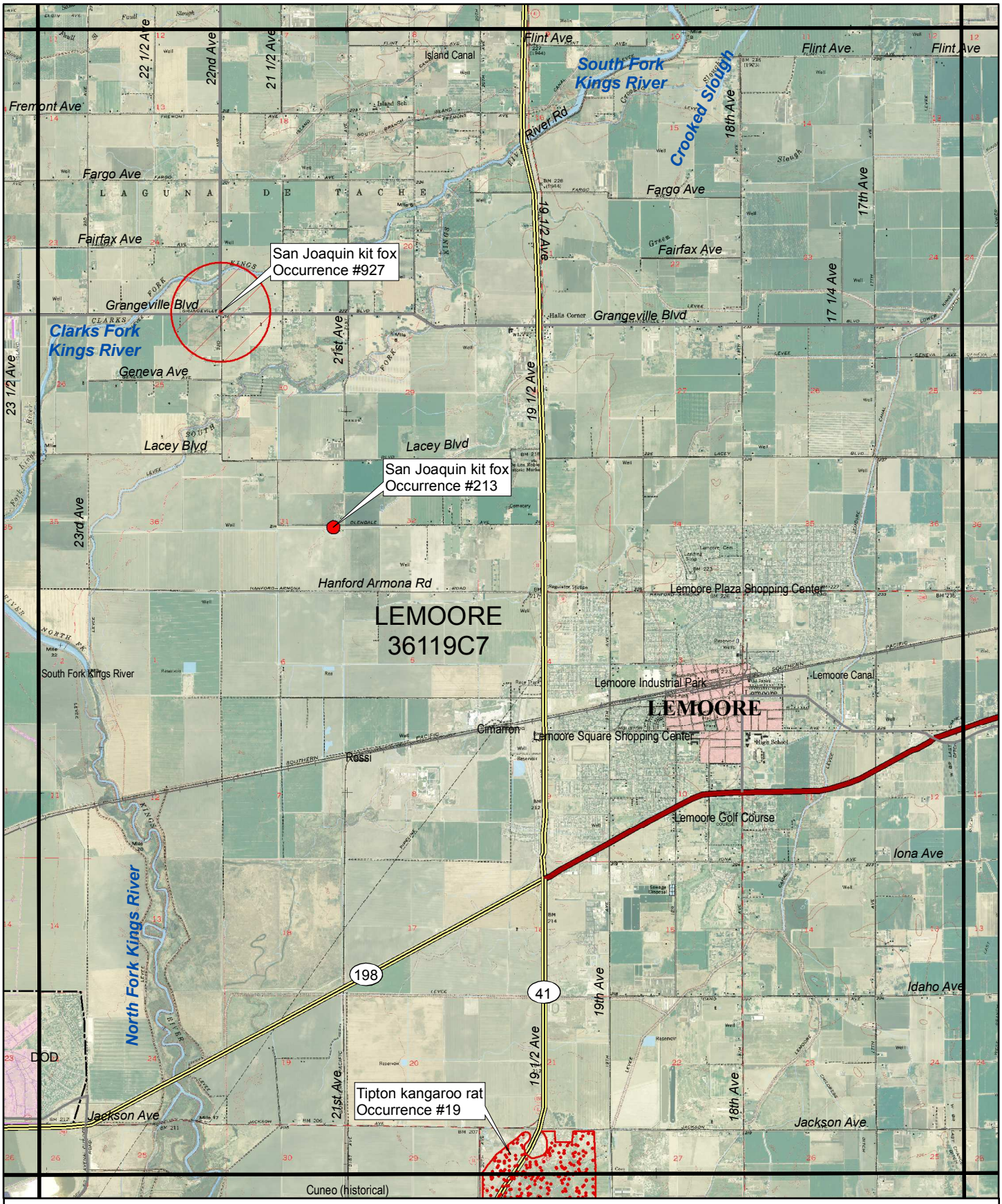
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25



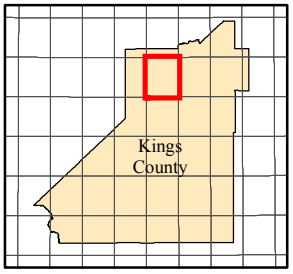
LEMOORE (36119C7)

California Natural Diversity Database (CNDDB) records

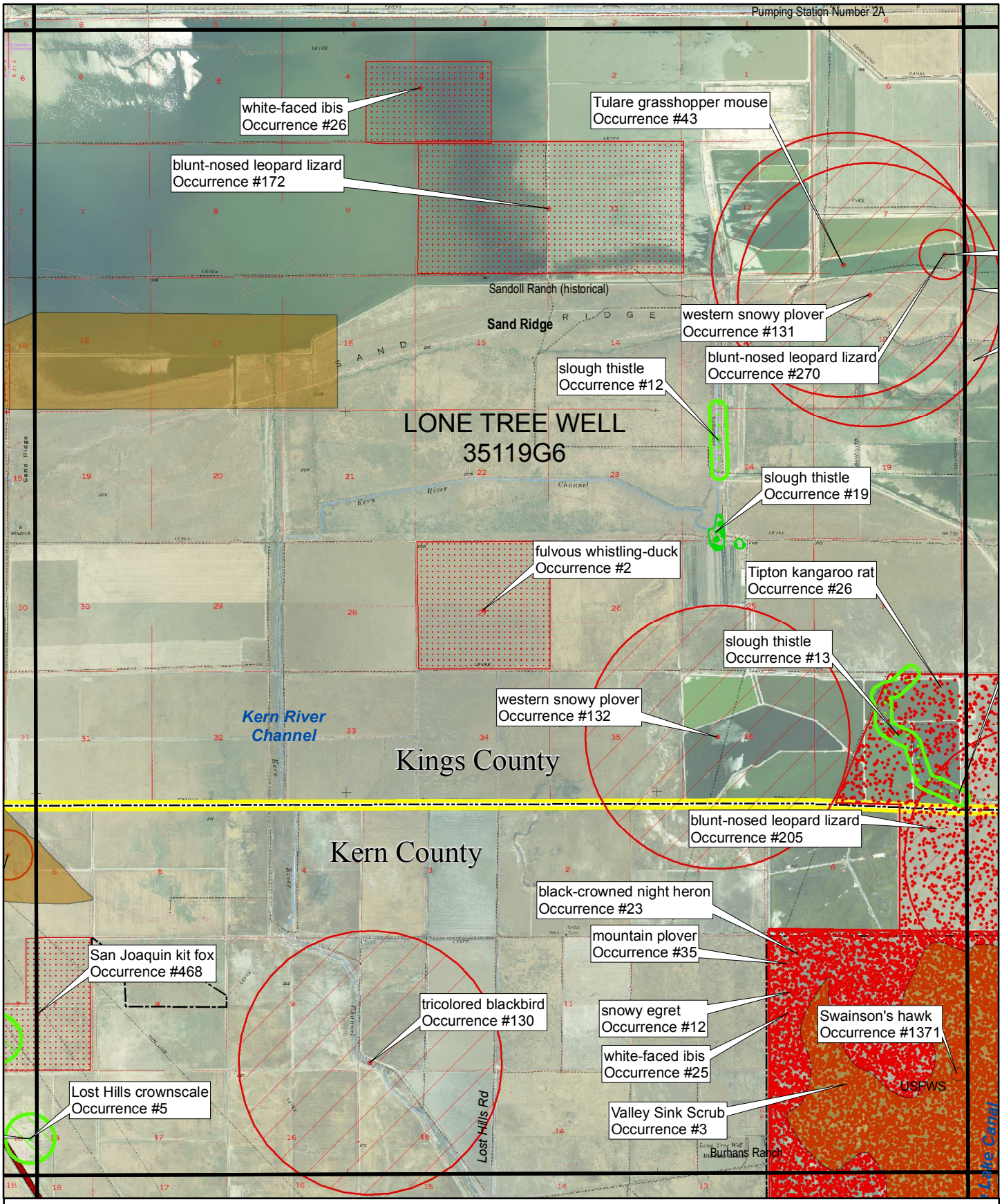
Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



sphillips@sanjoaquinvalley.org
2008-07-25



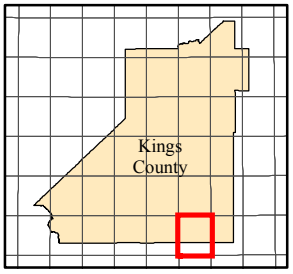
LONE TREE WELL (35119G6)

California Natural Diversity Database (CNDDB) records

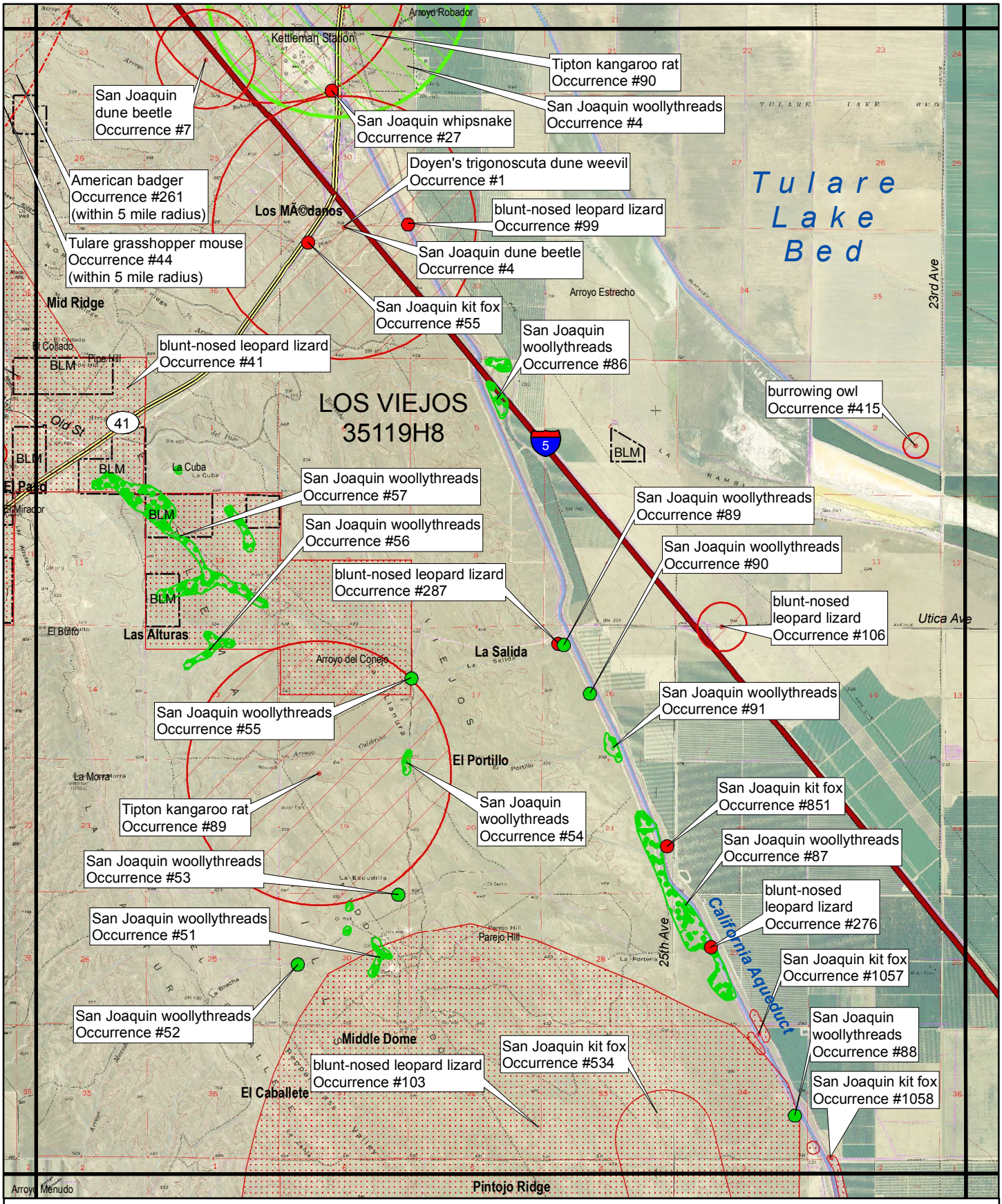
Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



sphillips@sanjoaquinvalley.org
2008-07-25



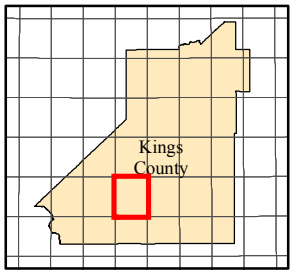
LOS VIEJOS (35119H8)

California Natural Diversity Database (CNDDB) records

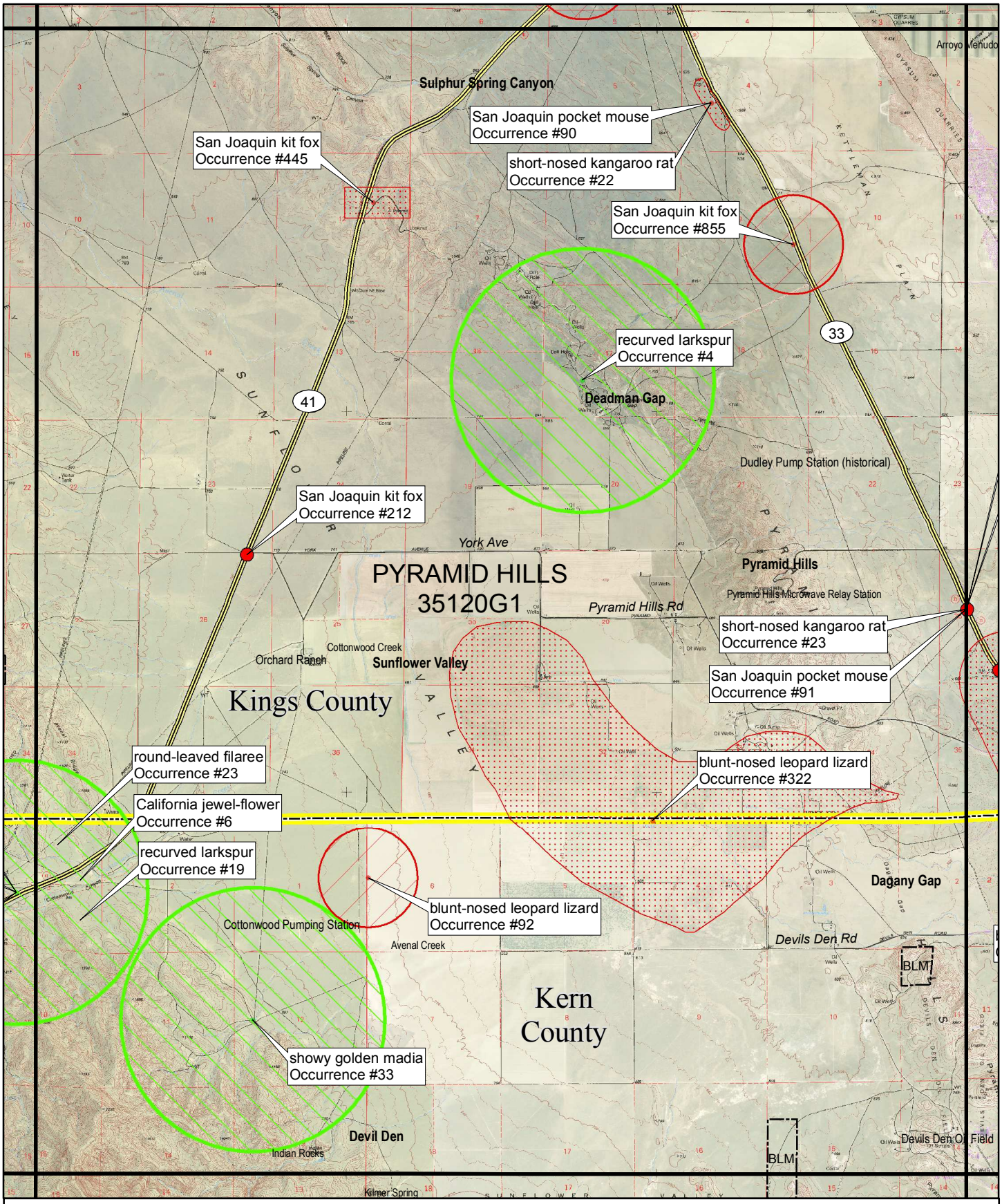
Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



sphillips@sanjoaquinvalley.org
2008-07-25



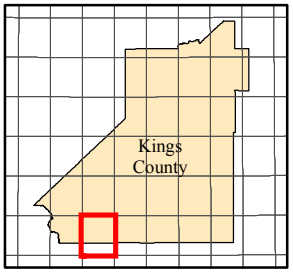
PYRAMID HILLS (35120G1)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



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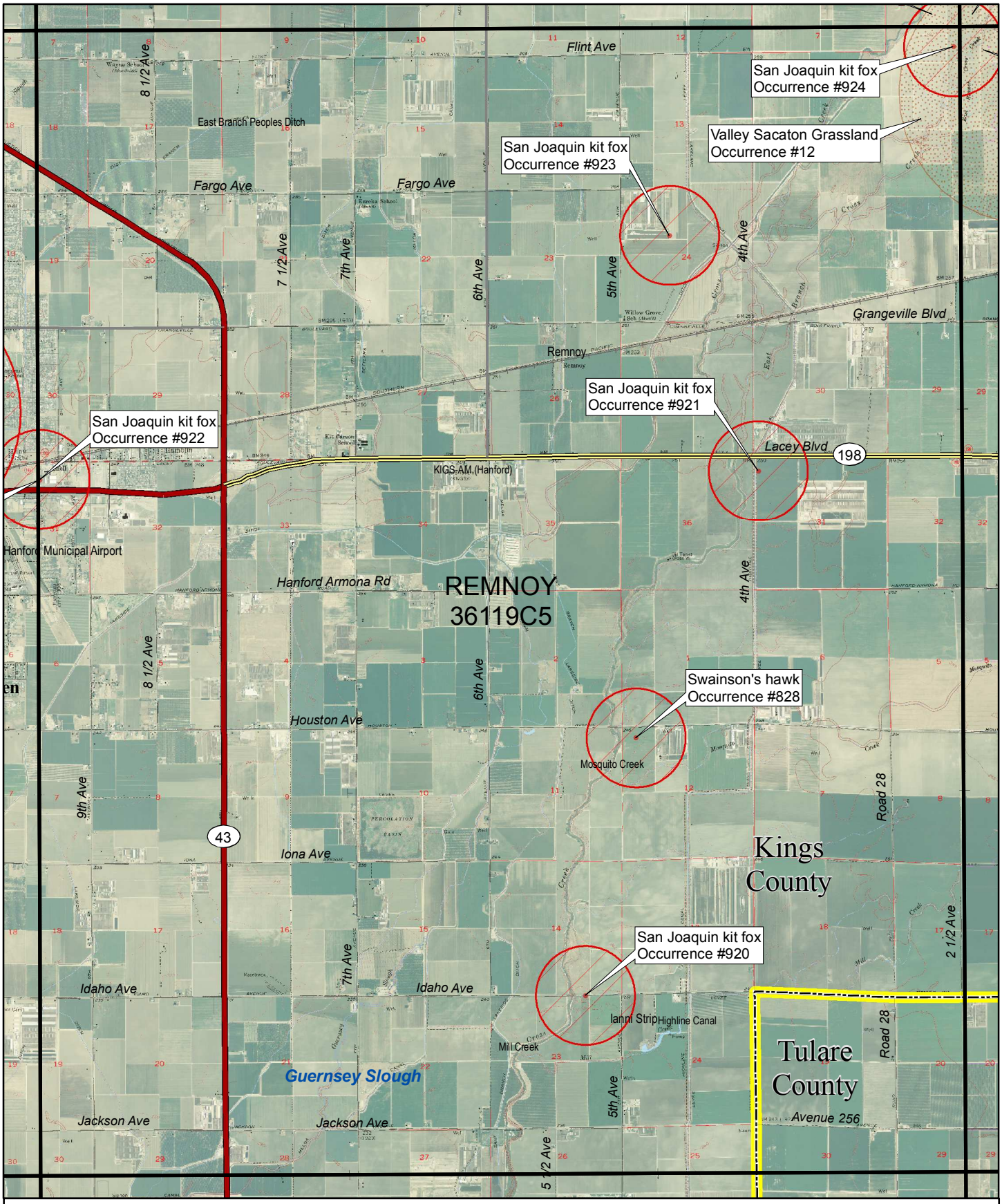
2008-07-25



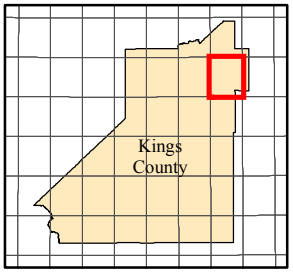
REMNOY (36119C5)

California Natural Diversity Database (CNDDB) records

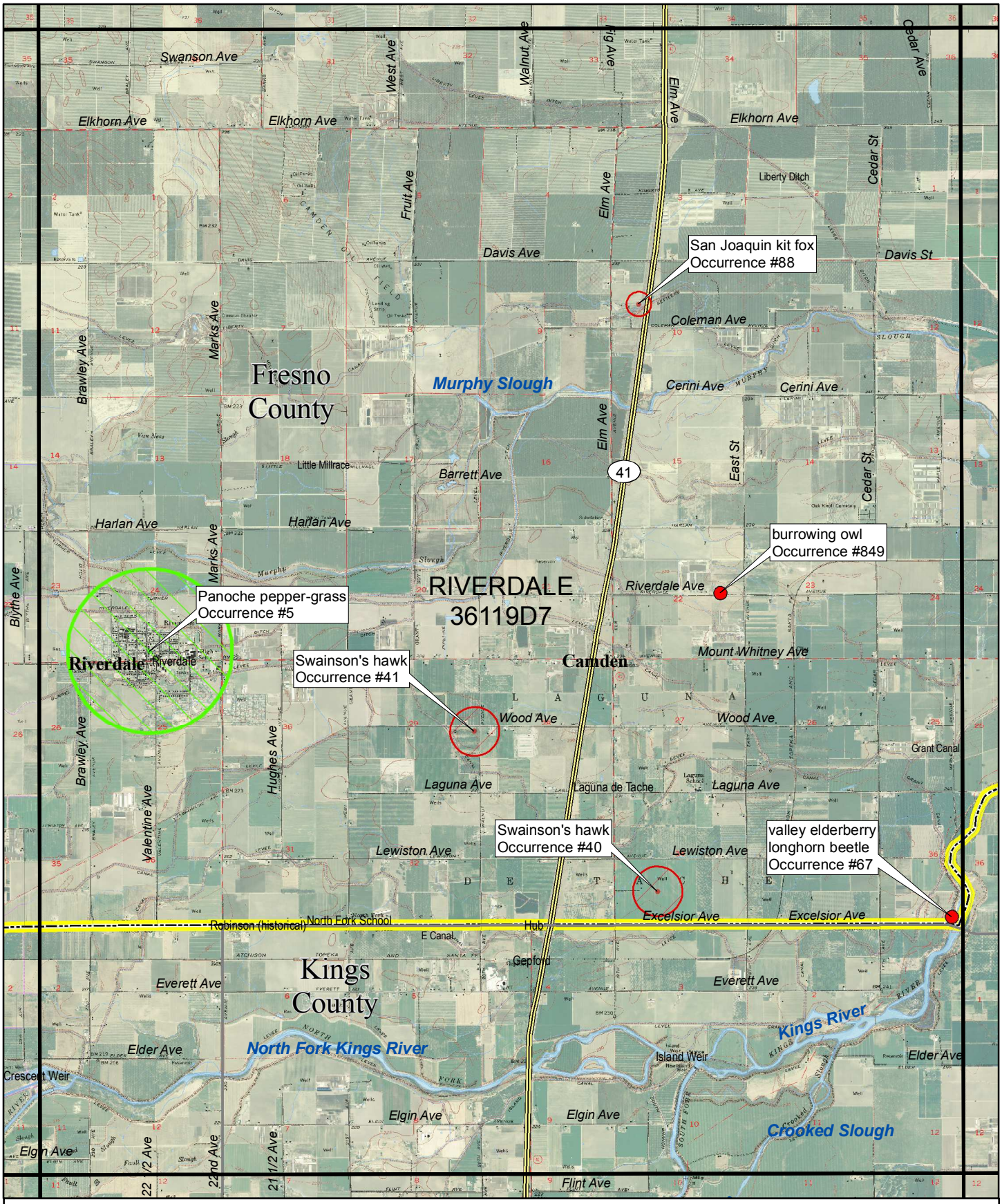
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25



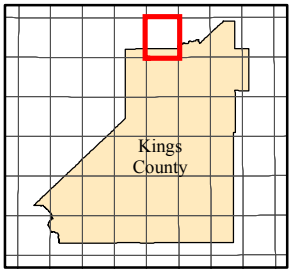
RIVERDALE (36119D7)

California Natural Diversity Database (CNDDB) records

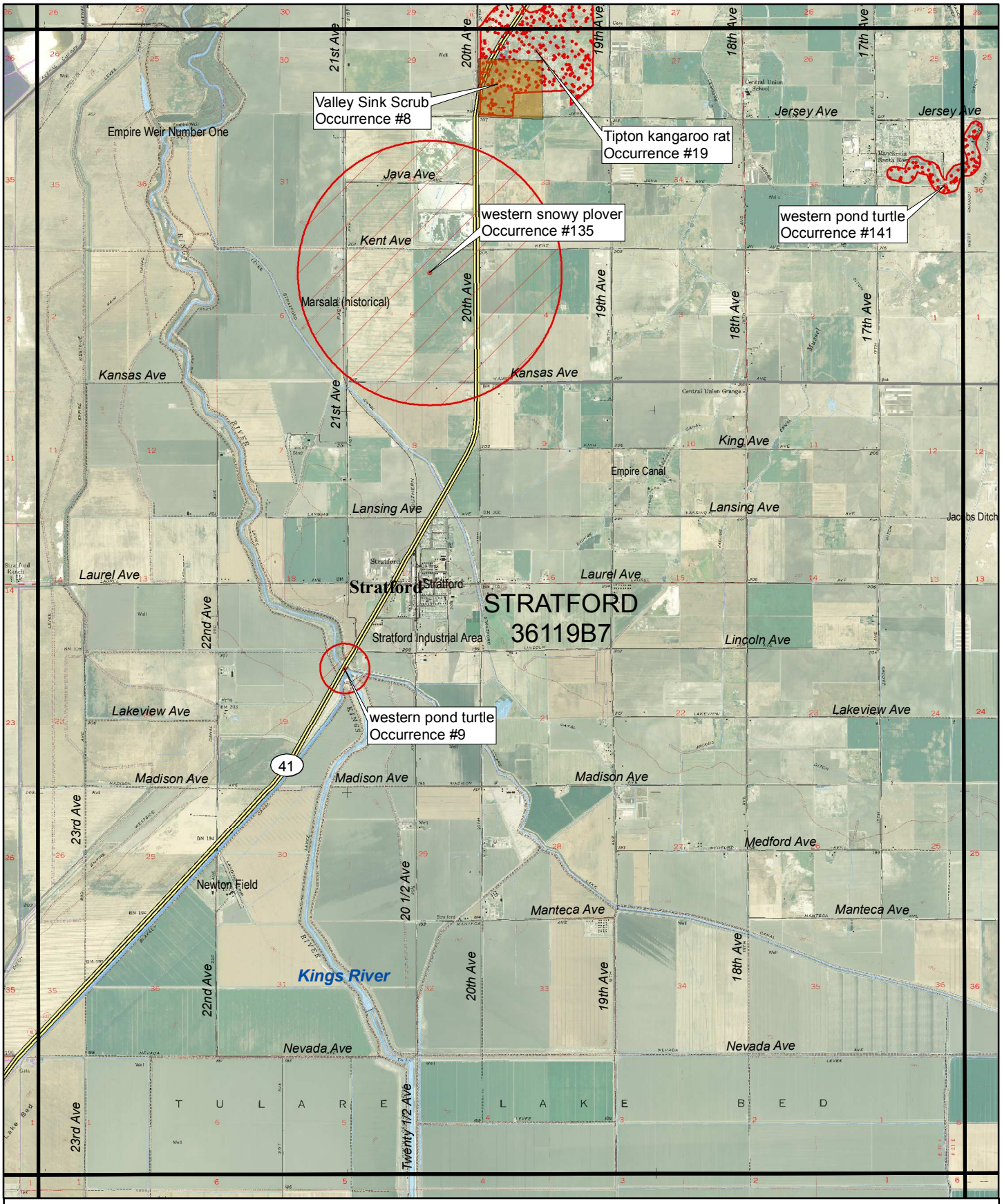
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25



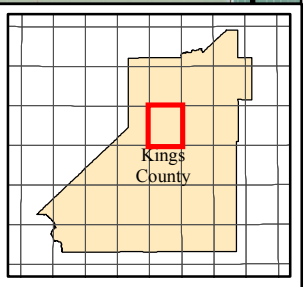
STRATFORD (36119B7)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25

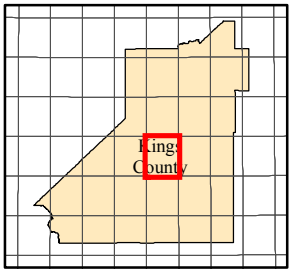
STRATFORD SE (36119A7)

California Natural Diversity Database (CNDDB) records

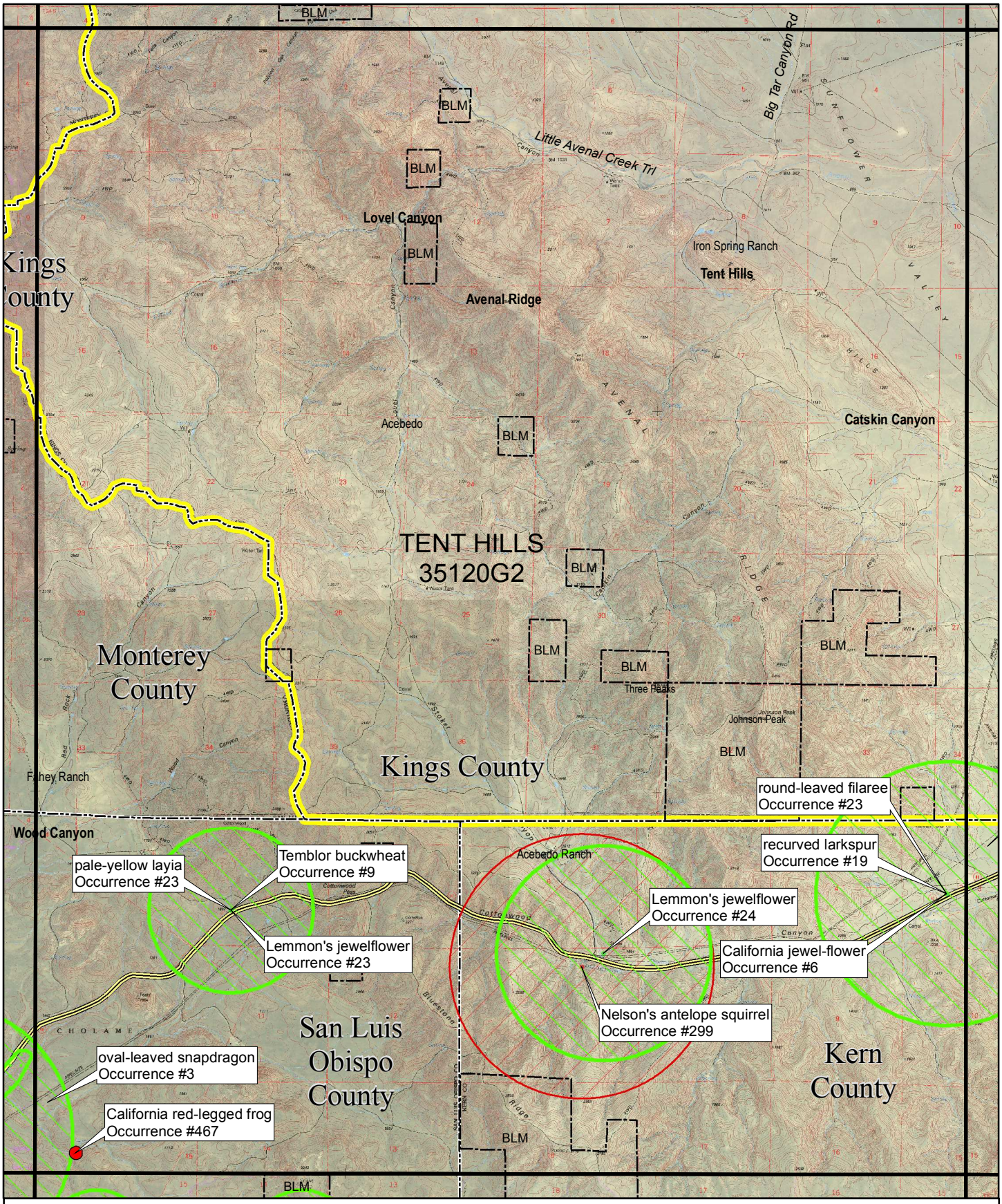
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25



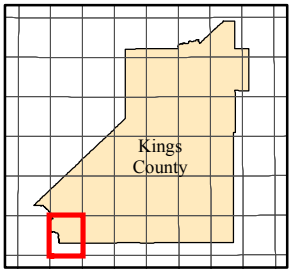
TENT HILLS (35120G2)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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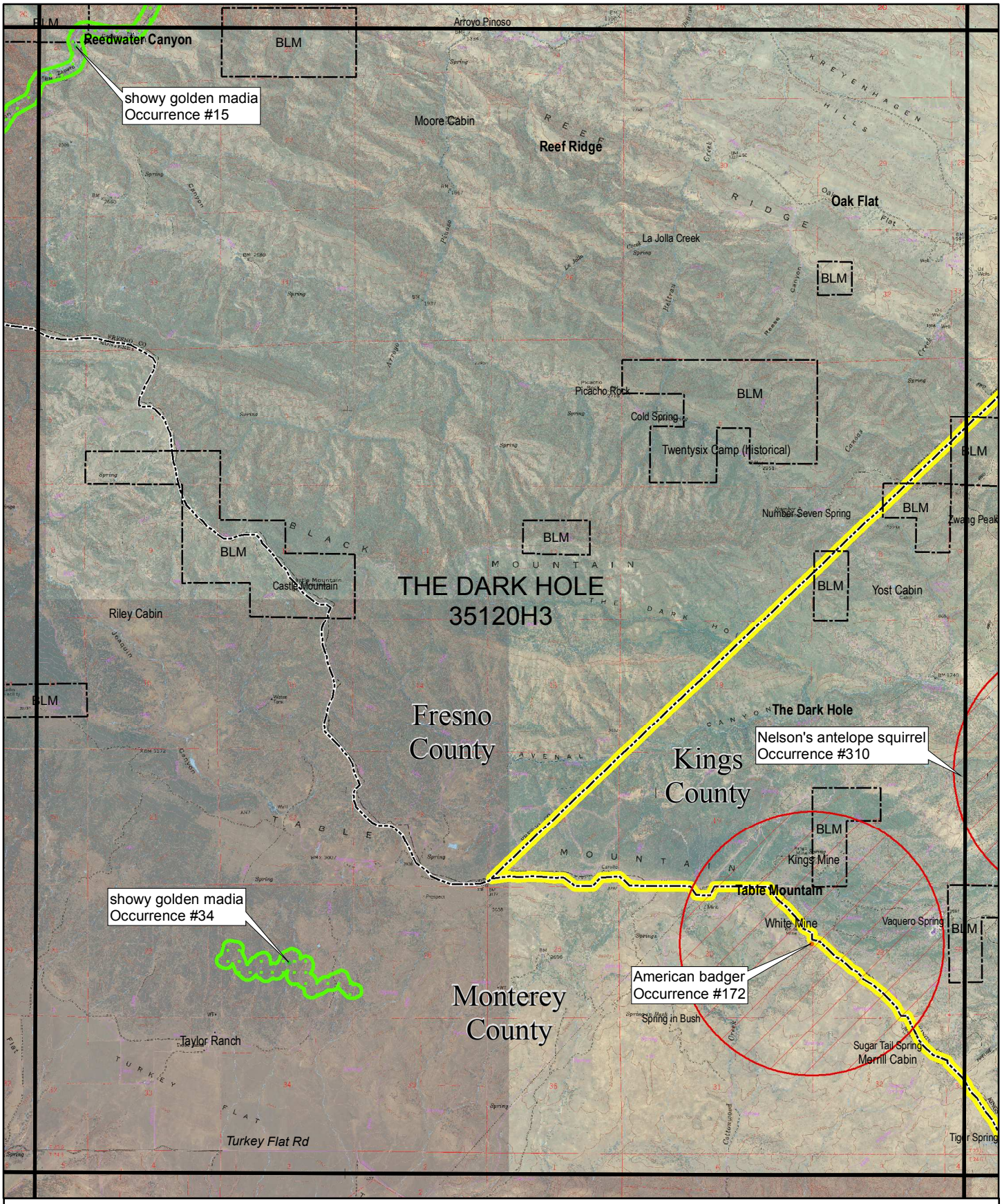
2008-07-25



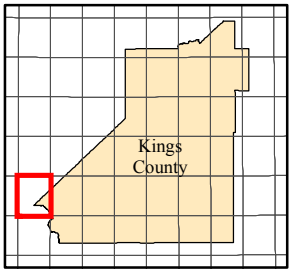
THE DARK HOLE (35120H3)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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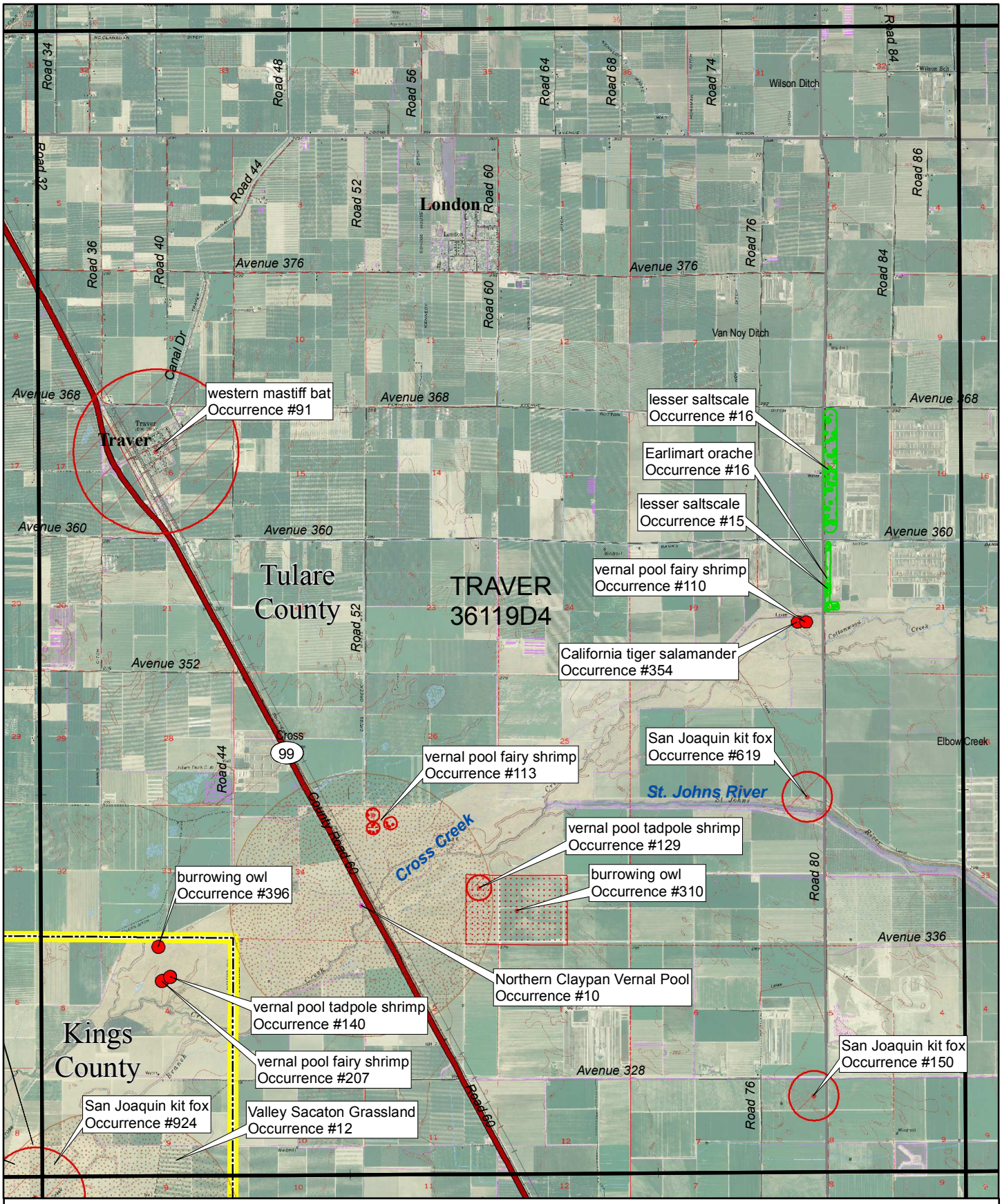

TRAVER (36119D4)

California Natural Diversity Database (CNDDB) records

Scale: 1:63,360
(1 inch equals 1 mile)

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0 0.5 1 Kilometers

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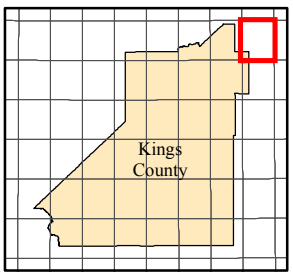
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



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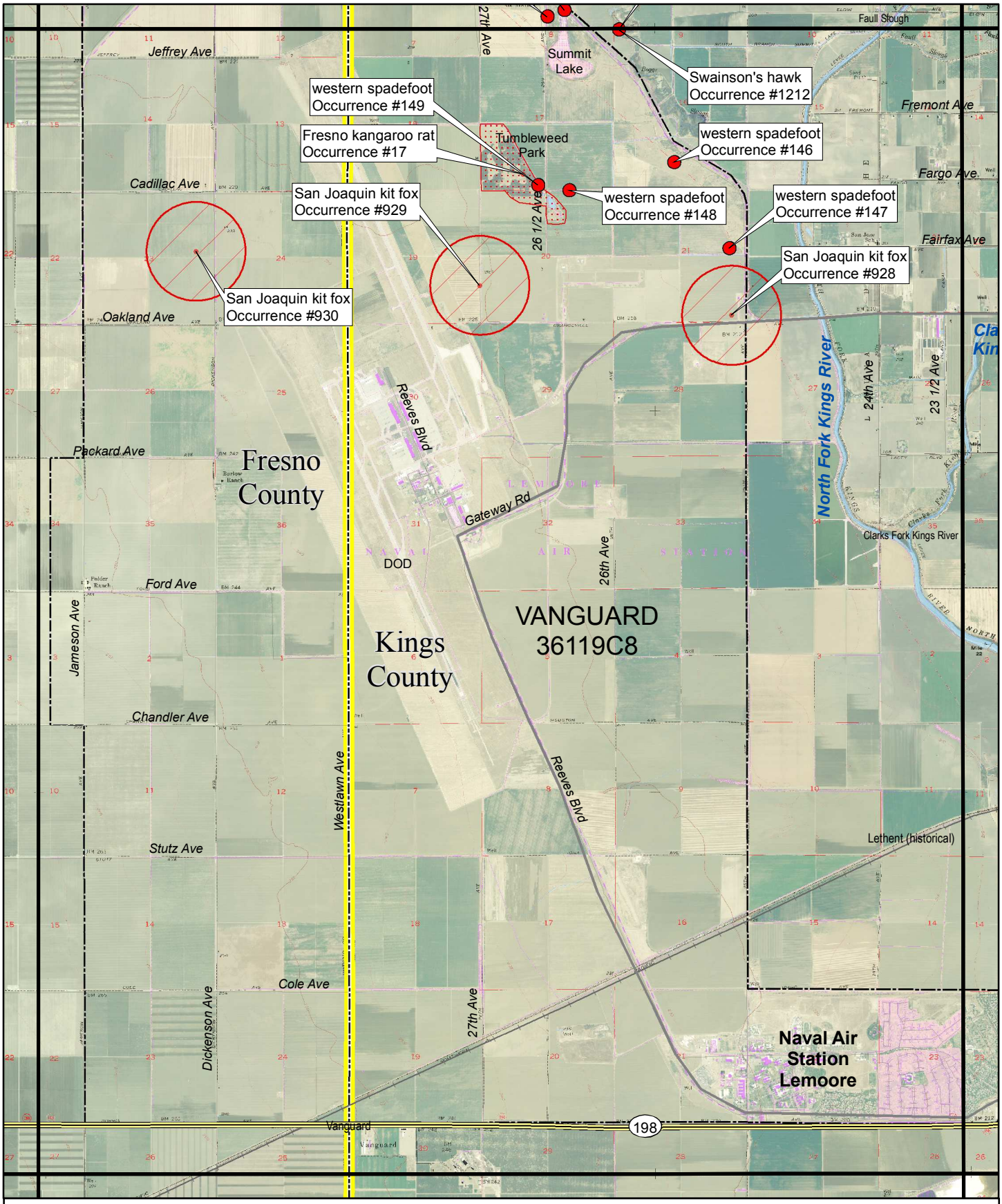

VANGUARD (36119C8)

California Natural Diversity Database (CNDDB) records

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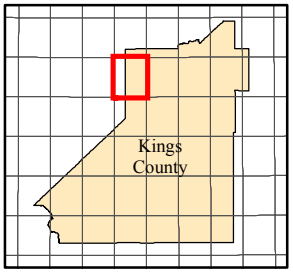
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



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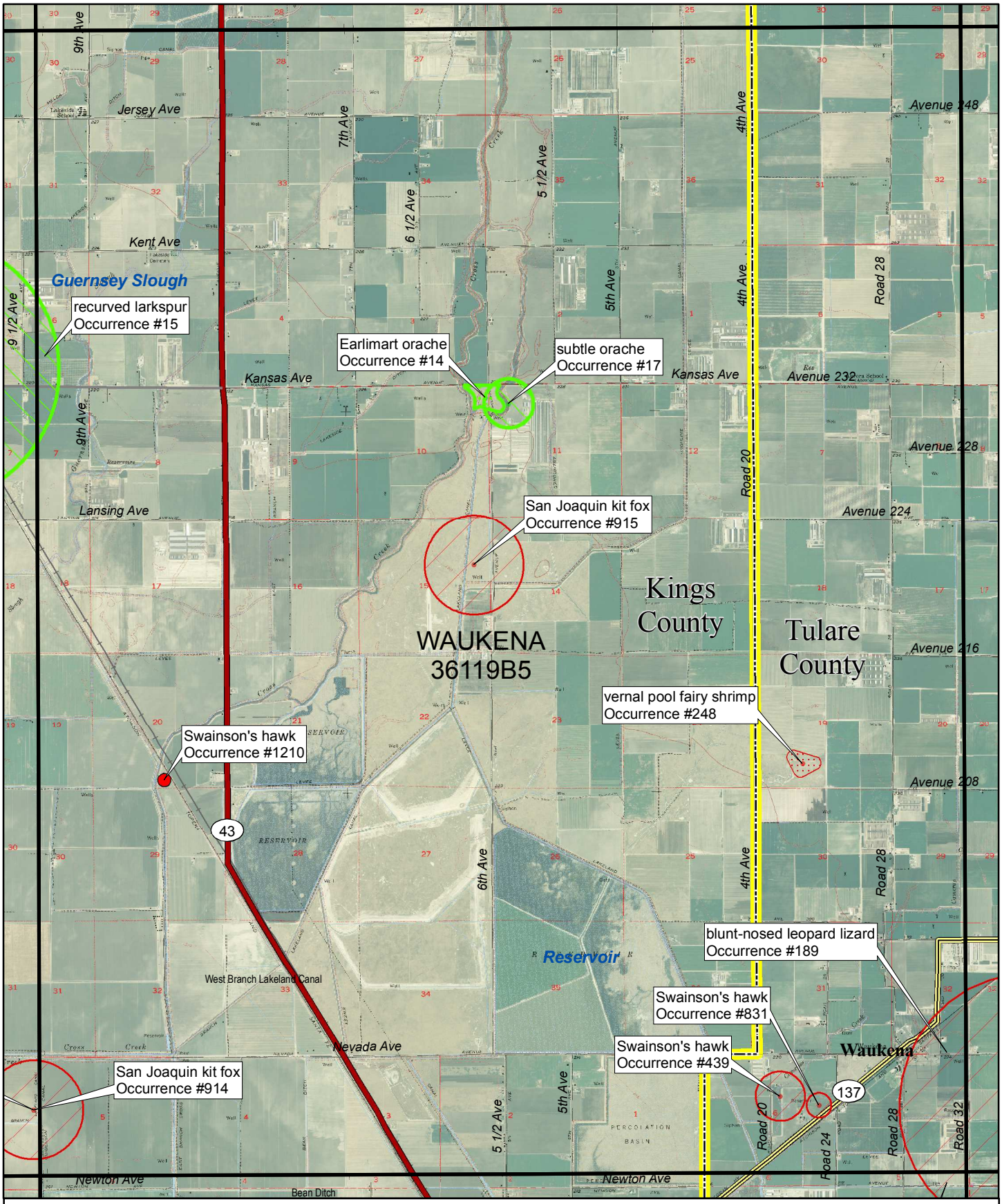


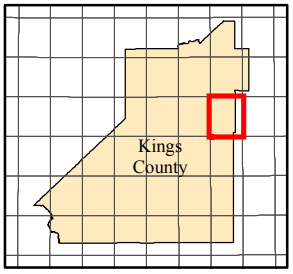
WAUKENA (36119B5)

California Natural Diversity Database (CNDDB) records

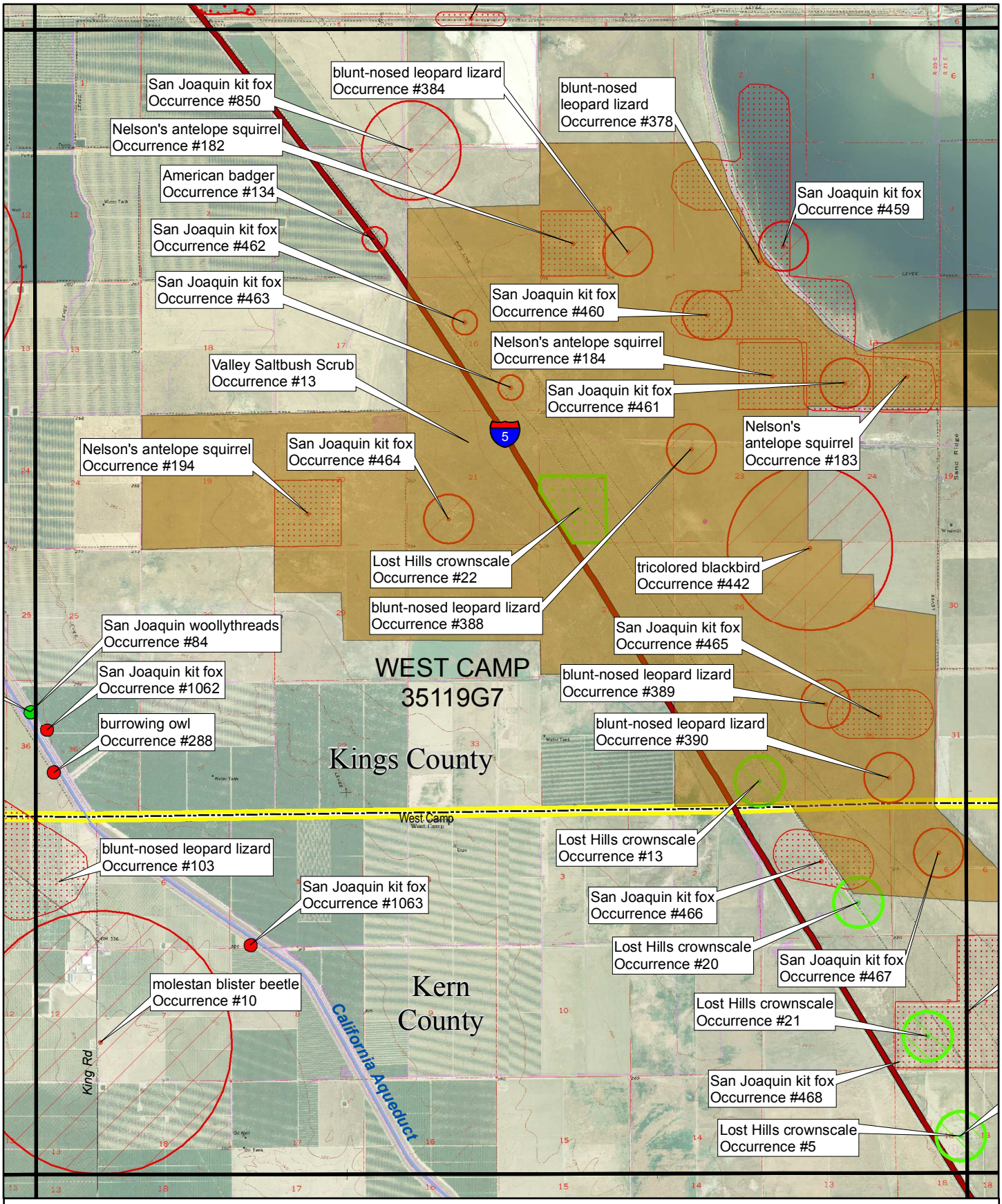
Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



sphillips@sanjoaquinvalley.org
2008-07-25



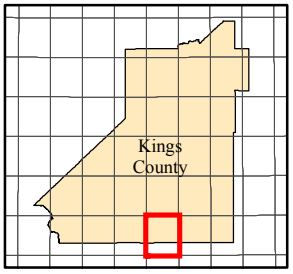
WEST CAMP (35119G7)

California Natural Diversity Database (CNDDB) records

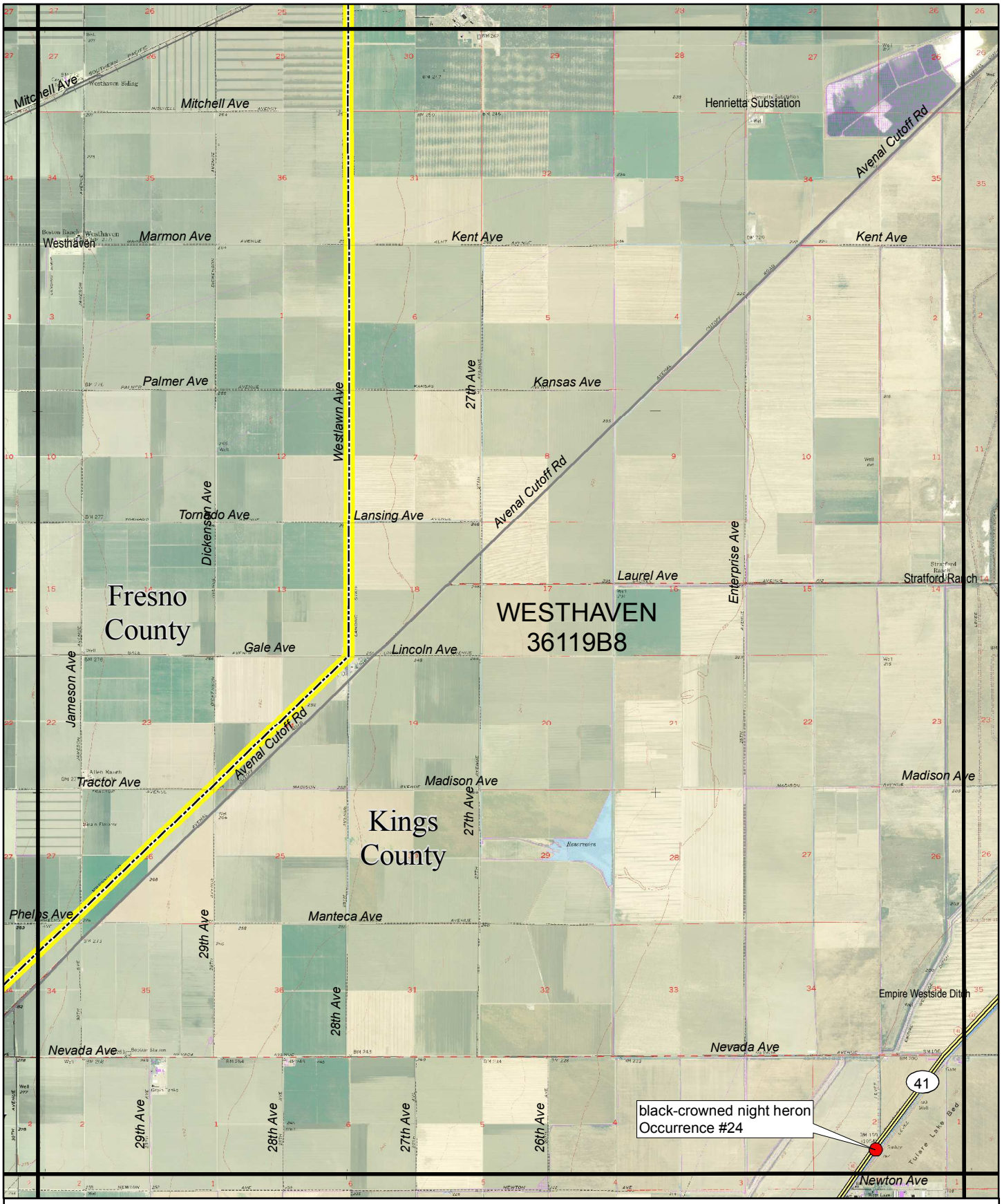
Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)



sphillips@sanjoaquinvalley.org
2008-07-25



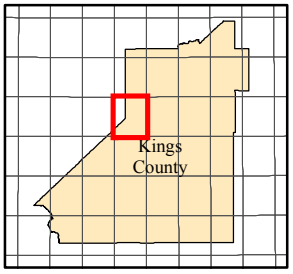
WESTHAVEN (36119B8)

California Natural Diversity Database (CNDDB) records

- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Terrestrial Community (specific)
- Terrestrial Community (non-specific)

Scale: 1:63,360
(1 inch equals 1 mile)

0 0.5 1 Miles
0 0.5 1 Kilometers



sphillips@sanjoaquinvalley.org
2008-07-25

APPENDIX B

TABLES

APPENDIX B1

Special Status Plant Species

Recorded in Kings County in the CNDDB

Special-Status Plant Species Recorded in Kings County in the CNDDB

Species	Status			Habitat Description	Bloom Period	Elevational Range (m)	Quad Map Occurrences
	Federal	State	CNPS				
Brittlescale *Atriplex depressa*	FSC	--	1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools. Alkaline or clay soils.	May-October	1-320	20
California jewelflower *Caulanthus californicus*	FT	SE	1B.2	Chenopod scrub, pinyon and juniper woodland, valley and foothill grasslands. Sandy soils.	February-May	70-1,000	1, 9, 16, 18, 24, 29
Earlimart orache *Atriplex erecticaulis*	FSC	--	1B.1	Valley and foothill grassland in southern San Joaquin valley. Alkaline soils.	August-September	40-100	31, 33
Heartscale *Atriplex cordulata*	--	--	1B.2	Chenopod scrub, valley and foothill grasslands, meadows.	April-August	1-150	10
King's gold *Twisselmannia californica*	FCS	--	1B.1	Chaparral scrub. Sub-alkaline sandy clay soil.	March	65	34
Lemmon's jewelflower *Caulanthus coulteri lemmonii*	FSC	--	1B.2	Pinyon and juniper woodland, valley and foothill grasslands.	March-May	80-1,220	9, 29
Lesser Saltscale *Atriplex miniscula*	--	--	1B.2	Chenopod scrub, playas, valley and foothill grassland.	April-August	20-100	10, 31
Lost Hills saltbush (=crownscale) *Atriplex vallicola*	FSC	--	1B.2	Chenopod scrub, valley and foothill grasslands Vernal pools in alkaline soils.	April-August	50-63	22, 34

Special-Status Plant Species Recorded in Kings County in the CNDDB							
Mason's Neststraw *Stylocline masonii*	--	--	1B.1	Chenopod scrub, pinyon-juniper woodland.	March-June	100-1200	5
Oval-leaved Snapdragon *Antirrhinum ovatum*	--	--	4.2	Chaparral, cismontane woodland, pinyon juniper woodland, valley and foothill grassland.	March-June	185-800	5, 29
Pale-yellow layia *Layia heterotricha*	FSC	--	1B.1	Cismontane woodland, pinyon and juniper woodland, valley and foothill grasslands. Alkaline or clay soils.	March-June	300-1,600	5, 9, 29
Panoche pepper-grass *Lepidium jaredii ssp.*	--	--	1B.2	Valley and foothill grasslands.	March-May	65-910	26
Recurved larkspur *Delphinium recurvatum*	FSC	--	1B.2	Chenopod scrub, cismontane woodland, valley and foothill grasslands. Alkaline soils.	March-May	3-750	2, 9, 11, 24, 29, 33
Round-leaved Filaree *California macrophyllum*	--	--	1B.1	Cismontane woodland, valley and foothill grasslands.	March-May	15-1200	9, 18, 24, 29
San Joaquin Woolythreads *Monolopia congdonii*	FE	--	1B.2	Chenopod scrub and valley and foothill grasslands.	April-May	200-2700	1, 2, 16, 17, 18, 19, 23, 34
Showy madia *Madia radiate*	FSC	--	1B.1	Cismontane woodland, valley and foothill grasslands.	March-May	25-900	5, 9, 24, 30

Special-Status Plant Species Recorded in Kings County in the CNDDB							
Slough thistle *Cirsium crassicaule*	FSC	--	1B.1	Chenopod scrub, riparian scrub. Marshes and sloughs.	May-August	3-1,000	13, 22
Subtle orache *Atriplex subtillis*	FSC	--	1B.2	Valley and foothill grasslands.	June-October	40-100	10, 33
Temblor Buckwheat *Eriogonum temblorense*	--	--	1B.2	Valley and foothill grasslands.	March-June	100-300	29

ACRONYM / CODE PAGE

(Note: These are the standard acronyms used by the resource and regulatory agencies to denote endangerment of a species.)

Federal Status

FE	Listed as endangered under the Federal Endangered Species Act
FT	Listed as threatened under the Federal Endangered Species Act
PE	Proposed for listing as endangered under the Federal Endangered Species Act
PT	Proposed for listing as threatened under the Federal Endangered Species Act
FC	Candidate species for listing under the Federal Endangered Species Act
FSC	Species of concern as identified by the U.S. Fish and Wildlife Service

State Status

SE	Listed as endangered under the California Endangered Species Act
ST	Listed as threatened under the California Endangered Species Act
SSC	Species of special concern as identified by the California Department of Fish and Game
Rare	Species identified as rare by the California Department of Fish and Game

California Native Plant Society Status (CNPS 2008)

1A	Plant species that are presumed extinct in California
1B	Plant species that are rare, threatened, or endangered in California and elsewhere.
2	Plant species that are rare, threatened, or endangered in California, but are more common elsewhere
3	Plant species that lack the necessary information to assign them to a listing status
4	Plant species that have a limited distribution or that are infrequent throughout a broader area in California

Threat Extension Codes: .1 – Seriously endangered in CA. .2 – Fairly endangered in CA. .3 - Not very endangered in CA.

Quadrangle Maps in Kings County

Avenal (1), Avenal Gap (2), Burrel (3), Burris Park (4), Cholame Valley (5), Corcoran (6), Dudley Ridge (7), El Rico Ranch (8), Garza Peak (9), Goshen (10), Guernsey (11), Hacienda Ranch NW (12), Hacienda Ranch (13), Hacienda Ranch NE (14), Hanford (15), Huron (16), Kettleman City (17), Kettlemen Plain (18), La Cima (19), Laton (20), Lemoore (21), Lone Tree Well (22), Los Viejos (23), Pyramid Hills (24), Remnoy (25), Riverdale (26) Stratford SE (27), Stratford (28), Tent Hills (29), The Dark Hole (30), Traver (31), Vanguard (32), Waukena (33), West Camp (34), and Westhaven (35).

APPENDIX B2

Special Status Wildlife Species

Recorded in Kings County in the CNDDB

Special-Status Wildlife Species Recorded in Kings County in the CNNDB

Species	Status		Habitat Association	Quad Map Occurrences
	Federal	State		
Invertebrates				
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	--	Endemic to the grasslands of the Central Valley, Central Coast Mountains, and South Coast Mountains of California, in static rain-filled pools. Inhabits small, clear-water sandstone-depression pools and grassed swales, earth slumps or basalt-flow depression pools.	4, 10, 31, 33
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	--	Inhabits seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions.	4, 31
San Joaquin tiger beetle *Cicindela tranquebarica* ssp.	FSC	--	Distribution is limited to vernal pools, alkali wetlands and scalds, and nearby open areas from Merced to Fresno County (possibly Kings County).	11
San Joaquin dune beetle *Coelus gracilis*	FSC	--	Inhabits sites with sandy substrates in fossil dunes along the western edge of the San Joaquin Valley.	1, 17, 23
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	--	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). Prefers to lay eggs in elderberry stems 2 to 8 inches in diameter; some preference shown for "stressed" elderberries.	26
Consevancy Fairy Shirmp *Branchinecta conservatio*	FE	--	Endemic to the grasslands of the northern two-thirds of the Central Valley. Found in large, turbid vernal pools and vernal swales.	Not Recorded in CNDDB in Kings County*
Doyen's trigonoscuta dune weevil *Trigonoscuta doyeni*	FSC	--	Inhabits fossil dunes along the western edge of the San Joaquin Valley.	23
Molestan blister beetle *Lytta molesta*	FSC	--	Inhabits the Central Valley of California from Contra Costa to Kern and Tulare counties. Flowers and foliage of various plants in grasslands.	2, 34

Special-Status Wildlife Species Recorded in Kings County in the CNNDB				
Fish				
Delta smelt *Hypomesus transpacificus*	FT	ST	This species inhabits the Sacramento-San Joaquin Delta and seasonally inhabits the Suisun Bay, Carquinez Strait and San Pablo Bay. This species is seldom found at salinities above 10 PPT, and is most often found at salinities below 2 PPT. Spawning appears to occur in side channels and sloughs in the middle reaches of the Delta.	Not Recorded in CNDDB in Kings County*
Amphibians				
California tiger salamander *Ambystoma californiense*	FT	SSC	Annual grasslands and grassy understory of valley-foothill hardwood habitats in central and northern California. Requires underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources for breeding.	4, 5, 31
Western spadefoot toad *Spea* (=*Scaphoipus*) *hammondii*	FSC	SSC	Occurs primarily in grassland environments, but can also be found in valley-foothill hardwood woodlands. Shallow, temporary ponds are used for breeding and egg-laying.	3, 4, 5, 10, 16, 32
California red-legged frog *Rana aurora draytonii*	FT	SSC	Lowlands and foothills in a variety of aquatic, riparian and upland environments near permanent sources of water.	29
Reptiles				
Western pond turtle *Clemmys marmorata*	FSC	SSC	Includes both subspecies (*C. m. pallida* and *C. m. marmorata*). Aquatic habitat of ponds, marshes, streams, and irrigation ditches that have abundant emergent or riparian vegetation.	11, 28
Blunt-nosed leopard lizard *Gambelia sila*	FE	SE/CFP	Associated with *Atriplex* and other alkali sink shrubs. Densities of the species may be correlated with high number of unused small mammal burrows.	1, 2, 6, 7, 11, 13, 18, 19, 22, 23, 24, 33, 34
San Joaquin coachwhip (=whipsnake) *Masticophis flagellum ruddock*	FSC	SSC	Inhabits open, dry environments with little or no tree cover. Found in valley grassland and saltbrush scrub in the San Joaquin Valley. Mammal burrows are used for refuge and oviposition sites.	9, 16, 18, 23
Giant garter snake *Thamnophis gigas*	FT	ST	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches.	3

Special-Status Wildlife Species Recorded in Kings County in the CNNDB				
Birds				
Snowy egret *Egretta thula*	MB	--	Inhabits fresh and saline emergent wetlands coastal estuaries, ponds, slow-moving rivers, irrigation ditches and wet fields.	13, 22
White faced ibis *Plegadis chihi*	FSC/MN BMC	SSC	Breeds in dense, fresh emergent wetlands; however, this species has declined in California and no longer breeds regularly. Fairly widespread during migration, foraging in fresh emergent wetlands, wet meadows and irrigated or flooded pastures and croplands.	13, 14, 22
California condor *Gymnogyps californianus*	FE	SE/CFP	Requires vast expanses of open savannah, grasslands, and foothill chaparral with cliffs, large trees and snags for roosting and nesting.	Not Recorded in CNDDB in Kings County*
Golden eagle *Aquila chrysaetos*	--	CFP	Found in annual grassland to above timberline forest habitats. Favors grass/forb, shrub/sapling, and open-canopied young woodlands of blue oak. Requires cliffs or large live or dead trees for nesting.	14
Swainson's hawk *Buteo swainsoni* (nesting)	--	ST	Breeds in stands of sparse juniper-sage flats, riparian areas and in oak savannahs. Requires adjacent suitable foraging habit such as grasslands, alfalfa or grain fields supporting rodent populations.	3, 6, 10, 11, 13, 16, 22, 25, 26, 32, 33
Prairie falcon *Falco mexicanus*	--	SSC	Ranges from annual grasslands through alpine meadows. Primarily associated with perennial grasslands, lodgeole pine of varying canopy closures, and alpine meadows. Requires open terrain for foraging and cliffs for nesting	9, 24, 29, 30
Mountain plover *Charadrius montanus*	FPT	SSC	Short grass plains, low rolling grass hills, freshly plowed agricultural fields and newly sprouting grain fields. Often associated with short vegetation and bare ground.	13, 22
Western snowy plover *Charadrius alexandrinus nivosus*	FT	SSC	Beaches and dry mud or salt falts; sand margins of rivers, lakes, and ponds.	7, 13, 14, 22, 28

Special-Status Wildlife Species Recorded in Kings County in the CNNDB				
Loggerhead shrike *Lanius ludovicianus*	FSC	SSC	Inhabits open areas with sparse shrubs, trees and other perches.	19
Tricolored blackbird *Agelaius tricolor*	FSC	SSC	Inhabits dense cattail marshes, marshy meadows and rangeland. A highly colonial species, it is most numerous in the Central Valley and the vicinity of California.	3, 6, 7, 8, 19, 22, 34
Black-crowned Night Heron *Nycticorax nycticorax*	--	--	Colonial nester, usually in trees and occasionally in tule patches.	13, 22, 35
Merlin *Falco columbarius*	--	SSC	Seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands and deserts, farms and ranches.	16
Fulvus Whistling-duck *Dendrocygna bicolor*	--	SSC	Fresh water marshes and tule patches	13, 22
Western burrowing owl *Athene cunicularia hypugaea*	FSC	SSC	Burrow sites occur in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. A subterranean nester dependent upon burrowing mammals, most notably, the California ground squirrel.	1, 2, 4, 6, 13, 14, 16, 17, 18, 19, 23, 26, 31, 34
Mammals				
Western mastiff-bat *Eumops perotis californicus*	--	SSC	This species utilizes a wide range of open habitats including coastal scrub, annual grasslands and conifer woodlands. Roosts in or on buildings, crevices in cliffs, trees and in tunnels.	31
San Joaquin (=Nelson's) antelope squirrel *Ammospermophilus nelsoni*	FSC	ST	This species inhabits the arid grassland, shrubland and alkali sink habitats of the San Joaquin Valley and adjacent foothills.	2, 9, 16, 19, 29, 30, 34
Giant kangaroo rat *Dipodomys ingens*	FE	SE	Prefers fine sandy loam with sparse vegetation in native annual grasslands occurring along the southwestern edge of the San Joaquin Valley, to southwestern Kern County and northern Santa Barbara County.	2
Short-nosed kangaroo rat *Dipodomys nitratoides brevinasis*	FSC	--	Inhabits grasslands with scattered shrubs, and desert-shrub associations on powdery soils.	2, 24

Special-Status Wildlife Species Recorded in Kings County in the CNNDB				
Fresno kangaroo rat *Dipodomys nitratoides exilis*	FE	SE	An inhabitant of alkali-sink open grassland environments in western Fresno County. Bare alkaline clay-based soils subject to seasonal inundation with more friable soil mounds around shrubs and grasses.	32
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	FE	SE	Occurs in the arid-land (uncultivated) communities of the Tulare Basin valley floor. They occupy alluvial fan and floodplain soils, ranging from fine sands to clay-sized particles. Woody shrubs are usually sparsely scattered with low to moderate ground cover of grasses and forbs.	11, 13, 14, 17, 21, 22, 23, 28
San Joaquin pocket mouse *Perognathus inornatus inornatus*	FSC	--	Inhabits grasslands and blue oak savannas. Requires friable soils.	2, 17, 18, 19, 24
Tulare grasshopper mouse *Onychomys torridus tularensis*	FSC	SSC	An inhabitant of hot, arid valleys and scrub deserts in the southern San Joaquin Valley	1, 9, 13, 17, 18, 19, 22, 23
American Badger *Taxidea taxus*	FSC	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats with friable soils.	1, 9, 13, 16, 17, 18
Hoary Bat *Lasiurus cinereus*	FSC	SSC	Prefers open habitats or habitat mosaics, with access to tree for cover & open areas or habitat edges for feeding.	6, 15
San Joaquin kit fox *Vulpes macrotis mutica*	FE	ST	Open, level areas with loose-textured soils are preferred. Inhabits a variety of communities including sagebrush scrub, alkali meadows, creosote bush scrub and valley grasslands.	1-7, 10, 11, 13, 15-26, 31, 32, 33

- - These species are listed by the USFWS on their Kings County sensitive species lists, but they do not occur in the county.

ACRONYM / CODE PAGE

(Note: These are the standard acronyms used by the resource and regulatory agencies to denote endangerment of a species.)

Federal status:

FE	Listed as endangered under the Federal Endangered Species Act
FT	Listed as threatened under the Federal Endangered Species Act
FPT	Proposed for listing as threatened under the Federal Endangered Species Act
FC	Candidate species for listing under the Federal Endangered Species Act
FSC	Species of concern as identified by the U.S. Fish and Wildlife Service
FD	Delisted in accordance with the Federal Endangered Species Act
MNBMC	Migaratory Nongame Birds of Management Concern

State Status:

SE	Listed as endangered under the California Endangered Species Act
ST	Listed as threatened under the California Endangered Species Act
SSC	Species of special concern as identified by the California Department of Fish and Game
CFP	Listed as fully protected by the California Fish and Game Code
Rare	Species identified as rare by the California Department of Fish and Game

SENSITIVE PLANT COMMUNITIES:

Southern Interior Cypress Forest
Sycamore Alluvial Woodland
Great Valley Valley Oak Riparian Forest
Northern Claypan Vernal Pool
Northern Hardpan Vernal Pool
Central Valley Drainage Hardhead/Squawfish Stream
Valley Saltbush Scrub
Valley Sink Scrub
Big Tree Forest
Valley Sacaton Grassland

Quadrangle Maps in Kings County:

Avenal (1), Avenal Gap (2), Burrel (3), Burris Park (4), Cholame Valley (5), Corcoran (6), Dudley Ridge (7), El Rico Ranch (8), Garza Peak (9), Goshen (10), Guernsey (11), Hacienda Ranch NW (12), Hacienda Ranch (13), Hacienda Ranch NE (14), Hanford (15), Huron (16), Kettleman City (17), Kettlemen Plain (18), La Cima (19), Laton (20), Lemoore (21), Lone Tree Well (22), Los Viejos (23), Pyramid Hills (24), Remnoy (25), Riverdale (26) Stratford SE (27), Stratford (28), Tent Hills (29), The Dark Hole (30), Traver (31), Vanguard (32), Waukena (33), West Camp (34), and Westhaven (35)

APPENDIX B3

Critical and Sensitive Habitats in Kings County

Critical and Sensitive Habitats in Kings County.

Habitat Category *	Habitat Type	Quad Map Occurrences or Maps Sources
Critical Habitats	Vernal Pool Habitat	Burris Park, Traver, Remnoy
	Vernal Pool Fairy Shrimp	Burris Park, Traver, Remnoy, Corcoran
	Vernal Pool Tadpole Shrimp	Burris Park, Traver, Remnoy
	California Tiger Salamander	Burris Park, Traver, Remnoy
	California Red-legged Frog	Cholame Valley, Tent Hills
Sensitive Habitats	Valley Sacaton Grassland	Burris Park, Goshen, Remnoy, Traver
	Valley Saltbush Scrub	Lone Tree Well, West Camp
	Valley Sink Scrub	Cholame Valley, Hacienda Ranch, Lone Tree Well, Stratford
	Northern Claypan Vernal Pool	Traver
	Wetlands	See Wetlands & Waters map and Habitat map in other Appendices.
	River, Creeks, & Streams	See Wetlands & Waters map and Habitat map in other Appendices.
	Intermittent Drainages	See Topographic maps in other Appendix.
	Floodplain	See Wetlands & Waters map and Habitat map in other Appendices.
	Riparian Habitat	See Habitat map in other Appendix.
	Lakes & Ponds	See Topographic maps in other Appendix.
	Raptor Nest Trees (such as hawks & owls)	No occurrences specified or source maps - potential throughout county.

* - Critical habitat is regulated by the U. S. Fish and Wildlife Service. Sensitive habitats are regulated by local, state, and/or federal agencies.

APPENDIX B4

Sensitive Resources Lists - Lists of Sensitive

Species and Habitats by Quad Map in Kings County

AVENAL QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE,ST
American Badger (*Taxidea taxus*)	SC
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE,SE
Arthropods	
San Joaquin Dune Beetle (*Coelus gracilis*)	G1/S1
Plants	
California Jewel-flower (*Caulanthus californicus)*	FE,SE
San Joaquin Woolythreads (*Monolopia congdonii*)	FE

AVENAL GAP QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	ST
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE,ST
Giant Kangaroo Rat (*Dipodomys ingens*)	FE,SE
San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*)	S2/S3
Short-nosed Kangaroo Rat (*Dipodomys nitratoides brevinasus*)	SC
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE,SE
Arthropods	
Molestan Blister Beetle (*Lytta molesta*)	G2/S2
Plants	
San Joaquin Woolythreads (*Monolopia congdonii*)	FE
Recurved Larkspur (*Delphinium recurvatum*)	1B.2

BURREL QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Birds	**Listed Status**
Swainson's Hawk (*Buteo swainsoni*)	ST
Tricolored Blackbird (*Agelaius tricolor*)	SC
Reptiles	
Giant Garter Snake (*Thamnophis gigas*)	ST,FT
Amphibians	
Western Spadefoot (*Spea hammondii*)	SC

BURRIS PARK QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Amphibians	
California Tiger Salamander (*Ambystoma californiense*)	FT, CSC
Western Spadefoot (*Spea hammondii*)	SC
Arthropods	
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT
Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)	FE
Critical and Sensitive Habitats	
Valley Sacaton Grassland	S1.1/G1
Northern Hardpan Vernal Pool	S1.1/G1

CHOLAME VALLEY QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Amphibians	
California Tiger Salamander (*Ambystoma californiense*)	FT, CSC
Western Spadefoot (*Spea hammondii*)	SC
Plants	
Showy Madia (*Madia radiata*)	1B.2
Pale-yellow Layia (*Layia heterotricha*)	1B.2
Oval-leaved Snapdragon (*Antirrhinum ovatum*)	G3/S3
Mason's neststraw (*Stylocline masonii*)	G1/S1
Critical and Sensitive Habitats	
Valley Sink Scrub	S1.1/G1

CORCORAN QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Hoary Bat (*Lasiurus cinereus*)	SC
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Burrowing Owl (*Athene cunicularia*)	SC
Tricolored Blackbird (*Agelaius tricolor*)	SC
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE

DUDLEY RIDGE QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Tricolored Blackbird (*Agelaius tricolor*)	SC
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	FT
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE

EL RICO RANCH QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Birds	**Listed Status**
Tricolored Blackbird (*Agelaius tricolor*)	SC

GARZA PEAK QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	ST
American Badger (*Taxidea taxus*)	SC
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Prairie Falcon (*Falco Mexicanus*)	SC
Reptiles	
San Joaquin Whipsnake (*Masticophis flagellum ruddocki*)	SC
Plants	
California Jewel-flower (*Caulanthus californicus)*	FE, SE
Lemmon's Jewelflower (*Caulanthus coulteri var. lemmonii*)	1B.2
Recurved Larkspur (*Delphinium recurvatum*)	1B.2
Round-leaved Filaree (*California macrophyllum*)	1B.2
Showy Madia (*Madia radiata*)	1B.2
Pale-yellow Layia (*Layia heterotricha*)	1B.2

GOSHEN QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Amphibians	
Western Spadefoot (*Spea hammondii*)	SC
Arthropods	
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT
Plants	
Subtle Orache (*Atriplex subtilis*)	1B.2
Heartscale(*Atriplex cordulata*)	G2/S2
Lesser Saltscale *(Atriplex miniscula)*	G1/S1
Critical and Sensitive Habitats	
Valley Sacaton Grassland	S1.1/G1

GUERNSEY QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE, SE
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
Western Pond Turtle (*Actinemys marmorata*)	SC
Arthropods	
San Joaquin Tiger Beetle (*Cicindela tranquebarica n. ssp.*)	S1
Plants	
Recurved Larkspur (*Delphinium recurvatum*)	1B.2

HACIENDA RANCH NW QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

No Occurrences Reported on this Map

HACIENDA RANCH QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE, SE
American Badger (*Taxidea taxus*)	SC
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Black-crowned Night Heron (*Nycticorax nycticorax*)	S3/G5
Burrowing Owl (*Athene cunicularia*)	SC
Fulvus Whistling-duck (*Dendrocygna bicolor*)	SC
White-faced ibis (*Plegadis chihi*)	SC
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	FT
Snowy Egret (*Egretta thula*)	G5/S4
Mountain Plover (*Charadrius montanus)*	G2/S2
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
Plants	
Slough Thistle (*Cirsium crassicaule*)	1B.2
Critical and Sensitive Habitats	
Valley Sink Scrub	S1.1/G1

HACIENDA RANCH NE QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE,SE
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
White-faced ibis (*Plegadis chihi*)	SC
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	FT
Golden Eagle (*Aquila chrysaetos)*	G5/S3

HANFORD QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Hoary Bat (*Lasiurus cinereus*)	SC

HURON QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	ST
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
American Badger (*Taxidea taxus*)	SC
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Burrowing Owl (*Athene cunicularia*)	SC
Merlin (*Falco columbarius*)	G5/S3
Reptiles	
San Joaquin Whipsnake (*Masticophis flagellum ruddocki*)	SC
Amphibians	
Western Spadefoot (*Spea hammondii*)	SC
Plants	
California Jewel-flower (*Caulanthus californicus)*	FE, SE
San Joaquin Woolythreads (*Monolopia congdonii*)	FE

KETTLEMAN CITY QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE, SE
American Badger (*Taxidea taxus*)	SC
San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*)	S2/S3
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Arthropods	
San Joaquin Dune Beetle (*Coelus gracilis*)	G1/S1
Plants	
San Joaquin Woolythreads (*Monolopia congdonii*)	FE

KETTLEMAN PLAIN QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
American Badger (*Taxidea taxus*)	SC
San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*)	S2/S3
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
San Joaquin Whipsnake (*Masticophis flagellum ruddocki*)	SC
Plants	
California Jewel-flower (*Caulanthus californicus)*	FE, SE
San Joaquin Woolythreads (*Monolopia congdonii*)	FE
Round-leaved Filaree (*California macrophyllum*)	1B.2

LA CIMA QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	ST
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
American Badger (*Taxidea taxus*)	SC
San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*)	S2/S3
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Tricolored Blackbird (*Agelaius tricolor*)	SC
Loggerhead Shrike (*Lanius ludovicianus*)	G4/S4
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
Plants	
San Joaquin Woolythreads (*Monolopia congdonii*)	FE

LATON QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Plants	
Brittlescale (*Atriplex dipressa*)	1B.2

LEMOORE QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE, SE

LONE TREE WELL QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE, SE
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Black-crowned Night Heron (*Nycticorax nycticorax*)	S3/G5
Fulvus Whistling-duck (*Dendrocygna bicolor*)	SC
Tricolored Blackbird (*Agelaius tricolor*)	SC
White-faced ibis (*Plegadis chihi*)	SC
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	FT
Mountain Plover (*Charadrius montanus*)	G2/S2
Snowy Egret (Egretta thula)	G5/S4
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
Plants	
Lost Hills Crownscale (*Atriplex vallicola*)	1B.2
Slough Thistle (*Cirsium crassicaule*)	1B.2
Critical and Sensitive Habitats	
Valley Saltbush Scrub	S2.2/G1
Valley Sink Scrub	S1.1/G1

LOS VIEJOS QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE, SE
American Badger (*Taxidea taxus*)	SC
Tulare Grasshopper Mouse (*Onychomys torridus tularensis*)	SC
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
San Joaquin Whipsnake (*Masticophis flagellum ruddocki*)	SC
Arthropods	
Doyen's trigonoscuta dune weevil (*Trigonoscuta sp.)*	G1/S1
San Joaquin Dune Beetle (*Coelus gracilis*)	G1/S1
Plants	
San Joaquin Woolythreads (*Monolopia congdonii*)	FE

PYRAMID HILLS QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*)	S2/S3
Short-nosed Kangaroo Rat (*Dipodomys nitratoides brevinasus*)	SC
Birds	
Prairie Falcon (*Falco Mexicanus*)	SC
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
Plants	
California Jewel-flower (*Caulanthus californicus)*	FE, SE
Recurved Larkspur (*Delphinium recurvatum*)	1B.2
Round-leaved Filaree (*California macrophyllum*)	1B.2
Showy Madia (*Madia radiata*)	1B.2

REMNOY QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Critical and Sensitive Habitats	
Valley Sacaton Grassland	S1.1/G1

RIVERDALE QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Burrowing Owl (*Athene cunicularia*)	SC
Arthropods	
Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)	FT
Plants	
Panoche pepper-grass (Lepidium jaredii ssp.)	G1/S1

STRATFORD SE QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

No Occurrences Reported on this Map

STRATFORD QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Tipton Kangaroo *Rat(Dipodomys nitratoides nitratoides*)	FE, SE
Birds	
Western Snowy Plover (*Charadrius alexandrinus nivosus*)	FT
Reptiles	
Western Pond Turtle (*Actinemys marmorata*)	SC
Critical and Sensitive Habitats	
Valley Sink Scrub	S1.1/G1

TENT HILLS QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	ST
Birds	
Prairie Falcon (*Falco Mexicanus*)	SC
Amphibians	
California Red-legged Frog (*Rana aurora draytonii*)	FT
Plants	
California Jewel-flower (*Caulanthus californicus)*	FE, SE
Lemmon's Jewelflower (*Caulanthus coulteri var. lemmonii*)	1B.2
Recurved Larkspur (*Delphinium recurvatum*)	1B.2
Round-leaved Filaree (*California macrophyllum*)	1B.2
Pale-yellow Layia (*Layia heterotricha*)	1B.2
Oval-leaved Snapdragon (*Antirrhinum ovatum*)	G3/S3
Temblor Buckwheat (*Eriogonum temblorense*)	G2/S2

THE DARK HOLE QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	ST
American Badger (*Taxidea taxus*)	SC
Birds	
Prairie Falcon (*Falco Mexicanus*)	SC
Plants	
Showy Madia (*Madia radiata*)	1B.2

TRAVER QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE,ST
Western Mastiff Bat (*Eumops perotis californicus*)	G5/S3
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Amphibians	
California Tiger Salamander (*Ambystoma californiense*)	FT,CSC
Arthropods	
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT
Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)	FE
Plants	
Earlimart Orache (*Atriplex erecticaulis*)	1B.2
Lesser saltscale (*Atriplex miniscula*)	G1/S1
Critical and Sensitive Habitats	
Valley Sacaton Grassland	S1.1/G1
Northern Claypan Vernal Pool	S1.1/G1

VANGUARD QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Fresno Kangaroo Rat (*Dipodomys nitratoides exilis*)	FE, SE
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Amphibians	
Western Spadefoot (*Spea hammondii*)	SC

WAUKENA QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Swainson's Hawk (*Buteo swainsoni*)	ST
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
Arthropods	
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	FT
Plants	
Earlimart Orache (*Atriplex erecticaulis*)	1B.2
Recurved Larkspur (*Delphinium recurvatum*)	1B.2
Subtle Orache (*Atriplex subtilis*)	1B.2

WEST CAMP QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Mammals	**Listed Status**
Nelson's Antelope Squirrel (*Ammospermophilus nelsoni*)	ST
American Badger (*Taxidea taxus*)	SC
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	FE, ST
Birds	
Burrowing Owl (*Athene cunicularia*)	SC
Tricolored Blackbird (*Agelaius tricolor*)	SC
Reptiles	
Blunt-nosed Leopard Lizard (*Gambelia sila*)	FE, SE
Arthropods	
Molestan Blister Beetle (*Lytta molesta*)	G2/S2
Plants	
San Joaquin Woolythreads (*Monolopia congdonii*)	FE
King's Gold (*Twisselmannia californica*)	1B.2
Lost Hills Crownscale (*Atriplex vallicola*)	1B.2
Critical and Sensitive Habitats	
Valley Saltbush Scrub	S2.2/G1

WESTHAVEN QUADRANGLE MAP

SENSITIVE SPECIES AND HABITAT OCCURRENCES/RECORDS

Birds	**Listed Status**
Black-crowned Night Heron (*Nycticorax nycticorax*)	S3/G5

APPENDIX B5

Biological Resources and Potential Permits

Required by Resource and Regulatory Agencies

Biological Resources and Potential Permits Required by Resource and Regulatory Agencies.

Biological Resource	California Department of Fish and Game 1602	California Department of Fish and Game 2081	Calif. Regional Water Quality Control Board 401	California Reclamation Board Permit or Waiver	U. S. Fish and Wildlife Service Sec. 7 or 10	U. S. Army Corps of Engineers 404	Kings County Planning Dept. CEQA
Wetland			X			X	X
Vernal Pool			X			X	X
Marsh			X			X	X
Slough			X			X	X
Lake	X		X			X	X
Pond	X		X			X	X
Riparian Habitat	X		X	X			X
Creek	X		X	X		X	X
River	X		X	X		X	X
Stream	X		X	X		X	X
Intermittent Drainage	X					X	X
Floodplain	X		X	X		X	X
Sensitive Habitats		X			X		X
Critical Habitat		X			X		X
Sensitive Plants		X			X		X
Sensitive Wildlife		X			X		X

APPENDIX C

Survey Guidelines (State)

APPENDIX C1

Region 4 Survey Methodologies

for San Joaquin Kit Fox, Blunt-nosed Leopard Lizard,

San Joaquin Antelope Squirrel, Tipton Kangaroo Rat,

and Giant Kangaroo Rat (CDFG 1990)

REGION 4

SURVEY METHODOLOGIES

for

SAN JOAQUIN KIT FOX

BLUNT NOSED LEOPARD LIZARD

SAN JOAQUIN ANTELOPE SQUIRREL

TIPTON KANGAROO RAT

GIANT KANGAROO RAT

Compiled by:

Ron Rempel
Associate Wildlife Biologist

Gail Presley
Wildlife Biologist

The following survey methods were developed to determine the presence of a species, not the absence. They are not designed to determine the density of the species nor the quality of the habitat based on the number of sightings. When a listed species is detected, surveys for that species may be discontinued (burrow and precinct mapping should be completed) and the agencies notified (USFWS and DFG). At that time we will discuss with the applicant and consulting biologist what additional specific studies (if any) must be conducted to determine: (l)the level of impact that a project will have on the species; (2) how the project can be modified to reduce impacts; and (3) appropriate mitigation measures.

Please remember that take (including harassment and trapping) of listed species is prohibited unless appropriate permits are obtained. As professional biologists conducting surveys, every effort should be made to accurately determine if a listed species is present. If a species is present and you fail to detect it, project proponents could encounter significant delays in their project or be placed in a situation where they may violate the State and/or Federal endangered species acts. If you have a question or would like to propose a modification of the survey methods for a specific project, please contact the Department at (209) 222—3761 or the USFWS at (916) 978—4866.

CALIFORNIA DEPARTMENT OF FISH AND GAME
REGION 4
APPROVED SURVEY METHODOLOGIES
FOR SENSITIVE SPECIES

SAN JOAQUIN KIT FOX, Vulpes macrotis mutica

Status: CT, FE

Methods: Three methods should be used to survey for San Joaquin kit fox (SJKF): 1) night spotlighting, 2) line transects (to identify known and potential den sites), and 3) scent stations.

1) Night spotlighting should be conducted on a minimum of six nights (within a 14-day period) using 400,000 (minimum) candle power spotlights. Surveys should be conducted using at least two observers with spotlights (one for each side of the road). For adequate visibility the observer's eye level should be a minimum of 60 inches above the road surface. This generally precludes the use of cars and small trucks for spotlight surveys. The survey vehicle should be operated at 10 m.p.h. or less. The entire project area should be surveyed, as well as approximately a two-mile area around the subject property. Vehicles should only be operated on existing roads to avoid adversely impacting endangered species or their habitat. Spotlighting should be conducted for a minimum of 3 hours each night and the routes should be varied so that specific locations are not spotlighted at the same time each survey period. Whenever eye shine or animal movement is detected, the vehicle should be stopped and the animal identified using binoculars (minimum 7x35) or spotting scopes. Sightings of SJKF, their prey, and competing predators should be recorded for later mapping, and the time, mileage, weather, and moon phase noted. Spotlight surveys should not be conducted when visibility is less than 2 miles.

2) Daytime line transect surveys for dens, tracks, scat, etc., should be conducted by walking the property at 10-30 meter (30 to 100-foot) intervals so that the area is completely covered in a systematic manner. Transect width should be adjusted based on vegetation height, topography, etc., to facilitate the detection of dens and other sign. When a den or burrow is discovered, the observer should determine if it has the potentiality be used by SJKF and if it is currently occupied (please refer to the attached USFWS SJKF den definitions). Potential burrow openings are generally round or oval in shape, 10-25 centimeters (4-10 inches) in diameter, and often have multiple openings. SJKF activities at a den site should be determined by noting a variety of factors (fresh digging, presence of prey remains, tracks, or scat near the opening). All known and potential dens should be accurately mapped. Photographs of the dens should be taken along with information on topography, vegetation, land use, den characteristics, and activity.

3) Scent stations should be established at a minimum density of five scent stations per 640 acres. One scent station should be placed at the center of the project site with the other four placed 1/4 mile away (i.e. a domino 5 pattern). A minimum of 5 scent stations is required for all projects unless otherwise agreed to by CDFG and USFWS. If a linear corridor is being surveyed, five scent stations should be established per linear mile. Scent stations should not be set adjacent to heavily traveled roads to reduce the potential for kit fox/vehicle collisions. Scent stations should be operated for a minimum of six nights (within a 14-day period), and checked each morning for visitation, re-baited and tracks cleared when necessary. All tracks observed (i.e. kit fox, dogs, kangaroo rats, etc.) should be recorded on pre-formatted data sheets.

Scent stations should be situated on relatively level ground and cover a circle approximately 1 meter (39-inches) in diameter. All vegetation and debris should be cleared and a thin layer (1-2 cm) of fine-grained tracking material (diatomaceous earth, fire day, finely sifted soil) sifted over the site.(The tracking substrate must be of a consistency to delineate the lines of a human hand when placed on the tracking medium). Smoked tracking plates are also acceptable. The scent stations should be baited with cat food placed at the center of the scent station (i.e. directly on the tracking substrate) or with Predator Survey Disks . Because kit fox have been observed to occasionally avoid scent stations baited with predator survey disks and fish-based baits, no more than 50% of the scent stations should use these types of bait. The disks are available from Pocatello Supply Depot, 238 E. Dillon, Pocatello, ID 83201, or (208) 236-6920.

Timing:

The optimum survey period is between May 1 and September 30. Surveys conducted outside of the optimum period should include a minimum ten nights of scent station operation. The period of lowest detectability is December, January and February. Survey methods for detecting kit fox during these months should be reviewed with the agencies prior to commencing field work. When presence of SJKF is confirmed, the agencies should be contacted for further instructions.

CALIFORNIA DEPARTMENT OF FISH AND GAME
REGION 4
APPROVED SURVEY METHODOLOGIES7
FOR SENSITIVE SPECIES

BLUNT-NOSED LEOPARD LIZARD, Gainbelia silus

Status: CE, FE

Methods: Blunt-nosed leopard lizards (BNLL) are often difficult to detect, especially in situations where shrubs are numerous and/or the herbaceous vegetation is tall (> 30 cm). Ten to 30 meter (30 to 100 foot) wide transects should be walked at a slow pace. The surveyor should stop frequently and scan the transect for BNLL using binoculars (minimum 7x35). BNLL surveys should be conducted for six days (or until BNLL presence is detected). Two of the six BNLL surveys may be conducted cocurrently with surveys for other species while four of the surveys must be conducted strictly for BNLL. This allows the surveyor to concentrate on looking for BNLL. Surveys should be conducted between 0900 and 1400 hrs. and within the appropriate temperature criteria. Generally, transects should be walked in a north-south direction to improve visibility (e.g. to reduce sun/glare problems). Optimum BNLL activity periods occur when air temperatures (measured 1-2 cm above the ground with thermometer shaded from the sun) are between 25-350 C and soil temperatures (measures l-g cm below the surface in the shade) are between 30-50 C. Transect surveys should only be conducted when these conditions are met. These parameters should be checked at the start and end of each transect. In addition to recording the location of any BNLL observed, the presence of special habitat features (washes, playas, relative abundance of small mammal burrows) should be recorded for each transect. Burrows and open areas should be examined closely for BNLL tail drags and scat. If BNLL are observed incidental to conducting surveys for other species, specific surveys for BNLL are not required.

Timing: BNLL are active above ground from April through September, but optimum activity periods occur from April 15 to June 30. All BNLL surveys should be confined to the periods April 15 to June 30 and August 1 to September 15. Please note that BNLL surveys conducted in July are not acceptable.

CALIFORNIA DEPARTMENT OF FISH AND GAME
REGION 4
APPROVED SURVEY METHODOLOGIES
FOR SENSITIVE SPECIES

TIPTON KANGAROO RAT, Dipodomys nitratoides nitratoides

Status: CE, FE

Methods: Live-trapping is the primary method for reliable Tipton kangaroo rat (TKR) identification (Williams, pers. comm.), but in many instances it may be possible to determine the probable presence of TKR on a site based on a variety of factors. Preliminary surveys to determine the probable presence of TKR should be based on range, presence of habitat, burrow characteristics, scat size, track measurements, and skeletal remains found in owl pellets. The locations of suitable habitat, potential burrows, arid other sign should be reported to DFG and USFWS to determine if trapping will be necessary. Please note; these criteria can only be used for the determination of presence. The Department will not accept the use of these criteria to determine that the site is unoccupied by TKR..

Live-traps should be placed close to burrow entrances, along runways, and near rodent sign to increase trapping success. Flagging should be located at each tap or trap cluster with the number of traps at that location noted on the flagging to assure that all traps are checked. Traps should be baited with rolled oats, oatmeal, peanut butter or other appropriate bait. Traps should be monitored for five consecutive nights or until presence is confirmed. A minimum of 100 traps per 160 acres should be used.

Timing: TKR are active year around, but optimum activity periods occur from April 1 to June 30. If trapping studies are required by the agencies, the traps should be opened at sunset and checked and closed for the night after approximately four hours. Insulating materials may be placed in traps, but must be changed each time an animal is trapped. Species experts recommend using tightly wadded paper towels as insulating material. Dacron or similar materials should not be used in the traps.

CALIFORNIA DEPARTMENT OF FISH AND GAME-
REGION 4
APPROVED SURVEY METHODOLOGIES
FOR SENSITIVE SPECIES

GIANT KANGAROO RAT, Dipodomys ingens

Status: CE, FE

Methods: Surveys for giant kangaroo rats (GKR) should focus on the identification of their characteristic habitat types and burrow systems (50-55 mm in diameter). GKR inhabit individual territories (known as precincts) averaging 6 meters (20 feet) in diameter where a shallow burrow system is constructed. GKR are found in colonies consisting of two to thousands of precincts.

Daytime line transect surveys for burrow systems should be conducted by walking the property at 10-3 0 meter (30 to 100-foot) intervals to provide systematic coverage of the entire project area. Transect width should be adjusted based on vegetation height, topography, etc., to facilitate the detection of precincts and other sign. All known or potential GKR precincts should be accurately mapped. Photographs of the precincts should be taken, and information on topography, vegetation, land use, etc., recorded. Scat should be collected for later confirmation of species by known experts.

Since Dipodomys heermanni are also known to construct haystacks, the presence of haystacks should not be used as a diagnostic characteristic to confirm presence of GKR. In some instances, confirmation of species' presence may require trapping. Trapping should not be undertaken without prior consultation with the Department's Region 4 Threatened andEndangered Species Coordinator.

Timing: GKR are active year-around.

Species Expert: Dan Williams
CSU Stanislaus
Department of Biological Sciences
Turlock, CA 95380
(209) 667-3476 or (209) 667-3485

CALIFORNIA DEPARTMENT OF FISH AND GAME
REGION 4
APPROVED SURVEY METHODOLOGIES
FOR SENSITIVE SPECIES

SAN JOAQUIN ANTELOPE SQUIRREL, Ammospermophilus nelsoni

Status: CT, FC2

Methods: The San Joaquin antelope squirrel (SJAS) is a vocal, diurnal species. Although burrow entrance sizes overlap with other rodents, SJAS burrows can usually be distinguished by the presence of irregularly-sized scats. Surveys for SJAS should be conducted using daytime line transects at 10-30 meter (30 to 100 foot) intervals so that the area is covered in a systematic manner. While walking the transects, the observer should scan the area (including using binoculars) looking for the species and listening for the species vocalizations. Transect surveys should be conducted only when air temperatures are between 20-300 C (68-86 F). These parameters should be checked before beginning each transect. Visual and audible observations of SJAS should be recorded and mapped along with the location of suitable burrows. Representative burrows should be photographed.

Timing: Surveys for SJAS should coincide with their most active season, April 1 to September 30. Less active times of year are associated with low temperatures. Surveys conducted outside of these parameters which confirm the presence of the species will also be accepted.

Species Expert:

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Sacramento, CA 95814
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APPENDIX C2

Burrowing Owl

Survey Protocol and Mitigation Guidelines

(The California Burrowing Owl Consortium 1993)

BURROWING OWL SURVEY PROTOCOL AND MITIGATION GUIDELINES

Prepared by:

The California Burrowing Owl Consortium

April 1993

INTRODUCTION

The California Burrowing Owl Consortium developed the following Survey Protocol and Mitigation Guidelines to meet the need for uniform standards when surveying burrowing owl *(Speotyto cunicularia)* populations and evaluating impacts from development projects. The California Burrowing Owl Consortium is a group of biologists in the San Francisco Bay area who are interested in burrowing owl conservation. The following survey protocol and mitigation guidelines were prepared by the Consortium's Mitigation Committee. These procedures offer a decision-making process aimed at preserving burrowing owls in place with adequate habitat.

California's burrowing owl population is clearly in peril and if declines continue unchecked the species may qualify for listing. Because of the intense pressure for development of open, flat grasslands in California, resource managers frequently face conflicts between owls and development projects. Owls can be affected by disturbance and habitat loss, even though there may be no direct impacts to the birds themselves or their burrows. There is often inadequate information about the presence of owls on a project site until ground disturbance is imminent. When this occurs there is usually insufficient time to evaluate impacts to owls and their habitat. The absence of standardized field survey methods impairs adequate and consistent impact assessment during regulatory review processes, which in turn reduces the possibility of effective mitigation.

These guidelines are intended to provide a decision-making process that should be implemented wherever there is potential for an action or project to adversely affect burrowing owls or the resources that support them. The process begins with a four-step survey protocol to document the presence of burrowing owl habitat, and evaluate burrowing owl use of the project site and a surrounding buffer zone. When surveys confirm occupied habitat, the mitigation measures are followed to minimize impacts to burrowing owls, their burrows and foraging habitat on the site. These guidelines emphasize maintaining burrowing owls and their resources in place rather than minimizing impacts through displacement of owls to an alternate site.

Each project and situation is different and these procedures may not be applicable in some circumstances. Finally, these are not strict rules or requirements that must be applied in all situations. They are guidelines to consider when evaluating burrowing owls and their habitat, and they suggest options for burrowing owl conservation when land use decisions are made.

Section 1 describes the four phase Burrowing Owl Survey Protocol. Section 2 contains the Mitigation Guidelines. Section 3 contains a discussion of various laws and regulations that protect burrowing owls and a list of references cited in the text.

We have submitted these documents to the California Department of Fish and Game (CDFG) for review and comment. These are untested procedures and we ask for your comments on improving their usefulness.

SECTION 1 BURROWING OWL SURVEY PROTOCOL

PHASE I: HABITAT ASSESSMENT

The first step in the survey process is to assess the presence of burrowing owl habitat on the project site including a 150-meter (approx. 500 ft.) buffer zone around the project boundary (Thomsen 1971, Martin 1973).

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat: both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures, such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by an observation of at least one burrowing owl, or, alternatively, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

The Phase II burrow survey is required if burrowing owl habitat occurs on the site. If burrowing owl habitat is not present on the project site and buffer zone, the Phase II burrow survey is not necessary. A written report of the habitat assessment should be prepared (Phase IV), stating the reason(s) why the area is not burrowing owl habitat.

PHASE II: BURROW SURVEY

1. A survey for-burrows and owls should be conducted by walking through suitable habitat over the entire project site and in areas within 150 meters (approx 500 ft.) of the project impact zone. This 150-meter buffer zone is included to account for adjacent burrows and foraging habitat outside the project area and impacts from factors such as noise and vibration due to heavy equipment which could impact resources outside the project area.

2. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.), and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To efficiently survey projects larger than 100 acres, it is recommended that two or more surveyors conduct concurrent surveys. Surveyors should maintain a minimum distance of 50 meters (approx. 160 ft.) from any owls or occupied burrows. It is important to minimize disturbance near occupied burrows during all seasons.

3. If burrows or burrowing owls are recorded on the site, a map should be prepared of the burrow concentration areas. A breeding season survey and census (Phase III) of burrowing owls is the next step required.

4. Prepare a report (Phase IV) of the burrow survey stating whether or not burrows are present.

5. A preconstruction survey may be required by project-specific mitigations no more than 30 days prior to ground disturbing activity.

PHASE III: BURROWING OWL SURVEYS, CENSUS AND MAPPING

If the project site contains burrows that could be used by burrowing owls, then survey efforts should be directed towards determining owl presence on the site. Surveys in the breeding season are required to describe if, when, and how the site is used by burrowing owls. If no owls are observed using the site during the breeding season, a winter survey is required.

Survey Methodology

A complete burrowing owl survey consists of four site visits. During the initial site visit examine burrows for owl sign and map the locations of occupied burrows. Subsequent observations should be conducted from as many fixed points as necessary to provide visual coverage of the site using spotting scopes or binoculars. It is important to minimize disturbance near occupied burrows during all seasons. Site visits must be repeated on four separate days. Conduct these visits from two hours before sunset to one hour after or from one hour before to two hours after sunrise. Surveys should be conducted during weather that is conducive to observing owls outside their burrows. Avoid surveys during heavy rain, high winds (> 20 mph), or dense fog.

Nesting Season Survey. The burrowing owl nesting season begins as early as February 1 and continues through August 31 (Thomsen 1971, Zam 1974). The timing of nesting activities may vary with latitude and climatic conditions. If possible, the nesting season survey should be conducted during the peak of the breeding season, between April 15 and July 15. Count and map all burrowing owl sightings, occupied burrows, and burrows with owl sign. Record numbers of pairs and juveniles, and behavior such as courtship and copulation. Map the approximate territory boundaries and foraging areas if known.

Survey for Winter Residents (non-breeding owls). Winter surveys should be conducted between December 1 and January 31, during the period when wintering owls are most likely to be present. Count and map all owl sightings, occupied burrows, and burrows with owl sign.

Surveys Outside the Winter and Nesting Seasons. Positive results, (i.e., owl sightings)- outside of the above survey periods would be adequate to determine presence of owls on site. However, results of these surveys may be inadequate for mitigation planning because the numbers of owls and their pattern of distribution may change during winter and nesting seasons. Negative results during surveys outside the above periods are not conclusive proof that owls do not use the site.

Preconstruction Survey. A preconstruction survey may be required by project-specific mitigations and should be conducted no more than 30 days prior to ground disturbing activity.

PHASE IV: RESOURCE SUMMARY, WRITTEN REPORT

A report should be prepared for CDFG that gives the results of each Phase of the survey protocol, as outlined below.

Phase I: Habitat Assessment

1. Date and time of visit(s) including weather and visibility conditions; methods of survey.

2. Site description including the following information: location, size, topography, vegetation communities, and animals observed during visit(s).

3. An assessment of habitat suitability for burrowing owls and explanation.

4. A map of the site.

Phase II: Burrow Survey

1. Date and time of visits including weather and visibility conditions; survey methods including transect spacing.

2. A more detailed site description should be made during this phase of the survey protocol including a partial plant list of primary vegetation, location of nearest freshwater (on or within one mile of site), animals observed during transects.

3. Results of survey transects including a map showing the location of concentrations of burrow(s) (natural or artificial) and owl(s), if present.

Phase III: Burrowing Owl Surveys, Census and Mapping

1. Date and time of visits including weather and visibility conditions; survey methods including transect spacing.

2. Report and map the location of all burrowing owls and owl sign. Burrows occupied by owl(s) should be mapped indicating the number of owls at each burrow. Tracks, feathers, pellets, or other items (prey remains, animal scat) at burrows should also be reported.

3. Behavior of owls during the surveys should be carefully recorded (from a distance) and reported. Describe and map areas used by owls during the surveys. Although not required, all behavior is valuable to document including feeding, resting, courtship, alarm, territorial, parental, or juvenile behavior.

4. Both winter and nesting season surveys should be summarized. If possible include information regarding productivity of pairs, seasonal pattern of use, and include a map of the colony showing territorial boundaries and home ranges.

5. The historical presence of burrowing owls on site should be documented, as well as the source of such information (local bird club, Audubon society, other biologists, etc.).

Burrowing: Owl Survey Protocol

April 1993

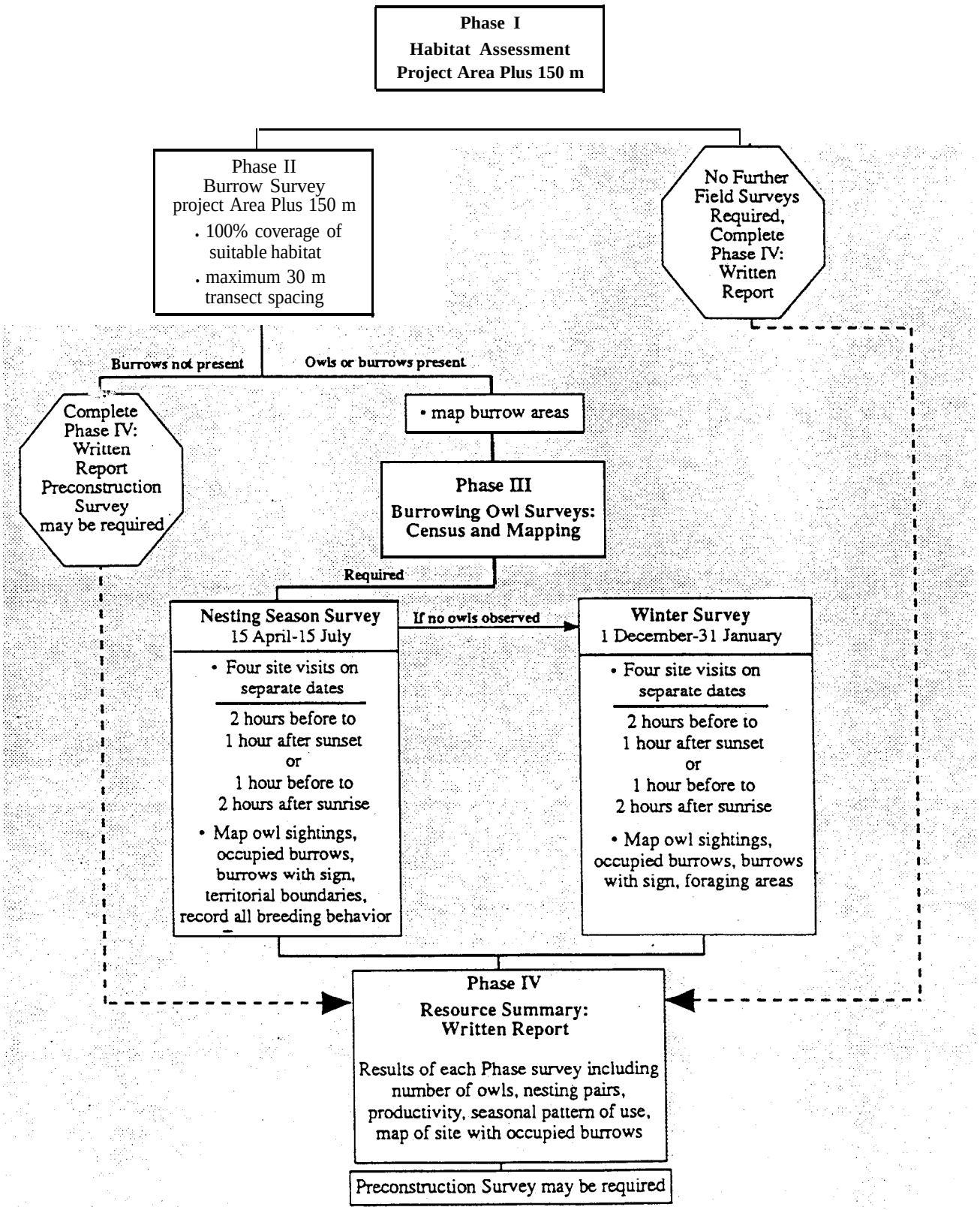

Figure 1.

SECTION 2 BURROWING OWL MITIGATION GUIDELINES

The objective of these mitigation guidelines is to minimize impacts to burrowing owls and the resources that support viable owl populations. These guidelines are intended to provide a decision-making process that should be implemented wherever there is potential for an action or project to adversely affect burrowing owls or their resources. The process begins with a four-step survey protocol (see *Burrowing Owl Survey Protocol)* to document the presence of burrowing owl habitat, and evaluate burrowing owl use of the project site and a surrounding buffer zone. When surveys confirm occupied habitat, the mitigation measures described below are followed to minimize impacts to burrowing owls, their burrows and foraging habitat on the site. These guidelines emphasize maintaining burrowing owls and their resources in place rather than minimizing impacts through displacement of owls to an alternate site.

Mitigation actions should be carried out prior to the burrowing owl breeding season, generally from February 1 through August 31 (Thomsen 1971, Zarn 1974). The timing of nesting activity may vary with latitude and climatic conditions. Project sites and buffer zones with suitable habitat should be resurveyed to ensure no burrowing owls have occupied them in the interim period between the initial surveys and ground disturbing activity. Repeat surveys should be conducted not more than 30 days prior to initial ground disturbing activity.

DEFINITION OF IMPACTS

1. Disturbance or harassment within 50 meters (approx. 160 ft.) of occupied burrows.

2. Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to burrowing owls.

3. Degradation of foraging habitat adjacent to occupied burrows.

GENERAL CONSIDERATIONS

1. Occupied burrows should not be disturbed during the nesting season, from February 1 through August 31, unless the Department of Fish and Game verifies that the birds have not begun egg-laying and incubation or that the juveniles from those burrows are foraging independently and capable of independent survival at an earlier date.

2. A minimum of 6.5 acres of foraging habitat, calculated on a 100-m (approx. 300 ft.) foraging radius around the natal burrow, should be maintained per pair (or unpaired resident single bird) contiguous with burrows occupied within the last three years (Rich 1984, Feeney 1992). Ideally, foraging habitat should be retained in a long-term conservation easement.

3. When destruction of occupied burrows is unavoidable, burrows should be enhanced (enlarged or cleared of debris) or created (by installing artificial burrows) in a ratio of 1:1 in adjacent suitable habitat that is contiguous with the foraging habitat of the affected owls.

4. If owls must be moved away from the disturbance area, passive relocation (see below) is preferable to trapping. A time period of at least one week is recommended to allow the owls to move and acclimate to alternate burrows.

5. The mitigation committee recommends monitoring the success of mitigation programs as required in Assembly Bill 3180. A monitoring plan should include mitigation success criteria and an annual report should be submitted to the California Department of Fish and Game.

AVOIDANCE

Avoid Occupied Burrows

No disturbance should occur within 50 m (approx. 160 ft.) of occupied burrows during the non-breeding Season of September 1 through January 31 or within 75 m (approx. 250 ft.) during the breeding Season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird (Figure 2).

MITIGATION FOR UNAVOIDABLE IMPACTS

On-site Mitigation

On-site passive relocation should be implemented if the above avoidance requirements cannot be met. Passive relocation is defined as encouraging owls to move from occupied burrows to alternate natural or artificial burrows that are beyond 50 m from the impact zone and that are within or contiguous to a minimum of 6.5 acres of foraging habitat for each pair of relocated owls (Figure 3). Relocation of owls should only be implemented during the non-breeding season. On-site habitat should be preserved in a conservation easement and managed to promote burrowing owl use of the site.

Owls should be excluded from burrows in the immediate impact zone and within a 50 m (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances: One-way doors should be left in place 48 hours to insure owls have left the burrow before excavation. One alternate natural or artificial burrow should be provided for each burrow that will be excavated in the project impact zone. The project area should be monitored daily for one week to confirm owl use of alternate burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe or burlap bags should be inserted into the tunnels

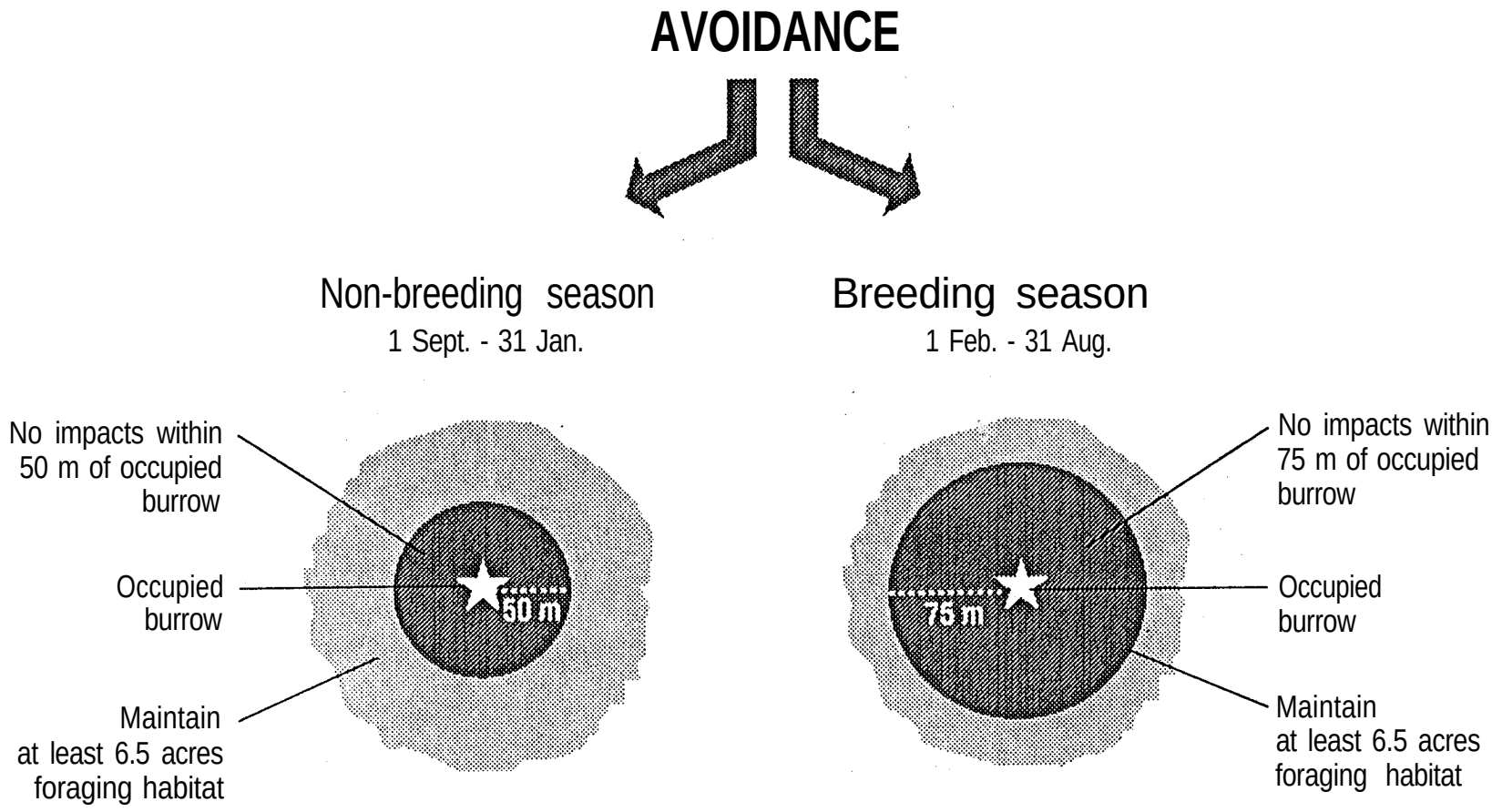

Figure 2. Burrowing owl mitigation guidelines.

ON-SITE MITIGATION
IF AVOIDANCE NOT MET

(More than 6.5 acres suitable habitat available)

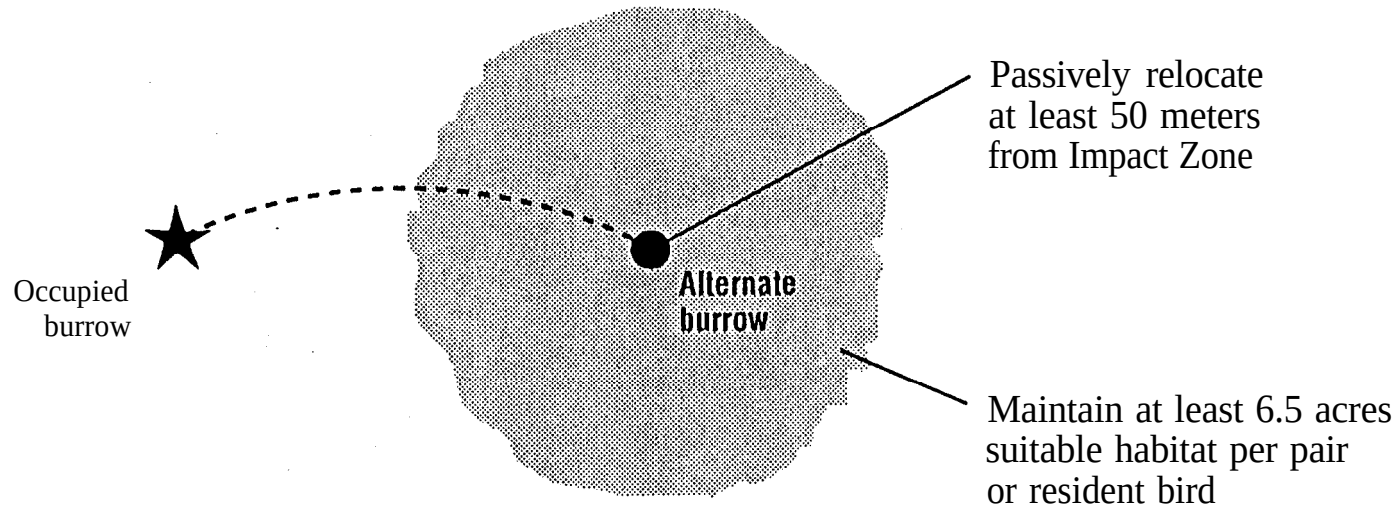

Figure 3. Burrowing owl mitigation guidelines.

during excavation to maintain an escape route for any animals inside the burrow.

Off-site Mitigation

If the project will reduce suitable habitat on-site below the threshold level of 6.5 acres per relocated pair or single bird, the habitat should be replaced off-site. Off-site habitat must be suitable burrowing owl habitat, as defined in the *Burrowing Owl Survey Protocol*, and the site approved by CDFG. Land should be purchased and/or placed in a conservation easement in perpetuity and managed to maintain suitable habitat. Off-site mitigation should use one of the following ratios:

1. Replacement of occupied habitat with occupied habitat: 1.5 times 6.5 (9.75) acres per pair or single bird.

2. Replacement of occupied habitat with habitat contiguous to currently occupied habitat: 2 times 6.5 (13.0) acres per pair or single bird.

3. Replacement of occupied habitat with suitable unoccupied habitat: 3 times 6.5 (19.5) acres per pair or single bird.

SECTION 3 LEGAL STATUS

The burrowing owl is a migratory bird species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter, any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3503, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. Implementation of the take provisions requires that project-related disturbance at active nesting territories be reduced or eliminated during critical phases of the nesting cycle (March 1 - August 15, annually). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) or the loss of habitat upon which the birds depend is considered "taking" and is potentially punishable by fines and/or imprisonment. Such taking would also violate federal law protecting migratory birds (e.g., MBTA).

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or "rare" regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001(c), 21083. Guidelines 15380, 15064, 15065). Avoidance or mitigation must be presented to reduce impacts to less than significant levels.

CEQA AND SUBDIVISION MAP ACT

CEQA Guidelines Section 15065 directs that a mandatory finding of significance is required for projects that have the potential to substantially degrade or reduce the habitat of, or restrict the range of a threatened or endangered species. CEQA requires agencies to implement feasible mitigation measures or feasible alternatives identified in EIR's for projects which will otherwise cause significant adverse impacts (Sections 21002, 21081, 21083; Guidelines, sections 15002, subd. (a)(3), 15021, subd. (a)(2), 15091, subd. (a).).

To be legally adequate, mitigation measures must be capable of "avoiding the impact altogether by not taking a certain action or parts of an action"; "minimizing impacts by limiting the degree or magnitude of the action and its implementation"; "rectifying the impact by repairing, rehabilitating or restoring the impacted environment"; "or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action." (Guidelines, Section 15.370).

Section 66474 (e) of the Subdivision Map Act states "a legislative body of a city or county shall deny approval of a tentative map or parcel map for which a tentative map was not required, if

it makes any of the following findings:... (e) that the design of the subdivision or the proposed improvements are likely to cause substantial environmental damage or substantially and avoidably injure fish and wildlife or their habitat". In recent court cases, the court upheld that Section 66474(e) provides for environmental impact review separate from and independent of the requirements of CEQA (Topanga Assn. for a Scenic Community v. County of Los Angeles, 263 Cal. Rptr. 214 (1989).). The finding in Section 66174 is in addition to the requirements for the preparation of an EIR or Negative Declaration.

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APPENDIX C3

Recommended Timing and Methodology for

Swainson's Hawk Nesting Surveys

in California's Central Valley

(Swainson's Hawk Technical Advisory Committee 2000)

RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY

Swainson's Hawk Technical Advisory Committee

May 31, 2000

This set of survey recommendations was developed by the Swainson's Hawk Technical Advisory Committee (TAC) to maximize the potential for locating nesting Swainson's hawks, and thus reducing the potential for nest failures as a result of project activities/disturbances. The combination of appropriate surveys, risk analysis, and monitoring has been determined to be very effective in reducing the potential for project-induced nest failures. As with most species, when the surveyor is in the right place at the right time, Swainson's hawks may be easy to observe; but some nest sites may be very difficult to locate, and even the most experienced surveyors have missed nests, nesting pairs, mis-identified a hawk in a nest, or believed incorrectly that a nest had failed. There is no substitute for specific Swainson's hawk survey experience and acquiring the correct search image.

METHODOLOGY

Surveys should be conducted in a manner that maximizes the potential to observe the adult Swainson's hawks, as well as the nest/chicks second. To meet the California Department of Fish and Game's (CDFG) recommendations for mitigation and protection of Swainson's hawks, surveys should be conducted for a ½ mile radius around all project activities, and if active nesting is identified within the ½ mile radius, consultation is required. In general, the TAC recommends this approach as well.

Minimum Equipment

Minimum survey equipment includes a high-quality pair of binoculars and a high quality spotting scope. Surveying even the smallest project area will take hours, and poor optics often result in eye-strain and difficulty distinguishing details in vegetation and subject birds. Other equipment includes good maps, GPS units, flagging, and notebooks.

Walking vs Driving

Driving (car or boat) or "windshield surveys" are usually preferred to walking if an adequate roadway is available through or around the project site. While driving, the observer can typically approach much closer to a hawk without causing it to fly. Although it might appear that a flying bird is more visible, they often fly away from the observer using trees as screens; and it is difficult to determine from where a flying bird came. Walking surveys are useful in locating a nest after a nest territory is identified, or when driving is not an option.

Angle and Distance to the Tree

Surveying subject trees from multiple angles will greatly increase the observer's chance of detecting a nest or hawk, especially after trees are fully leafed and when surveying multiple trees

in close proximity. When surveying from an access road, survey in both directions. Maintaining a distance of 50 meters to 200 meters from subject trees is optimal for observing perched and flying hawks without greatly reducing the chance of detecting a nest/young: Once a nesting territory is identified, a closer inspection may be required to locate the nest.

Speed
Travel at a speed that allows for a thorough inspection of a potential nest site. Survey speeds should not exceed 5 miles per hour to the greatest extent possible. If the surveyor must travel faster than 5 miles per hour, stop frequently to scan subject trees.

Visual and Aural Ques
Surveys will be focused on both observations and vocalizations. Observations of nests, perched adults, displaying adults, and chicks during the nesting season are all indicators of nesting Swainson's hawks. In addition, vocalizations are extremely helpful in locating nesting territories. Vocal communication between. hawks is frequent during territorial displays; during courtship and mating; through the nesting period as mates notify each other that food is available or that a threat exists; and as older chicks and fledglings beg for food.

Distractions
Minimize distractions while surveying. Although two pairs of eyes may be better than one pair at times, conversation may limit focus. Radios should be off, not only are they distracting, they may cover a hawk's call.

Notes and Species Observed
Take thorough field notes. Detailed notes and maps of the location of observed Swainson's hawk nests are essential for filling gaps in the Natural Diversity Data Base; please report all observed nest sites. Also document the occurrence of nesting great homed owls, red-tailed hawks, red-shouldered hawks and other potentially competitive species. These species will infrequently nest within 100 yards of each other, so the presence of one species will not necessarily exclude another.

TIMING

To meet **the minimum level** of protection for the species, surveys should be completed for **at least** the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete 3 surveys in Period III and 3 surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. **Surveys should not be conducted in Period IV.**

The survey periods are defined by the timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawks from San Joaquin County to Northern Yolo County. Dates should be adjusted in consideration of early and late nesting seasons, and geographic differences (northern nesters tend to nest slightly later, etc). If you are not sure, contact a TAC member or CDFG biologist.

Survey dates **Justification and search image**	**Survey time**	**Number of Surveys**
I. *January-March 20 (recommended optional)*	*All day*	*1*

Prior to Swainson's hawks returning, it may be helpful to survey the project site to determine potential nest locations. Most nests are easily observed from relatively long distances, giving the surveyor the opportunity to identify potential nest sites, as well as becoming familiar with the project area. It also gives the surveyor the opportunity to locate and map competing species nest sites such as great homed owls from February on, and red-tailed hawks from March on. After March 1, surveyors are likely to observe Swainson's hawks staging in traditional nest territories.

II. *March 20 to April 5*	*Sunrise to 1000* *1600 to sunset*	*3*

Most Central Valley Swainson's hawks return by April 1, and immediately begin occupying their traditional nest territories. For those few that do not return by April 1, there are often hawks ("floaters") that act as place-holders in traditional nest sites; they are birds that do not have mates, but temporarily attach themselves to traditional territories and/or one of the site's "owners." Floaters are usually displaced by the territories' owner(s) if the owner returns.

Most trees are leafless and are relatively transparent; it is easy to observe old nests, staging birds, and competing species. The hawks are usually in their territories during the survey hours, but typically soaring and foraging in the mid-day hours. Swainson's hawks may often be observed involved in territorial and courtship displays, and circling the nest territory. Potential nest sites identified by the observation of staging Swainson's hawks will usually be active territories during that season, although the pair may not successfully nest/reproduce that year.

III. *April 5 to April 20*	*Sunrise to 1200* *1630 to Sunset*	***3***

Although trees are much less transparent at this time, 'activity at the nest site increases significantly. Both males and females are actively nest building, visiting their selected site frequently. Territorial and courtship displays are increased, as is copulation. The birds tend to vocalize often, and nest locations are most easily identified. This period may require a great deal of "sit and watch" surveying.

IV. *April 21 to June 10*	*Monitoring known nest sites only* ***Initiating Surveys is not recommended***	

Nests are extremely difficult to locate this time of year, and even the most experienced surveyor will miss them, especially if the previous surveys have not been done. During this phase of nesting, the female Swainson's hawk is in brood position, very low in the nest, laying eggs, incubating, or protecting the newly hatched and vulnerable chicks; her head may or may not be visible. Nests are often well-hidden, built into heavily vegetated sections of trees or in clumps of mistletoe, making them all but invisible. Trees are usually not viewable from all angles, which may make nest observation impossible.

Following the male to the nest may be the only method to locate it, and the male will spend hours away from the nest foraging, soaring, and will generally avoid drawing attention to the nest site. Even if the observer is fortunate enough to see a male returning with food for the female, if the female determines it is not safe she will not call the male in, and he will not approach the nest; this may happen if the observer, or others, are too close to the nest or if other threats, such as rival hawks, are apparent to the female or male.

V. ***June 10 to JuIy 30 (post-fledging)*** ***Sunrise to 1200*** ***3***
1600 to sunset

Young are active and visible, and relatively safe without parental protection. Both adults make numerous trips to the nest and are often soaring above, or perched near or on the nest tree. The location and construction of the nest may still limit visibility of the nest, young, ‘and adults.

DETERMINING A PROJECT'S POTENTIAL
FOR IMPACTING SWAINSON'S HAWKS

LEVEL OF RISK	REPRODUCTIVE SUCCESS (Individuals)	LONGTERM SURVIVABILITY (Population)	NORMAL SITE CHARACTERISTICS (Daily Average)	NEST MONI-TORING
HIGH	Direct physical contact with the nest tree while the birds are on eggs or protecting young. (Helicopters in close proximity)	Loss of available foraging area. Loss of nest trees.	Little human-created noise, little human use: nest is well away from dwellings, equipment yards, human access areas, etc. *Do not include general cultivation practices in evaluation.*	MORE
	Loss of nest tree after nest building is begun prior to laying eggs.	Loss of potential nest trees.		
	Personnel within 50 yards of nest tree (out of vehicles) for extended periods while birds are on eggs or protecting young that are < 10 days old.	Cumulative: Multi-year, multi-site projects with substantial noise/personnel disturbance.		
	Initiating construction activities (machinery and personnel) within 200 yards of the nest after eggs are laid and before young are > 10 days old.	Cumulative: Single-season projects with substantial noise/personnel disturbance that is greater than or significantly different from the daily norm.		
	Heavy machinery only working within 50 yards of nest.		Substantial human-created noise and occurrence: nest is near roadways, well-used waterways, active airstrips, areas that have high human use. *Do not include general cultivation practices in evaluation.*	
	Initiating construction activities within 200 yards of nest before nest building begins or after young > 10 days old.	Cumulative: Single-season projects with activities that "blend" well with site's "normal' activities.		
LOW	All project activities (personnel and machinery) greater than 200 yards from nest.			LESS

APPENDIX C4

Guidelines for Assessing the Effects of

Proposed Projects on Rare, Threatened, and

Endangered Plants and Natural Communities

(CDFG 2000)

Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities

State of California
THE RESOURCES AGENCY
Department of Fish and Game
December 9, 1983
Revised May 8, 2000

The following recommendations are intended to help those who prepare and review environmental documents determine **when** a botanical survey is needed, **who** should be considered qualified to conduct such surveys, **how** field surveys should be conducted, and **what** information should be contained in the survey report. The Department may recommend that lead agencies not accept the results of surveys that are not conducted according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all rare, threatened, and endangered plants and plant communities. Rare, threatened, and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare, threatened, and/or endangered under the following definitions:

A species, subspecies, or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is "threatened" when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

Rare natural communities are those communities that are of highly limited distribution. These communities may or may not contain rare, threatened, or endangered species. The most current version of the California Natural Diversity Database's List of California Terrestrial Natural Communities may be used as a guide to the names and status of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or to the extent that, rare, threatened, or endangered plants will be affected by a proposed project when:

a. Natural vegetation occurs on the site, it is unknown if rare, threatened, or endangered plants or habitats occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
b. Rare plants have historically been identified on the project site, but adequate information for impact assessment is lacking.

3. Botanical consultants should possess the following qualifications:

a. Experience conducting floristic field surveys;
b. Knowledge of plant taxonomy and plant community ecology;
c. Familiarity with the plants of the area, including rare, threatened, and endangered species;
d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
e. Experience with analyzing impacts of development on native plant species and communities.

4. Field surveys should be conducted in a manner that will locate any rare, threatened, or endangered species that may be present. Specifically, rare, threatened, or endangered plant surveys should be:

a. Conducted in the field at the proper time of year when rare, threatened, or endangered species are both evident and identifiable. Usually, this is when the plants are flowering.

When rare, threatened, or endangered plants are known to occur in the type(s) of habitat present in the project

area, nearby accessible occurrences of the plants (reference sites) should be observed to determine that the species are identifiable at the time of the survey.

b. Floristic in nature. A floristic survey requires that every plant observed be identified to the extent necessary to determine its rarity and listing status. In addition, a sufficient number of visits spaced throughout the growing season are necessary to accurately determine what plants exist on the site. In order to properly characterize the site and document the completeness of the survey, a complete list of plants observed on the site should be included in every botanical survey report.

c. Conducted in a manner that is consistent with conservation ethics. Collections (voucher specimens) of rare, threatened, or endangered species, or suspected rare, threatened, or endangered species should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit requirements. A collecting permit from the Habitat Conservation Planning Branch of DFG is required for collection of state-listed plant species. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a thorough coverage of potential impact areas.

e. Well documented. When a rare, threatened, or endangered plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5 minute topographic map with the occurrence mapped, should be completed and submitted to the Natural Diversity Database. Locations may be best documented using global positioning systems (GPS) and presented in map and digital forms as these tools become more accessible.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations and mitigated negative declarations, Timber Harvesting Plans (THPs), EIR's, and EIS's, and should contain the following information:

a. Project description, including a detailed map of the project location and study area.
b. A written description of biological setting referencing the community nomenclature used and a vegetation map.
c. Detailed description of survey methodology.
d. Dates of field surveys and total person-hours spent on field surveys.
e. Results of field survey including detailed maps and specific location data for each plant population found. Investigators are encouraged to provide GPS data and maps documenting population boundaries.
f. An assessment of potential impacts. This should include a map showing the distribution of plants in relation to proposed activities.
g. Discussion of the significance of rare, threatened, or endangered plant populations in the project area considering nearby populations and total species distribution.
h. Recommended measures to avoid impacts.
i. A list of all plants observed on the project area. Plants should be identified to the taxonomic level necessary to determine whether or not they are rare, threatened or endangered.
j. Description of reference site(s) visited and phenological development of rare, threatened, or endangered plant(s).
k. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.
l. Name of field investigator(s).
m. References cited, persons contacted, herbaria visited, and the location of voucher specimens.

APPENDIX C5

Approved Survey Methodology

for the

Blunt-nosed Leopard Lizard

(CDFG 2003)

CALIFORNIA DEPARTMENT OF FISH AND GAME

APPROVED SURVEY METHODOLOGY FOR THE
BLUNT-NOSED LEOPARD LIZARD
April 2003

Blunt-nosed leopard lizard, *Gambelia sila* = (*Gambelia silus*)
STATUS: SE, FE, DFG fully protected

This protocol has been developed to provide a minimum level of protection for blunt-nosed leopard lizards (BNLL) when projects or maintenance activities are scheduled to occur within potential BNLL habitat. Disturbing activities should not proceed until appropriate surveys are conducted to determine if the species is present on the site. Surveys conducted according to the following protocol by qualified researchers provide a reasonable, although not conclusive, indication of BNLL presence at a particular site and yield critical information needed to prevent mortality and minimize impacts to the species. Researchers conducting the surveys are expected to understand the basic biological requirements of the species and have the ability to recognize potential BNLL habitat. This protocol satisfies the Department of Fish and Game requirements when it is determined that formal BNLL surveys are needed. [Note: This protocol is appropriate for pre-project BNLL surveys, however, population monitoring over time on a site is best conducted using a permanent survey grid, such as described in Tollestrup (1976).]

METHODS:
A minimum of two researchers, walking in parallel on adjacent transects, should conduct a BNLL survey. Optimum BNLL activity periods occur when air temperature is between 25C-35C (77F-95F) (Tollestrup 1976; USFWS 1985, 1998). Surveys must be conducted when the air temperature falls within the optimal range. Surveys may begin after sunrise as soon as the minimum air temperature criterion is met, and must end by 1400 hours or when the maximum temperature is reached, whichever occurs first (Tollestrup 1976). Time of day and air temperature should be recorded at the start and end of each survey. Air temperature should be periodically checked to ensure that the maximum has not been exceeded. Air temperature should be measured at 1-2 cm above the ground over a surface most representative of the area being surveyed. The researcher must shade the thermometer from direct sunlight while taking the reading. Other factors that affect BNLL activity such as soil temperature (measured at 1cm below soil surface with a shaded thermometer) and weather conditions must be recorded at the start and end of each survey. Surveys should not be conducted on overcast days (cloud cover > 90%) or when sustained wind velocity exceeds 10 mph (force > 3 on Beaufort wind scale) (Montanucci 1965; Tollestrup 1976; J. Vance, pers. comm.).

Surveys must be conducted on foot, and researchers must survey all areas with potential BNLL habitat. BNLL are often difficult to detect, particularly in areas where shrubs are fairly numerous (>30% cover) and/or the herbaceous vegetation is tall (>30 cm). In such conditions, 10 meter wide transects should be walked at a slow pace. In areas with few shrubs and shorter herbaceous vegetation (<15 cm), transects as wide as 30 meters are acceptable. When feasible, transects should be walked in a north-south orientation to minimize glare from the sun. The surveyor should stop periodically and scan the transect for BNLL using close-focusing binoculars (minimum 7X35 magnification). In addition to recording the location of all BNLL observed (must provide UTM coordinates), the presence of habitat features important for BNLL (washes, playas, relative abundance of small mammal burrows) should also be recorded for each transect. Streambeds, washes, roads, etc., should be walked in addition to transect lines since BNLL are often seen in these areas.

TIMING AND LENGTH OF SURVEY:
Survey intensity should be commensurate with the anticipated level of disturbance to the BNLL habitat. The primary concern for BNLL when disturbance occurs during maintenance activities is direct mortality from equipment or personnel. Removal of intact BNLL habitat has a much greater potential for "take" due to direct impact on animals aboveground as well as any hibernating animals or eggs underground. A longer survey effort including both spring adult surveys and fall hatchling surveys is therefore required for activities that cause impacts to undisturbed BNLL habitat. The more intensive survey effort increases the chances of observing the species, even if the population is small. Once a BNLL has been observed, surveys may cease and consultation with the Department must begin regarding avoidance measures. If BNLL are observed incidentally while conducting surveys for other species, specific surveys for BNLL are not required. Surveys will be accepted for one year from the date of completion.

Disturbances for Maintenance Activities
Examples of maintenance activities include grading existing roads, grass mowing on roadsides, and maintaining existing structures. BNLL are active and above ground from April through September, but optimum activity periods for adults occur from April 15 to July 15 (Montanucci 1965; Tollestrup 1979; USFWS 1985, 1998). BNLL surveys should be conducted for a total of 8 days over the course of the three month period. A minimum of 3 survey days should be conducted consecutively, with a maximum of 6 days completed within any 30-day period.

Disturbances Leading to Habitat Removal
Examples of disturbances that impact intact habitat include establishment of new roads or structures, housing subdivisions, and changes in historic land use. BNLL surveys should be conducted for 12 days over the course of the adult optimal survey period (April 15 to July 15), with a maximum of 4 survey days per week and 8 days within a 30-day period. At least one survey session should be

conducted for 4 consecutive days, weather permitting. BNLL hatchlings and subadults are most commonly observed from August 1 to September 15, along with a few adults that are still active above ground (Montanucci 1965; Tollestrup 1979; USFWS 1985, 1998). An additional 5 survey days are required during the hatchling optimal survey period for a total of 17 survey days overall.

QUALIFICATIONS OF RESEARCHERS:
An acceptable BNLL survey crew should consist of no more than 3 Level I researchers for every Level II researcher. This restriction should reduce the number of incorrect/missed identifications. The names and affiliations of all researchers must be recorded for each survey day.

Level I: Researcher has demonstrated the ability to distinguish BNLL from other common lizard species that may inhabit the area;

Level II: Researcher has demonstrated the ability to distinguish BNLL from other common lizard species that may inhabit the area and has participated in at least 50 survey days for BNLL (or 25 survey days and a BNLL identification course recognized by/acceptable to the Department of Fish and Game). Researcher has made at least one confirmed* field sighting of a BNLL.

REPORTING
All BNLL observations should be reported to the California Natural Diversity Database within 30 days. A sample form is attached. Additional forms can be obtained at http://www.dfg.ca.gov/whdab/html/animals.html .

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United States Fish and Wildlife Service. 1985. Revised blunt-nosed leopard lizard recovery plan. United States Fish and Wildlife Service. Region 1, Portland, OR. 85 pp.

United States Fish and Wildlife Service. 1998. Recovery plan for upland species of the San Joaquin Valley, California. United States Fish and Wildlife Service. Region 1, Portland, OR. 319 pp.

PERSONAL COMMUNICATIONS

Julie Vance, California Department of Water Resources, San Joaquin District, 3374 E. Shields Ave, Fresno, California, 93726.

*A minimum of one confirmed field sighting must be documented for each Level II researcher and be available to the Department upon request. As with all BNLL sightings, it should also be submitted to the California Natural Diversity Database. Information to be included in documentation of BNLL sighting: Name of researcher, date of survey, location of survey, names of accompanying researchers who can confirm the sighting, and details of sighting (distance, BNLL activity, etc).

CONTACT INFORMATION

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San Joaquin Valley Southern Sierra Region
Habitat Conservation Planning
1234 Shaw Ave
Fresno, CA 93710
559/243-4005

****

The Department is willing to cooperate with researchers who have circumstances or needs not addressed by this protocol and who may wish to propose alternative methods to comply with State law prohibiting take of BNLL.

APPENDIX D

Survey Guidelines (Federal)

APPENDIX D1

Interim Survey Guidelines to Permittees for Recovery

Permits under Section 10(a)(1)(A) of the

Endangered Species Act for the

Listed Vernal Pool Branchiopods (USFWS 1996)

April 19, 1996

Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods

The endangered Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) were listed on September 19, 1994, under the Endangered Species Act of 1973, as amended (Act) (59 Federal Register 48136). These species are endemic to vernal pools in the Central Valley, coast ranges, and a limited number of sites in the Transverse Range and Riverside County, California. The endangered Riverside fairy shrimp (*Streptocephalus woottoni*) was listed under the Act on August 3, 1993 (58 Federal Register 41391). This species inhabits Riverside, Orange and San Diego Counties, California, and northern Baja California, Mexico. These five species, hereafter referred to as vernal pool branchiopods, are fully protected under the Act. The San Diego fairy shrimp (*Branchinecta sandiegonensis*) is a proposed endangered species. Surveys for all these species should follow the methodologies described in these Interim Survey Guidelines (Guidelines). It is expected that the Guidelines will be revised in the future as additional information becomes available.

These Guidelines are issued as guidance to section 10(a)(1)(A) permittees. Because taking (killing, injuring, harming or harassing) endangered species is strictly prohibited under the Act, a section 10(a)(1)(A) recovery permit must be obtained prior to initiating any surveys or studies that might result in the take of endangered or threatened branchiopods. Failure to obtain this permit may result in violation(s) of section 9 of the Endangered Species Act. Additionally, violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

For the purposes of these Guidelines, vernal pools and swales are defined as follows:

> Vernal pools and swales are ephemeral wetlands that form in areas of California with Mediterranean climates that have shallow depressions underlain by a substrate of hardpan, clay, or basalt near the surface that restricts the percolation of water. They may be characterized by a barrier to overland flow that causes water to collect and pond. Vernal pools/swales may occur singly, but more typically occur in vernal pool/swale complexes, due to the local hydrology, geology, and topography. Initially, the dry soil in vernal pools/swales becomes wet and starts to saturate during the fall and early winter rains. The second stage in a typical vernal pool cycle is characterized by peak rainfall and inundation of the vernal pools/swales. Vernal pools may remain inundated until spring or early summer, sometimes filling and emptying numerous times during the wet season. The vernal pools gradually dry down during the spring, quite often forming the unique "bathtub ring" of flowers from endemic vernal pool plants blooming profusely at the pool margins. This drying down stage is typified by the production of seeds in the endemic plants and the dispersal of animals from the vernal pools. These pools eventually dry down totally, with the onset of drought conditions. During this final stage, early season and shallow-rooted plants turn brown, and the soil dries and may crack. With average rainfall patterns, vernal pools are typically characterized by a predominantly annual plant community dominated by wetland species.

Note: At this time, vernal pool-associated activities not directed toward the listed species, such as botanical surveys and wetland delineations, are not considered to require a permit. However, persons conducting such activities should minimize any potential impact on the vernal pool branchiopods or plants by reducing the amount of walking through vernal pools to the lowest

extent practical. Persons conducting projects that require permits (e.g., branchiopod or amphibian surveys) should also minimize walking through the pools.

I. Survey Approval

Unless otherwise authorized by the U.S. Fish and Wildlife Service (Service) in writing, these Guidelines shall be utilized for all surveys conducted for the listed vernal pool branchiopods. Any deviations from the methods prescribed by these Guidelines must be approved by the Service before surveys are conducted. The permittee shall provide the appropriate Service Field Office (see XI, Service Contact section) with all of the following information in writing for each project site at least 10 working days prior to the anticipated start date of survey work:

a. The precise location of the project site clearly delineated on either an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2,000 ft.). The map should contain the project name, type of project by category [the categories are: development, mitigation banking, or other (specify)], the estimated area (acreage) of the project site and an estimated number or area (acreage) of pool/swales on the site, quad name, and county name;

b. Names of all vernal pool biologists and associated personnel with reference to their section 10(a)(1)(A) permit number; and

c. A written request to commence wet season or dry season sampling for each project to be surveyed for the listed vernal pool branchiopods.

II. Sampling Survey Completion

a. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if:

1. the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the wet season survey cycle; or

2. it is agreed that one or more of the listed vernal pool branchiopods are present on the subject site.

b. Permission to dry season survey for the listed vernal pool branchiopods requires the completion of both the full wet season survey and the dry season survey, including the complete analysis of all dry soil samples (see V).

c. A complete survey consists of sampling for either:

1. two full wet season surveys done within a 5-year period; or

2. two consecutive seasons of one full wet season survey and one dry season survey (or one dry season survey and one full wet season survey).

d. Each vernal pool/swale in a vernal pool/swale complex shall be surveyed as per these Guidelines. However, in the case of a large vernal pool/swale complex, the Service may authorize a representative portion or portions of the vernal pool/swale complex to be surveyed as per these Guidelines.

III. Notification of Presence

Should the permittee determine that any of the five listed vernal pool branchiopods are present at a site, the appropriate Service Field Office (see XI, Service Contact section) shall be notified within 10 working days by letter or telephone.

IV. Wet Season Surveys

Wet season survey sampling shall not be conducted at any project site unless the permittee receives prior permission from the Service (see I (c)).

a. Survey Initiation, Frequency, and Termination

1. Surveyors should visit sites after initial storm events to determine when pools/swales have been inundated. A pool/swale is considered to be inundated when it holds greater than 3 cm of standing water 24 hours after a rain event.

2. Pools/swales shall be adequately sampled once every two weeks, beginning no later than two weeks after their initial inundation and continuing until they are no longer inundated, or until they have experienced 120 days of continuous inundation. .

3. In cases where the pools/swales dry and then refill in the same wet season, sampling shall be reinitiated within eight days of refilling every time they meet the 3 cm of standing water criteria and shall continue until they have experienced 120 days of continuous inundation, or until they are no longer inundated.

4. If a vernal pool/swale has already experienced 120 days of continuous inundation, but then dries down and subsequently refills in the same wet season, surveys must be re-initiated in accordance with IV(a)(3) above, each time the vernal pool/swale refills and meets the 3 cm of standing water criteria.

5. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the wet season survey cycle

b. Survey Sampling At each wet season visit, representative portions of the pool/swale bottom, edges, and vertical water column shall be adequately sampled using a seine, dip net or aquarium net appropriate for the size of the pool or swale. Net mesh size shall not be larger than (1/8) inch. Seines shall be examined and emptied of material at least once every five linear meters.

c. Voucher Specimens

1. Voucher specimens shall be collected only once for each individual vernal pool/swale and shall be accessioned to either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM) (see VIII).

2. Voucher specimens of all listed vernal pool branchiopods captured shall be collected and all other specimens shall be returned in good condition to the vernal pool/swale where they were found as quickly as possible.

3. No more than 20 specimens of each species of listed vernal pool branchiopods from each pool/swale, or less than 10% of the subpopulation present in the pool/swale, whichever is the lesser amount, shall be retained and preserved as voucher specimens.

4. Only sexually mature, adult branchiopods shall be used for purposes of voucher specimens for species identification. The Service will not accept species identifications made using immature specimens.

5. The sample of 20 voucher specimens shall include no less than three specimens of either sex.

V. Dry Season Surveys

Dry season soil sampling shall not be conducted at any project site unless the permittee receives prior written permission from the Service (see I (c)).

a. Soil Collection

Soil shall be collected when it is dry to avoid damaging or destroying cysts which are more fragile when wet. A hand trowel or similar instrument shall be used to collect approximately one liter volume sample per pool/swale of the top 1-3 cm of pool sediment. Whenever possible, soil samples shall be collected in chunks. The trowel shall be used to pry up intact chunks of

sediment, rather than loosening the soil by raking and shoveling which can damage cysts.

In southern California there are a number of federally listed plant species (Orcuttia californica, Pogogyne abramsii, and Pogogyne nudiscula) that often co-occur with the fairy shrimp. Removal of soil could damage populations of these plants by inadvertently removing seed. Dry sampling should be minimized or avoided within those vernal pools/swales that are known to, or may, contain these species. The permittee shall contact the Carlsbad Field Office (see XI, Service Contact section) regarding the distribution of these listed plants species prior to conducting dry sampling in Los Angeles, Orange, Riverside and other southern California counties.

b. Soil Sample Volume

Each soil sample from the 10 soil sample locations shall be labeled, stored, and analyzed individually.

1. A total of 10 soil samples of approximately 100 ml each shall be taken from each pool/swale, for a total soil sample volume of approximately one liter per pool/swale.

2. In the case of a very large playa, dry lake, or vernal pool, the Service may authorize the removal of more than one liter of soil.

3. If a pool has a diameter of less than three meters, the total soil sample taken shall not exceed ½ liter in volume per pool, and the 10 soil samples shall be approximately 50 ml each in volume.

c. Soil Sample Locations

A total of 10 soil samples shall be collected from the following locations within each pool/swale sampled:

1. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the longest transect of the pool/swale.

2. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the widest transect of the pool/swale.

3. If neither the longest or the widest transect encompasses the deepest part (or parts) of the pool/swale, then at least two soil samples shall

be taken from the deepest part (or parts) of the pool/swale..

d. Soil Storage

1. The soil samples from each soil sample location shall be stored in separate bags, labeled with the specific location within the pool/swale from where each soil sample was taken. A sketch of the pool/swale showing the specific location of each soil sample shall be included in the 90-day report.

2. Soil samples containing any residual moisture initially shall be adequately ventilated and allowed to air dry thoroughly before storage of the sample. The bags containing the soil samples shall be kept out of direct sunlight in order to avoid excessively heating the sample.

3. All soil samples shall be retained and stored as directed in V(d)(1) and V(d)(2) above until the Service is able to provide direction in species-level identification of the cysts of all the aforementioned branchiopod species.

e. Soil Sieving

1. The soil samples shall not be ground, crushed, or otherwise manipulated in order to expedite the sieving process. A relatively short period of pre-soaking the soil sample may be helpful/necessary in order to facilitate the sieving process. Small aliquots (approximately 50 ml in volume) of soil shall be gently washed with water through a graded series of U.S. standard eight inch soil sieves ending in mesh sizes 300 micron (um), and 150 micron (um).

2. Sieves must be thoroughly rinsed and visually inspected for any cysts adhered to the sieves prior to the start of sieving. This process must be repeated for each individual soil sample location. Sieves shall also be rinsed and thoroughly inspected upon completion of sieving soil samples.

f. Soil Examination

1. Washed and sieved soil fractions from the 300 um and 150 um sieves shall be examined under a dissecting microscope for tadpole shrimp and fairy shrimp cysts. The process shall be repeated until all individual soil samples have been examined. All sieved material shall be processed and dried as quickly as possible, preferably within one hour from the initial wetting.

Note: Do not return soil to survey sampling site.

2. All fairy shrimp and tadpole shrimp cysts shall be removed from the soil, separated by cyst type into labeled vials, allowed to air-dry, and then stored dry.

g. Cyst Density

Cyst density information for each soil sample location shall be calculated by dividing the total number of cysts recovered by the total amount of soil from the individual aliquots from that soil sample location. Total cyst density information for each soil sample location shall be reported for each species in terms of: none; 1-25 cysts/100 ml soil; 26-50 cysts/100 ml soil; 51-100 cysts/100 ml soil; 101-199 cysts/100 ml soil; or more than 200 cysts/100 ml soil.

h. Cyst Identification

Each fairy shrimp and tadpole shrimp cyst type shall be identified to genus by a qualified biologist. The Service may require an independent review by a crustacean biologist(s) of any vernal pool branchiopod or cyst identification.

There are two options when a branchiopod cyst identification is made to genus:

1. the survey, pursuant to these Guidelines, may be suspended if it is agreed one or more of the listed species are present on the project site; or

2. one subsequent complete wet season sampling survey shall be conducted to complete survey requirements.

VI. Cyst Voucher Specimens

A representative sample of each cyst type from each pool/swale shall be accessioned to either CAS or LACM (see VIII).

VII. 90-Day Reports

a. U.S. Fish & Wildlife Service

The permittee shall provide the appropriate Service Field Office (listed in the Service Contact section) with all of the following information in writing, using the appropriate Vernal Pool Data Sheet where applicable as the reporting form, no more than 90 calendar days after completing the last field visit of the season at each project site:

1. The location of the project site clearly delineated on an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2,000 ft.). The location of the listed vernal pool branchiopods is to be included on the 7.5 minute maps in as precise a manner as possible (e.g., lat/long or location within a section).

2. Five color photographic 35mm slides and/or 3" x 5" photographs of each project site taken during sampling in the wet season; this is to include two slides and/or photographs taken from standing position that portray the general landscape of the site [i.e., two photos from an opposing axis of the site (e.g., north and south compass headings)]; and three slides and/or photographs of representative vernal pools, swales, and other areas within the site sampled for the five listed vernal pool branchiopod species. The following information shall be legibly written on each slide/photograph with permanent ink: precise location of the project site, direction from which photograph was taken, date of photograph, initials of photographer, and initials of the scientific names of any of the five listed vernal pool branchiopod species that were found at the depicted site. Note: Slides and/or photographs only need to be submitted once per project site.

3. The estimated number of individuals of any of the listed vernal pool branchiopods observed in each pool/swale shall be reported in terms of an order of magnitude (e.g., 10's, 100's, 1000's). (*Refer to the Vernal Pool Data Sheet*)

4. The number of individuals of any of the listed vernal pool branchiopods or cysts preserved from each pool/swale and the name of the institution in which they are accessioned. (*Refer to the Vernal Pool Data Sheet*)

5. A qualitative description of the vernal pool/swale community. A general list of amphibian species and non-listed vernal pool crustacean species (by common and/or scientific name) encountered at the project site is desirable. For purposes of this permit a full survey for these species is not required. However, if more detailed information is collected, it shall be included in the Vernal Pool Data Sheet. .
(*Refer to the Vernal Pool Data Sheet*)

6. Data collected during each field visit, including: date, air temperature, water temperature, weather conditions (e.g., sunny, overcast), maximum depth of each pool/swale, and size (area in square meters) of each pool/swale.
(*Refer to the Vernal Pool Data Sheet*).

7. (Optional) water chemistry data collected during each field visit, including: alkalinity (total: ppm or mg/l), conductivity (uMHO), dissolved oxygen (ppm or mg/l), dissolved NH4 (ppm or mg/l), pH, salinity (ppt), total dissolved solids (TDS, ppm), and turbidity. (Refer to the Vernal Pool Data Sheet)

b. California Department of Fish & Game

1. Permittees should consult with the California Department of Fish and Game (916/653-4875) to determine their responsibilities under the California Endangered Species Act and the California Fish and Game Code.

2. The permittee shall supply the California Department of Fish and Game (Natural Diversity Data Base, Staff Zoologist, California Department of Fish and Game, 1416 9th Street, Sacramento, California 95814; telephone 916/322-2494) with completed California Native Species Field Survey Forms, no more than 90 calendar days after completing the last field visit of the season at each project site.

VIII. Accessioning Voucher Specimens

a. All vernal pool branchiopod voucher specimens (including individuals collected and cysts) shall be accessioned into either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM). All specimens shall be preserved according to the accession standards of the repository which will accession and maintain the specimens. The October 1995 CAS and September 1995 LACM standards are attached to these Interim Survey Guidelines.

b. All vernal pool branchiopod voucher specimens (including individuals collected and cysts), along with a copy of the Vernal Pool Data Sheet containing all of the items listed in VII (a), shall be permanently deposited in the CAS or LACM within 90 calendar days of the completion of the field survey and the Service shall be supplied with the CAS or LACM catalog numbers given to the specimens.

c. The permittee shall supply the CAS or LACM with a photocopy of their section 10(a)(1)(A) permit to validate that the specimens supplied to them were taken pursuant to a permit. The Service will likely consider refusal by the CAS or LACM to accession any listed branchiopod specimens to be a violation by the permittee of their section 10(a)(1)(A) permit (e.g., if due to improper preservation/storage).

California Academy of Sciences (CAS)
Department of Invertebrate Zoology and Geology, Golden Gate Park,
San Francisco, California 94118; telephone (415) 750-7082

Natural History Museum of Los Angeles County (LACM)
Crustacea Section, Invertebrate Zoology, 900 Exposition Boulevard,
Los Angeles, California 90007; telephone (213) 744-3450

IX. Additional information, limitations, and caveats with respect to these Guidelines are as follows:

a. From time to time, specific circumstances may justify or necessitate revision of these Guidelines, on a case-by-case basis. At the discretion of the Service, such a variance may be allowable under these Guidelines if:

1. the permittee explains to the Service in writing why the variance to the Guidelines is needed and justified; and

2. the Service concurs, in writing, with the variance requested by the permittee.

b. The Service reserves the right to reject vernal pool branchiopod surveys conducted under these protocols as inadequate if:

1. survey methods used are inconsistent with these Guidelines, unless prior written permission (see I, Survey Approval) has been obtained; or

2. other information indicates that the survey is inadequate as determined by the Service.

X. Permit Infractions

The Service may consider any of these actions to be a violation by the permittee of their section 10(a)(1)(A) permit:

a. falsification of any reporting or information;

b. failure to follow the stated Guidelines sampling methodologies;

c. failure to obtain prior permission to commence wet season surveys or failure to obtain written permission to commence dry season surveys (see section I (c));

d. failure to notify the Service within 10 days of a determination of presence of one or more of the listed vernal pool branchiopods on a survey site;

e. failure to accession voucher specimens or improperly accessioned voucher specimens;

f. failure to file completed 90-day reports with the Service within 90 calendar days after completing the last field visit of the season at each project site; or

g. failure to file completed Natural Diversity Data Base forms with the California Department of Fish and Game within 90 calendar days after completing the last field visit of the season at each project site.

Violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

XI. Service Contact

For the Central Valley hydrographic basin and the coast ranges north of the Santa Cruz County line, the Sacramento Field Office (2800 Cottage Way Room E-1803, Sacramento, California 95825; telephone 916/979-2728) should be contacted regarding vernal pool branchiopod issues.

For areas from Santa Cruz County south to Ventura County, contact the Ventura Field Office (2493 Portola Road - Suite B, Ventura, California 93003; telephone 805/644-1766).

For areas from Los Angeles County south to the U.S.- Mexico border, contact the Carlsbad Field Office (2730 Loker Avenue West, Carlsbad, California 92008; telephone 619/431-9440).

APPENDIX D2

Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (USFWS 1996)

Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed, or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

    a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

    b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

    c. survey dates and survey methodology(ies)

    d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

    e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

f. current and historic land uses of the habitat(s) and degree of site alteration

g. presence of target species off-site on adjacent parcels, if known

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

GENERAL RARE PLANT SURVEY GUIDELINES

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Revised July 2002

All surveys for rare plants should be conducted in accordance with the standardized guidelines issued by the regulatory agencies (U.S. Fish and Wildlife Service 1996, California Department of Fish and Game 2000) and the California Native Plant Society (2001). Some of the requirements specified in the standardized guidelines are that surveys must be conducted during the appropriate season and be floristic in nature. Thus, surveys should not target a single species but should aim to identify any and all rare species and rare plant communities in the area. The guidelines also provide information on selecting a qualified botanist and providing appropriate documentation of surveys. Additional considerations for conducting rare plant surveys are described by Nelson (1987). Permission of the landowner or land-management agency is required for both site access and plant collection. In addition, federal and/or state permits are necessary to collect specimens of plants listed as endangered, threatened, or rare.

The species-specific methods presented below are intended as a supplement to the basic guidelines. They describe the conditions under which the potential for discovering each listed plant species in the survey area will be maximized. Multiple visits to a site may be necessary to ensure that survey conditions have been appropriate for all potentially-occurring rare plant species.

Certain methods are common to all of the following species-specific survey guidelines; similar methods may be employed for species not covered herein. In the southern San Joaquin Valley, many of the listed plants are small and easily obscured by dense vegetation. Thus intensive, systematic surveys are recommended to detect rare plant species in this region. Biologists should walk parallel transects spaced 5 to 10 meters (16 to 33 feet) apart throughout the entire site, regardless of subjective habitat evaluations. Transects may be stratified by topography or plant community for convenience. Field survey crews should include at least one member who has seen the target species growing in its natural habitat. Other team members may be trained using photographs and/or herbarium specimens but should be accompanied in the field by the experienced crew member during all surveys. Project-area surveys are valid only for those species that are evident during the survey period. Prior to conducting surveys in a given year, at least one member of the survey crew should visit known populations of the target species that occur in areas similar in elevation, latitude, vegetation, and topography to the survey area. Such visits will determine whether precipitation has been adequate for germination and growth, as well as confirm current phenology of the target species. Survey reports should document the known locations that were visited, the date of the visit, and the observability and phenology of the target

species at that time, plus the date of the survey, the abundance and distribution of all rare species in the survey area, and any other elements required by the agency guidelines. Information on the locations of known populations may be obtained from agency biologists, the California Natural Diversity Data Base, or local chapters of the California Native Plant Society (see below). The current status and abundance of any known populations visited as well as any new populations discovered also should be reported to the California Natural Diversity Data Base.

Surveys can confirm the presence of rare plants on a site, but negative results do not guarantee that rare plant species are absent. However, for practical purposes, surveys that adhere to the attached species-specific guidelines provide reasonable evidence that the specified plant taxa do not occur in the survey area. Surveys that employ methods or timing other than those recommended herein may be used as evidence of the presence (but not absence) of rare plant species.

References

California Department of Fish and Game. 2000. Guidelines for assessing the effects of proposed projects on rare, threatened, and endangered plants and natural communities. (Revision of 1983 guidelines.) Sacramento, CA, 2 pp.

California Native Plant Society. 2001. CNPS botanical survey guidelines. Pages 38-40 *in* California Native Plant Society's inventory of rare and endangered vascular plants of California (D.P. Tibor, editor). Sixth edition. Special Publication No. 1, California Native Plant Society, Sacramento, 387 pp.

Nelson, J.R. 1987. Rare plant surveys: techniques for impact assessment. Pages 159-166 *in* Conservation and management of rare and endangered plants: proceedings of a California conference on the conservation and management of rare and endangered plants (T.S. Elias, editor). California Native Plant Society, Sacramento, 630 pp.

U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed, and candidate plants. Sacramento, California. 2 pp.

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SUPPLEMENTAL SURVEY METHODS FOR SAN JOAQUIN WOOLLY-THREADS

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Revised July 2002

Literature review

San Joaquin woolly-threads [*Monolopia congdonii* (Gray) B.G. Baldwin] is an annual herb of the aster family (Asteraceae). When first described (Gray 1883), this species was included in the genus *Eatonella*; Greene (1897) later transferred it to *Lembertia*. The name *Lembertia congdonii* (Gray) Greene was in use for many years, but a recent revision based on phylogeny (Baldwin 1999) changed the scientific name to *Monolopia congdonii* (Gray) B.G. Baldwin. San Joaquin woolly-threads is federally listed as an endangered species (U.S. Fish and Wildlife Service 1990).

The plant size and habit of San Joaquin woolly-threads are influenced by associated vegetation. On sparsely-vegetated sites, individuals generally are 2 to 7 centimeters (0.8 to 2.8 inches) tall, erect, and single-stemmed, whereas individuals in tall, dense vegetation may have many decumbent stems up to 45 centimeters (17.7 inches) long (Cypher 1994). In years of below-average precipitation, few seeds of San Joaquin woolly-threads germinate (Twisselmann 1967, Taylor 1989), and those that do typically produce tiny plants (E. Cypher personal observation). Phenology also varies with location and weather conditions. Seed germination may begin as early as November (Taylor 1989) but usually occurs in December and January (Lewis 1993, E. Cypher unpublished data). San Joaquin woolly-threads typically flowers between late February and early April (Taylor 1989), but flowering may continue into early May if conditions are optimal (B. Delgado personal communication). Populations in the northern part of the range flower earlier than those on the Carrizo Plain (Mazer and Hendrickson 1993, Cypher 1994). Small, vegetative individuals closely resemble *Eriogonum* species, but flowering individuals are readily distinguishable (E. Cypher personal observation).

The historical range of this species included Fresno, Kern, Kings, San Benito, San Luis Obispo, Santa Barbara, and Tulare Counties (Taylor 1989, Tibor 2001). San Joaquin woolly-threads occurs in a number of the plant communities described by Holland (1986), including Non-native Grassland, Valley Saltbush Scrub, Interior Coast Range Saltbush Scrub, and Upper Sonoran Subshrub Scrub (Cypher 1994). However, this species typically occupies portions of the habitat with less than 10% shrub cover and may occur in association with cryptogamic crust (Taylor 1989, Cypher 1994). Occurrences have been reported at elevations ranging from as low as 60 m (190 feet) on the San Joaquin Valley floor up to 838 meters (2,750 feet) in the Inner Coast Ranges of San Luis Obispo and Santa Barbara counties (Lewis 1993, California Natural Diversity Data Base 2002).

San Joaquin woolly-threads occurs on soils of alluvial origin that are neutral to subalkaline (Taylor 1989, Lewis 1993). On the San Joaquin Valley floor, this species typically is found on sandy or sandy loam soils, particularly those of the Kimberlina series (Taylor 1989, Taylor and Buck 1993), whereas on the Carrizo Plain it occurs on silty soils (Lewis 1993). San Joaquin woolly-threads frequently occurs on sand dunes and sand ridges (Taylor 1989, California Natural Diversity Data Base 2002) as well as along the high-water line of washes and on adjacent terraces (Lewis 1993, E. Cypher personal observation). Populations of this species have been documented in previously cultivated lands, heavily grazed pastures, and remnant habitat in oil fields (Taylor 1989, Lewis 1993, Taylor and Buck 1993).

Survey guidelines

All surveys for rare plants should be conducted in accordance with the standardized guidelines issued by the regulatory agencies (U.S. Fish and Wildlife Service 1996, California Department of Fish and Game 2000) and the California Native Plant Society (2001). The species-specific methods presented below are intended as a supplement to those standardized guidelines.

Systematic surveys are recommended to detect presence and determine distribution of San Joaquin woolly-threads within the survey area. For systematic searches, biologists should walk parallel transects spaced 5 to 10 meters (16 to 33 feet) apart throughout the entire site, regardless of subjective habitat evaluations. However, transects may be stratified by topography or plant community for convenience. Field survey crews should include at least one member who has seen San Joaquin woolly-threads growing in its natural habitat. Other team members may be trained using photographs and/or herbarium specimens but should be accompanied in the field by the experienced crew member during all surveys.

Prior to beginning surveys in a given year, at least one member of the survey crew should visit one or more known locations of San Joaquin woolly-threads to verify that precipitation has been adequate for germination and to determine current phenology. The known locations should be as similar as possible to the survey area in elevation, habitat, and topography. Species-specific surveys should not be attempted if San Joaquin woolly-threads is not seen at known locations, the densities are very low relative to normal years, or the plants are inconspicuous. Survey reports should document the known locations that were visited, the date of the visit, and the observability and phenology of San Joaquin woolly-threads at that time, plus the date of the survey, the abundance and distribution of all rare species in the survey area, and any other elements required by the agency guidelines. The typical survey period for San Joaquin woolly-threads is March and April.

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SUPPLEMENTAL SURVEY METHODS FOR KERN MALLOW

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Literature review

The taxonomy of Kern mallow (*Eremalche kernensis* C.B. Wolf) is somewhat controversial. At issue are the taxonomic rank and the circumscription of Kern mallow in relation to Parry's mallow [*Eremalche parryi* (Greene) Greene]. Kern mallow was first described as *Eremalche kernensis* (Wolf 1938) but also has been included in the genus *Malvastrum* (Munz and Keck 1959). The most recently-published treatments of this complex (Bates 1992, Bates 1993) assign Kern mallow the name *Eremalche parryi* (Greene) Greene ssp. *kernensis* (Wolf) Bates, and Parry's mallow the name *E. parryi* ssp. *parryi*. Other combinations have been suggested (Leonelli 1986) but have not been validly published. After consultation with species experts, the U.S. Fish and Wildlife Service made the decision to continue using the original name and circumscription for Kern mallow (Medlin in litt. 1995). Kern mallow is federally listed as endangered (U.S. Fish and Wildlife Service 1990). In terms of status, its rank is irrelevant because subspecies also are protected under the federal Endangered Species Act (U.S. Fish and Wildlife Service 1992). Throughout this document, "Kern mallow" refers to *Eremalche kernensis* in the strict sense.

The circumscription debate centers around the gender, size, and color of flowers to be included in each taxon. Certain populations in the Kern/Parry's mallow complex exhibit a condition known as gynodioecy, meaning that some of the plants have only bisexual flowers and other plants in the same population have only pistillate flowers. Bisexual flowers have both male and female parts; these flowers also are known as perfect or hermaphroditic. Pistillate flowers have only female parts; these flowers also are known as male-sterile. Pistillate flowers have shorter petals than bisexual flowers in the same population (Bates 1992, Bates 1993, E. Cypher unpublished data) (Table 1). Experts agree that Kern mallow is gynodioecious. However, any gynodioecious population in the complex keys to *Eremalche parryi* ssp. *kernensis* in Bates (1993), including those that species experts consider to be Parry's mallow (Taylor and Davilla 1986, E. Cypher unpublished data). Other populations in the Kern/Parry's mallow complex consist only of plants with bisexual flowers; these populations key to *Eremalche parryi* ssp. *parryi* (Bates 1993) and are indisputably Parry's mallow. Parry's mallow is generally accepted to have larger flower parts than Kern mallow (Table 1) (Munz and Keck 1959, Bates 1992, Bates 1993, E. Cypher unpublished data).

Gynodioecious populations in the Kern/Parry's mallow complex may have a mixture of flower colors. Kern mallow flowers may be either white or pale lavender, regardless of gender (Wolf

Table 1. Comparison of morphological characters (ranges) of three *Eremalche* species. Compiled from Abrams (1951), Munz and Keck (1959), Bates (1992, 1993), Stebbins et al. (1992), and E. Cypher (unpublished data).

Character	*exilis* (bisexual only)	*kernensis*		*parryi* [1]	
		pistillate flower	bisexual flower	pistillate flower	bisexual flower
Petal color	white, pinkish, or pale lavender	white or pale lavender	white or pale lavender	mauve, purple, or rose-pink, rarely white or lavender	mauve, purple, or rose-pink, rarely white or lavender
Petal length	3-6 mm	2.5-8.5 mm	3.5-10.5 mm	4.5-11 mm	5-19 mm
Calyx length	3-7 mm	2.5-7 mm	3-8 mm	3.5-9 mm	5-10 mm
Calyx lobe width	1.5-2.5 mm	1-3.5 mm	1-3.5 mm	1-4 mm	1.5-4 mm
Shape of sepal tip	acute	gradually tapering [2]	gradually tapering [2]	abruptly acuminate [2]	abruptly acuminate [2]
Bractlet length	3-7 mm	2-6 mm	2-6 mm	3-7 mm	3-9 mm
Filament length	equal to styles	-	shorter than styles	-	shorter than styles
Anther position	even with stigmas	-	below stigmas	-	below stigmas
Number of carpels	9-13	9-19	7-14	11-23	8-24
Number of rays per stellate hair	?	5-7 [2]	5-7 [2]	10-20 [2]	10-20 [2]

[1] Measurements obtained from plants in Kern, Tulare, and San Luis Obispo counties only.
[2] Not differentiated by flower gender.

1938, Munz and Keck 1959, E. Cypher unpublished data). Parry's mallow typically has mauve to purple flowers (Bates 1992), but white or pale lavender flowers are observed occasionally (Taylor and Davilla 1986, E. Cypher unpublished data).

Another source of confusion is that the closely-related desert mallow (*Eremalche exilis*) co-occurs with Kern and Parry's mallows in western Kern County. Desert mallow plants have only bisexual flowers that are similar in size to the pistillate flowers of Kern mallow (Table 1). Despite the gender difference, the bisexual flowers of desert mallow are easily mistaken for the pistillate flowers of Kern mallow due to their size and the fact that the anthers of the former are not easily distinguished from the stigmas (Andreasen et al. in press). Desert mallow is known to grow sympatrically with Kern mallow in the Lokern area but occupies a much broader range overall (Twisselmann 1956, Twisselmann 1967, Hoover 1970, Bates 1993, Andreasen et al. in press). Although Mojave desert populations of desert mallow typically have trailing stems, those in western Kern County and San Luis Obispo County may have either trailing stems or robust, upright stems. Numerous populations attributed to Kern mallow in the past actually consist of desert mallow (Andreasen et al. in press). Due to their morphological similarity, close inspection is required to differentiate the two species.

Widely varying geographical ranges have been reported for Kern mallow due to the unresolved taxonomic problems and misidentifications of desert mallow. Kern mallow in the strict sense occurs only in the Lokern area of Kern County (Wolf 1938, Munz and Keck 1959, Taylor and Davilla 1986, Tibor 2001, Andreasen et al. in press). Plants reported from elsewhere in Kern County or from San Luis Obispo, Santa Barbara, and Tulare counties (Hoover 1970, Leonelli 1986, Taylor and Davilla 1986, Olson and Magney 1992, Stebbins et al. 1992, California Natural Diversity Data Base 2002, E. Cypher personal observations) are referable either to Parry's mallow or desert mallow (Andreasen et al. in press). These erroneous locations include Buena Vista Valley, Carrizo Plain, Cuyama Valley, Elk Hills, Elkhorn Plain, Fellows, Lost Hills, Maricopa, McKittrick Hills, Panorama Hills, Pixley, Telephone Hills, and the Temblor Range. The distribution map in the recovery plan for Kern mallow (U.S. Fish and Wildlife Service 1998) has been invalidated by the recent research of Andreasen et al. (in press).

As with many desert annuals, the height, habit, density, and phenology of Kern mallow vary greatly depending on precipitation. Kern mallow may not germinate in dry years (Twisselmann 1956, Bates 1992). True Kern mallow typically flowers in March and early April, although flowers may be present in late February or into May if weather conditions are favorable (Taylor and Davilla 1986, E. Cypher unpublished data). The majority of Kern mallow flowers open in late morning (approximately 10:00 am standard time) and wither by late afternoon (approximately 3:00 pm standard time) of the same day. Desert mallow in Lokern begins flowering somewhat earlier in the season and flowers are open only for a few hours at mid-day (E. Cypher personal observation).

Kern mallow occurs primarily in the Valley Saltbush Scrub plant community (cf. Holland 1986) and its ecotones with Valley Sink Scrub and Non-native Grassland (Taylor and Davilla 1986, California Natural Diversity Data Base 2002, E. Cypher unpublished data). This species typically grows in areas where shrub cover is less than 25%. However, much of the Kern mallow habitat in Lokern is shrubless due to repeated fires, which type-converted the areas from

shrubland to grassland. Herbaceous cover in occupied habitat is variable depending on rainfall; it has ranged from 48% to 97% between 1993 and 2001, but a lower cover probably would be optimal (Taylor and Davilla 1986, Cypher 1994, Anonymous 1997, Anonymous 1998, Anonymous 1999, Anonymous 2000, Anonymous 2001). Elevations at true Kern mallow locations range from 84 to 275 meters (275 to 900 feet) (California Natural Diversity Data Base 2002). The primary soil type supporting Kern mallow is Kimberlina sandy loam, followed by Kimberlina fine sandy loam and Panoche clay loam (E. Cypher unpublished data). Kern mallow occasionally has reinvaded disturbed sites when existing populations remained in adjacent areas to provide sources of seed (Mitchell 1989, E. Cypher unpublished observation).

Survey guidelines

All surveys for rare plants should be conducted in accordance with the standardized guidelines issued by the regulatory agencies (U.S. Fish and Wildlife Service 1996, California Department of Fish and Game 2000) and the California Native Plant Society (2001). The species-specific methods presented below are intended as a supplement to those standardized guidelines.

Systematic surveys are recommended to detect presence and determine distribution of Kern mallow within the survey area. For systematic searches, biologists should walk parallel transects spaced 5 to 10 meters (16 to 33 feet) apart throughout the entire site, regardless of subjective habitat evaluations. However, transects may be stratified by topography or plant community for convenience. Field survey crews should include at least one member who has seen Kern mallow growing in its natural habitat. Other team members may be trained using photographs and/or herbarium specimens but should be accompanied in the field by the experienced crew member during all surveys. The identity of each population discovered must be confirmed by a botanist familiar with both Kern mallow and desert mallow. Any non-flowering *Eremalche* populations that are observed during surveys must be revisited when the flowers are open to confirm their identity.

Prior to beginning surveys in a given year, at least one member of the survey crew should visit one or more known locations of Kern mallow in the Lokern area to verify that precipitation has been adequate for germination and to determine current phenology. The known locations should be as similar as possible to the survey area in elevation, habitat, and topography. Species-specific surveys should not be attempted if Kern mallow is not seen at known locations, the densities are very low relative to normal years, or the plants are inconspicuous. Survey reports should document the known locations that were visited, the date of the visit, and the observability and phenology of Kern mallow at that time, plus the date of the survey, the diagnostic characteristics of any *Eremalche* populations discovered, the abundance and distribution of all rare species in the survey area, and any other elements required by the agency guidelines. The typical survey period for Kern mallow is March and April.

Until biosystematic studies have been conducted to resolve the taxonomic issues, any gynodioecious or small-flowered *Eremalche* population west of the Sierra crest should be reported to the appropriate agency, regardless of flower color or apparent gender. The identity of populations to be acquired as mitigation for disturbance to known Kern mallow should be confirmed by a species expert.

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SUPPLEMENTAL SURVEY METHODS FOR CALIFORNIA JEWELFLOWER

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Literature review

California jewelflower [*Caulanthus californicus* (S. Watson) Payson] is a showy annual belonging to the mustard family (Brassicaceae). It was included previously in the genera *Stanfordia* (Watson 1880) and *Streptanthus* (Greene 1891). California jewelflower is both federally and state listed as an endangered species (U.S. Fish and Wildlife Service 1990, Tibor 2001).

As is typical of annuals, both the size of California jewelflower plants and population size may vary dramatically, depending on site and weather conditions. California jewelflower is most conspicuous during the flowering period, which can range from February into May (Taylor and Davilla 1986, E. Cypher unpublished data). Heights at flowering can range from less than 10 centimeters (4 inches) to 50 centimeters (20 inches) or more (Munz and Keck 1959, Mazer and Hendrickson 1993, Cypher 1994). Even in optimal years, California jewelflower colonies are very limited in extent due to the clumped distribution of plants (Taylor and Davilla 1986, Mazer and Hendrickson 1993).

Other species of *Caulanthus* resemble California jewelflower superficially. However, California jewelflower has smaller flowers and shorter, flatter fruits than Coulter's jewelflower (*C. coulteri* Watson) and desert candle *(C. inflatus* Watson) (Table 1). Depauperate individuals of desert candle may lack the characteristic inflated stems but can be identified by their lavender stigmas (Buck 1993, E. Cypher personal observation). The rosettes of California jewelflower can be confused with those of several other species in the mustard family and aster family (Asteraceae).

Historically, California jewelflower occurred in the San Joaquin Valley and the inner Coast Ranges from Fresno County south to Santa Barbara and Ventura Counties (Taylor and Davilla 1986). Populations have been reported from elevations ranging from approximately 75 to 945 meters (240 to 3,100 feet) and occur on level to gentle sloping (usually <25% slope) terrain. Soils at known locations are primarily subalkaline, sandy loams (Taylor and Davilla 1986, California Natural Diversity Data Base 2002, R. Lewis personal communication).

Plant communities (cf. Holland 1986) supporting extant California jewelflower populations include Non-native Grassland, Upper Sonoran Subshrub Scrub, and Cismontane Juniper Woodland and Scrub (E. Cypher unpublished data). Historical records suggest that California jewelflower also occurred in the Valley Saltbush Scrub plant community (California Natural

Table 1. Diagnostic characters of three *Caulanthus* species. Data from Buck (1993), Munz and Keck (1959), and E. Cypher (unpublished data).

Character	*C. californicus*	*C. coulteri*	*C. inflatus*
Filaments	distinct or 1 pair fused	1-2 pair fused	1-2 pair fused
Stem	not inflated	not inflated	usually inflated
Cauline leaf shape	ovate to rounded	oblong to ovate	oblong to ovate
Sepal length	4-10 mm	5-18 mm	8-10 mm
Petal length	6-11 mm	8-31 mm	8-14 mm
Stigma color	greenish	?	lavender
Mature fruit length	1-6 cm	4-13 cm	5-11 cm
Fruit cross-section	flattened perpendicular to septum	rounded or flattened parallel to septum	rounded to squarish
Seed shape	spheric	oblong	oblique-oblong

Diversity Data Base 2002). Herbaceous cover is dense at most locations except those in Santa Barbara County, where up to 50% of the surface is barren. Native plant species comprise a high proportion of the vegetation at many of the known locations (Taylor and Davilla 1986, Cypher 1994, R. Lewis personal communication).

Survey guidelines

All surveys for rare plants should be conducted in accordance with the standardized guidelines issued by the regulatory agencies (U.S. Fish and Wildlife Service 1996, California Department of Fish and Game 2000) and the California Native Plant Society (2001). The species-specific methods presented below are intended as a supplement to those standardized guidelines.

Systematic surveys are recommended to detect presence and determine distribution of California jewelflower within the survey area. For systematic searches, biologists should walk parallel transects spaced 5 to 10 meters (16 to 33 feet) apart throughout the entire site, regardless of subjective habitat evaluations. However, transects may be stratified by topography or plant community for convenience. Field survey crews should include at least one member who has seen California jewelflower growing in its natural habitat. Other team members may be trained using photographs and/or herbarium specimens but should be accompanied in the field by the experienced crew member during all surveys.

Prior to beginning surveys in a given year, at least one member of the survey crew should visit one or more known locations of California jewelflower to verify that precipitation has been adequate for germination and to determine current phenology. The known locations should be as similar as possible to the survey area in elevation, habitat, and topography. Species-specific surveys should not be attempted if California jewelflower is not seen at known locations, the densities are very low relative to normal years, or the plants are inconspicuous. Survey reports should document the known locations that were visited, the date of the visit, and the observability and phenology of California jewelflower at that time, plus the date of the survey, the abundance and distribution of all rare species in the survey area, and any other elements required by the agency guidelines. The typical survey period for this species is March and April.

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SUPPLEMENTAL SURVEY METHODS FOR BAKERSFIELD CACTUS

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Literature review

The taxonomy of Bakersfield cactus has not been accepted universally, even though it was named over a century ago. Originally, Bakersfield cactus was treated as a full species, *Opuntia treleasii* Coulter (1896). Shortly thereafter, Toumey (1901) renamed Bakersfield cactus as a variety of the more widespread beavertail cactus (*Opuntia basilaris* Englemann and Bigelow), resulting in the combination *O. basilaris* var. *treleasii* (Coulter) Toumey for Bakersfield cactus. Griffiths and Hare (1906) considered Bakersfield cactus to be a distinct species and further subdivided it into two varieties, *O. treleasii* Coulter var. *treleasii* and *O. treleasii* Coulter var. *kernii* Griffiths and Hare. Britton and Rose (1920) corrected the spelling of the epithet to *treleasei* to be consistent with the name of the original collector, William Trelease. In the most recent treatment (Parfitt and Baker 1993), the scientific name of Bakersfield cactus was given as *Opuntia basilaris* var. *treleasei* (Coulter), which includes both varieties of the former *O. treleasei*. Some experts still consider Bakersfield cactus to be a unique species.

Bakersfield cactus differs from the common beavertail cactus (*O. basilaris* var. *basilaris*) in several key characters (Table 1). Bakersfield cactus is unique among the varieties of *O. basilaris* in that the eye-spots contain spines in addition to the bristles. Bakersfield cactus individuals from the type locality near Caliente in Kern County have spines less than 7 millimeters (0.3 inches) long, which may be shorter than the bristles (ESA 1986, R. van de Hoek personal communication). Most other populations of Bakersfield cactus have longer, more conspicuous spines. If the taxonomy of Griffiths and Hare (1906) is used, *O. treleasii* var. *treleasii* refers to the plants with short spines and *O. treleasii* var. *kernii* refers to the form with longer spines. Bakersfield cactus typically flowers in May (Munz and Keck 1959), and plants are less than 35 centimeters (1 foot) tall (Abrams 1951). It is federally and state listed as an endangered species (U.S. Fish and Wildlife Service 1990, Tibor 2001).

Bakersfield cactus is endemic to a limited area of central Kern County, ranging from Granite Station southeast to the Caliente Hills and south to Wheeler Ridge (Twisselmann 1967, U.S. Fish and Wildlife Service 1998, Tibor 2001). Only isolated remnants of the formerly extensive colonies remain (Twisselmann 1967, U.S. Fish and Wildlife Service 1990). Bakersfield cactus occurs on well-drained sandy, gravelly, or loamy soils on stream banks, ridges, bluffs, and rolling hills (ESA 1986, California Natural Diversity Data Base 2002). Historical records indicate that the majority of Bakersfield cactus occurred at elevations ranging from 88 to 396 meters (290 to 1,300 feet) with a few colonies, including the type locality, up to 550 meters

Table 1. Characters differentiating *Opuntia basilaris* var. *basilaris* from var. *treleasei*. Data from Coulter (1896), Griffiths and Hare (1906), Abrams (1951), and Benson (1969).

Character	var. *basilaris*	var. *treleasei*
Joint (pad) shape	obovate to orbicular	obovate to narrowly elliptic
Joint base	flattened	terete
Areoles (eye-spots)	depressed	not depressed
Spine length	absent	4-38 mm

(1,800 feet) in elevation (California Natural Diversity Data Base 2002). Plant communities in which it grows include Sierra-Tehachapi Saltbush Scrub, Relictual Interior Dune Grassland, and Blue Oak Woodland (ESA 1986, Holland 1986, Griggs et al. 1992, California Natural Diversity Data Base 2002, R. van de Hoek personal communication). Beavertail cactus also is found in Kern County, occurring in the Mojave Desert and the western foothills of the Sierra Nevada and Tehachapi mountains (Twisselmann 1967). The ranges of Bakersfield cactus and beavertail cactus may overlap in the Caliente and Kern Canyon areas (Twisselmann 1967, E. Cypher personal observation). Cultivated prickly-pear cacti (*Opuntia* spp.) also have escaped in the vicinity of Bakersfield (E. Cypher personal observation).

Survey guidelines

All surveys for rare plants should be conducted in accordance with the standardized guidelines issued by the regulatory agencies (U.S. Fish and Wildlife Service 1996, California Department of Fish and Game 2000) and the California Native Plant Society (2001). The species-specific methods presented below are intended as a supplement to those standardized guidelines.

Surveys for Bakersfield cactus are possible year-round because it is a perennial. However, vegetative individuals may be obscured by dense annual grasses, and thus plants are most conspicuous while they are in flower. Systematic surveys are recommended to detect presence and determine distribution of Bakersfield cactus within the survey area. For systematic searches, biologists should walk parallel transects spaced 5 to 15 meters (approximately 15 to 50 feet) apart throughout the entire site, regardless of subjective habitat evaluations. However, transects may be stratified by topography or plant community for convenience. Field survey crews should include at least one member who has seen Bakersfield cactus growing in its natural habitat. Other team members may be trained using photographs and/or herbarium specimens but should be accompanied in the field by the experienced crew member during all surveys.

Visits to one or more known locations of Bakersfield cactus are recommended to determine current phenology and observability. The known locations should be as similar as possible to the survey area in elevation, habitat, and topography. Survey reports should document the known locations that were visited, the date of the visit, and the observability and phenology of Bakersfield cactus at that time, plus the date of the survey, the diagnostic characteristics of any *Opuntia* populations discovered, the abundance and distribution of all rare species in the survey area, and any other elements required by the agency guidelines.

Due to the difficulty of identifying short-spined populations of Bakersfield cactus, any wild *Opuntia* population in Kern County west of the Sierra crest should be reported to the appropriate agency. The identity of any such cactus populations outside of the range reported in the recovery plan (U.S. Fish and Wildlife Service 1998) should be confirmed by a species expert before being disturbed or acquired as mitigation for disturbance to known Bakersfield cactus.

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SUPPLEMENTAL SURVEY METHODS FOR HOOVER'S WOOLLY-STAR

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Literature review

Hoover's woolly-star [*Eriastrum hooveri* (Jepson) Mason] is an inconspicuous annual member of the phlox family (Polemoniaceae). It was named originally by Jepson (1943) as *Huegelia hooveri* Jepson but has been known as *Eriastrum hooveri* since Mason (1945) revised the genus. Hoover's woolly-star has small, white to pale blue flowers that are less than 5 millimeters (0.2 inches) long; the stamens are shorter than the corolla (Abrams 1951, Munz and Keck 1959, Patterson 1993). Many-flowered eriastrum [*Eriastrum pluriflorum* (Heller) Mason] frequently occurs in mixed populations with Hoover's woolly-star (Lewis 1992, Cypher 1994). Many-flowered eriastrum can be distinguished by its dark blue flowers that are 16 millimeters (0.6 inches) or more in length and stamens that protrude from the corolla (Abrams 1951, Munz and Keck 1959, Taylor and Davilla 1986, Patterson 1993). Hoover's woolly-star is federally listed as a threatened species (U.S. Fish and Wildlife Service 1990). It has been proposed for delisting (U.S. Fish and Wildlife Service 2001) but must be treated as a listed species until a final rule is published that officially delists this species.

The flowering period for Hoover's woolly-star occurs between March and June (Munz and Keck 1959, Lewis 1992, Cypher 1994), but phenology varies among sites and years. Unlike many other annual forbs, stems of *Eriastrum* species may persist for many months after the plants die. However, surveys outside of the flowering season are unreliable because dead stems do not always persist and even if they do, the plants are not identifiable to species unless the corollas remain attached (Taylor and Davilla 1986, Lewis 1992).

Differing rainfall and site conditions can affect the size of both individual plants and populations (Cypher 1994). The wiry stems of Hoover's woolly-star may be simple or branching and vary in height from 1 to 17 centimeters (0.4 to 6.7 inches) at flowering; similarly, single plants have been observed with as few as 1 and as many as 82 flowers (E. Cypher unpublished data). Densities may vary greatly within a single population (Cypher 1994).

Hoover's woolly-star is known to be extant from Fresno and San Benito Counties south to Kern and Santa Barbara Counties (U.S. Fish and Wildlife Service 1998, Tibor 2001); recently, two populations were discovered in the Antelope Valley of Los Angeles County (Boyd and Porter 1999). The species occurs in a wide variety of sites, from alkali sinks to ridgetops (Lewis 1992). Populations of Hoover's woolly-star have been reported from approximately 50 to 915 meters

(165 to 3,000 feet) in elevation (Danielson et al. 1994, California Natural Diversity Data Base 1995), but the majority of valley-floor populations have been extirpated due to agricultural conversion (Taylor and Davilla 1986).

A wide variety of plant communities support Hoover's woolly-star. Most are dominated by shrubs such as saltbush (*Atriplex* spp.), Mormon tea (*Ephedra* spp.), and iodinebush (*Allenrolfea occidentalis*), but other shrubs, herbs, or trees may dominate the landscape in some areas (Taylor and Davilla 1986, Danielson et al. 1994, California Natural Diversity Data Base 1995). Shrub cover in occupied habitats typically is less than 20% (Taylor and Davilla 1986, Cypher 1994). Features common to many Hoover's woolly-star sites are stabilized silty to sandy soils, a low cover of competing herbaceous vegetation, and presence of cryptogamic crust (Taylor and Davilla 1986, Lewis 1992). However, dense vegetation, other soil types, and lack of cryptogamic crust do not preclude the occurrence of Hoover's woolly-star (Cypher 1994, California Natural Diversity Data Base 1995). Hoover's woolly-star may reinvade disturbed soil surfaces (*e.g.,* well pads, dirt roads) if seeds remain in the vicinity (Lewis 1992, Danielson et al. 1994, Hinshaw et al. 1998, Holmstead and Anderson 1998).

Survey guidelines

All surveys for rare plants should be conducted in accordance with the standardized guidelines issued by the regulatory agencies (U.S. Fish and Wildlife Service 1996, California Department of Fish and Game 2000) and the California Native Plant Society (2001). The species-specific methods presented below are intended as a supplement to those standardized guidelines.

Systematic surveys are recommended to detect presence and determine distribution of Hoover's woolly-star within the survey area. For systematic searches, biologists should walk parallel transects spaced 5 to 10 meters (16 to 33 feet) apart throughout the entire site, regardless of subjective habitat evaluations. However, transects may be stratified by topography or plant community for convenience. Field survey crews should include at least one member who has seen Hoover's woolly-star growing in its natural habitat. Other team members may be trained using photographs and/or herbarium specimens but should be accompanied in the field by the experienced crew member during all surveys.

Prior to beginning surveys in a given year, at least one member of the survey crew should visit one or more known locations of Hoover's woolly-star to verify that precipitation has been adequate for germination and to determine current phenology. The known locations should be as similar as possible to the survey area in elevation, habitat, and topography. Species-specific surveys should not be attempted if Hoover's woolly-star is not seen at known locations, the densities are very low relative to normal years, or the plants are inconspicuous. Survey reports should document the known locations that were visited, the date of the visit, and the observability and phenology of Hoover's woolly-star at that time, plus the date of the survey, the abundance and distribution of all rare species in the survey area, and any other elements required by the agency guidelines. If *Eriastrum* stems are observed outside of the flowering season, the site should be treated as if a threatened species was present, and the population should be

revisited at the appropriate time to determine the identity of the plants. The typical survey period for Hoover's woolly-star is April and May.

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Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed, or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations(s) is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

    a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

    b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

    c. survey dates and survey methodology(ies)

    d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

    e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

f. current and historic land uses of the habitat(s) and degree of site alteration

g. presence of target species off-site on adjacent parcels, if known

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than 3 years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

APPENDIX D3

Conservation Guidelines

for the

Valley Elderberry Longhorn Beetle

(USFWS 1999)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
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Sacramento, California 95825

Conservation Guidelines for the
Valley Elderberry Longhorn Beetle
9 July 1999

The following guidelines have been issued by the U.S. Fish and Wildlife Service (Service) to assist Federal agencies and non-federal project applicants needing incidental take authorization through a section 7 consultation or a section 10(a)(1)(B) permit in developing measures to avoid and minimize adverse effects on the valley elderberry longhorn beetle. The Service will revise these guidelines as needed in the future. The most recently issued version of these guidelines should be used in developing all projects and habitat restoration plans. The survey and monitoring procedures described below are designed to avoid any adverse effects to the valley elderberry longhorn beetle. Thus a recovery permit is not needed to survey for the beetle or its habitat or to monitor conservation areas. If you are interested in a recovery permit for research purposes please call the Service's Regional Office at (503) 231-2063.

Background Information

The valley elderberry longhorn beetle (Desmocerus californicus dimorphus), was listed as a threatened species on August 8, 1980 (Federal Register 45: 52803-52807). This animal is fully protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The valley elderberry longhorn beetle (beetle) is completely dependent on its host plant, elderberry (Sambucus species), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time the elderberry produces flowers. The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

Surveys

Proposed project sites within the range of the valley elderberry longhorn beetle should be surveyed for the presence of the beetle and its elderberry host plant by a qualified biologist. The beetle's range extends throughout California's Central Valley and associated foothills from about the 3,000-foot elevation contour on the east and the watershed of the Central Valley on the west (Figure 1). All or portions of 31 counties are included: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba.

If elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level occur on or adjacent to the proposed project site, or are otherwise located where they may be directly or indirectly affected by the proposed action, minimization measures which include planting replacement habitat (conservation planting) are required (Table 1).

All elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level that occur on or adjacent to a proposed project site must be thoroughly searched for beetle exit holes (external evidence of beetle presence). In addition, all elderberry stems one inch or greater in diameter at ground level must be tallied by diameter size class (Table 1). As outlined in Table 1, the numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether a proposed project lies in a riparian or non-riparian area.

Elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level are unlikely to be habitat for the beetle because of their small size and/or immaturity. Therefore, no minimization measures are required for removal of elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level with no exit holes. Surveys are valid for a period of two years.

Avoid and Protect Habitat Whenever Possible

Project sites that do not contain beetle habitat are preferred. If suitable habitat for the beetle occurs on the project site, or within close proximity where beetles will be affected by the project, these areas must be designated as avoidance areas and must be protected from disturbance during the construction and operation of the project. When possible, projects should be designed such that avoidance areas are connected with adjacent habitat to prevent fragmentation and isolation of beetle populations. Any beetle habitat that cannot be avoided as described below should be considered impacted and appropriate minimization measures should be proposed as described below.

Avoidance: Establishment and Maintenance of a Buffer Zone

Complete avoidance (i.e., no adverse effects) may be assumed when a 100-foot (or wider) buffer is established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. Firebreaks may not be included in the buffer zone. In buffer areas construction-related disturbance should be minimized, and any damaged area should be promptly restored following construction. The Service must be consulted before any disturbances within the buffer area are considered. In addition, the Service must be provided with a map identifying the avoidance area and written details describing avoidance measures.

Protective Measures

1. Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer has been approved by the Service, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant.

2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.

3. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.

4. Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

Restoration and Maintenance

1. Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.

2. Buffer areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding, and trash removal are usually appropriate.

3. No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.

4. The applicant must provide a written description of how the buffer areas are to be restored, protected, and maintained after construction is completed.

5. Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five (5) feet of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., stripping away bark through careless use of mowing/trimming equipment).

Transplant Elderberry Plants That Cannot Be Avoided

Elderberry plants must be transplanted if they can not be avoided by the proposed project. All elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level must be transplanted to a conservation area (see below). At the Service's discretion, a plant that is unlikely to survive transplantation because of poor condition or location, or a plant that would be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible the minimization ratios in Table 1 may be increased to offset the additional habitat loss.

Trimming of elderberry plants (e.g., pruning along roadways, bike paths, or trails) with one or more stems 1.0 inch or greater in diameter at ground level, may result in take of beetles. Therefore, trimming is subject to appropriate minimization measures as outlined in Table 1.

1. Monitor. A qualified biologist (monitor) must be on-site for the duration of the transplanting of the elderberry plants to insure that no unauthorized take of the valley elderberry longhorn beetle occurs. If unauthorized take occurs, the monitor must have the authority to stop work until corrective measures have been completed. The monitor must immediately report any unauthorized take of the beetle or its habitat to the Service and to the California Department of Fish and Game.

2. Timing. Transplant elderberry plants when the plants are dormant, approximately November through the first two weeks in February, after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the plant and increase transplantation success.

3. Transplanting Procedure.

    a. Cut the plant back 3 to 6 feet from the ground or to 50 percent of its height (whichever is taller) by removing branches and stems above this height. The trunk and all stems measuring 1.0 inch or greater in diameter at ground level should be replanted. Any leaves remaining on the plant should be removed.

b. Excavate a hole of adequate size to receive the transplant.

c. Excavate the plant using a Vemeer spade, backhoe, front end loader, or other suitable equipment, taking as much of the root ball as possible, and replant immediately at the conservation area. Move the plant only by the root ball. If the plant is to be moved and transplanted off site, secure the root ball with wire and wrap it with burlap. Dampen the burlap with water, as necessary, to keep the root ball wet. Do not let the roots dry out. Care should be taken to ensure that the soil is not dislodged from around the roots of the transplant. If the site receiving the transplant does not have adequate soil moisture, pre-wet the soil a day or two before transplantation.

d. The planting area must be at least 1,800 square feet for each elderberry transplant. The root ball should be planted so that its top is level with the existing ground. Compact the soil sufficiently so that settlement does not occur. As many as five (5) additional elderberry plantings (cuttings or seedlings) and up to five (5) associated native species plantings (see below) may also be planted within the 1,800 square foot area with the transplant. The transplant and each new planting should have its own watering basin measuring at least three (3) feet in diameter. Watering basins should have a continuous berm measuring approximately eight (8) inches wide at the base and six (6) inches high.

e. Saturate the soil with water. Do not use fertilizers or other supplements or paint the tips of stems with pruning substances, as the effects of these compounds on the beetle are unknown.

f. Monitor to ascertain if additional watering is necessary. If the soil is sandy and well-drained, plants may need to be watered weekly or twice monthly. If the soil is clayey and poorly-drained, it may not be necessary to water after the initial saturation. However, most transplants require watering through the first summer. A drip watering system and timer is ideal. However, in situations where this is not possible, a water truck or other apparatus may be used.

Plant Additional Seedlings or Cuttings

Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) must be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). Minimization ratios are listed and explained in Table 1. Stock of either seedlings or cuttings should be obtained from local sources. Cuttings may be obtained from the plants to be transplanted if the project site is in the vicinity of the conservation area. If the Service determines that the elderberry plants on the proposed project site are unsuitable candidates for

transplanting, the Service may allow the applicant to plant seedlings or cuttings at higher than the stated ratios in Table 1 for each elderberry plant that cannot be transplanted.

Plant Associated Native Species

Studies have found that the beetle is more abundant in dense native plant communities with a mature overstory and a mixed understory. Therefore, a mix of native plants associated with the elderberry plants at the project site or similar sites will be planted at ratios ranging from 1:1 to 2:1 [native tree/plant species to each elderberry seedling or cutting (see Table 1)]. These native plantings must be monitored with the same survival criteria used for the elderberry seedlings (see below). Stock of saplings, cuttings, and seedlings should be obtained from local sources. If the parent stock is obtained from a distance greater than one mile from the conservation area, approval by the Service of the native plant donor sites must be obtained prior to initiation of the revegetation work. Planting or seeding the conservation area with native herbaceous species is encouraged. Establishing native grasses and forbs may discourage unwanted non-native species from becoming established or persisting at the conservation area. Only stock from local sources should be used.

Examples

Example 1

The project will adversely affect beetle habitat on a vacant lot on the land side of a river levee. This levee now separates beetle habitat on the vacant lot from extant Great Valley Mixed Riparian Forest (Holland 1986) adjacent to the river. However, it is clear that the beetle habitat located on the vacant lot was part of a more extensive mixed riparian forest ecosystem extending farther from the river's edge prior to agricultural development and levee construction. Therefore, the beetle habitat on site is considered riparian. A total of two elderberry plants with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The two plants have a total of 15 stems measuring over 1.0 inch. No exit holes were found on either plant. Ten of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are greater than 5.0 inches in diameter. The conservation area is suited for riparian forest habitat. Associated natives adjacent to the conservation area are box elder (Acer negundo californica), walnut (Juglans californica var. hindsii), sycamore (Platanus racemosa), cottonwood (Populus fremontii), willow (Salix gooddingii and S. laevigata), white alder (Alnus rhombifolia), ash (Fraxinus latifolia), button willow (Cephalanthus occidentalis), and wild grape (Vitis californica).

Minimization (based on ratios in Table 1):

• Transplant the two elderberry plants that will be affected to the conservation area.

• Plant 40 elderberry rooted cuttings (10 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

• Plant 40 associated native species (ratio of associated natives to elderberry plantings is 1:1 in areas with no exit holes):

5 saplings each of box elder, sycamore, and cottonwood
5 willow seedlings
5 white alder seedlings
5 saplings each of walnut and ash
3 California button willow
2 wild grape vines
Total: 40 associated native species

• Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 80 plants must be planted (40 elderberries and 40 associated natives), a total of 0.33 acre (14,400 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Example 2

The project will adversely affect beetle habitat in Blue Oak Woodland (Holland 1986). One elderberry plant with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The plant has a total of 10 stems measuring over 1.0 inch. Exit holes were found on the plant. Five of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are between 3.0 and 5.0 inches in diameter. The conservation area is suited for elderberry savanna (non-riparian habitat). Associated natives adjacent to the conservation area are willow (Salix species), blue oak (Quercus douglasii), interior live oak (Q. wislizenii), sycamore, poison oak (Toxicodendron diversilobum), and wild grape.

Minimization (based on ratios in Table 1):

• Transplant the one elderberry plant that will be affected to the conservation area.

• Plant 30 elderberry seedlings (5 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

• Plant 60 associated native species (ratio of associated natives to elderberry plantings is 2:1 in areas with exit holes):

20 saplings of blue oak, 20 saplings of sycamore, and 20 saplings of willow, and seed and plant with a mixture of native grasses and forbs

• Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 90 plants must be planted (30 elderberries and 60 associated natives), a total of 0.37 acre (16,200 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Conservation Area—Provide Habitat for the Beetle in Perpetuity

The conservation area is distinct from the avoidance area (though the two may adjoin), and serves to receive and protect the transplanted elderberry plants and the elderberry and other native plantings. The Service may accept proposals for off-site conservation areas where appropriate.

1. Size. The conservation area must provide at least 1,800 square feet for each transplanted elderberry plant. As many as 10 conservation plantings (i.e., elderberry cuttings or seedlings and/or associated native plants) may be planted within the 1800 square foot area with each transplanted elderberry. An additional 1,800 square feet shall be provided for every additional 10 conservation plants. Each planting should have its own watering basin measuring approximately three feet in diameter. Watering basins should be constructed with a continuous berm measuring approximately eight inches wide at the base and six inches high.

   The planting density specified above is primarily for riparian forest habitats or other habitats with naturally dense cover. If the conservation area is an open habitat (i.e., elderberry savanna, oak woodland) more area may be needed for the required plantings. Contact the Service for assistance if the above planting recommendations are not appropriate for the proposed conservation area.

   No area to be maintained as a firebreak may be counted as conservation area. Like the avoidance area, the conservation area should connect with adjacent habitat wherever possible, to prevent isolation of beetle populations.

   Depending on adjacent land use, a buffer area may also be needed between the conservation area and the adjacent lands. For example, herbicides and pesticides are

often used on orchards or vineyards. These chemicals may drift or runoff onto the conservation area if an adequate buffer area is not provided.

2. Long-Term Protection. The conservation area must be protected in perpetuity as habitat for the valley elderberry longhorn beetle. A conservation easement or deed restrictions to protect the conservation area must be arranged. Conservation areas may be transferred to a resource agency or appropriate private organization for long-term management. The Service must be provided with a map and written details identifying the conservation area; and the applicant must receive approval from the Service that the conservation area is acceptable prior to initiating the conservation program. A true, recorded copy of the deed transfer, conservation easement, or deed restrictions protecting the conservation area in perpetuity must be provided to the Service before project implementation.

   Adequate funds must be provided to ensure that the conservation area is managed in perpetuity. The applicant must dedicate an endowment fund for this purpose, and designate the party or entity that will be responsible for long-term management of the conservation area. The Service must be provided with written documentation that funding and management of the conservation area (items 3-8 above) will be provided in perpetuity.

3. Weed Control. Weeds and other plants that are not native to the conservation area must be removed at least once a year, or at the discretion of the Service and the California Department of Fish and Game. Mechanical means should be used; herbicides are prohibited unless approved by the Service.

4. Pesticide and Toxicant Control. Measures must be taken to insure that no pesticides, herbicides, fertilizers, or other chemical agents enter the conservation area. No spraying of these agents must be done within one 100 feet of the area, or if they have the potential to drift, flow, or be washed into the area in the opinion of biologists or law enforcement personnel from the Service or the California Department of Fish and Game.

5. Litter Control. No dumping of trash or other material may occur within the conservation area. Any trash or other foreign material found deposited within the conservation area must be removed within 10 working days of discovery.

6. Fencing. Permanent fencing must be placed completely around the conservation area to prevent unauthorized entry by off-road vehicles, equestrians, and other parties that might damage or destroy the habitat of the beetle, unless approved by the Service. The applicant must receive written approval from the Service that the fencing is acceptable prior to initiation of the conservation program. The fence must be maintained in perpetuity, and must be repaired/replaced within 10 working days if it is found to be damaged. Some conservation areas may be made available to the public for appropriate recreational and educational opportunities with written approval from the Service. In

these cases appropriate fencing and signs informing the public of the beetle's threatened status and its natural history and ecology should be used and maintained in perpetuity.

7. Signs. A minimum of two prominent signs must be placed and maintained in perpetuity at the conservation area, unless otherwise approved by the Service. The signs should note that the site is habitat of the federally threatened valley elderberry longhorn beetle and, if appropriate, include information on the beetle's natural history and ecology. The signs must be approved by the Service. The signs must be repaired or replaced within 10 working days if they are found to be damaged or destroyed.

Monitoring

The population of valley elderberry longhorn beetles, the general condition of the conservation area, and the condition of the elderberry and associated native plantings in the conservation area must be monitored over a period of either ten (10) consecutive years or for seven (7) years over a 15-year period. The applicant may elect either 10 years of monitoring, with surveys and reports every year; or 15 years of monitoring, with surveys and reports on years 1, 2, 3, 5, 7, 10, and 15. The conservation plan provided by the applicant must state which monitoring schedule will be followed. No change in monitoring schedule will be accepted after the project is initiated. If conservation planting is done in stages (i.e., not all planting is implemented in the same time period), each stage of conservation planting will have a different start date for the required monitoring time.

Surveys. In any survey year, a minimum of two site visits between February 14 and June 30 of each year must be made by a qualified biologist. Surveys must include:

1. A population census of the adult beetles, including the number of beetles observed, their condition, behavior, and their precise locations. Visual counts must be used; mark-recapture or other methods involving handling or harassment must not be used.

2. A census of beetle exit holes in elderberry stems, noting their precise locations and estimated ages.

3. An evaluation of the elderberry plants and associated native plants on the site, and on the conservation area, if disjunct, including the number of plants, their size and condition.

4. An evaluation of the adequacy of the fencing, signs, and weed control efforts in the avoidance and conservation areas.

5. A general assessment of the habitat, including any real or potential threats to the beetle and its host plants, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, excessive weed growth, etc.

The materials and methods to be used in the monitoring studies must be reviewed and approved by the Service. All appropriate Federal permits must be obtained prior to initiating the field studies.

Reports. A written report, presenting and analyzing the data from the project monitoring, must be prepared by a qualified biologist in each of the years in which a monitoring survey is required. Copies of the report must be submitted by December 31 of the same year to the Service (Chief of Endangered Species, Sacramento Fish and Wildlife Office), and the Department of Fish and Game (Supervisor, Environmental Services, Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814; and Staff Zoologist, California Natural Diversity Data Base, Department of Fish and Game, 1220 S Street, Sacramento, California 95814). The report must explicitly address the status and progress of the transplanted and planted elderberry and associated native plants and trees, as well as any failings of the conservation plan and the steps taken to correct them. Any observations of beetles or fresh exit holes must be noted. Copies of original field notes, raw data, and photographs of the conservation area must be included with the report. A vicinity map of the site and maps showing where the individual adult beetles and exit holes were observed must be included. For the elderberry and associated native plants, the survival rate, condition, and size of the plants must be analyzed. Real and likely future threats must be addressed along with suggested remedies and preventative measures (e.g. limiting public access, more frequent removal of invasive non-native vegetation, etc.).

A copy of each monitoring report, along with the original field notes, photographs, correspondence, and all other pertinent material, should be deposited at the California Academy of Sciences (Librarian, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118) by December 31 of the year that monitoring is done and the report is prepared. The Service's Sacramento Fish and Wildlife Office should be provided with a copy of the receipt from the Academy library acknowledging receipt of the material, or the library catalog number assigned to it.

Access. Biologists and law enforcement personnel from the California Department of Fish and Game and the Service must be given complete access to the project site to monitor transplanting activities. Personnel from both these agencies must be given complete access to the project and the conservation area to monitor the beetle and its habitat in perpetuity.

Success Criteria

A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the monitoring period. Within one year of discovery that survival has dropped below 60 percent, the applicant must replace failed plantings to bring survival above this level. The Service will make any determination as to the

applicant's replacement responsibilities arising from circumstances beyond its control, such as plants damaged or killed as a result of severe flooding or vandalism.

Service Contact

These guidelines were prepared by the Endangered Species Division of the Service's Sacramento Fish and Wildlife Office. If you have questions regarding these guidelines or to request a copy of the most recent guidelines, telephone (916) 414-6600, or write to:

U.S. Fish and Wildlife Service
Ecological Services
2800 Cottage Way, W-2605
Sacramento, CA 95825

Figure 1: Range of the Valley Elderberry Longhorn Beetle

Literature Cited

Barr, C. B. 1991. The distribution, habitat, and status of the valley elderberry longhorn beetle Desmocerus californicus dimorphus. U.S. Fish and Wildlife Service; Sacramento, California.

Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished Report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division, Sacramento, California.

USFWS. 1980. Listing the valley elderberry longhorn beetle as a threatened species with critical habitat. Federal Register 45:52803-52807.

USFWS. 1984. Recovery plan for the valley elderberry longhorn beetle. U.S. Fish and Wildlife Service, Endangered Species Program; Portland, Oregon.

Table 1: Minimization ratios based on location (riparian vs. non-riparian), stem diameter of affected elderberry plants at ground level, and presence or absence of exit holes.

Location	Stems (maximum diameter at ground level)	Exit Holes on Shrub Y/N (quantify)[1]	Elderberry Seedling Ratio[2]	Associated Native Plant Ratio[3]
non-riparian	stems > = 1" & = < 3"	No:	1:1	1:1
		Yes:	2:1	2:1
non-riparian	stems > 3" & < 5"	No:	2:1	1:1
		Yes:	4:1	2:1
non-riparian	stems >= 5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems > = 1" & = < 3"	No:	2:1	1:1
		Yes:	4:1	2:1
riparian	stems > 3" & < 5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems > = 5"	No:	4:1	1:1
		Yes:	8:1	2:1

[1] All stems measuring one inch or greater in diameter at ground level on a single shrub are considered occupied when exit holes are present anywhere on the shrub.

[2] Ratios in the *Elderberry Seedling Ratio* column correspond to the number of cuttings or seedlings to be planted per elderberry stem (one inch or greater in diameter at ground level) affected by a project.

[3] Ratios in the *Associated Native Plant Ratio* column correspond to the number of associated native species to be planted per elderberry (seedling or cutting) planted.

APPENDIX D4

Standard Recommendations for Protection of the

San Joaquin Kit Fox Prior to or During

Ground Disturbance (USFWS 1999)

U.S. FISH AND WILDLIFE SERVICE
STANDARDIZED RECOMMENDATIONS
FOR PROTECTION OF THE SAN JOAQUIN KIT FOX
PRIOR TO OR DURING GROUND DISTURBANCE

Prepared by the Sacramento Fish and Wildlife Office
June 1999

INTRODUCTION

The following document includes many of the San Joaquin kit fox (*Vulpes macrotis mutica*) protection measures typically recommended by the U. S. Fish and Wildlife Service (Service), prior to and during ground disturbance activities. However, incorporating relevant sections of these guidelines into the proposed project is not the only action required under the Endangered Species Act of 1973, as amended (Act). Project applicants should contact the Service in Sacramento to determine the full range of requirements that apply to your project; the address and telephone number are given at the end of this document. Formal authorization for the project may be required under either section 7 or section 10 of the Act. Implementation of the measures presented in this document may be necessary to avoid violating the provisions of the Act, including the prohibition against "take" (defined as killing, harming, or harassing a listed species, including actions that damage or destroy its habitat). Such protection measures may also be required under the terms of a biological opinion pursuant to section 7 of the Act resulting in incidental take authorization (authorization), or an incidental take permit (permit) pursuant to section 10 of the Act. The specific measures implemented to protect kit fox for any given project shall be determined by the Service based upon the applicant's consultation with the Service.

The purpose of this document is to make information on kit fox protection strategies readily available and to help standardize the methods and definitions currently employed to achieve kit fox protection. The measures outlined in this document are subject to modification or revision at the discretion of the Service.

All surveys, den destructions, and monitoring described in this document must be conducted by a qualified biologist. A qualified biologist (biologist) means any person who has completed at least four years of university training in wildlife biology or a related science and/or has demonstrated field experience in the identification and life history of the San Joaquin kit fox. In addition, biologist(s) must be able to identify coyote, red fox, gray fox, and kit fox tracks, and to have seen a kit fox in the wild, at a zoo, or as a museum mount.

SMALL PROJECTS

Small projects are considered to be those projects with small foot prints such as an individual in-fill oil well, communication tower, or bridge repair. These projects must stand alone and not be part of, or in any way connected to larger projects (i.e., bridge repair or improvement to serve a

future urban development). The Service recommends that on these small projects, the biologist survey the proposed project boundary and a 200-foot area outside of the project footprint to identify habitat features, and make recommendations on situating the project to minimize or avoid impacts. If habitat features cannot be completely avoided, then preconstruction surveys should be conducted.

Preconstruction/preactivity surveys shall be conducted no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any project activity likely to impact the San Joaquin kit fox. Surveys should identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, and assess the potential impacts to the kit fox by the proposed activity. The status of all dens should be determined and mapped (see Survey Protocol).

Written results of preconstruction/preactivity surveys must be received by the Service within five days after survey completion and prior to the start of ground disturbance and/or construction activities. If a natal/pupping den is discovered within the project area or within 200-feet of the project boundary, the Service shall be immediately notified. If the preconstruction/preactivity survey reveals an active natal pupping or new information, the project applicant should contact the Service immediately to obtain the necessary take authorization/permit.

If take authorization/permit has already been issued, then the biologist may proceed with den destruction within the project boundary, except natal/pupping dens (active or inactive). Protective exclusion zones can be placed around all known and potential dens which occur outside the project footprint (conversely, the project boundary can be demarcated, see den destruction section).

OTHER PROJECTS

It is likely that all other projects occurring within kit fox habitat will require a take authorization/permit from the Service. This determination would be made by the Service during the early evaluation process (see Survey Protocol). These other projects would include, but are not limited to: linear projects; projects with large footprints such as urban development; and projects which in themselves may be small but have far reaching impacts (i.e., water storage or conveyance facilities that promote urban growth or agriculture, etc.).

The take authorization/permit issued by the Service may incorporate some or all of the protection measures presented in this document. The take authorization/permit may include measures specific to the needs of the project, and those requirements supersede any requirements found in this document.

EXCLUSION ZONES

The configuration of exclusion zones around the kit fox dens should have a radius measured outward from the entrance or cluster of entrances. The following radii are minimums, and if they cannot be followed the Service must be contacted:

Potential den	50 feet
Known den	100 feet
Natal/pupping den (occupied and unoccupied)	Service must be contacted
Atypical den	50 feet

Known den: To ensure protection, the exclusion zone should be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by kit foxes. Exclusion zone fencing should be maintained until all construction related or operational disturbances have been terminated. At that time, all fencing shall be removed to avoid attracting subsequent attention to the dens.

Potential and Atypical dens: Placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed.

Construction and other project activities should be prohibited or greatly restricted within these exclusion zones. Only essential vehicle operation on existing roads and foot traffic should be permitted. Otherwise, all construction, vehicle operation, material storage, or any other type of surface-disturbing activity should be prohibited within the exclusion zones.

DESTRUCTION OF DENS

Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Protection provided by kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species. Limited destruction of kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed. The value to kit foxes of potential, known, and natal/pupping dens differ and therefore, each den type needs a different level of protection. **Destruction of any known or natal/pupping kit fox den requires take authorization/permit from the Service**.

Natal/pupping dens: Natal or pupping dens which are occupied will not be destroyed until the pups and adults have vacated and then only after consultation with the Service. Therefore, project activities at some den sites may have to be postponed.

Known Dens: Known dens occurring within the footprint of the activity must be monitored for three days with tracking medium or an infra-red beam camera to determine the current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den during its normal activity. Use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of the biologist. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant, for example during the animal's normal foraging activities. The Service encourages hand excavation, but realizes that soil conditions may necessitate the use of excavating equipment. However, extreme caution must be exercised.

Destruction of the den should be accomplished by careful excavation until it is certain that no kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when in the judgement of the biologist, the animal has escaped from the partially destroyed den.

Potential Dens: If a take authorization/permit has been obtained from the Service, den destruction may proceed without monitoring, unless other restrictions were issued with the take authorization/permit. If no take authorization/permit has been issued, then potential dens should be monitored as if they were known dens. If any den was considered to be a potential den, but is later determined during monitoring or destruction to be currently, or previously used by kit fox (e.g., if kit fox sign is found inside), then destruction shall cease and the Service shall be notified immediately.

CONSTRUCTION AND OPERATIONAL REQUIREMENTS

Habitat subject to permanent and temporary construction disturbances and other types of project-related disturbance should be minimized. Project designs should limit or cluster permanent project features to the smallest area possible while still permitting project goals to be achieved. To minimize temporary disturbances, all project-related vehicle traffic should be restricted to established roads, construction areas, and other designated areas. These areas should also be

included in preconstruction surveys and, to the extent possible, should be established in locations disturbed by previous activities to prevent further impacts.

1. Project-related vehicles should observe a 20-mph speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. To the extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas should be prohibited.

2. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under number 13 of this section must be followed.

3. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the Service has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.

4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in closed containers and removed at least once a week from a construction or project site.

5. No firearms shall be allowed on the project site.

6. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets should be permitted on project sites.

7. Use of rodenticides and herbicides in project areas should be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the Service. If rodent control

must be conducted, zinc phosphide should be used because of proven lower risk to kit fox.

8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual. The representative will be identified during the employee education program. The representative's name and telephone number shall be provided to the Service.

9. An employee education program should be conducted for any project that has expected impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and agency personnel involved in the project. The program should include the following: a description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the above-mentioned people and anyone else who may enter the project site.

10. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but that after project completion will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the Service, California Department of Fish and Game (CDFG), and revegetation experts.

11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for advice.

12. Any contractor, employee, or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFG immediately in the case of a dead, injured or entrapped kit fox. The CDFG contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or biologist.

13. The Sacramento Fish and Wildlife Office and CDFG will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during

project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers given below. The CDFG contact is Mr. Ron Schlorff at 1416 9th Street, Sacramento, California 95814, (916) 654-4262.

Any project-related information required by the Service or questions concerning the above conditions or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at:

Endangered Species Division
2800 Cottage Way, Suite W2605
Sacramento, California 95825-1846
(916) 414-6620

"Take" - Section 9 of the Endangered Species Act of 1973, as amended (Act) prohibits the "take" of any federally listed endangered species by any person (an individual, corporation, partnership, trust, association, etc.) subject to the jurisdiction of the United States. As defined in the Act, take means " . . . to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Thus, not only is a listed animal protected from activities such as hunting, but also from actions that damage or destroy its habitat.

"Dens" - 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.

APPENDIX D5

Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative

Finding of the California Tiger Salamander

(USFWS & CDFG 2003)

Attn: Permit Coordinator 2800 Cottage Way, W-2605
Sacramento, California 95825
(916) 414-6547
For hydrobasins south of and including Santa Cruz County:

U.S. Fish and Wildlife Service
Attn: Permit Coordinator
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B Ventura, California 93003
(805) 644-1766

http://www.fws.gov/endangered/permits/

Please refer to http://www.fws.gov/ventura/areas/responsibilities.html or http://www.fws.gov/sacramento/sfwo_jurisdiction.htm for a map showing U.S. Fish and Wildlife Office jurisdictions.

California Department of Fish and Game

For Department reporting or questions regarding land use activity guidance, a map of regional offices and telephone numbers is available at http://www.dfg.ca.gov/regions/regions.html

For State of California Scientific Collecting permit applications and information, please contact:
California Department of Fish and Game
License and Revenue Branch
3211 S Street
Sacramento, California 95816
(916) 227-2271

For additional State permit information, please refer to:

http://www.dfg.ca.gov/hcpb/ceqacesa/ceqacesa.shtml (How to Obtain a Scientific Collecting Permit)

http://www.dfg.ca.gov/hcpb/ceqacesa/rsrchpermit/mou/whenneedmou.shtml (When is the MOU Required?)

http://www.dfg.ca.gov/licensing/pdffiles/fg1476.pdf (Scientific Collecting Regulations)

http://www.dfg.ca.gov/licensing/pdffiles/fg1379e.pdf (Scientific Collecting Permit Attachment)

APPENDIX D6

Revised Guidance on Site Assessment and

Field Surveys for the California Red-legged Frog

(USFWS 2005)

U.S. Fish and Wildlife Service

Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog

August 2005

I. Introduction

The U.S. Fish and Wildlife Service (Service) issued guidance on conducting site assessments and surveys for the California red-legged frog (*Rana aurora draytonii*) (CRF) on February 18, 1997 (1997 Guidance). Since then, the Service has reviewed numerous CRF site assessments and surveys results, accompanied wildlife biologists in the field during the preparation and performance of site assessments and CRF surveys, and consulted with species experts on the effectiveness of the 1997 Guidance. Based on our review of the information, the Service has determined that the survey portion of the 1997 Guidance is less likely to accurately detect CRF than previously thought, especially in certain portions of the species range and particularly where CRF exist in low numbers. In response to the need for new guidance, the Service has prepared this *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog* (Guidance).

Similar to the 1997 Guidance, two procedures are recommended in the new Guidance to accurately assess the likelihood of CRF presence in the vicinity of a project site: (1) an assessment of CRF locality records and potential CRF habitat in and around the project area and, (2) focused field surveys of breeding pools and other associated habitat to determine whether CRF are likely to be present.

Because CRF are known to use aquatic, riparian, and upland habitat, they may be present in any of these habitat types, depending on the time of year, on any given property. For sites with no suitable aquatic breeding habitat, but where suitable upland dispersal habitat exists, it is difficult to support a negative finding with the results of any survey guidance. Therefore, this Guidance focuses on site assessments and surveys conducted in and around aquatic and riparian habitat.

This Guidance was developed by the Service's Sacramento Fish and Wildlife Office in coordination with the Ventura Fish and Wildlife Office. Input by field biologists and scientists experienced in surveying for the CRF was also used in the development of this Guidance.

If the following Guidance is followed in its entirety, the results of the site assessments and surveys will be considered valid by the Service for two (2) years, unless determined otherwise on a case-by-case basis by the appropriate Service Fish and Wildlife Office. After two (2) years, new surveys conducted under the most current Service Guidance may be required, if deemed necessary by the appropriate Service Fish and Wildlife Office.

Modifications of this Guidance for specific projects or circumstances may be approved by the appropriate Fish and Wildlife Office; however, we strongly recommend that all modifications be reviewed and approved by the Service prior to implementation.

II. Permit Requirements

Unless otherwise authorized, individuals participating in site assessments and surveys for CRF may **NOT** take the California red-legged frog during the course of site assessments or survey activities. Take may only be authorized via section 7 or section 10 of the Endangered Species Act of 1973, as amended. Typically, take associated with survey activities is authorized via issuance of section 10(a)(1)(A) permits. For reference, an application for a section 10(a)(1)(A) permit is available through the appropriate Fish and Wildlife Office or online at: http://forms.fws.gov/3-200-55.pdf.

The site assessment and survey methods recommended in this Guidance do NOT require the surveyor to have a permit. As stated below, the surveyor must be otherwise qualified to conduct the surveys.

It is the responsibility of the surveyor to ensure all other applicable permits are obtained and valid (*e.g.*, state scientific collection permits), and that permission from private landowners or land managers is obtained prior to accessing a site and beginning site assessments and surveys.

III. Site Assessments

To prevent any unnecessary loss of time or use of resources, it is essential that completed site assessments be submitted to the appropriate Service Fish and Wildlife Office for review in order to obtain further guidance from the Service before conducting surveys.

Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting a site assessment to prevent the spread of parasites and diseases to CRF and other amphibians.

Careful evaluation of the following information about CRF and their habitats in the vicinity of a project or other land use activities is important because this information indicates the likelihood of the presence of CRF. This information will help determine whether it is necessary to conduct field surveys.

To conduct a site assessment for CRF, complete the data sheet in Appendix D and return it with any necessary supporting documentation to the appropriate Service Fish and Wildlife Office for review prior to initiating surveys. The following information is critical to completing a proper site assessment:

1. Is the site within the current or historic range of the CRF?

Since knowledge of the distribution of the CRF is likely to change as new locality information becomes available, biologists are expected to contact the appropriate Fish and Wildlife Office (see section IV below) to determine if a project site is within the range of this species.

2. Are there known records of CRF at the site or within a 1.6-kilometer* (1-mile) radius of the site?

The biologist should consult the California Natural Diversity Data Base (CNDDB) maintained by the California Department of Fish and Game's (CDFG) Natural Heritage Division as a starting point to determine if there are reported localities of CRF within a 1.6-kilometer (1-mile) radius of the site. Information on the CNDDB is attached to the end of this document. Data entry into the CNDDB is not always current nor do all surveyors submit reports to the CNDDB, thus it is essential that other information sources on local occurrences of CRF be consulted. These sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resource managers and biologists from municipal, State, and Federal agencies, environmental groups, and herpetologists at museums and universities. The biologist should report to the Service all known CRF records at the project site and within a 1.6-kilometer (1-mile) radius of the project boundaries. One-point-six (1.6) kilometers (1 mile) was selected as a proximity radius to a project site based on telemetry data collected by Bulger *et al.* (2003), rounded to the nearest whole mile. This distance may be subject to change when new data becomes available, or based on site-specific conditions, so it is advised that surveyors check with the appropriate Service Fish and Wildlife Office to ensure they are using the most up-to-date information.

> *** IMPORTANT**: One-point-six (1.6) kilometers (1 mile) radius is a general guideline. The appropriate Service Fish and Wildlife Office will advise surveyors of the most appropriate distance for each specific project location on a case-by-case basis.

3. What are the habitats within the project site and within 1.6 kilometers* (1 mile) of the project boundary?

In order to properly characterize the habitat within 1.6 kilometers (1 mile) of the project site, individuals conducting site assessments must visit the project site and as much of the surrounding habitat within 1.6 kilometers (1 mile) of the project site as possible. Aerial photographs, maps, and other resources should be consulted as well to ensure all possible accessible habitats are considered. Based on this reconnaissance assessment, the surveyor shall describe the upland and aquatic habitats within the project site and within 1.6 kilometers (1 mile) of the project boundary. The aquatic habitats should be mapped and characterized (*e.g.*, ponds vs. creeks, pool vs. riffle, ephemeral vs. permanent (if ephemeral, give date it goes dry), vegetation (type, emergent, overhanging), water depth at the time of the site assessment, bank full depth, stream gradient (percent slope), substrate, and description of bank). The presence of

bullfrogs (*Rana catesbeiana*) and other aquatic predators such a centrarchid fishes (bass, perch, sunfish) should be documented even though their presence does not negate the presence of CRF. Upland habitats should be characterized by including a description of upland vegetation communities, land uses, and any potential barriers to CRF movement. The information provided in Appendix A serves as a guide to the features that will indicate possible CRF habitat.

4. Report the results of the site assessment

A site assessment report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1) Copies of the data sheet provided at Appendix D;

2) Copies of field notes and all other supporting documentation including:

   A. A list of all known CRF localities within 1.6 kilometers* (1 mile) of the project site boundaries;
   B. Photographs of the project site (photopoints shall be indicated on an accompanying map);
   C. A map of the site showing all of the habitat types and other important features as well as the location of any species detected during the site assessment within 1.6 kilometers (1 mile) of the project site boundaries. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;
   D. A description of the project and/or land use that is being proposed at the site.

Based on the information provided in the site assessment report, the Service will provide guidance on how CRF issues should be addressed, including whether field surveys are appropriate, where the field surveys should be conducted, and whether incidental take authorization should be obtained through section 7 consultation or a section 10 permit pursuant to the Endangered Species Act.

IV. Field Surveys

<u>Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting surveys to prevent the spread of parasites and diseases to CRF and other amphibians.</u>

To avoid and minimize the potential of harassment or harm to CRF, no additional surveys will be conducted in an area once occupancy has been established, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

<u>The Service should be notified in writing (*e.g.*, email) by the surveyor within three (3) working</u>

days once a CRF is detected. The Service will provide guidance to the surveyor regarding the need to collect additional information such as population size, age class, habitat use, *etc*.

A. Qualifications of Surveyors

Surveyors must be familiar with the distinguishing physical characteristics of all life stages of the CRF, other anurans of California, and with introduced, exotic species such as the bullfrog and the African clawed frog (*Xenopus Laevis*) prior to conducting surveys according to this Guidance.

Surveyors must submit their qualifications to the Service along with their survey results.

A field guide should be consulted (*e.g.*, Wright and Wright 1949; Stebbins 2003) to confirm the identification of amphibians encountered during surveys. Surveyors also should be familiar with the vocalizations of the CRF and other amphibians found in California. Recordings of these vocalizations are available through various sources (*e.g.*, Davidson 1995). Surveyors that do not have experience with the species are required to obtain training on locating and identifying CRF adult, larval and egg stages before survey results are accepted. Training may include attendance at various workshops that have an emphasis on the biology of the California red-legged frog, accompanied by an appropriate level of field identification training; field work with individuals who possess valid 10(a)(1)(A) permits for the CRF; and experience working with ranids and similar taxa.

In some localities more intensive surveys (*e.g*., dip-netting larvae and adults) may be desirable to document the presence of CRF. In order to conduct such focused surveys a valid section 10(a)(1)(A) permit is required (refer to introduction section for information on how to apply for a section 10(a)(1)(A) permit). Applicants will be considered qualified for a section 10(a)(1)(A) permit if they meet the Service's most current qualification requirements. At a minimum, prospective applicants must:

1) Possess a Baccalaureate degree in biology, ecology, a resource management-related field, or have equivalent relevant experience;
2) Have completed course work in herpetology and study-design/survey-methodology or have equivalent relevant experience;
3) Have verifiable experience in the design and implementation of amphibian surveys or research or have equivalent relevant experience;
4) Have verifiable experience handling and identifying a minimum of 10 CRF, or similar ranid species, comprised of a minimum of 5 adults and a combination of larva and juveniles;
5) Obtain a minimum of 40 hours of field experience through assisting in surveys for the CRF during which positive identification is made;
6) Have familiarity with suitable habitats for the species and be able to identify the major vegetative components of communities in which California red-legged frog surveys or

research may be conducted.

7) Have familiarity with and be able to identify native and non-native amphibians that may co-occur with the listed species.

B. Survey Periods

Surveys may begin anytime during January and should be completed by the end of September. Multiple survey visits conducted throughout the survey-year (January through September) increases the likelihood of detecting the various life stages of the CRF. For example, adult frogs are most likely to be detected at night between January 1 and June 30, somewhere in the vicinity of a breeding location, whereas, sub-adults are most easily detected during the day from July 1 through September 30.

Due to the geographic and yearly variation in egg laying dates, it is not possible to specify a range of dates that is appropriate for egg surveys throughout the range of the CRF. The following table summarizes the best approximated times to survey for CRF egg masses.

Geographic Area	Best Survey Period*
Northern California along the coast and interior to the Coast Range (north of Santa Cruz County)	January 1 and February 28
Southern California along the coast and interior through the Coast Range (south of, and including Santa Cruz County)	February 25 and April 30
Sierra Nevada Mountains and other high-elevation locations	Should not begin before April 15

Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval prior to conducting the surveys.

Survey Methodology

This Guidance recommends a total of **up to** eight (8) surveys to determine the presence of CRF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (*i.e.*, the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1 and September 30.

If CRF are identified at any time during the course of surveys, no additional surveys will be conducted in the area, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

The following methodology shall be followed unless otherwise specified, or approved by the

appropriate Service Fish and Wildlife Office:

1) Upon arrival at the survey site, surveyors should listen for a few minutes for frogs calling, prior to disturbing the survey site by walking or looking for eye shine using bright lights. If CRF calls are identified, the surveyor should note this information on the survey data sheet and note the approximate location of the call. Once the survey begins, the surveyor should pay special attention to the area where the call originated in an attempt to visually identify the frog.

2) The most common method of surveying for CRF is the visual-encounter survey. This survey is conducted either during daylight hours or at night by walking entirely around the pond or marsh or along the entire length of a creek or stream while repeatedly scanning for frogs. This procedure allows one to scan each section of shore from at least two different angles. Surveyors should begin by first working along the entire shoreline, then by entering the water (if necessary and no egg masses would be crushed or disturbed), and visually scanning all shoreline areas and all aquatic habitats identified in the site assessment. Generally, surveyors shall focus on all open water to at least 2 meters (6.5 feet) up the bank. When wading, surveyors must take maximum care to avoid disturbing sediments, vegetation, or larvae. When walking on the bank, surveyors shall take care to not crush rootballs, overhanging banks, and stream-side vegetation that might provide shelter for frogs. Surveys must cover the entire area, otherwise the remaining survey area must be surveyed the next day/night that weather conditions allow (both visits would constitute one day/night survey).

3) Day surveys may be conducted on the same day as a night survey.

   The main purpose of day surveys during the breeding season is to look for larvae, metamorphs, and egg masses; the main purpose of day surveys during the non-breeding season is to look for metamorphosing sub-adults, and non-breeding adults. Daytime surveys shall be conducted between one hour after sunrise and one hour before sunset.

4) Night surveys

   The main purpose of night surveys is to identify and locate adult and metamorphosed frogs. Conditions and requirements for conducting night surveys are as follows:

   A. Night surveys must commence no earlier than one (1) hour after sunset.
   B. Due to diminished visibility, surveys should not be conducted during heavy rains, fog, or other conditions that impair the surveyor's ability to accurately locate and identify frogs.
   C. Nighttime surveys shall be conducted with a Service-approved light such as a Wheat Lamp, Nite Light, or sealed-beam light that produces less than 100,000 candle watt. Lights that the Service does not accept for surveys are lights that are either too dim or too bright. For example, Mag-Light-type lights and other

types of flashlights that rely on 2 or 4 AA's/AAA's, 2 C's or 2 D batteries. Lights with 100,000 candle watt or greater are too bright and also would not meet Service requirements.

D. The Service approved light must be held at the surveyor's eye level so that the frog's eye shine is visible to the surveyor.
E. The use of binoculars is a must in order to effectively see the eye shine of the frogs. Surveys conducted without the use of binoculars may call in to question the validity of the survey.

5) Weather conditions.

Weather and visibility conditions must be consistent throughout the duration of the survey; if weather conditions become unsuitable, the survey must be completed at another time when conditions are better suited to positively locating and identifying frogs. Suitable conditions are as follows:

A. Air temperature at the survey site must be at least 10 degrees Celsius (50 degrees Fahrenheit). Frogs are less likely to be active when temperatures are below 10 degrees Celsius (50 degrees Fahrenheit).
B. Wind speed must not exceed 8 kilometers/hour (5 miles/hour) at the survey site. High wind speeds affect temperatures and the surveyor's ability to hear frogs calling.
C. Surveys must be conducted under clear to partly cloudy skies (high clouds are okay) but not under dense fog or during heavy rain, as stated above. Surveys may be conducted during light rains.

Surveyors should carefully consider weather conditions prior to initiating a survey. Ask yourself, "Can I collect accurate, reliable data under the existing weather conditions" prior to proceeding with the survey. Weather conditions will be taken into account when the data is reviewed by the appropriate Service Fish and Wildlife Service Office.

6) Decontamination of equipment

In an effort to minimize the spread of terrestrial and aquatic pathogens, all aquatic survey equipment including chest waders, wet suits, float tubes, kayaks, shall be decontaminated before entering potential CRF habitat using the guidelines in Appendix B. Careful attention shall be taken to remove all dirt from boots, chest waders, wetsuits, float tubes, kayaks, and other equipment before placing equipment into the water.

7) Unidentified larvae, sub-adults, and adults

If the larval life stage is the only life stage detected and the larvae are not identified to species (or similarly, if sub-adult or adult frogs are observed but not identified to

species), the surveyor must either return to the habitat to identify the frog in another life stage or obtain the appropriate permit (*e.g.*, section 10(a)(1)(A) permit) authorization allowing the surveyor to handle CRF and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

8) Reporting results of the surveys

A species survey report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1. Copies of the data sheets provided at Appendix E;

2. Copies of field notes and all other supporting documentation including:

   A. Photographs of all CRF observed during the survey and of the habitat where each individual was located, if possible without harming or harassing the individual;
   B. A map of the site showing the location of any species detected during the survey. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;

Based on the information provided in the site assessment report and the survey results, the Service will provide guidance on how CRF issues should be addressed through the section 7 or section 10 processes.

All information on CRF distribution resulting from field surveys shall be sent to the California Natural Diversity Database (CNDDB). CNDDB forms shall be completed, as appropriate, for each listed species identified during the survey(s) and submitted to the California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1807 13th Street, Suite 202, Sacramento, California 95814, with copies submitted to the appropriate Service Fish and Wildlife Office. Each form sent to the CDFG shall have an accompanying 1:24,000 scale USGS map (or an exact scale photocopy of the appropriate portion(s) of the map) -or- Global Information System (GIS) data coverage of the site. Copies of the form can be obtained from the CDFG at the above address (telephone: 916-324-3812) or online at: http://www.dfg.ca.gov/whdab/html/animals.html. Additional information about the CNDDB is available in Appendix C.

The Service may not accept the results of field surveys conducted under this Guidance for any of the following reasons:

A. if the appropriate Service Fish and Wildlife Office was not contacted to review the results of the site assessment prior to field surveys being conducted;
B. if field surveys were conducted in a manner inconsistent with this Guidance or with

survey methods not previously approved by the Service;

C. if field surveys were incomplete;
D. if surveyors were not adequately qualified to conduct the surveys;
E. if the reporting requirements, including submission of CNDDB forms, were not fulfilled.

IV. Service Contacts

There are three Service Fish and Wildlife Offices within the range of the CRF (see Map 1). The appropriate office to contact regarding site assessments or survey authorization depends on the location where the surveys are to be conducted.

For project sites and land use activities in Santa Cruz, Monterey, San Benito, San Luis Obispo, Santa Barbara, and Ventura Counties, portions of Los Angeles and San Bernardino Counties outside of the Los Angeles Basin, and portions of Kern, Inyo and Mono Counties east of the Sierra Crest and south of Conway Summit, contact:

Ventura Fish and Wildlife Office,
2493 Portola Road, Suite B
Ventura, California, 93003
(805/644-1766).

For project sites and land use activities in all other areas of the State south of the Transverse Ranges, contact:

Carlsbad Fish and Wildlife Office
Attn: Recovery Permit Coordinator
6010 Hidden Valley Road
Carlsbad, California, 92009
(760/431-9440).

For project sites and land use activities in all other areas of the State, contact:

Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825
(916/414-6600).
(916/414-6713, fax)

For information on section 10(a)(1)(A) recovery permits, contact:

Regional Office,
Eastside Federal Complex
911 N.E., 11th Avenue
Portland, Oregon 97232-4181
(503/231-6241)

* These are independent offices overlapping with the Sacramento Fish and Wildlife Office. Their work primarily focuses on salmonid restoration, fishery monitoring and Forest Plan Implementation.

Map 1. Map of California showing jurisdictional boundaries of Service Fish and Wildlife Offices.

References

Davidson, C. 1995. Frog and toad calls of the Pacific Coast: Vanishing Voices. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York. 27 pp. +1 cassette.

Stebbins, R.C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, New York, New York. 533 pp.

Wright, A.H. and A.A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Third Edition. Comstock Publishing Company, Ithaca, New York. xii+640 pp.

Appendix A.
California red-legged frog identification and ecology.

1. Identification

The following information may aid surveyors in the identification of California red-legged frogs and similar species. However, all surveyors are expected to consult field guides (Wright and Wright 1949; Davidson 1995; Stebbins 2003) for further information.

General Description
The California red-legged frog (*Rana aurora draytonii*), is a relatively large aquatic frog ranging from 4 to 13 centimeters (1.5 to 5 inches) from the tip of the snout to the vent. From above, the California red-legged frog can appear brown, gray, olive, red or orange, often with a pattern of dark flecks or spots. The skin usually does not look rough or warty. The back of the California red-legged frog is bordered on either side by an often prominent dorsolateral fold of skin running from the eye to the hip. The hindlegs are well-developed with large webbed feet. A cream, white, or orange stripe usually extends along the upper lip from beneath the eye to the rear of the jaw. The undersides of adult California red-legged frogs are white, usually with patches of bright red or orange on the abdomen and hindlegs. The groin area can show a bold black mottling with a white or yellow background.

Adults
Positive diagnostic marks should be used to accurately distinguish California red-legged frogs from other species of frogs that may be observed. A positive diagnostic mark is an attribute of the animal that will not be found on any other animal likely to be encountered at the same locality. The following features are positive diagnostic marks that, if observed, will distinguish California red-legged frogs from foothill yellow-legged frogs (*Rana boylii)* and bullfrogs *(Rana catesbeiana)*:

a. Prominent dorsolateral folds (thick upraised fold of skin running from eye to hip) on any frog greater than 5 centimeters (2 inches) long from snout to vent. Young yellow-legged frogs can show reddish folds; these usually fade as the frogs mature.

b. Bright red dorsum.

c. Well defined stripe as described above running along upper lip.

Since California red-legged frogs are often confused with bullfrogs, surveyors should note those features that might be found on bullfrogs that will rarely be observed on California red-legged frogs. These features are:

a. Absence of the dorsolateral fold.
b. Bright yellow on throat.
c. Uniform bright green snout.
d. Tympanum (ear disc) distinct and much larger than eye.

Please note that some frogs may lack all of the above characteristics given for both California red-legged frogs and bullfrogs. Surveyors should regard such frogs as unidentified, unless it is clearly identified as another species.

California red-legged frogs are cryptic because their coloration tends to help them blend in with their surroundings, and they can remain immobile for great lengths of time. When an individual California red-legged frog is disturbed, it may jump into the water with a distinct "plop." The California red-legged frog may do this either when the surveyor is still distant or when a surveyor is very near. Bullfrogs exhibit similar behavior but will often emit a "squawk" as they dive into the water. Because a California red-legged frog is unlikely to make such a sound, a "squawk" from a fleeing frog will be considered sufficient to positively identify the frog as a bullfrog.

Larvae
Tadpoles may be trapped and handled only by those with a valid 10(a)1(A) permit. California red-legged frog larvae range from 14 to 80 millimeters (0.5 to 3.25 inches) in length. They are greenish to generally brownish color with darker marbling and lack distinct black or white spotting or speckling. Large California red-legged frog larvae often have a wash of red coloration on their undersides and a very small single row of evenly spaced whitish or gold flecks along the side where the dorsolateral fold will develop. Other features to look for to identify California red-legged frog larvae include: eyes set well in from the outline of the head (contrasts with treefrogs (*Hyla* spp.)), oral papillae on both the sides of the mouth and the bottom of the mouth (contrasts with *Bufo* spp.), well developed oral papillae on the sides of the mouth (contrasts with other subspecies of red-legged frogs (*Rana aurora* spp.) and spadefoot toads (*Scaphiopus* spp.)), generally mottled body and tail with few or no distinct black spots on tail fins (contrasts with bullfrogs), and two to three tooth rows on the top and bottom (contrasts with foothill yellow-legged frogs).

Eggs
California red-legged frogs breed during the winter and early spring from as early as late November through April and May. Adults engage in courtship behaviors that result in the female depositing from 2,000 to 6,000 eggs, each measuring between 2 and 3 millimeter (0.1 inches). California red-legged frog eggs are typically laid in a mass attached to emergent vegetation near the surface of the water, where they can be easily dislodged. However, egg masses have been detected lying on the bottom of ponds. The egg mass is well defined and

about the size of a softball. Eggs hatch within 6 to 14 days after deposition at which time the newly hatched larvae are delicate and easily injured or killed. California red-legged frog larvae transform into juvenile frogs in 3.5 to 7 months.

During the time that red-legged frog egg surveys are conducted, other amphibian eggs may be found including those of Pacific treefrogs, spadefoot toads, California tiger salamanders, and newts. Bullfrogs and foothill yellow-legged frogs lay their eggs later in the season. Field guides should be consulted for additional information on egg identification.

2. Habitat

California red-legged frogs occur in different habitats depending on their life stage, the season, and weather conditions. Rangewide, and even within local populations, there is much variation in how frogs use their environment; in some cases, they may complete their entire life cycle in a particular habitat (*i.e.,* a pond is suitable for all life stages), and in other cases, they may seek multiple habitat types (U.S. Fish and Wildlife Service 2002).

Breeding habitat
All life history stages are most likely to be encountered in and around breeding sites, which are known to include coastal lagoons, marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds. California red-legged frog eggs are usually found in ponds or in backwater pools in creeks attached to emergent vegetation such as *Typha* and *Scirpus*. However, they have been found in areas completely denuded of vegetation. Creeks and ponds where California red-legged frogs are found most often have dense growths of woody riparian vegetation, especially willows (*Salix* spp.) (Hayes and Jennings 1988). The absence of *Typha*, *Scirpus*, and *Salix* at an aquatic site does not rule out the possibility that the site provides habitat for California red-legged frogs, for example stock ponds often are lacking emergent vegetation yet they provide suitable breeding habitat. California red-legged frog larvae remain in these habitats until metamorphosis in the summer months (Storer 1925; Wright and Wright 1949). Young California red-legged frogs can occur in slow moving, shallow riffle zones in creeks or along the margins of ponds.

Summer habitat
California red-legged frogs often disperse from their breeding habitat to forage and seek summer habitat if water is not available. In the summer, California red-legged frogs are often found close to a pond or a deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter from predators. California red-legged frogs may also take shelter in small mammal burrows and other refugia on the banks up to 100 meters from the water any time of the year and can be encountered in smaller, even ephemeral bodies of water in a variety of upland settings (Jennings and Hayes 1994; U.S. Fish and Wildlife Service 2002).

Upland habitat
California red-legged frogs are frequently encountered in open grasslands occupying seeps and

springs. Such bodies may not be suitable for breeding but may function as foraging habitat or refugia for dispersing frogs. During periods of wet weather, starting with the first rains of fall, some individuals make overland excursions through upland habitats (U.S. Fish and Wildlife Service 2002).

3. Movement

California red-legged frogs may move up to 3 kilometers (1.88 miles) up or down drainages and are known to wander throughout riparian woodlands up to several dozen meters from the water (Rathbun *et al.* 1993). Dispersing frogs have been recorded to cover distances from 0.40 kilometer (0.25 mile) to more than 3.2 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors (Bulger 1998). California red-legged frogs have been observed to make long-distance movements that are straight-line, point to point migrations rather than using corridors for moving in between habitats. Dispersal distances are considered to be dependent on habitat availability and environmental conditions. On rainy nights California red-legged frogs may roam away from aquatic sites as much as 1.6 kilometers (1 mile). California red-legged frogs will often move away from the water after the first winter rains, causing sites where California red-legged frogs were easily observed in the summer months to appear devoid of this species. Additionally, California red-legged frogs will sometimes disperse in response to receding water which often occurs during the driest time of the year.

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Appendix B.
Recommended Equipment Decontamination Procedures

In an effort to minimize the spread of pathogens that may be transferred as result of activities, surveyors should follow the guidance outlined below for disinfecting equipment and clothing after entering a pond and before entering a new pond, unless the wetlands are hydrologically connected to one another:

i. All organic matter should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water or potentially contaminated sediments. Cleaned items should be rinsed with clean water before leaving each study site.

ii. Boots, nets, traps, hands, *etc*. should be scrubbed with either a 75% ethanol solution, a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128™ (1:60), or a 6% sodium hypochlorite 3 solution. Equipment should be rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided (*e.g.*, clean in an area at least 100 feet from aquatic features). Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

iii. Used cleaning materials (liquids, *etc.*) should be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

iv. Additionally, the surveyors shall implement the following when working at sites with known or suspected disease problems: disposable gloves should be worn and changed between handling each animal. Gloves should be wetted with water from the site or distilled water prior to handling any amphibians. Gloves should be removed by turning inside out to minimize cross-contamination.

Appendix C.
General instructions for filling out CNDDB field survey forms

The Natural Diversity Data Base (NDDB) is the largest, most comprehensive database of its type in the world. It presently contains more than 33,000 site specific records on California's rarest plants, animals, and natural communities. The majority of the data collection effort for this has been provided by an exceptional assemblage of biologists throughout the state and the west. The backbone of this effort is the field survey form. We are enclosing copies of Natural Diversity Data Base (NDDB) field survey forms for species and natural communities. We would greatly appreciate you recording your field observations of rare, threatened, endangered, or sensitive species and natural communities
(elements) and sending them to us on these forms.

We are interested in receiving forms on elements of concern to us; refer to our free publications: *Special Plants Lis*t, *Special Animals List*, and *Natural Communities List* for lists of which elements these include. Reports on multiple visits to sites that already exist in the NDDB are as important as new site information as it helps us track trends in population/stand size and condition. Naturally, we also want information on new sites. We have enclosed an example of a field survey form that includes the information we like to see. It is especially important to include a xeroxed portion of a USGS topographic quad with the population/stand outlined or marked (see back of enclosed example).

Without the map, your information will be mapped less accurately, as written descriptions of locations are frequently hard to interpret. Do not worry about filling in every box on the form; only fill out what seems most relevant to your site visit. Remember that your name and telephone number are very important in case we have any questions about the form.

If you are concerned about the sensitivity of the site, remember that the NDDB can label your element occurrence "Sensitive" in the computer, thus restricting access to that information. The NDDB is only as good as the information in it, and we depend on people like you as the source of that information. Thank you for your help in improving the NDDB.

Copies of the NDDB form can be obtained from the CDFG at the above address (telephone: 916-324-3812) *or* online at: http://www.dfg.ca.gov/whdab/html/animals.html.

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

This data sheet is to assist in the data collection of California red-legged frog habitat in the vicinity of projects or other land use activities, following the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance), issued by the U.S. Fish and Wildlife Service. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance.

The "Site Assessments" section of the Guidance details the data needed to complete a site assessment. When submitting a complete site assessment to the Service (one that has been done following the Guidance), one data sheet should be included for each aquatic habitat identified. If multiple aquatic habitats are identified within the project site, then multiple data sheets should be completed. A narrative description of the aquatic, riparian, and upland habitats should be provided to characterize the breeding habitat within the project site and the breeding and dispersal habitat within 1.6 kilometers (1 mile) of the project site. In addition to completing this data sheet, field notes, photographs, and maps should be provided to the appropriate Fish and Wildlife Service Office, as requested in the "Site Assessments" section of the Guidance.

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

Site Assessment reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Site Assessment: _____
(mm/dd/yyyy)

Site Assessment Biologists: _____ _____
(Last name) (first name) (Last name) (first name)

_____ _____
(Last name) (first name) (Last name) (first name)

Site Location:_____
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: _____
Brief description of proposed action:

1) Is this site within the current or historic range of the CRF (circle one)? YES NO

2) Are there known records of CRF within 1.6 km (1 mi) of the site (circle one)? YES NO
If yes, attach a list of all known CRF records with a map showing all locations.

GENERAL AQUATIC HABITAT CHARACTERIZATION

(if multiple ponds or streams are within the proposed action area, fill out one data sheet for each)

POND:

Size: _____ Maximum depth: _____

Vegetation: emergent, overhanging, dominant species: _____
_____
_____

Substrate: _____
_____

Perennial or Ephemeral *(circle one)*. If ephemeral, date it goes dry: _____

Appendix D.
<u>California Red-legged Frog Habitat Site Assessment Data Sheet</u>

STREAM:

Bank full width: _____
Depth at bank full: _____
Stream gradient: _____

Are there pools (circle one)? YES NO
If yes,
Size of stream pools: _____
Maximum depth of stream pools: _____

Characterize non-pool habitat: run, riffle, glide, other: _____
_____
_____
Vegetation: emergent, overhanging, dominant species: _____
_____
_____
Substrate: _____
_____
Bank description: _____
_____
_____

Perennial or Ephemeral *(circle one)*. If ephemeral, date it goes dry: _____

Other aquatic habitat characteristics, species observations, drawings, or comments:

Necessary Attachments:

1. All field notes and other supporting documents
2. Site photographs
3. Maps with important habitat features and species location

Appendix E.
California Red-legged Frog Survey Data Sheet

This data sheet is to assist in the data collection during surveys for California red-legged frogs in areas with potential habitat. This data sheet is intended to assist in the preparation of a final report on the field surveys as detailed in the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance) issued by the U.S. Fish and Wildlife Service (Service). Before completing this data sheet, a site assessment should have been conducted using the Guidance and the Service should have been contacted to determine whether surveys are required. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance. To avoid and minimize the potential of harassment to California red-legged frogs, all survey activities shall cease once an individual California red-legged frog has been identified in the survey area, unless prior approval has been received from the appropriate Service Fish and Wildlife Office. The Service shall be notified within three (3) working days by the surveyor once a California red-legged frog is detected, at which point the Service will provide further guidance. Surveys should take place in consecutive breeding/non-breeding seasons (*i.e.*, the entire survey period, including breeding and non-breeding surveys should not exceed 9 months). It is important that both the breeding and non-breeding survey be conducted during the time period specified in the Guidance. Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval. The survey consists of two (2) day and four (4) night surveys during the breeding season and one (1) day and one (1) night surveys during the non-breeding season.

All California red-legged frog life stages should be surveyed for. Surveyors may detect larvae but not be able to identify this life stage to species as handling any life stage of the California red-legged frog necessitates a valid 10(a)(1)(A) permit. If the larval life stage is the only life stage detected and the larvae are not identified to species, the surveyor must either return to the habitat to identify the frog in another life stage or have a valid 10(a)(1)(A) permit allowing the surveyor to handle California red-legged frogs and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

Survey results reviewed by_____ _____ _____
(FWS Field Office) (date) (biologist)

Date of Survey: _____ **Survey Biologist:** _____
(mm/dd/yyyy) **(Last name) (first name)**
Survey Biologist: _____
(Last name) (first name)

Site Location:_____
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: _____
Brief description of proposed action:

Type of Survey (circle one): **DAY NIGHT** **BREEDING NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time:_____ **End Time:**_____

Cloud cover:_____ **Precipitation:**_____

Air Temperature:_____ **Water Temperature:**_____

Wind Speed:_____ **Visibility Conditions:**_____

Moon phase:_____ **Humidity:**_____

Description of weather conditions: _____
_____

Brand name and model of light used to conduct surveys: _____

Were binoculars used for the surveys (circle one)**? YES NO**
Brand, model, and power of binoculars: _____

Appendix E.
<u>California Red-legged Frog Survey Data Sheet</u>

AMPHIBIAN OBSERVATIONS

Species	**# of indiv.**	**Observed (O) Heard (H)**	**Life Stages**	**Size Class**	**Certainty of Identification**

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: _____
_____
_____
_____
_____

Other notes, observations, comments, *etc*.

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

APPENDIX E

Mitigation Guidelines

APPENDIX E1

Staff Report Regarding Mitigation

for Impacts to Swainson's Hawk

(CDFG 1994)

Staff Report regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni* in the Central Valley of California

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates which, if implemented, are intended to help stabilize and reverse dramatic population declines of threatened and endangered species. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to Swainson's hawks in the Central Valley, Staff (WMD, ESD and Regions) has prepared this report. To ensure compliance with legislative and Commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); (2) Fish and Game Code Section 2081 Management Authorizations (Management Authorizations); and (3) Fish and Game Code Section 2090 Consultations with State CEQA Lead Agencies.

The report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes "model" mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature and Fish and Game Commission. Alternative mitigation measures, tailored to specific projects, may be developed if consistent with this report are intended to help achieve the conservation goals for the Swainson's hawk and should complement multi-species habitat conservation planning efforts currently underway.

The Department is preparing a recovery plan for the species and it is anticipated that this report will be revised to incorporate recovery plan goals. It is anticipated that the recovery plan will be completed by the end of 1995. The Swainson's hawk recovery plan will establish criteria for species recovery through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific recovery efforts.

During project review the Department should consider whether a proposed project will adversely affect suitable foraging habitat within a ten (10) mile radius of an active (used during one or more of the last 5 years) Swainson's hawk nest(s). Suitable Swainson's hawk foraging habitat will be those habits and crops identified in

Bechard (1983), Bloom (1980), and Estep (1989). The following vegetation types/agricultural crops are considered small mammal and insect foraging habitat for Swainson's hawks:

- alfalfa
- fallow fields
- beet, tomato, and other low-growing row or field crops
- dry-land and irrigated pasture
- rice land (when not flooded)
- cereal grain crops (including corn after harvest)

The ten mile radius standard is the flight distance between active (and successful) nest sites and suitable foraging habitats, as documented in telemetry studies (Estep 1989, Babcock 1993). Based on the ten mile radius, new development projects which adversely modify nesting and/or foraging habitat should mitigate the project's impacts to the species. The ten mile foraging radius recognizes a need to strike a balance between the biological needs of reproducing pairs (including eggs and nestlings) and the economic benefit of development(s) consistent with Fish and game Code Section 2053.

Since over 95% of Swainson's hawk nests occur on private land, the Department's mitigation program should include incentives that preserve agricultural lands used for the production of crops, which are compatible with Swainson's hawk foraging needs, while providing an opportunity for urban development and other changes in land use adjacent to existing urban areas.

LEGAL STATUS

Federal

The Swainson's hawk is a migratory bird species protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in Section 50 of the Code of Federal Regulations (C.F.R.) Part 10, including feathers or other parts, nests, eggs or products, except as allowed by implementing regulations (50 C.F.R. 21).

State

The Swainsons' hawk has been listed as a threatened species by the California Fish and Game Commission pursuant to the California Endangered Species Act (CESA), see Title 14, California Code of Regulations, Section 670.5(b)(5)(A).

LEGISLATIVE AND COMMISSION POLICIES
LEGAL MANDATES AND STANDARDS

The FGC policy for threatened species is, in part, to: "Protect and preserve all native species...and their habitats..." This policy also directs the Department to work with all interested persons to protect and preserve sensitive resources and their habitats. Consistent with this policy and direction, the Department is enjoined to implement measures that assure protection for the Swainson's hawk.

The California State Legislature, when enacting the provisions of CESA, made the following findings and declarations in Fish and Game Code Section 2051:

a)"Certain species of fish, wildlife, and plants have been rendered extinct as a consequence of man's activities, untempered by adequate concern and conservation";

b)"Other species of fish, wildlife, and plants are in danger of, or threatened with, extinction because their habitats are threatened with destruction, adverse modification, or severe curtailment because of overexploitation, disease, predation, or other factors (emphasis added)"; and

c)"These species of fish, wildlife, and plants are of ecological, educational, historical, recreational, esthetic, economic, and scientific value to the people of this state, and the conservation, protection, and enhancement of these species and their habitat is of statewide concern" (emphasis added).

The Legislature also proclaimed that it "is the policy of the state to conserve, protect, restore, and enhance any endangered or threatened species and its habitat and that it is the intent of the Legislature, consistent with conserving the species, to acquire lands for habitat for these species" (emphasis added).

Section 2053 of the Fish and Game Code states, in part, "it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species and or its habitat which would prevent jeopardy" (emphasis added).

Section 2054 states "The Legislature further finds and declares that, in the event specific economic, social, and or other conditions make infeasible such alternatives, individual projects may be approved if appropriate mitigation and enhancement measures are provided" (emphasis added).

Loss or alteration of foraging habitat or nest site disturbance which results in: (1) nest abandonment; (2) loss of young; (3) reduced health and vigor of eggs and/or nestlings (resulting in reduced survival rates), may ultimately result in the take (killing) of nestling or fledgling Swainsons's hawks incidental to otherwise lawful activities. The taking of Swainson's hawks in this manner can be a violation of Section 2080 of the Fish and Game Code. This interpretation of take has been judicially affirmed by the landmark appellate court decision pertaining to CESA (DFG v. ACID, 8 CA App.4, 41554). The essence of the decision emphasized that the intent and purpose of CESA applies to all activities that take or kill endangered or threatened species, even when the taking is incidental to otherwise legal activities. To avoid potential violations of Fish and Game Code Section 2080, the Department recommends and encourages project sponsors to obtain 2081 Management Authorizations for their projects.

Although this report has been prepared to assist the Department in working with the development community, the prohibition against take. (Fish and Game Code Section 2080) applies to all persons, including those engaged in agricultural activities and routine maintenance of facilities. In addition, sections 3503, 3503.5, and 3800 of the Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs.

To avoid potential violation of Fish and Game Section 2080 (i.e. killing of a listed species), project-related disturbance at active Swainson's hawk nesting sites should be reduced or eliminated during critical phases of the nesting cycle (March 1 - September 15 annually). Delineation of specific activities which could cause nest abandonment (take) of Swainson's hawk during the nesting period should be done on a case-by-case basis.

CEQA requires a mandatory findings of significance if a project's impacts to threatened or endangered species are likely to occur (Sections 21001 {c}, 21083, Guidelines Sections 15380, 15064, 15065). Impacts must be avoided or mitigated to less than significant levels unless the CEQA Lead Agency makes and supports findings of Overriding Consideration. The CEQA Lead Agency's Findings of Overriding Consideration does not eliminate the project sponsor's obligation to comply with Fish and Game Code Section 2080.

NATURAL HISTORY

The Swainson' hawk (*Buteo swainsoni*) is a large, broad winged buteo which frequents open country. They are about the same size as a red-tailed hawk (*Buteo jamaicensis*), but trimmer, weighing approximately 800-1100 grams (1.75 - 2 lbs.). They have about a 125 cm. (4+foot) wingspan. The basic body plumage may be highly variable and is characterized by several color morphs - light, dark, and rufous. In dark phase birds, the entire body of the bird may be sooty black. Adult birds generally have dark backs. The ventral or underneath sections may be light with a characteristic dark, wide "bib" from the lower throat down to the upper breast, light colored wing linings and pointed wing tips. The tail is gray ventrally with a subterminal dusky band, and narrow, less conspicuous barring proximally. The sexes are similar in appearance; females however, are slightly larger and heavier than males, as is the case in most sexually dimorphic raptors. There are not recognized subspecies (Palmer 1988).

The Swainson's hawk is a long distance migrator. The nesting grounds occur in northwestern Canada, the western U.S., and Mexico and most populations migrate to wintering grounds in the open pampas and agricultural areas of South America (Argentina, Uruguay, southern Brazil). The species is included among the group of birds known as "neotropical migrants". Some individuals or small groups (20-30 birds) may winter in the U.S., including California (Delta Islands). This round trip journey may exceed 14,000 miles. The birds return to the nesting grounds and establish nesting territories in early March.

Swainson's hawks are monogamous and remain so until the loss of a mate (Palmer 1988). Nest construction and courtship continues through April. The clutch (commonly 3-5 eggs) is generally laid in early April to early May, but may occur later. Incubation lasts 34-35 days, with both parents participating in the brooding of eggs and young. The young fledge (leave the nest) approximately 42-44 days after hatching and remain with their parents until they depart in the fall. Large groups (up to 100+ birds) may congregate in holding areas in the fall and may exhibit a delayed migration depending upon forage availability. The specific purpose of these congregation areas is as yet unknown, but is likely related to: increasing energy reserves for migration; the timing of migration; aggregation into large migratory groups (including assisting the young in learning migration routes); and providing a pairing and courtship opportunity for unattached adults.

Foraging Requirements

Swainson's hawk nests in the Central Valley of California are generally found in scattered trees or along riparian systems adjacent to agricultural fields or pastures. These open fields and pastures are the primary foraging areas. Major prey items for Central Valley birds include: California voles (*Microtus californicus*), valley pocket gophers (*Thomomys bottae*), deer mice (*Peromyscus maniculatus*), California ground squirrels (*Spermophilus beecheyi*), meadowlarks (*Sturnella neglecta*),other passerines, grasshoppers (*Conocephalinae sp.*), crickets (*Gryllidae sp.*), and beetles (Estep 1989). Swainson's hawks generally search for prey by soaring in open country and agricultural fields similar to northern harriers (*Circus cyaneus*) and ferruginous hawks (*Buteo regalis*). Often several hawks may be seen foraging together following tractors or other farm equipment capturing prey escaping from farming operations. During the breeding season, Swainson's hawks eat mainly vertebrates (small rodents and reptiles), whereas during migration vast numbers of insects are consumed (Palmer 1988).

Department funded research has documented the importance of suitable foraging habitats (e.g., annual grasslands, pasture lands, alfalfa and other hay crops, and combinations of hay, grain and row crops) within an energetically efficient flight distance from active Swainson's hawk nests (Estep pers. comm.). Recent telemetry studies to determine foraging requirements have shown that birds may use in excess of 15,000 acres of habitat or range up to 18.0 miles from the nest in search of prey (Estep 1989, Babcock 1993). The prey base (availability and abundance) for the species is highly variable from year to year, with major prey population (small mammals and insects) fluctuations occurring based on rainfall patterns, natural cycles and agricultural cropping and harvesting patterns. Based on these variables, significant acreages of potential foraging habitat (primarily agricultural lands) should be preserved per nesting pair (or aggregation of nesting pairs) to avoid jeopardizing existing populations. Preserved foraging areas should be adequate to allow additional Swainson's hawk nesting pairs to successfully breed and use the foraging habitat during good prey production years.

Suitable foraging habitat is necessary to provide an adequate energy source for breeding adults, including support of nestlings and fledglings. Adults must achieve an energy balance between the needs of themselves and the demands of nestlings and fledglings, or the health and survival of both may be jeopardized. If prey resources are not sufficient, or if adults must hunt long distances from the nest site, the energetics of the foraging effort may

result in reduced nestling vigor with an increased likelihood of disease and/or starvation. In more extreme cases, the breeding pair, in an effort to assure their own existence, may even abandon the nest and young (Woodbridge 1985).

Prey abundance and availability is determined by land and farming patterns including crop types, agricultural practices and harvesting regimes. Estep (1989) found that 73.4 % of observed prey captures were in fields being harvested, disced, mowed, or irrigated. Preferred foraging habitats for Swainson's hawks include:

- alfalfa;
- fallow fields;
- beet, tomato, and other low-growing row or field crops;
- dry-land and irrigated pasture;
- rice land (during the non-flooded period); and
- cereal grain crops (including corn after harvest).

Unsuitable foraging habitat types include crops where prey species (even if present) are not available due to vegetation characteristics (e.g. vineyards, mature orchards, and cotton fields, dense vegetation).

Nesting Requirements

Although the Swainson's hawk's current nesting habitat is fragmented and unevenly distributed, Swainson's hawks nest throughout most of the Central Valley floor. More than 85% of the known nests in the Central Valley are within riparian systems in Sacramento, Sutter, Yolo, and San Joaquin counties. Much of the potential nesting habitat remaining in this area is in riparian forests, although isolated and roadside trees are also used. Nest sites are generally adjacent to or within easy flying distance to alfalfa or hay fields or other habitats or agricultural crops which provide an abundant and available prey source. Department research has shown that valley oaks (*Quercus lobata*), Fremont's cottonwood (*Populus fremontii*), willows (*Salix spp.*), sycamores (*Platanus spp.*), and walnuts (*Juglans spp.*) are the preferred nest trees for Swainson's hawks (Bloom 1980, Schlorff and Bloom 1983, Estep 1989).

Fall and Winter Migration Habitats

During their annual fall and winter migration periods, Swainson's hawks may congregate in large groups (up to 100+ birds). Some of these sites may be used during delayed migration periods lasting up to three months. Such sites have been identified in Yolo, Tulare, Kern and San Joaquin counties and protection is needed for these

critical foraging areas which support birds during their long migration.

Historical and Current Population Status

The Swainson's hawk was historically regarded as one of the most common and numerous raptor species in the state, so much so that they were often not given special mention in field notes. The breeding population has declined by an estimated 91% in California since the turn of the century (Bloom 1980). The historical Swainson's hawk population estimates are based on current densities and extrapolated based on the historical amount of available habitat. The historical population estimate is 4,284-17,136 pairs (Bloom 1980). In 1979, approximately 375 (±50) breeding pairs of Swainson's hawks were estimated in California, and 280 (75%) of those pairs were estimated to be in the Central Valley (Bloom 1980). In 1988, 241 active breeding pairs were found in the Central Valley, with an additional 78 active pairs known in northeastern California. The 1989 population estimate was 430 pairs for the Central Valley and 550 pairs statewide (*Estep, 1989*). This difference in population estimates is probably a result of increased survey effort rather than an actual population increase.

Reasons for decline

The dramatic Swainson's hawk population decline has been attributed to loss of native nesting and foraging habitat, and more recently to the loss of suitable nesting trees and the conversion of agricultural lands. Agricultural lands have been converted to urban land uses and incompatible crops. In addition, pesticides, shooting, disturbance at the nest site, and impacts on wintering areas may have contributed to their decline. Although losses on the wintering areas in South America may occur, they are not considered significant since breeding populations outside of California are stable. The loss of nesting habitat within riparian areas has been accelerated by flood control practices and bank stabilization programs. Smith (1977) estimated that in 1850 over 770,000 acres of riparian habitat were present in the Sacramento Valley. By the mid-1980s, Warner and Hendrix (1984) estimated that there was only 120,000 acres of riparian habitat remaining in the central Valley (Sacramento and San Joaquin Valleys combined). Based on Warner and Hendrix's estimates approximately 93% of the San Joaquin Valley and 73% of the Sacramento Valley riparian habitat has been eliminated since 1850.

MANAGEMENT STRATEGIES

Management and mitigation strategies for the Central Valley

population of the Swainson's hawk should ensure that:

- suitable nesting habitat continues to be available (this can be accomplished by protecting existing nesting habitat from destruction or disturbance and by increasing the number of suitable nest trees); and

- foraging habitat is available during the period of the year when Swainson's hawks are present in the Central Valley (this should be accomplished by maintaining or creating adequate and suitable foraging habitat in areas of existing and potential nest sites and along migratory routes within the state).

A key to the ultimate success in meeting the Legislature's goal of maintaining habitat sufficient to preserve this species is the implementation of these management strategies in cooperation with project sponsors and local, state and federal agencies.

DEPARTMENT'S ROLES AND RESPONSIBILITIES IN PROJECT CONSULTATION AND ADMINISTRATION OF CEQA AND THE FISH AND GAME CODE

The Department, through its administration of the Fish and Game Code and its trust responsibilities, should continue its efforts to minimize further habitat destruction and should seek mitigation to offset unavoidable losses by (1) including the mitigation measures in this document in CEQA comment letters and/or as management conditions in Department issued Management Authorizations or (2) by developing project specific mitigation measures (consistent with the Commission's and the Legislature's mandates) and including them in CEQA comment letters and/or as management conditions in Fish and Game Code Section 2081 Management Authorizations issued by the Department and/or in Fish and Game Code Section 2090 Biological Opinions.

The Department should submit comments to CEQA Lead Agencies on all projects which adversely affect Swainson's hawks. CEQA requires a mandatory findings of significance if a project's impacts to threatened or endangered species are likely to occur (Sections 21001 {c}, 21083. Guidelines 15380, 15064, 15065). Impacts must be: (1) avoided; or (2) appropriate mitigation must be provided to reduce impacts to less than significant levels; or (3) the lead agency must make and support findings of overriding consideration. If the CEQA Lead Agency makes a Finding of Overriding Consideration, it does not eliminate the project sponsor's obligation to comply with the take prohibitions of Fish and Game Code Section 2080. Activities which result in (1) nest abandonment; (2) starvation of young; and/or (3) reduced health and

vigor of eggs and nestlings may result in the take (killing) of Swainson's hawks incidental to otherwise lawful activities (urban development, recreational activities, agricultural practices, levee maintenance and similar activities. The taking of Swainson's hawk in this manner may be a violation of Section 2080 of the Fish and Game Code. To avoid potential violations of Fish and Game Code Section 2080, the Department should recommend and encourage project sponsors to obtain 2081 Management Authorizations.

In aggregate, the mitigation measures incorporated into CEQA comment letters and/or 2081 Management Authorizations for a project should be consistent with Section 2053 and 2054 of the Fish and Game Code. Section 2053 states, in part, "it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species and or its habitat which would prevent jeopardy". Section 2054 states: "The Legislature further finds and declares that, in the event specific economic, social, and or other conditions make infeasible such alternative, individual projects may be approved if appropriate mitigation and enhancement measures are provided."

State lead agencies are required to consult with the Department pursuant to Fish and Game Code Section 2090 to ensure that any action authorized, funded, or carried out by that state agency will not jeopardize the continued existence of any threatened or endangered species. Comment letters to State Lead Agencies should also include a reminder that the State Lead Agency has the responsibility to consult with the Department pursuant to Fish and Game Code Section 2090 and obtain a written findings (Biological Opinion). Mitigation measures included in Biological Opinions issued to State Lead Agencies must be consistent with Fish and Game Code Sections 2051-2054 and 2091-2092.

NEST SITE AND HABITAT LOCATION INFORMATION SOURCES

The Department's Natural Diversity Data Base (NDDB) is a continually updated, computerized inventory of location information on the State's rarest plants, animals, and natural communities. Department personnel should encourage project proponents and CEQA Lead Gencies, either directly or through CEQA comment letters, to purchase NDDB products for information on the locations of Swainson's hawk nesting areas as well as other sensitive species. The Department's Nongame Bird and Mammal Program also maintains

information on Swainson's hawk nesting areas and may be contacted for additional information on the species.

Project applicants and CEQA Lead Agencies may also need to conduct site specific surveys (conducted by qualified biologists at the appropriate time of the year using approved protocols) to determine the status (location of nest sites, foraging areas, etc.) of listed species as part of the CEQA and 2081 Management Authorization process. Since these studies at the earliest possible time in the project review process. To facilitate project review and reduce the potential for costly project delays, the Department should make it a standard practice to advise developers or others planning projects that may impact one or more Swainson's hawk nesting or foraging areas to initiate communication with the Department as early as possible.

MANAGEMENT CONDITIONS

Staff believes the following mitigation measures (nos. 1-4) are adequate to meet the Commission's and Legislature's policy regarding listed species and are considered as preapproved for incorporation into any Management Authorizations for the Swainson's hawk issued by the Department. The incorporation of measures 1.4 into a CEQA document should reduce a project's impact to a Swainson's hawk(s) to less than significant levels. Since these measures are Staff recommendations, a project sponsor or CEQA Lead agency may choose to negotiated Management Conditions must be consistent with Commission and Legislative policy and be submitted to the ESD for review and approval prior to reaching agreement with the project sponsor or CEQA Lead Agency.

Staff recommended Management Conditions are:

1. No intensive new disturbances (e.g. heavy equipment operation associated with construction, use of cranes or draglines, new rock crushing activities) or other project related activities which may cause nest abandonment or forced fledging, should be initiated within 1/4 mile (buffer zone) of an active nest between March 1 - September 15 or until August 15 if a Management Authorization or Biological Opinion is obtained for the project. The buffer zone should be increased to 1/2 mile in nesting areas away from urban development (i.e. in areas where disturbance [e.g. heavy equipment operation associated with construction, use of cranes or draglines, new rock crushing activities] is not a normal occurrence during the nesting season). Nest trees should not be removed, a Management Authorization (including conditions to off-set the loss of the nest tree) must be obtained with the tree removal

period specified in the Management Authorization, generally between October 1 - February 1. If construction or other project related activities which may cause nest abandonment or forced fledging are necessary within the buffer zone, monitoring of the nest site (funded by the project sponsor) by a qualified biologist (to determine if the nest is abandoned) should be required. If it is abandoned and if the nestlings are still alive, the project sponsor shall fund the recovery and hacking (controlled release of captive reared young) of the nestling(s). Routine disturbances such as agricultural activities, commuter traffic, and routine facility maintenance activities within 1/4 mile of an active nest should not be prohibited.

2. Hacking as a substitute for avoidance of impacts during the nesting period may be used in unusual circumstances after review and approval of a hacking plan by ESD and WMD. Proponents who propose using hacking will be required to fund the full costs of the effort, including any telemetry work specified by the Department.

3. To mitigate for the loss of foraging habitat (as specified in this document), the Management Authorization holder/project sponsor shall provide Habitat Management (HM) lands to the Department based on the following ratios:

(a) Projects within 1 mile of an active nest tree shall provide:

- one acre of HM land (at least 10% of the HM land requirements shall be met by fee title acquisition or a conservation easement allowing for the active management of the habitat, with the remaining 90% of the HM lands protected by a conservation easement [acceptable to the Department] on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk) for each acre of development authorized (1:1 ratio); or

- one-half acre of HM land (all of the HM land requirements shall be met by fee title acquisition or a conservation easement [acceptable to the Department] which allows for the active management of the habitat for prey production on the HM lands) for each acre of development authorized (0.5:1 ratio).

(b) Projects within 5 miles of an active nest tree but greater than 1 mile from the nest tree shall provide 0.75 acres of HM

land for each acre of urban development authorized (0.75:1 ratio). All HM lands protected under this requirement may be protected through fee title acquisition or conservation easement (acceptable to the Department) on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk.

(c) Projects within 10 miles of an active nest tree but greater than 5 miles from an active nest tree shall provide 0.5 acres of HM land for each acre of urban development authorized (0.5:1 ratio). All HM lands protected under this requirement may be protected through fee title acquisition or a conservation easement (acceptable to the Department) on agricultural lands or other suitable habitats which provide foraging habitat for Swainson's hawk.

4. Management Authorization holders/project sponsors shall provide for the long-term management of the HM lands by funding a management endowment (the interest on which shall be used for managing the HM lands) at the rate of $400 per HM land acre (adjusted annually for inflation and varying interest rates).

Some project sponsors may desire to provide funds to the Department for HM land protection. This option is acceptable to the extent the proposal is consistent with Department policy regarding acceptance of funds for land acquisition. All HM lands should be located in areas which are consistent with a multi-species habitat conservation focus. Management Authorization holders/project sponsors who are willing to establish a significant mitigation bank (>900 acres) should be given special consideration such as 1.1 acres of mitigation credit for each acre preserved.

PROJECT SPECIFIC MITIGATION MEASURES

Although this report includes recommended Management Measures, the Department should encourage project proponents to propose alternative mitigation strategies that provide equal or greater protection of the species and which also expedite project environmental review or issuance of a CESA Management Authorization. The Department and sponsor may choose to conduct cooperative, multi-year field studies to assess the site's habitat value and determine its use by nesting and foraging Swainson's hawk. Study plans should include clearly defined criteria for judging the project's impacts on Swainson's hawks and the methodologies (days of monitoring, foraging effort/efficiency, etc.) that will be used.

The study plans should be submitted to the Wildlife Management Division and ESD for review. Mitigation measures developed as a result of the study must be reviewed by ESD (for consistency with the policies of the Legislature and Fish and Game Commission) and approved by the Director.

EXCEPTIONS

Cities, counties and project sponsors should be encourage to focus development on open lands within already urbanized areas. Since small disjunct parcels of habitat seldom provide foraging habitat needed to sustain the reproductive effort of a Swainson's hawk pair, Staff does not recommend requiring mitigation pursuant to CEQA nor a Management Authorization by the Department for infill (within an already urbanized area) projects in areas which have less than 5 acres of foraging habitat and are surrounded by existing urban development, unless the project area is within 1/4 mile of an active nest tree.

REVIEW

Staff should revise this report at least annually to determine if the proposed mitigation strategies should be retained, modified or if additional mitigation strategies should be included as a result of new scientific information.

State of California

Memorandum

: "Div. Chiefs - IFD, BDD, NED, & WMD
Reg. Mgrs. - Regions 1, 2, 3, 4, & 5

Date : October 17, 1995

From : Department of Fish and Game

Subject :
Staff Report on Burrowing Owl Mitigation

I am hereby transmitting the Staff Report on Burrowing Owl Mitigation for your use in reviewing projects (California Environmental Quality Act [CEQA] and others) which may affect burrowing owl habitat. The Staff Report has been developed during the last several months by the Environmental Services Division (ESD) in cooperation with the Wildlife Management Division (WMD) and regions 1, 2, and 4. It has been sent out for public review and redrafted as appropriate.

Either the mitigation measures in the staff report may be used or project specific measures may be developed. Alterative project specific measures proposed by the Department divisions/regions or by project sponsors will also be considered. However, such mitigation measures must be submitted to ESD for review. The review process will focus on the consistency of the proposed measure with Department, Fish and Game Commission, and legislative policy and with laws regarding raptor species. ESD wiIl coordinate project specific mitigation measure review with WMD.

If you have any questions regarding the report, please contact Mr. Ron Rempel, Supervising Biologist, Environmental Services Division, telephone (916) 654-9980.

COPY Original signed by C.F. Raysbrook

C. F. Raysbrook
Interim Director

Attachment

cc: Mr. Ron Rempel
Department of Fish and Game
Sacramento

APPENDIX E2

Staff Report on Burrowing Owl Mitigation

(CDFG 1995)

STAFF REPORT ON BURROWING OWL MITIGATION

Introduction

The Legislature and the Fish and Game Commission have developed the policies, standards and regulatory mandates to protect native species of fish and wildlife. In order to determine how the Department of Fish and Game (Department) could judge the adequacy of mitigation measures designed to offset impacts to burrowing owls *(Speotyto cunicularia;* A.O.U. 1991) staff (WMD, ESD, and Regions) has prepared this report. To ensure compliance with legislative and commission policy, mitigation requirements which are consistent with this report should be incorporated into: (1) Department comments to Lead Agencies and project sponsors pursuant to the California Environmental Quality Act (CEQA); and (2) other authorizations the Department gives to project proponents for projects impacting burrowing owls.

This report is designed to provide the Department (including regional offices and divisions), CEQA Lead Agencies and project proponents the context in which the Environmental Services Division (ESD) will review proposed project specific mitigation measures. This report also includes preapproved mitigation measures which have been judged to be consistent with policies, standards and legal mandates of the Legislature,. the Fish and Game Commission and the Department's public trust responsibilities. Implementation of mitigation measures consistent with this report are intended to help achieve the conservation of burrowing owls and should compliment multi-species habitat conservation planning efforts currently underway. The *Burrowing Owl Survey Protocol and Mitigation Guidelines* developed by The California Burrowing Owl Consortium (CBOC 1993) were taken into consideration in the preparation of this staff report as were comments from other interested parties.

A range-wide conservation strategy for this species is needed. Any range-wide conservation strategy should establish criteria for avoiding the need to list the species pursuant to either the California or federal Endangered Species Acts through preservation of existing habitat, population expansion into former habitat, recruitment of young into the population, and other specific efforts.

California's burrowing owl population is clearly declining and, if declines continue, the species may qualify for listing. Because of the intense pressure for urban development within suitable burrowing owl nesting and foraging habitat (open, flat and gently rolling grasslands and grass/shrub lands) in California, conflicts between owls and development projects often occur. Owl survival can be adversely affected by disturbance and foraging habitat loss even when impacts to individual birds and nests/burrows are avoided. Adequate information about the presence of owls is often unavailable prior to project approval. Following project approval there is no legal mechanism through which to seek mitigation other than avoidance of occupied burrows or nests. The absence of standardized survey methods often impedes consistent impact assessment.

Burrowing Owl Habitat Description

Burrowing owl habitat can be found in annual and perennial grasslands, deserts, and arid scrublands characterized by low-growing vegetation (Zarn 1974). Suitable owl habitat may also include trees and shrubs if the canopy covers less than 30 percent of the ground surface. Burrows are the essential component of burrowing owl habitat. Both natural and artificial burrows provide protection, shelter, and nests for burrowing owls (Henny and Blus 1981). Burrowing owls typically use burrows made by fossorial mammals, such as ground squirrels or badgers, but also may use man-made structures such as cement culverts; cement, asphalt, or wood debris piles; or openings beneath cement or asphalt pavement.

Occupied Burrowing Owl Habitat

Burrowing owls may use a site for breeding, wintering, foraging, and/or migration stopovers. Occupancy of suitable burrowing owl habitat can be verified at a site by detecting a burrowing owl, its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance. Burrowing owls exhibit high site fidelity, reusing burrows year after year (Rich 1984, Feeney 1992). A site should be assumed occupied if at least one burrowing owl has been observed occupying a burrow there within the last three years (Rich 1984).

CEQA Project Review

The measures included in this report are intended to provide a decision-making process that should be implemented whenever-there is potential for-an action or project to adversely affect burrowing owls. For projects subject to the California Environmental Quality Act (CEQA), the process begins by conducting surveys to determine if burrowing owls are foraging or nesting on or adjacent to the project site. If surveys confirm that the site is occupied habitat, mitigation measures to minimize impacts to burrowing owls, their burrows and foraging habitat should be incorporated into the CEQA document as enforceable conditions. The measures in this document are intended to conserve the species by protecting and maintaining viable' populations of the species throughout their range in California. This may often result in protecting and managing habitat for the species at sites away from rapidly urbanizing/developing areas. Projects and situations vary and mitigation measures should be adapted to fit specific circumstances.

Projects not subject to CEQA review may have to be handled separately since the legal authority the Department has with respect to burrowing owls in this type of situation is often limited. The burrowing owl is protected from "take" (Section 3503.5 of the Fish and Game Code) but unoccupied habitat is likely to be lost for activities not subject to CEQA.

Legal Status

The burrowing owl is a migratory species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. To avoid violation of the take provisions of these laws generally requires that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle (February 1 to August 31). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered "take"' and is potentially punishable by fines and/or imprisonment.

The burrowing owl is a Species of Special Concern to California because of declines of suitable habitat and both localized and statewide population declines. Guidelines for the Implementation of the California Environmental Quality Act (CEQA) provide that a species be considered as endangered or "rare" regardless of appearance on a formal list for the purposes of the CEQA (Guidelines, Section 15380, subsections b and d). The CEQA requires a mandatory findings of significance if impacts to threatened or endangered species are likely to occur (Sections 21001 (c), 2103; Guidelines 15380, 15064, 15065). To be legally adequate, mitigation measures must be capable of "avoiding the impact altogether by not taking a certain action or parts of an action"; "minimizing impacts by limiting the degree or magnitude of the action and its implementation"; "rectifying the impact by repairing, rehabilitating or restoring the impacted environment"; "or reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action" (Guidelines, Section 15370). Avoidance or mitigation to reduce impacts to less than significant levels must be included in a project or the CEQA lead agency must make and justify findings of overriding considerations.

Impact Assessment

Habitat Assessment

The project site and a 150 meter (approximately 500 ft.) buffer (where possible and appropriate based on habitat) should be surveyed to assess the presence of burrowing owls and their habitat (Thomsen 1971, Martin 1973). If occupied habitat is detected on or adjacent to the site, measures to avoid, minimize, or mitigate the project's impacts to the species should be incorporated into the project, including burrow preconstruction surveys to ensure avoidance of direct take. It is also recommended that preconstruction surveys be conducted if the species was not detected but is likely to occur on the project site.

Burrowing Owl and Burrow Surveys

Burrowing owl and burrow surveys should be conducted during both the wintering and nesting seasons, unless the species is detected on the first survey. If possible, the winter survey should be conducted between December 1 and January 31 (when wintering owls are most likely to be present) and the nesting season survey should be conducted between April 15 and July 15 (the peak of the breeding season). Surveys conducted from two hours before sunset to one hour after, or from one hour before to two hours after sunrise, are also preferable.

Surveys should be conducted by walking suitable habitat on the entire project site and (where possible) in areas within 150 meters (approx. 500 ft.) of the project impact zone. The 150-meter buffer zone is surveyed to identify burrows and owls outside of the project area which may be impacted by factors -such as noise and vibration (heavy equipment, etc.) during project construction. Pedestrian survey transects should be spaced to allow 100 percent visual coverage of the ground surface. The distance between transect center lines should be no more than 30 meters (approx. 100 ft.) and should be reduced to account for differences in terrain, vegetation density, and ground surface visibility. To effectively survey large projects (100 acres or larger), two or more surveyors should be used to walk adjacent transects. To avoid impacts to owls from surveyors, owls and/or occupied burrows should be avoided by a minimum of 50 meters (approx. 160 ft.) wherever practical. Disturbance to occupied burrows should be avoided during all seasons.

Definition of Impacts

The following should be considered impacts to the species:

- Disturbance within 50 meters (approx. 160 ft.) Which may result in harassment of owls at occupied burrows;
- Destruction of natural and artificial burrows (culverts, concrete slabs and debris piles that provide shelter to burrowing owls); and
- Destruction and/or degradation of foraging habitat adjacent (within 100 m) of an occupied burrow(s).

Written Report

A report for the project should be prepared for the Department and copies should be submitted to the Regional contact and to the Wildlife Management Division Bird and Mammal Conservation Program. The report should include the following information:

- Date and time of visit(s) including name of the qualified biologist conducting surveys, weather and visibility conditions, and survey methodology;

- Description of the site including location, size, topography, vegetation communities, and animals observed during visit(s);

- Assessment of habitat suitability for burrowing owls;

- Map and photographs of the site;

- Results of transect surveys including a map showing the location of all burrow(s) (natural or artificial) and owl(s), including the numbers at each burrow if present and tracks, feathers, pellets, or other items (prey remains, animal scat);

- Behavior of owls during the surveys;

- Summary of both winter and nesting season surveys including any productivity information and a map showing territorial boundaries and home ranges; and

- Any historical information (Natural Diversity Database, Department regional files? Breeding Bird Survey data, American Birds records, Audubon Society, local bird club, other biologists, etc.) regarding the presence of burrowing owls on the site.

Mitigation

The objective of these measures is to avoid and minimize impacts to burrowing owls at a project site and preserve habitat that will support viable owls populations. If burrowing owls are detected using the project area, mitigation measures to minimize and offset the potential impacts should be included as enforceable measures during the CEQA process.

Mitigation actions should be carried out from September 1 to January 31 which is prior to the nesting season (Thomsen 1971, Zam 1974). Since the timing of nesting activity may vary with latitude and climatic conditions, this time frame should be adjusted accordingly. Preconstruction surveys of suitable habitat at the project site(s) and buffer zone(s) should be conducted within the 30 days prior to construction to ensure no additional, burrowing owls have established territories since the initial surveys. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.

Although the mitigation measures may be included as enforceable project conditions in the CEQA process, it may also be desirable to formalize them in a Memorandum of Understanding (MOU) between the Department and the project sponsor. An MOU is needed when lands (fee title or conservation easement) are being transferred to the Department.

Specific Mitigation Measures

1. Occupied burrows should not be disturbed during the nesting season (February 1 through August 3 1) unless a qualified biologist approved by the Department verifies through non-invasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

2. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat (calculated on a 100 m {approx. 300 ft.} foraging radius around the burrow) per pair or unpaired resident bird, should be acquired and permanently protected. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to the Department. *Protection of additional habitat acreage per pair or unpaired resident bird may be applicable in some instances.* The CBOC has also developed mitigation guidelines (CBOC 1993) that can be incorporated by CEQA lead agencies and which are consistent with this staff report.

3. When destruction of occupied burrows is unavoidable, existing unsuitable burrows should be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. One example of an artificial burrow design is provided in Attachment A.

4. If owls must be moved away from the disturbance area, passive relocation techniques (as described below) should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to alternate burrows.

5. The project sponsor should provide funding for long-term management and monitoring of the protected lands. The monitoring plan should include success criteria, remedial measures, and an annual report to the Department.

Impact Avoidance

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approx. 160 ft.) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approx. 250 ft.) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be *permanently* preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department.

Passive Relocation - With One-Way Doors

Owls should be excluded from burrows in the immediate impact zone and within a 50 meter (approx. 160 ft.) buffer zone by installing one-way doors in burrow entrances. One-way doors (e.g., modified dryer vents) should be left in place 48 hours to insure owls have left the burrow before excavation. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily for one* week to confirm owl use of burrows before excavating burrows in the immediate impact zone. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrow.

Passive Relocation - Without One-Way Doors

Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. The project area should be *monitored daily until the owls have relocated to the new burrows.* The formerly occupied burrows may then. be excavated. Whenever possible, burrows should be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe should be inserted into burrows during excavation to maintain an escape route for any animals inside the burrow.

Projects Not Subject to CEQA

The Department is often contacted regarding the presence of burrowing owls on construction sites, parking lots and other areas for which there is no CEQA action or for which the CEQA process has been completed. In these situations, the Department should seek to reach agreement with the project sponsor to implement the specific mitigation measures described above. If they are unwilling to do so, passive relocation without the aid of one-way doors is their only option based upon Fish and Game Code 3503.5.

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Reproductive Success of Burrowing Owls Using Artificial Nest Burrows in Southeastern Idaho

by Bruce Olenick

Artificial nest burrows were implanted in southeastern Idaho f'or burrowing owls in the spring of 1986. These artificial burrows consisted of a 12" x 12" x 8" wood nesting chamber with rernovable top and a 6 foot corrugated and perforated plastic drainage pipe 6 inches in diameter (Fig. 1). Earlier investigators claimed that artificial burrows must provide a natural dirt floor to allow burrowing owls to modify the nesting tunnel and chamber. Contrary to this, the artificial burrow introduced here does not allow owls to modify the entrance or tunnel. The inability to change the physical dimensions of the burrow tunnel does not seem to reflect the owls' breeding success or deter them from using this burrow design.

In 1936, 22 artificial burrows were inhabited. Thirteen nesting attempts yielded an average clutch size of 8.3 eggs per breeding pair. Eight nests successfully hatched at least 1 nestling. In these nests, *67 of 75* eggs hatched (59.3%) and an estimated 61 nestlings (91.0%) fledged. An analysis of the egg laying and incubation periods showed that incubation commenced well after egg laying bega. Average clutch size at the start of incubation was 5.6 eggs. Most eggs tended to hatch synchronously in all successful nests.

Although the initial cost of constructing this burrow design may be slightly higher than a burrow consisting entirely of wood, the plastic pipe burrow offers the following advantages: (1) it lasts several field seasons without rotting or collapsing; (2) it may prevent or retard predation; (3) construction time is minimal; (4) it is easy to transport, especially over long distances; and (5) the flexible tunnel simplifies installation. The use of this artificial nest burrow design was highly successful and may prove to be a great resource technique for future management of this species.

For additional information on constructing this artificial nest burrow, contact Bruce Olenick, Department of Biology, Idaho State University, Pocatello, ID 83209.

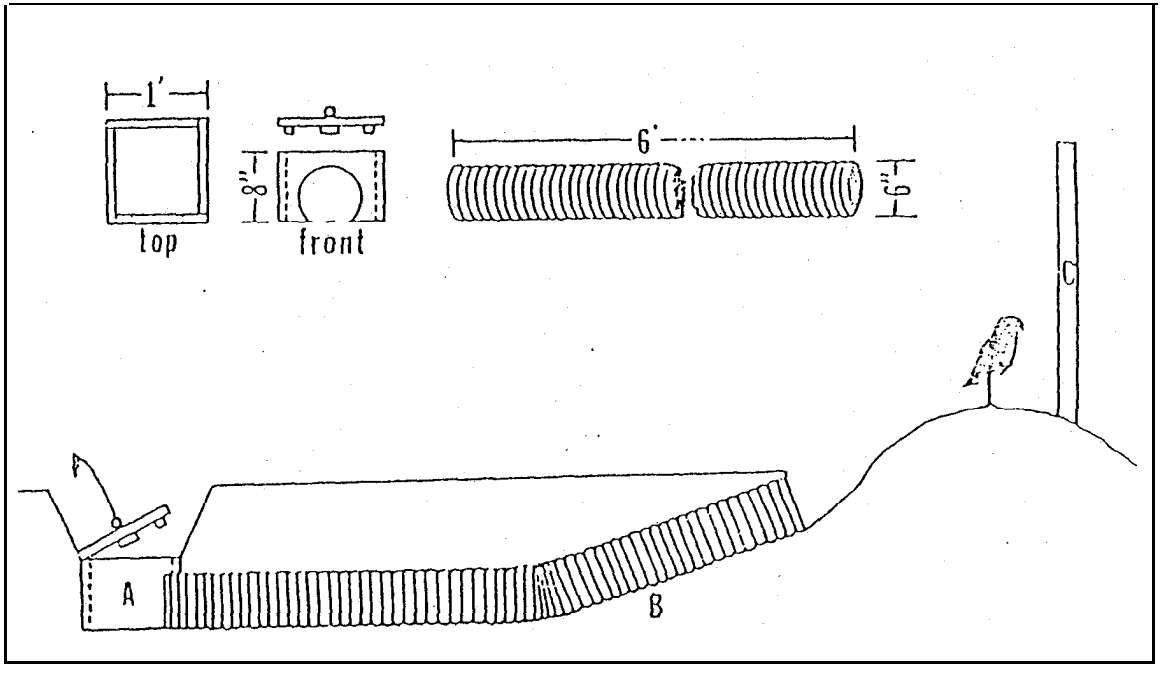

fig. 1 Artificial nest burrow design for burrowing owls Entire unit (including nest chamber) is buried 12" -- 18" below ground for maintaining thermal stability of the nest chamber. A= nest chamber, B = plastic pipe. C = perch.

ATTACHMENT A

APPENDIX F

Species Information

APPENDIX F1

Special Status Plants of Kings County

Species Information

Special Status Plants of Kings County
Species Information

This appendix provides summary technical data for special status plant species as recognized in the BRS and by the state and federal resource and regulatory agencies. The species are treated alphabetically by common name. Information is organized in the following format: common name of species, description and natural history information, habitat affinities, current status in Kings County, and potential threats, management concerns, or special considerations. Additional information and photographs of these species can be found at the following websites: CDFG website (www.dfg.ca.gov), USFWS's website (www.sacramento.fws.gov), and CNPS (www.cnps.org).

Maps for the Species

For the sensitive plants, a general range map is provided in Appendix A5. CNDDB maps showing the specific locales for the species in Kings County are presented in Appendix A7. In Appendix B1, basic information for the species is presented, and this includes a reference to the CNDDB maps where the species is recorded. For species without records in the CNDDB, no range maps are presented and they are not listed in Appendix B1. Distribution information for such species are presented in the text.

Brittlescale (*Atriplex depressa*)

Description and Natural History Information. -A small, annual plant with oval to heart-shaped leaves and inconspicuous flowers. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from May to October, and ranges in elevation from 1 to 320 meters.

Habitat Affinities. - This species inhabits chenopod scrub, meadows and seeps, playas, valley and foothill grassland, and vernal pools in alkaline or clay soils.

Current Status in Kings County. -This species is recorded in the CNDDB from the Laton quadrangle map in adjacent Fresno County. See CNDDB map in Appendix A7 and listing in Appendix B1. This locale is near the town of Laton.

Potential Threats, Management Concerns, or Special Considerations. - This species is restricted to chenopod scrub and grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required. This species is one of several *Atriplex* species that have special status, and their identification is very difficult. Surveys for this species and other *Atriplex* species should be conducted by a qualified biologist.

California Jewel-flower (*Caulanthus californicus*)

Description and Natural History Information. -California jewel-flower is an annual herb about one foot (6-15 inches) tall, with several flower branches. Foliage is gray-green; sparse hairs appear only around the basal leaves. Usually with dry, wavy cut leaves at the base and clasping leaves on the stein. Unopened flowers appear deep maroon in color. Open flowers are translucent white to greenish-yellow with purple tips. Individual flowers are displayed together in an open, one-sided raceme. Each flower contains four purple-tipped white sepals, four wavy-margined narrow petals, six stamens (which are usually not fused) and a two-lobed stigma. The flattened seed pods, about one-quarter inch wide and 1 inch long, are sword-shaped. The seam of the pod is on the flat surface and runs the length of the pod. The seeds are brown and wingless and the cotyledons are three-lobed. Collection records for California jewel-flower exhibit a strong concentration of specimens taken in March, with relatively few specimens taken in April and fewer still in May (Taylor and Davilla, 1986), suggesting a strongly vernal growth phenology. Observations made by Jack Zaninovich indicate that, under cultivation, seeds of *C. californicus* germinate and begin growth in response to the first, often insubstantial, rains typical of November. Growth proceeds apace, with rosette formation, during the tule-fog dominated December-January period typical of the San Joaquin Valley. Flowering can begin as early as early February, with seed production beginning about mid-March (Taylor and Davilla, 1986).

Habitat Affinities. -Reported populations of *C. californicus* occur in the most arid portions of the southern San Joaquin Valley and the Cuyama Valley. Annual precipitation for the available

recording stations averages between 5 and 7 inches-essentially the most arid climate in cismontane California (Taylor and Davilla, 1986). The majority of collection sites that can be located with geographic precision are situated on relatively non-saline, sandy soils. Anecdotal historical accounts of landscape conditions prior to settlement indicate a sizable portion of the Valley floor was covered by a sandy grassland habitat (Taylor and Davilla, 1986). All of the historical collection localities for *C. californicus* on the floor of the San Joaquin Valley would fall within this type of habitat.

One of the natural population sites is an open, *Juniperus californica*-dominated woodland situated on a gentle sloping terrace adjacent to the Cuyama River (Taylor and Davilla, 1986). Juniper canopy cover is about 20 percent. Another important, smaller shrub at this site is *Ericameria linearifolia*, with about 10 percent canopy cover over the area. Both *Juniperus* and *Ericameria* cover is patchy, with some areas being relatively more densely interspersed with intervening patches of grassland. The most striking characteristic of the herbaceous component of this stand is the relative importance of native taxa. *Poa scabrella* is an important grass co-dominant with the introduced taxa *Bromus mollis* and L. *rubens*. Two native annual herbs, *Lasthenia californica* and *Platystemon californicus*, are important in the vegetation at this population location. The population at the Kreyenhagen Hills site is found in the non-native grassland natural community adjacent to a juniper woodland community. Grazing pressure at this site is low which may make the habitat viable for *C. californicus*.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Avenal, Garza Peak, Huron, Kettleman Plain, Pyramid Hills, and Tent Hills quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur in the Kreyenhagen Hills near Avenal, near the town of Huron, and Cottonwood Canyon near the Kern County border.

This extremely endangered species historically occurred in the upper San Joaquin Valley and adjacent valleys from Coalinga in the northwest to the Cuyama Valley in the southwest. It has been discovered at other sites in the Carrizo plains in San Luis Obispo County, in the Interior Coast Ranges, and in the Kreyenhagen Hills.

Potential Threats, Management Concerns, or Special Considerations. -Collection records indicate the pristine distribution of *Caulanthus californicus* corresponds to the region bounded by the present towns of Coalinga and Fresno in Fresno County, New Cuyama in Santa Barbara County, and Bakersfield in Kern County. A status survey performed by Biosystems Analysis, Inc., in 1986 found documentation in herbaria and CNDDB that indicate 38 historical localities for natural populations and two localities for introduced populations of *C. californicus* (Taylor and Davilla, 1986). Of the 40 localities addressed in the Biosystems report only one natural population and one introduced population were known to exist (upon the completion of that study). Overgrazing and conversion of land to intensive agriculture appear to have been the major factors contributing to the decline of this species. Historical records indicate that *C. californicus* was abundant in the 1890's and remained relatively conspicuous through the 1930's (Taylor and Davilla, 1986). Many of the reported populations on the floor of the San Joaquin Valley were situated on sandy soils now ideally suited for viticulture. Development of intensive, irrigated agriculture accounts for the loss of 15 of 38 (39 percent) historically recorded

populations of California jewel-flower (Taylor and Davilla, 1986). Overgrazing accounts for the loss of at least 17 historical populations (45 percent of the total).

Cottony Buckwheat (*Eriogonum gossypinum*)

Description and Natural History Information. -This plant, on which the restrained Jepson lavished the word "remarkable" is a short annual with a cotton-like covering of densely matted hairs (Twisselmann 1956). The flowering period of cottony buckwheat is April to September.

Habitat Affinities. -Sandy soils in valley grassland below 3,000 feet; apparently restricted in range to the head of the San Joaquin Valley, particularly in the Taft-McKittrick area (Twisselmann 1956).

Current Status in Kings County. -CNDDB tracks this species, but has not entered occurrence site records into its computer database. Thus, no locale maps are presented for this species. No records are known from Kings County and it is not listed in Appendix B1, but this species may occur in the county. Smith and Berg (1988) do indicate that there are records from Kings County.

Potential Threats. Management Concerns, or Special Considerations. -Apparently it has great seasonal variation in occurrence. Twisselmann found only one small colony in the Buena Vista Hills in 1954 and the plant did not grow in the same locality in 1955, a more arid year.

Earlimart Orache (*Atriplex erecticaulis*) (Hickman (1993) does not recognize this species.)

Description and Natural History Information. -Little information is known for this plant. See the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from August to September, and ranges in elevation from 40 to 100 meters.

Habitat Affinities. -This species inhabits valley and foothill grassland in southern San Joaquin Valley in alkaline soils.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Traver and Waukena quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur east of the town of Traver and at Cross Creek northwest of the town of Waukena.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required. This species is one of several *Atriplex* species that have special status, and their identification is very difficult. Surveys for this species and other *Atriplex* species should be conducted by a

qualified biologist.

Forked Fiddleneck (*Amsinkia vernicosa* var. *furcata*)

Description and Natural History Information. -This rare species was considered by Munz and Keck (1973) and Hickman (1993) to be a variety of the more widespread species *Amsinckia vernicosa*. It is recognized by its large (12-18 mm long) orange corolla and smooth nutlets. The flowering period of Forked Fiddleneck is March to May.

Habitat Affinities. -Valley grassland, steep talus slopes of shale or gypsum; diatomaceous outcrops below 4,500 feet.

Current Status in Kings County. -CNDDB tracks this species, but has not entered occurrence site records into its computer database. Thus, no locale maps are presented for this species. No records are know from Kings County and it is not listed in Appendix B1, but this species may occur in the county. Smith and Berg (1988) do indicate that there are records from Kings County.

Potential Threats, Management Concerns, or Special Considerations. -Loss of habitat, improperly managed sheep and cattle grazing, and possible impacts from off-highway vehicle use are probably the greatest long-term threats to populations of this species.

Heartscale (*Atriplex cordulata*)

Description and Natural History Information. -This is an erect, much branched annual, with small (.2-.5 in.) gray-white leaves that clasp the stem. The plant grows to a height of 6-14 inches depending on seasonal rains. It is very similar to *Atriplex vallicola* in appearance. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from April to August, and ranges in elevation from 1 to 150 meters.

Habitat Affinities. -This species inhabits chenopod scrub, meadows and seeps, valley and foothill grassland in sandy, saline, or alkaline soils.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Goshen quadrangle map. See CNDDB map in Appendix A7 and listing in Appendix B1. The locale is near the town of Goshen.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to chenopod scrub and grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required. This species is one of several *Atriplex* species that have special status,

and their identification is very difficult. Surveys for this species and other *Atriplex* species should be conducted by a qualified biologist.

Hoover's Eriastrum (*Eriastrum hooveri*)

Description and Natural History Information. -This species was delisted in 2003 and is no longer considered as sensitive species. Hoover's Eriastrum is a small annual species that reaches a height of 4 to 6 inches. Stems typically support erect branches. Leaves are entire and linear to three-cleft with two lateral lobes. The small and inconspicuous flowers are organized into small heads. Corollas range in color from pale bluish to white or cream yellow. Capsules are oblong-ellipsoid with two to four seeds each. Flowers usually appear in mid-to late-spring (April to May (June).

Habitat Affinities. -The habitat for Hoover's Eriastrum is valley grassland with scattered saltbush (*Atriplex polycarpa* or *A. spinifera*). Associated species include red brome, annual fescues, and goldfields. Hoover's Eriastrum is often found in areas where annual grass cover is sparse. Such areas of micro habitat often have a moss and lichen cover on the soil surface and other short, sparse wildflowers.

Current Status in Kings County. -No locale maps are presented for this species since it has been delisted and is no longer considered a sensitive species. Kings County occurrences for this plant are the northern Kettleman Hills, the vicinity of Kettleman City, and along the California Aqueduct just east of Avenal Gap.

Potential Threats, Management Concerns, or Special Considerations. -This ephemeral annual was once fairly widespread throughout the alkaline soils of the San Joaquin Valley from Fresno County to west and northwest of Bakersfield. Much of its native habitat has been converted to agriculture. It was known to be extant at 23 sites throughout the Valley based upon a 1986 study funded by the U.S. Fish and Wildlife Service (Taylor and Davilla, 1986). Because of the wide distribution and lack of potential threats to the continued existence of the species, it was delisted and is no longer considered a sensitive species.

King's Gold (*Tropidocarpum califronicum*) (Hickman (1993) does not recognize this species)

Description and Natural History Information. -Small annual herb, with yellow, four-petaled flowers and dissected leaves. See the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms in March at an elevation of 65 meters.

Habitat Affinities. -Chenopod scrub.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the West Camp quadrangle map. See CNDDB map in Appendix A7 and listing in Appendix B1. The locale is along the California Aqueduct near the Kern County border.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to chenopod scrub and grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

Lemmon's Jewelflower (*Caulanthus coulteri* var. *lemmonii*)

Description and Natural History Information. -A hairless (or nearly so) form of *Caulanthus coulteri*. The plant is an erect annual, with the flowers white to purple tinged and the sepals a showy maroon fading to yellow-green. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to May, and ranges in elevation from 80 to 1,220 meters.

Habitat Affinities. -Pinyon-juniper woodland, valley and foothill grassland.

Current Status in Kings County. -This species is recorded in the CNDDB from the Garza Peak and Tent Hills quadrangle maps in and adjacent to Kings County. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locale on the Garza Peak quad map occurs along Big Tar Creek near Reef Ridge in Kings County. The locales on the Tent Hills quad map occur near Highway 41 both in San Luis Obispo and Kern Counties.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to Pinyon-juniper woodland, valley and foothill grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required. This species is one of several *Atriplex* species that have special status, and their identification is very difficult. Surveys for this species and other *Atriplex* species should be conducted by a qualified biologist.

Lesser Saltscale (*Atriplex miniscula*)

Description and Natural History Information. -Similar to *Atriplex depressa*, but more erect. A many branched annual, with tiny oval to heart shaped leaves. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from April to August, and ranges in elevation from 20 to 100 meters.

Habitat Affinities. -This species inhabits chenopod scrub, playas, valley and foothill grassland in alkaline or sandy soils.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from

the Goshen and Traver quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur near the town of Goshen and east of the town of Traver.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to chenopod scrub and grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required. This species is one of several *Atriplex* species that have special status, and their identification is very difficult. Surveys for this species and other *Atriplex* species should be conducted by a qualified biologist.

Lost Hills Saltbush (Crownscale) (*Atriplex vallicola*)

Description and Natural History Information. -Lost Hills saltbush is a gray-green scurfy annual, with tiny white bran-like scales on its stems and leaves. Stems are slender and spreading. Depending on rainfall in any given year, plants can range from 1 inch tall (or not germinate at all) in low rainfall years, to 8 inches tall in years with above average rains, especially if the rains occur in late spring or early summer. Leaves are oval-shaped, or heart-shaped on the upper stem, and about 0.25 inches long or less. Flowers are very small and inconspicuous. Fruits develop as flattened greenish structures in the leaf-axils. This endangered species was considered by Abrams (1951) to be a probable subspecies of the more common *Atriplex cordulata*, but Munz and Keck (1973) listed it as a separate species. The flowering period of Lost Hills saltbush is June-August. This species blooms from April to August, and ranges in elevation from 50 to 63 meters.

Habitat Affinities. -Lost Hills saltbush often grows in chenopod scrub (Valley Sink Scrub and Valley Saltbush Scrub) along the fringes of bare areas with highly alkaline, powdery soils. Associated species include spiny saltbush, seepweed, iodine bush, and *Frankenia salina*.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Lone Tree Well and West Camp quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur along Interstate 5 near the Kern County border.

Potential Threats, Management Concerns, or Special Considerations. -It is unclear exactly how much habitat disturbance the species can tolerate, but it is likely that any large-scale development would create favorable conditions for the establishment of many introduced weedy annuals that could outcompete this native herbaceous saltbush. Urbanization and petroleum development are also cause for concern.

Mason's Neststraw (*Stylocline masonii*)

Description and Natural History Information. -A low growing, cobwebby, grayish annual, with small oval leaves and inconspicuous flowers that lack petals. See Hickman (1993) for a

description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to June, and ranges in elevation from 100 to 1,200 meters.

Habitat Affinities. -Chenopod scrub, pinyon-juniper woodland.

Current Status in Kings County. -This species is recorded in the CNDDB from the Cholame Valley quadrangle map adjacent to Kings County. See CNDDB map in Appendix A7 and listing in Appendix B1. The locale is actually in San Luis Obispo County in the Cholame Valley near Stone Corral Canyon.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to chenopod scrub and pinyon-juniper woodland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

Oval-leaved Snapdragon (*Antirrhinum ovatum*)

Description and Natural History Information. -An upright annual often leaning on neighboring plants for support. The pink to cream flowers are born singly or as a small raceme. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to June, and ranges in elevation from 185 to 800 meters.

Habitat Affinities. -Chaparral, cismontane woodland, Pinyon-juniper woodland, valley and foothill grassland.

Current Status in Kings County. -This species is recorded in the CNDDB from the Cholame Valley and Tent Hills quadrangle maps adjacent to Kings County. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales actually occur in Monterey and San Luis Obispo Counties.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to chaparral, cismontane woodland, pinyon-juniper woodland, and foothill and valley grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

Pale-yellow Layia (*Layia heterotricha*)

Description and Natural History Information. -This is a stout annual (.5' - 3' tall) with sticky

pubscence that smells of banana or apple. The ray flowers, “petals”, are white to cream colored. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to June, and ranges in elevation from 300 to 1,600 meters.

Habitat Affinities. -Cismontane woodland, Pinyon-juniper woodland, valley and foothill grassland.

Current Status in Kings County. -This species is recorded in the CNDDB from the Cholame Valley, Garza Peak, and Tent Hills quadrangle maps in and adjacent to Kings County. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales on the Cholame Valley and Tent Hills quad maps occur along Highway 41 in San Luis Obispo County. The locale on the Garza Peak quad map occurs along Big Tar Creek southwest of the town of Avenal in Kings County.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to cismontane woodland, pinyon-juniper woodland, valley and foothill grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

Panoche pepper-grass (*Lepidium jaredii* ssp. *album*) (Hickman (1993) does not recognize this subspecies.)

Description and Natural History Information. -This erect annual has divided leaves and small white flowers about 1/4 inch across. It has flat, oval seed pods typical of most pepper-grasses. It is similar to the nominate species, but with white flowers instead of yellow. See the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to May, and ranges in elevation from 65 to 910 meters.

Habitat Affinities. -This species inhabits valley and foothill grasslands in alluvial fans and washes.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Riverdale quadrangle map. See CNDDB map in Appendix A7 and listing in Appendix B1. The locale is near the town of Riverdale.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to grassland habitats in alluvial fans and washes. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

Recurved Larkspur (*Delphinium recurvatum*)

Description and Natural History Information. -Recurved larkspur has erect reddish to purple stems that range from 8 to 24 inches in height. Stems are slightly hairy below and glabrous in the inflorescence. Leaves are several, 0.6 to 1.2 inches long, palmatifid into few-parted divisions, and hairy beneath. The inflorescence supports 15-24 flowers which have light blue sepals and cream to white petals. Sepals are oblong-ovate with incurved tips and are sparsely strigulose. The spur is somewhat straight and 0.4 to 0.6 inches long. Follicle fruits are 0.3 to 0.5 inches long and thinly hairy. Seeds are lightly colored, broadly winged and approximately 0.04 inches long. This species blooms from March to May, and ranges in elevation from 3 to 750 meters.

Habitat Affinities. -Recurved Larkspur grows in sub-alkaline soils supporting shrubby or grassland habitats of the western Central Valley from Contra Costa County to Kern County and the Carrizo Plain. Co-occurring species include saltbush, brome grass, and wild oats.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Avenal Gap, Garza Peak, Guernsey, Pyramid Hills, Tent Hills, and Waukena quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales are widely scattered throughout the county including the valley floor northwest of the town of Waukena, the Kreyenhagen Hills, the Pyramid Hills, the Kettleman Hills, and long Highway 41 near the Kern County border.

Potential Threats, Management Concerns, or Special Considerations. -Much of the original habitat of Recurved Larkspur has been lost to agriculture. Many of the historic populations have either been extirpated or lack current field confirmations of population status. Habitat loss continues to be the principal threat to the continued existence of this species.

Round-leaved Filaree (*Erodium macrophyllum*)

Description and Natural History Information. -Where the typical filarees have dissected leaves, this one has kidney-shaped leaves with scalloped edges. These leaves form a basal rosette from which the bloom-stem arises. The flowers are generally white with a tinge of purple. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to May, and ranges in elevation from 15 to 1,200 meters.

Habitat Affinities. -Cismontane woodland, valley and foothill grasslands.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Garza Peak, Kettleman Plain, Pyramid Hills, and Tent Hills quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur in the Kreyenhagen Hills and along Highway 41near the Kern County border.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to cismontane woodland and grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

San Joaquin Woollythreads (*Monolopia congdonii*)

Description and Natural History Information. -San Joaquin Woollythreads is a small inconspicuous annual herb in the sunflower family with white-woolly stems 3 ½ inches long, often trailing on the ground. The leaves are about 1/4-inch wide and about 1 ½ inches long, and have uneven, wavy margins. The flowers are small, lacking rays, with a yellow center, and are about 1/4 inch in diameter (Taylor, 1989). Individual flowers are arranged in "heads" that are clustered towards the ends of branches. Each head has four to seven phyllaries which are commonly black-tipped. This species blooms from April to May, and ranges in elevation from 200 to 2,700 meters. *Monolopia congdonii* is not easily confused with any other taxa of *Asteraceae*. When very young, however, vegetative plants are difficult to distinguish from other white-woolly annual taxa. Since it is a low, spreading plant, *M. congdonii* is often difficult to detect in dense grass or herb stands. This rare annual sunflower was once "fairly common" in the native saltbush scrub of the lower San Joaquin Valley. Jepson (1923) described it as being more common during years of above normal rainfall.

Habitat Affinities. -San Joaquin Woollythreads is most often associated with the grassland component of the Valley Saltbush Scrub community and occurs most frequently on sandy soils. The saltbush scrub community is characterized by open, gray or blue-green chenopod scrubs with a low herbaceous understory. Characteristic species include *Atriplex polycarpa*, *A. phyllostegia*, *A. spinifera*, and *Ericarmeria*. Both historical collection information and direct observation suggest a strong association of wooly-threads populations with sandy soils. However in Kern County it can also exist in heaver soils containing clays and silts. Most populations occur on soils of the Panoche, Kettleman, and Lost Hills series (Taylor, 1989). These soils are relatively sandy, not heavily alkaline, and are highly variable in proportion of gravels and silts. Populations of *M. congdonii* in the far southern portion of the San Joaquin Valley occur in association with sandy soils of the Kimberlina Series or Milhan Series. Both of these soils are sandy, sub-alkaline barns, low in organic matter (Taylor, 1989). Climatic factors also may have a role in defining the distribution of *M. congdonii*. In general, the historical range for woollythreads essentially corresponds to the most arid, continental portion of cismontane California. The northern distributional limit for woollythreads in the San Joaquin Valley corresponds to about the 7" isohet (Taylor, 1989).

Field data from known populations revealed that shrub cover was relatively low, about 10 percent, with *Atriplex polycarpa* and *Ericarmeria linearifolia* being most important (Taylor, 1989). Herbaceous annual cover at the known populations was dominated by *Erodium cicutarium* and *Bromus rubens*. The annual herb component at the known populations was diverse, with an average of about 20 codominating species. The native annual herbs *Lasthenia*

californica, *Lotus subpinnatus* and *Astragalus didymocarpus* were particularly important. Dense annual grass swards dominated by *Hordeum* are probably suboptimal habitat for *M. congdonii*.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Avenal, Avenal Gap, Huron, Kettleman City, Kettleman Plain, La Cima, Los Viejos, and West Camp quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur along the eastern edge of the Kettleman Plain along Highway 41, the Kettleman Hills, near the towns of Huron, Avenal, and Kettleman City, and along the California Aqueduct.

Potential Threats. Management Concerns, or Special Considerations. -*Monolopia congdonii* once ranged throughout the floor of the San Joaquin Valley from western Fresno County and eastern Tulare County (as far north as Deer Creek) south to the foothills of the Tehachapi Mountains (Taylor, 1989). In the northwestern portion of its range, the species just enters San Benito County in the far southern portion of the Panoche Valley. *M. congdonii* reaches the floor of the Carrizo Plain in far eastern San Luis Obispo County, isolated from the San Joaquin Valley by the Temblor Range. The species also occurred in the upper, most arid portions of the Cuyama Valley in Santa Barbara County. *M. congdonii* was largely absent from the lowest, swampy portions of the Tulare Lake basin (Taylor, 1989).

Biosystems Analysis, Inc., performed a status survey of the 51 populations recorded in the CNDDB and herbarium records from 1986-1988 (Taylor, 1989). At that time, 32 of the 51 historical populations were presumed extirpated. Nine of the populations were confirmed extant and another nine were presumed extant. New populations have been discovered in Kern County near the California Aqueduct and on Bureau of Land Management land in the Panoche Hills (San Benito County).

Showy Golden Madia (*Madia radiata*)

Description and Natural History Information. -An upright annual that grows to a height of 3 feet. The plant is sticky glandular with bright golden yellow flowers. See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to May, and ranges in elevation from 25 to 900 meters.

Habitat Affinities. -Valley and foothill grassland, cismontane woodland, chenopod scrub.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Cholame Valley, Garza Peak, and Tent Hills quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales on the Cholame Valley and Tent Hills quad maps occur along Highway 41 in San Luis Obispo County. The locale on the Garza Peak quad map occurs along Big Tar Creek southwest of the town of Avenal in Kings County.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to chenopod scrub, cismontane woodland, and valley and foothill grassland habitats. Any

developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

Slough Thistle (*Cirsium crassicaule*)

Description and Natural History Information. -Slough thistle is a tall robust annual (or biennial) that ranges between 3 to 6 feet in height. The lower stem is typically unbranched while the upper portion is commonly much branched, supporting several paniculately disposed heads. Herbage is prominently hoary-tomentose to sometimes glabrescent on the upper surfaces. Individual leaves are lanceolate in overall shape with sinuate-pinnatifid margins. Individual lobes are often spine-tipped. This species is distinguished from the "weedy" *Cirsium* species by the presence of spines on the margins of the phyllaries. One does have to be careful not to confuse this species with the invasive *Onopordium* species, which also have spines on the margins of the phyllaries. This species blooms from May to August, and ranges in elevation from 3 to 1,000 meters. Flowers are whitish to pinkish.

Habitat Affinities. -It is found in low-lying, seasonally to permanently wet habitats (sloughs and marshy areas) that traverse chenopod scrub habitat in the Central Valley. The collections made in Kings and Kern Counties indicate that it apparently tolerates fairly disturbed habitats.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Hacienda Ranch and Lone Tree Well quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur north of the Kern National Wildlife Refuge.

Potential Threats, Management Concerns, or Special Considerations. -The modern restricted distribution of slough thistle is likely the result of the historical conversion of Valley floor wetland habitats to a variety of agricultural uses and various flood-control projects that have combined to substantially eliminate suitable habitat.

Subtle Orache (*Atriplex subtilis*) (Hickman (1993) does not recognize this species.)

Description and Natural History Information. -Little information is known for this plant. See the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from June to October, and ranges in elevation from 40 to 100 meters.

Habitat Affinities. -Valley and foothill grasslands.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Goshen and Waukena quadrangle maps. See CNDDB maps in Appendix A7 and listing in Appendix B1. The locales occur near the town of Goshen (Tulare County) and at Cross Creek northwest of the town of Waukena.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required. This species is one of several *Atriplex* species that have special status, and their identification is very difficult. Surveys for this species and other *Atriplex* species should be conducted by a qualified biologist.

Temblor Buckwheat (*Eriogonum temblorense*)

Description and Natural History Information. -The flowering stem arises from a basal rosette of densely hairy, oval leaves. The small white flowers are carried on stems that range in height from 4" to 30". See Hickman (1993) for a description of this plant and the California Native Plant Society website (www.cnps.org) for information on this plant. This species blooms from March to June, and ranges in elevation from 100 to 300 meters.

Habitat Affinities. -Valley and foothill grasslands. An extremely drought tolerant plant typically associated with fractured shales.

Current Status in Kings County. -This species is recorded in the CNDDB from the Tent Hills quadrangle map adjacent to Kings County. See CNDDB map in Appendix A7 and listing in Appendix B1. The locale is actually in San Luis Obispo County along Highway 41 in the Cholame Hills.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to valley and foothill grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

APPENDIX F2

Special Status Arthropods of Kings County

Species Information

Special Status Arthropods of Kings County
Species Information

This appendix provides summary technical data for special status arthropod species as recognized in the BRS and by the state and federal resource and regulatory agencies. The species are treated alphabetically by common name. Information is organized in the following format: common name of species, description and natural history information, habitat affinities, current status in the county, potential threats, management concerns, or special considerations. Additional information and photographs of these species can be found at the CDFG's website (www.dfg.ca.gov) and the USFWS's website (www.sacramento.fws.gov).

Maps for the Species

A general range map of special status arthropods in Kings County is provided in Appendix A6. CNDDB maps showing the specific locales in Kings County are presented in Appendix A7. A table in Appendix B2 shows basic information for the species and references the CNDDB maps where the species is recorded. For species without records in the CNDDB, no range maps are presented and they are not listed in Appendix B1. Distribution information for such species is presented in the text. A list of special status species for each quadrangle map is presented in Appendix B4. Critical habitat for special status species and habitats is mapped in Appendix A4.

Doyon's Trigonoscuta Dune Weevil

Description and Natural History Information. -The weevil is a gray, sand-colored, oval weevil about 0.25 inches in length. The weevil is restricted to sandy soils in interior, sand dunes with grassland habitat. The weevil is associated with a wide variety of plant types. The larvae feed on roots and the adults upon leaves. Two plants which occur in sand dune grassland habitat, *Atriplex* and *Astragalus oxyphysus* are know host plants. The weevil is flightless and nocturnal. The active season may be March through May, and females have been observed laying eggs in April. Development time and the number of larval stages is unknown.

The weevil inhabits a very interesting habitat. The dunes where it is found are near the Kettleman Hills northwest of Bakersfield. Yet this weevil's closest relatives are species of *Trigonoscuta* which live in coastal dunes. The apparent reason for this strange distribution is that these inland dunes were themselves coastal dunes at one time. During the Pliocene (2.5-3 million years ago) the Central Valley was a vast inland sea which were bordered by beaches and dunes similar to those seen on the coast today. When sea levels dropped and this inland sea retreated, the dunes and the organisms which had become adapted to them were left behind in patches now scattered around the Valley. An interesting characteristic possessed by this weevil, one shared by many dune inhabiting insects, is a loss of flight ability. Therefore, differentiation into separate species may occur relatively rapidly between populations isolated in separate dune systems. So each patch may often be a unique and irreplaceable community.

Habitat Affinities. -Restricted to interior sand dunes with associated grassland habitat.

Current Status in Kings County. -The weevil is recorded in the CNDDB in Kings County from the Los Viejos quadrangle map. See CNDDB map in Appendix A7. The locale is from one sand dune in the Los Medanos area just south of Kettleman Station.

Potential Threats, Management Concerns, or Special Considerations. -This species is restricted to one dune in the Los Medanos area, south of Kettleman Station in Kings County. Any developments which occur in inland sand dune habitat could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required.

Molestans Blister Beetle

Description and Natural History Information. -Blister beetles of the genus Lytta are poorly studied and little specific information is available. The beetle is black to metallic colored and 0.5 to 1 inches in length. Some beetles have orange or reddish markings on the pronotum, but some are completely black. Like most meloid beetles, the beetle parasitizes the nest of wild bees, feeding on provision or immature stages of the bees. Adults are known to feed on flowers, especially on *Lupinus* (Leguminosae) flowers and seed pods and on *Erodium* (Geraniaceae). Because of its black color and large size, adults are conspicuous when they emerge and become active on flowers. Adult beetles have been collected in April through July. They can be readily

sampled during periods when they visit flowers to collect pollen and locate hosts for their larvae.

Habitat Affinities. -Valley and foothill woodland and *Atriplex* scrub habitats.

Current Status in Kings County. -The beetle is recorded in the CNDDB from the Avenal Gap and West Camp quadrangle maps adjacent to Kings County. See CNDDB map in Appendix A7. The locale is actually in Kern County near the California Aqueduct just south of the Kings County border.

Potential Threats, Management Concerns, or Special Considerations. -Basic biological information is needed to determine the actual distribution and status of these blister beetles in Kings County.

San Joaquin Dune Beetle

Description and Natural History Information. -The beetle is yellowish-brown to dark brownish black and about 0.25 inches in length. The beetle is restricted to interior sand dunes with grassland habitat. The beetle is believed to be a detritivore, feeding upon decomposing vegetation buried in the sand. Nothing is known about the mating habits. Larval of the dune beetle may be found throughout the year, indicating that egg laying occurs over a long perior of time. Adult beetles are active from about November to April, during the growth period of the winter plants under which it takes refuge. Few dune beetles are found during summer months. Adult beetles may live at least six months in the laboratory, and for a year or longer in the wild. The beetle and its larvae live two to four inches underground under a canopy of vegetation. Rarely, they area found underground in areas with no vegetation covering the surface.

is known from four remnant sand dune areas along the western edge of the San Joaquin Valley in Fresno and Kings County, including a site just south of Kettleman City (CNDDB 1993). This beetle and its larvae live about four inches under the sand.

Habitat Affinities. -Restricted to interior sand dunes with associated grassland habitat.

Current Status in Kings County. -The beetle is recorded in the CNDDB in Kings County from the Avenal, Kettleman City, and Los Viejos quadrangle maps. See CNDDB map in Appendix A7. The locales are from interior sand dunes in the Kettleman Hills, along Interstate 5 west of Kettleman City, along Interstate 5 west of Kettleman Station, and the Highway 41-Interstate 5 interchange south of Kettleman Station.

Potential Threats, Management Concerns, or Special Considerations. -Loss of dune habitat to land development in the vicinity of the Highway 41-Interstate 5 interchange. Off-highway vehicle use may have unknown impacts on this species.

San Joaquin Tiger Beetle

Description and Natural History Information. -The beetle is shiny metallic green, its abdomen is metallic blue, and various degrees of ivory marking occur on the elytra (forewings). The beetle is about 0.5 inches in length. Adult beetles are predaceous upon other insects. The eggs are laid in sandy areas and the larvae grow and develop under the ground. They also are predaceous upon other soil organisms. Adults are active in the March through May and September through November periods. San Joaquin Tiger Beetle is one of the most wide-spread and diverse of the U.S. tiger beetles. Over 27 names have been applied to it, and the 12 subspecies recognized by most workers are more than any other North American species. Eleven of the subspecies occur west of the Great Plains, including 10 in the southwest and 6 of these in California. The most distinctive character of this species is the extended anterior maculation which is long and angles gradually inward from the outer edge of the elytron, and the absence of a marginal white line. Dorsal coloration varies from black, brown, red, and green to bluish-green.

Habitat Affinities. -The beetle inhabits valley grassland habitat with sandy floodplains along rivers or streams or alkali sinks, flats, and playas within grassland habitat.

Current Status in Kings County. -The beetle is recorded in the CNDDB in Kings County from the Guernsey quadrangle map. See CNDDB map in Appendix A7. The locale is near the town of Guernsey.

Potential Threats, Management Concerns, or Special Considerations. - This species is restricted to valley grassland habitat with sandy floodplains along rivers or streams or alkali sinks, flats, and playas within grassland habitats. Any developments which occur in these habitats could potentially impact this species. At the present time, this species is only a species of special concern so its presence would not stop projects or require mitigation. In the future, should this species be listed as threatened or endangered, then avoidance measures and mitigation for impacts will be required. biologist.

Valley Elderberry Longhorn Beetle

Description and Natural History Information. -The beetle is cylindrical and about one inch long. Females are black with a greenish tinge and reddish margins on the wing covers (elytra); males have orange-red elytra marked with two or four black spots. The beetle requires elderberry trees/bushes to live. In spring, adults feed and lay eggs on elderberry shrubs in Central Valley and foothill riparian communities. Larvae bore into the pithy core of the elderberry stems and after one year, mine passages in the wood as they feed. They then metamorphose into adults and emerge in spring and summer. Adults feed on the leaves and flowers, and the larvae develop within the trunks and stems. Frequently, the only exterior evidence of the plant's use by the beetle is an exit hole created by the larva just prior to pupal stage. The animal spends most of its life in the larval state, living within the stems of an elderberry plant. Adult emergence is predominantly from April through June, about the same time the elderberry produces flowers. Potential habitat for the beetle is any elderberry tree or bush.

There are two subspecies of Desmocerus californicus. The threatened subspecies occurs from Red Bluff on the Sacramento River south to the Kern River. The non-threatened subspecies occurs in coastal California and possibly the Sierra Nevada foothills. Recently Halstead (2000) found the beetle in the lower Central Valley and Sierra Nevada foothills. Regulatory Agencies are treating the newly found beetles as the threatened subspecies. The USFWS recognizes the range of the valley elderberry longhorn beetle to extend throughout California's Central Valley and associated foothills from about the 3,000-ft. elevation contour on the east to the watershed boundary of the Central Valley on the west.

Habitat Affinities. -The beetle is restricted to elderberry bushes in riparian and foothill communities in and around the Central Valley. The USFWS recognizes the range of the beetle to extend throughout California's Central Valley and associated foothills from about the 3,000-ft. elevation contour on the east to the watershed boundary of the Central Valley on the west.

Current Status in Kings County. -The beetle is recorded in the CNDDB in Kings County from the Riverdale quadrangle map. See CNDDB map in Appendix A7. The locale is along the Kings River at Excelsior Avenue about 3 miles southeast of the town of Camden. The beetle's exit holes were found in a stand of elderberry bushes along the Kings River.

Potential Threats, Management Concerns, or Special Considerations -More than 90 percent of California's streamside woodlands have been destroyed by agriculture and river diversion. With those woodlands have gone most of the elderberry bushes required by the beetles. They may be threatened by urban development, by insecticides and herbicides drifting on the wind from neighboring farms, and by fluctuating water levels. Recently, the beetle was found to be more widely distributed than previous thought (Halstead and Oldham 2000) and the USFWS is considering delisting this species.

Vernal Pool Fairy Shrimp

Description and Natural History Information. -The shrimp is one of 17 species of *Anostraca* found in California and one of six species found in the Central Valley (Eng 1990). This shrimp is the only frequently encountered *Branchinecta* in the vernal pools of California. Fairy shrimp are distinguished by stalked eyes, absence of a carapace and an elongated body with 11 pairs of swimming legs. Distinguishing this shrimp from other species of *Branchinecta* is very difficult. Differences in the morphology of the antenna of male *Branchinecta* is the primary identifying characteristic. Another important characteristic is the size, shape, and location of the brood pouch of the females. The shrimp inhabits vernal pools in the Central Valley of California where eggs over-summer in the soils of dry pools by means of a protective egg shell. Upon winter or spring rains and the filling of vernal pools, the eggs hatch and the shrimp develop. The developing and adult shrimp complete their cycle in about a two week to one month period. Collections of this shrimp have occurred from early December through early May.

Habitat Affinities. -The shrimp is restricted to vernal pools, grass-bottomed swales, or basalt-flow pools in valley and foothill grasslands. The size of the pools have ranged from 20 square meters to 10 hectares (Eng, 1990). This species occurs at temperatures between 6 and 20 degrees

Celsius in waters having low total dissolved solids, conductivity, alkalinity and chloride, and an average pH of 7.0.

Current Status in Kings County. -The shrimp is recorded in the CNDDB in Kings County from the Burris Park, Goshen, Traver, and Waukena quadrangle maps. See CNDDB map in Appendix A7.
The locales occur near Cross Creek just west of Highway 99, near the town of Goshen, and north of the town of Waukena. Critical habitat for the shrimp occurs near Cross Creek just west of Highway 99 (Appendix A4). Adjacent to and east of Kings County, another area of critical habitat occurs in Tulare County near Blanco.

Potential Threats, Management Concerns, or Special Considerations. -The greatest threat to this species is the potential conversion of grasslands containing vernal pools to other land uses. Basic biological information is needed to determine the actual distribution and status of the shrimp in Kings County.

Vernal Pool Tadpole Shrimp

Description and Natural History Information. -The shrimp is brownish-colored, resembles a tadpole of a frog, and is about 1 to 2 inches in length. The shrimp lives in vernal pools. The adults and developing larvae feed upon small, microscopic animals swimming within the vernal pool. The eggs are carried around by the female in a brood sac and they over-summer in the soils of dry pools by means of a protective egg shell. Upon winter or spring rains and the filling of vernal pools, the eggs hatch and the shrimp develop. The developing and adult shrimp complete their cycle in about a one to two month period. Collections of this shrimp have occurred from early December through early May.

Habitat Affinities. -The shrimp is restricted to vernal pools, grass-bottomed swales, or basalt-flow pools in valley and foothill grasslands.

Current Status in Kings County. -The shrimp is recorded in the CNDDB in Kings County from the Burris Park and Traver quadrangle maps. See CNDDB maps in Appendix A7. The locales occur near Cross Creek just west of Highway 99. Critical habitat for the shrimp occurs near Cross Creek just west of Highway 99 (Appendix A4).

Potential Threats, Management Concerns, or Special Considerations. -The greatest threat to this species is the potential conversion of grasslands containing vernal pools to other land uses. Basic biological information is needed to determine the actual distribution and status of the shrimp in Kings County.

APPENDIX F3

Special Status Fishes of Kings County

Species Information

Special Status Fishes of Kings County
Species Information

This appendix provides summary technical data for special status fish species as recognized in the BRS and by the state and federal resource and regulatory agencies. The species are treated alphabetically by common name. Information is organized in the following format: common name of species, description and natural history information, habitat affinities, current status in the county, potential threats, management concerns, or special considerations. Additional information and photographs of these species can be found at the CDFG's website (www.dfg.ca.gov) and the USFWS's website (www.sacramento.fws.gov).

Maps for the Species

A general range map of special status arthropods in Kings County is provided in Appendix A6. CNDDB maps showing the specific locales in Kings County are presented in Appendix A7. A table in Appendix B2 shows basic information for the species and references the CNDDB maps where the species is recorded. For species without records in the CNDDB, no range maps are presented and they are not listed in Appendix B1. Distribution information for such species is presented in the text. A list of special status species for each quadrangle map is presented in Appendix B4. Critical habitat for special status species and habitats is mapped in Appendix A4.

Hardhead

Description and Natural History Information. -This large minnows may attain a total length of nearly 3 feet. Adults are greenish-colored on the back, white on the belly, and have a forked tail. The resemble the more common Northern Pikeminnow, but the head is not as pointed, the body is slightly deeper and heavier, the jaw does not reach past the front margin of the eye, and a small bridge of skin connects the upper jaw to the head. The young are silvery in color, gradually turning brown to dusky bronze on the bck as they mature. The fish feeds on bottom dwelling invertebrates and aquatic plants in quiet water. Spawning take place in gravel riffles and fish may migrate upstream to tributaries to spawn. Spawning occurs in April and May.

Habitat Affinities. -Large streams at low and middle elevations in and around the Central Valley. Abundant populations occur in warm, clear streams with large and deep, rock or sand-bottomed pools. Hardheads occur in the Sacramento-San Joaquin and Russian River drainages.

Current Status in Kings County. -CNDDB tracks this species, but has not entered occurrence site
records into its computer database. Thus, no locale maps are presented for this species. Like most native fish species, hardheads are now rare in Kings County. The fish persists in small numbers only in portions of the Kings River and wherever else permanent water is maintained.

Potential Threats, Management Concerns, or Special Considerations. -The hardhead is presently encountering stiff competition for the bottom invertebrate food resource from introduced fish species. Hardhead has been impacted by water diversions and increases in water temperatures due to reductions of instream flow.

Delta Smelt

Description and Natural History Information. -Slender and nearly translucent, the pale bluish gray Delta Smelt generally measures 2 to 3 inches in length. The fish usually lives for about one year-just long enough to breed. From February to June adults usually swim upstream into river channels and backwaters of dead-end sloughs where they spawn. Most adults die soon after spawning, preventing them from defending their eggs and young. Despite this, the smelt only produces 1,400-2,800 eggs per female-an unusually low number of eggs for a fish species that does not tend to its eggs or young. This low fecundity may leave the species vulnerable to alterations of its habitat, and may delay its recovery from population declines.

Habitat Affinities. -Delta smelt are endemic to the Sacramento Delta and major inflowing rivers where it is distributed from the Suison Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano and Yolo Counties. The smelt is a pelagic (live in the open water column away from the bottom) euryhaline species (tolerant of a wide salinity range). They have been collected from estuarine waters up to 14 ppt (parts per thousand) salinity.
Current Status in Kings County. -Not recorded in the CNDDB in Kings County. The smelt is listed by the USFWS in their Kings County sensitive species lists, but it does not occur in the Kings County.

Potential Threats, Management Concerns, or Special Considerations. -The Delta Smelt has the unlucky distinction of being one of the few native California fishes to spend its entire life in the Sacramento-San Joaquin River Delta-the primary source of water for the cities and farms in the Central Valley and southern California. This has placed the tiny fish's survival in potential conflict with the water needs of powerful agricultural and development interests, turning the debate over its protection into a major political battle. At the same time, the smelt-a fish adapted to a set of environmental conditions unique to the Sacramento-San Joaquin Estuary is viewed by biologists and environmentalists as an indicator of the overall health of the entire estuary, and it remains a focus of environmental concern.

APPENDIX F4

Special Status Amphibians of Kings County

Species Information

Special Status Amphibians of Kings County
Species Information

This appendix provides summary technical data for special status amphibian species as recognized in the BRS and by the state and federal resource and regulatory agencies. The species are treated alphabetically by common name. Information is organized in the following format: common name of species, description and natural history information, habitat affinities, current status in the county, potential threats, management concerns, or special considerations. Additional information and photographs of these species can be found at the CDFG's website (www.dfg.ca.gov) and the USFWS's website (www.sacramento.fws.gov).

Maps for the Species

A general range map of special status arthropods in Kings County is provided in Appendix A6. CNDDB maps showing the specific locales in Kings County are presented in Appendix A7. A table in Appendix B2 shows basic information for the species and references the CNDDB maps where the species is recorded. For species without records in the CNDDB, no range maps are presented and they are not listed in Appendix B1. Distribution information for such species is presented in the text. A list of special status species for each quadrangle map is presented in Appendix B4. Critical habitat for special status species and habitats is mapped in Appendix A4.

California Red-legged Frog

Description and Natural History Information. -The frog grows to about 5 inches in length. It is red on the lower abdomen and on the underside of the hind legs. Eggs are laid in February and March in pools of permanent, slow-moving streams and ponds. Mean clutch size is 300 (range 100 to 600). This species is not thought to be territorial. They wait for, pounce on, and consume insects and other small animals near the water's edge.

Habitat Affinities. -Found in riparian deciduous corridors within blue oak savannah, digger pine-oak, and chaparral habitat types. Primarily found from Mariposa County northward. Ranges in elevation from 1,000 to 6,000 feet. Few present locations known above 1,000 feet. Requires quiet pools at least three feet in depth in permanent streams.

Current Status in Kings County. -The frog is recorded in the CNDDB from the Tent Hills quadrangle map adjacent to Kings County. See CNDDB map in Appendix A7. The locale is actually in San Luis Obispo County near the town of Shandon. No records occur in Kings County and this from is possibly extirpated from Kings County. This large native frog was originally present in sufficient numbers in Tulare Lake that it was commercially harvested in the late 1800's. A remnant population may yet persist if there are still any suitable streams (which have yet to be colonized by bullfrogs) in the far western and southwestern portions of Kings County. Critical habitat for the frog occurs southwest of and adjacent to Kings County in San Luis Obispo County (Appendix A4).

Potential Threats, Management Concerns or Special Considerations. -The range of the frog has experienced a serious reduction since the introduction of the non-native Bullfrog. Populations in the central and southern Sierra Nevada are rare, perhaps extinct. A thorough survey of isolated streams in the far western and southwestern portion of Kings County would shed some light on whether any remnant populations persist.

California Tiger Salamander

Description and Natural History Information. -The salamander is endemic to the Central Valley and central coastal valleys of California from Santa Barbara and Tulare counties north to southern Butte County. The salamander inhabits grassland and open woodland communities and occurs in the Sierra foothills if suitable breeding habitat is present. Surveys show that over two-thirds of its range had been rendered uninhabitable and that a series of populations in the eastern San Joaquin Valley (principally in Madera County) constituted one of the last strongholds for the salamander.

The salamander breeds in temporary pools (vernal pools), cattle ponds formed by late winter and spring rains, slow-flowing creeks, and occasionally perennial ponds that lack fish predators. They may forego breeding in years of low rainfall. Adults and post-metamorphic juveniles migrate from breeding ponds to underground refuges such as rodent burrows, crevices in rock or soil, or fallen logs, where they estivate during the dry season. Salamanders may migrate up to 1 mile from breeding ponds to upland refuges.

Habitat Affinities. -The salamander inhabits annual grasslands and grassy understory of valley-foothill hardwood habitats in central and northern California. It requires underground refuges, especially California Ground Squirrel burrows, and vernal pools or other seasonal water sources for breeding. Livestock pond without fishes are idea breeding pools.
Current Status in Kings County. -The salamander is recorded in the CNDDB in Kings County from the Burris Park, Cholame Valley, and Traver quadrangle maps. See CNDDB maps in Appendix A7. The locales are near Cross Creek east of Highway 99 and Cottonwood Creek east of Traver in Kings County. The Cholame Valley quad map locale is actually in San Luis Obispo County from the Cholame Hills. Critical habitat for the salamander occurs near Cross Creek just west of Highway 99 (Appendix A4).

Potential Threats, Management Concerns, or Special Considerations. -Particular efforts should be made to protect the vicinity of large rainpool complexes that are known core breeding sites in order to maintain the integrity of the breeding-refuge site ensembles that salamanders use. It has also been found that a low level of gene flows between extant salamander populations, even those in close spatial proximity. As they emphasize, this suggests that each population is a genetically independent entity, and this warrants strong consideration for conservation to be resolved at a local population-level of protection. Because the large rain pools that salamanders use are also the only habitat for a number of plant species and invertebrates that are listed or proposed for listing, ample justification exists for protection of these unique habitats beyond simply the presence of tiger salamanders.

Western Spadefoot

Description and Natural History Information. -A moderate sized (37-62 mm SUL) greenish, greyish, or brownish toad irregularly marked with dark orange or reddish-tipped tubercles; having feint hourglass markings on the back consisting of four irregular, light colored stripes; and possessing a distinctive, black, cornified, teardrop-shaped spade on each hindfoot. Hind limbs are short, and undersurfaces are cream to dirty white. Constricted pupils have vertical, fusiform shape, and the iris is pale gold because of a prominent reticulum of gold iridophores on a brown ground color.

Habitat Affinities. -The toad inhabits valley grassland environments, but can also be found in valley-foothill hardwood woodlands and it uses shallow, temporary ponds for breeding and egg-laying. This toad commonly occurs in vernal pools.

Current Status in Kings County. -The toad is recorded in the CNDDB in Kings County from the Burrel, Burris Park, Cholame Valley, Goshen, Huron, and Vanguard quadrangle maps. See CNDDB maps in Appendix A7. The locales are from Boggs Slough north of the Lemoore Naval Air Station, Cross Creek west of Highway 99, east of the town of Goshen, north of the town of Huron, and on the Lemoore Naval Air Station near Lemoore. The Cholame Valley quad map locale is actually in San Luis Obispo County in Cholame Valley.

Potential Threats, Management Concerns, or Special Considerations. - Efforts should be made to protect significant areas of rainpool habitat from alteration. Currently rainpool habitats that harbor Western Spadefoot Toads are protected in only a handful of relatively small preserves, mostly under the jurisdiction of The Nature Conservancy. The biggest gap in current understanding of spadefoots relates to its population structure and how the habitat fragmentation may affect its likely metapopulation structure. Such an understanding is critical to determine the spatial population array that will allow Western Spadefoot Toads to survive long-term.

APPENDIX F5

Special Status Reptiles of Kings County

Species Information

Special Status Reptiles of Kings County
Species Information

This appendix provides summary technical data for special status reptile species as recognized in the BRS and by the state and federal resource and regulatory agencies. The species are treated alphabetically by common name. Information is organized in the following format: common name of species, description and natural history information, habitat affinities, current status in the county, potential threats, management concerns, or special considerations. Additional information and photographs of these species can be found at the CDFG's website (www.dfg.ca.gov) and the USFWS's website (www.sacramento.fws.gov).

Maps for the Species

A general range map of special status arthropods in Kings County is provided in Appendix A6. CNDDB maps showing the specific locales in Kings County are presented in Appendix A7. A table in Appendix B2 shows basic information for the species and references the CNDDB maps where the species is recorded. For species without records in the CNDDB, no range maps are presented and they are not listed in Appendix B1. Distribution information for such species is presented in the text. A list of special status species for each quadrangle map is presented in Appendix B4. Critical habitat for special status species and habitats is mapped in Appendix A4.

Blunt-nosed Leopard Lizard

Description and Natural History Information. -The lizard is a large lizard with a long, round tail. Color above is grey or brown, with whitish crossbars on the back and tail. Dark blotches on the back and tail and a short, blunt snout give this species its common name. Breeding females have orange or reddish spots on sides. Lengths from snout to vent in adults is 3-5 inches. The species was originally found throughout the San Joaquin Valley and adjacent foothills from about San Joaquin County southward and into eastern San Luis Obispo County. The lizard is active above ground between April and September. Most of the local sightings are reported during May, June, and July.

Habitat Affinities. -The lizard inhabits relatively flat, sparsely vegetated plains, alkali flats, low foothills, grasslands, canyon washes, and arroyos. Dirt roads, and other disturbed areas with sparse vegetation are also preferred; dense grasslands impair the vision and movements of the lizard. Since the lizard requires escape cover, the presence of small mammal burrows is an important habitat component. The presence of some scattered shrubs (chiefly *Atriplex*) affords a measure of shade and cover that allows lizards to extend their surface activity into the warmer daytime hours relative to lizards in pure grassland (Kato et al 1987).

Current Status in Kings County. -The lizard is recorded in the CNDDB in Kings County from the Avenal, Avenal Gap, Corcoran, Dudley Ridge, Guernsey, Hacienda Ranch, Kettleman Plain, La Cima, Lone Tree Well, Los Viejos, Pyramid Hills, Waukena, and West Camp quadrangle maps. See CNDDB maps in Appendix A7. Most Kings County records are from the Kettleman Hills, but populations still exist on the Valley floor west of Guernsey and south of the Tulare Lake Basin. These two Valley floor populations are now isolated from the Kettleman Hills by agricultural land, the California Aqueduct, and Interstate 5.

Potential Threats, Management Concerns, or Special Considerations. -Urbanization and agricultural development have eliminated nearly all leopard lizard habitat on the floor of the San Joaquin Valley. The blunt-nosed leopard lizard now occurs only in scattered locations in the Valley and in the eastern portions of the coast ranges including the Antelope and Carrizo Plains and Cuyama Valley. A major threat to this species in Kings County is the continued loss of scrub/grassland habitat on the Valley floor west of Guernsey and south of the Tulare Lake Basin. The other major threat pertains to the insularization of those two Valley floor population centers (they are becoming isolated from the Coast Range populations). Maintenance of habitat corridors between these population areas is an important biological consideration.

California Horned Lizard

Description and Natural History Information. -The lizard is about 5 inches in length, sandy-colored, has a flat body, and has horny spikes. Eggs are laid in loose, well-aerated soil from April to June, with peak activity in May. The lizard requires 2 to 3 years to reach sexual maturity. Mean clutch size is 11. Not thought to be territorial. Adults may live from more than eight years. Their home range is unknown, but it is thought to be small. Horned lizards wait and search for insects (especially ants) on the surface of the ground and under surface objects. The

lizard hibernates during the winter months.

Habitat Affinities. -The lizard inhabits discontinuous patches of limited habitat in annual grassland, scrub habitats, blue oak savannah, and digger pine-oak woodland types. Horned lizards may range up to 4,000 feet. Most common in grassland/scrub habitat types in Kings County. Horned lizards requires friable, sandy soil in which to establish their breeding burrows.

Current Status in Kings County. -CNDDB tracks this species, but has not entered occurrence site
records into its computer database. Thus, no locale maps are presented for this species. The lizard is known from scattered records in native plant communities west of the California Aqueduct, south of the Tulare Lake Basin, and from scrub habitats west of Guernsey.

Potential Threats, Management Concerns, or Special Considerations. -Loss of habitat by agriculture, compaction of friable soils by grazing and off highway vehicle use, and possibly over-collecting by well-meaning, casual collectors who just want a pet "horny toad".

Giant Garter Snake

Description and Natural History Information. -The snake can reach a length of over 48 inches. Their overall color is brown, with a dull yellow mid-back stripe and a checkered pattern of black spots above. These extremely shy animals are active mostly in the daytime when they feed on fish and frogs. Seven to 25 live young are born in late summer or early fall.

Habitat Affinities. -The snake lives in riverine marshes, seasonal wetlands, sloughs, and irrigation ditches in the Central Valley. One key feature of giant garter snake biology is that they require permanent water in their habitat.

Current Status in Kings County. -During the 1950's, when Tulare Lake was quite full, there was a possible record of giant garter snake at Tulare Lake in Kings County (Robert W. Hansen, pers comm.). Giant garter snakes use to occur as far south in the Tulare Valley as the Kern River in Bakersfield. There are no current records of this species from Kings County south, but individuals could travel into Kings County via the Fresno Slough (this snake occurs in the Fresno Slough at Mendota Wildlife Area in Fresno County). The USFWS considers the snake to be extirpated from its historical southern range including Kings County south to Kern County.

Potential Threats, Management Concerns, or Special Considerations. -Construction or maintenance work that destroys or alters riparian habitat, or associated water flows and water tables, will have an adverse effect on this species. Besides their native marsh and riparian predators, giant garter snakes may also fall prey to house cats and introduced predatory game fish such as largemouth bass.

San Joaquin Whipsnake

Description and Natural History Information. -The snake is a large-sized (90-155 cm SVL) smooth-scaled, large-eyed, slender snake with a buffy citrine, tan-yellow, or olive brown dorsal color without lengthwise stripes. The ventral color is straw yellow that acquires a pinkish or orangish cast under the tail and on the top of the head is light brown. Mating and egg-laying occurs in May to early July. The snake uses rodent burrows for daily cover and for hibernating during the winter months. This snake is active during the day and does not emerge from its burrow unless temperatures reach 28 degrees Celcius on the ground surface. The snake feeds upon lizards and small mammals.

Habitat Affinities. -The snake inhabits open, dry habitats with little or no tree cover. Found in valley grassland and saltbush scrub habitats in the San Joaquin Valley.

Current Status in Kings County. -The snake is recorded in the CNDDB in Kings County from the Garza Peak, Huron, Kettleman Plain, and Los Viejos quadrangle maps. See CNDDB maps in Appendix A7. The locales are from north of the town of Huron, south of the town of Avenal, and south of Kettleman Station.

Potential Threats, Management Concerns, or Special Considerations. -The life history of the San Joaquin Whipsnake needs intensive study to better establish its habitat utilization patterns, its dependance on mammal associates, and the patch sizes of habitat it needs to maintain populations over the long-term. Until the life history is understood, the largest open patches of suitable habitat in valley grassland, saltbush, and shadscale scrub associations should be protected or preserved to ensure this species survival.

Southwestern Pond Turtle

Description and Natural History Information. -The turtle is moderately large with adults reaching 4 to 9 inches in length. Like other turtles, the flattened legs, head, and neck can be drawn in to the carapace when the animal is threatened. Typically the dorsal coloration is dark, ranging from dark brown to olive and with or without darker streaks. Ventral coloration ranges from cream colored to light yellowish with scattered darker markings (Ernst and Barbour 1989). Western pond turtles are sexually dimorphic. Males have a concave plastron while females are flat. Seeliger (1945) described two subspecies of western pond turtle. The southwestern pond turtle is characterized by uniform coloration of the dorsal and ventral portions of the head and neck. The western pond turtle is omnivorous. In addition to aquatic vegetation, turtles feed on a variety of aquatic invertebrates (Bury 1986; Holland 1985a, 1985b). Carrion is reported to be a common food item. Western pond turtles grow slowly and may live as long as 40 years. Mature females lay one to thirteen eggs per clutch. Eggs are typically laid in upland areas neighboring the aquatic adult habitat. Eggs are buried in excavated nests and left unattended to hatch approximately two months later.

Habitat Affinities. -The turtle frequents streams, rivers, ponds, lakes, and marshes. Dense cover and exposed basking sites are key components to the occurrence of western pond turtles in these

wetland habitat types. Bury (1972) found a positive correlation between the abundance of turtles and the availability of basking sites, and that they preferred the largest and deepest pools in streams.

Current Status in Kings County. -The turtle is recorded in the CNDDB in Kings County from the Guernsey and Stratford quadrangle maps. See CNDDB maps in Appendix A7. The locales are from near Stratford, near Guernsey, and on the Santa Rosa Rancheria. This turtle was originally present in sufficient numbers in the Tulare Lake that it was commercially harvested in the late 1800's. Few extant populations are now known from Kings County. Pond turtles are still found in the Kings River and there is a population that lives at the Hanford Wastewater Treatment Facility.

Potential Threats, Management Concerns, or Special Considerations. -The historic collection of western pond turtles for both human consumption and human pets greatly depleted the historic populations of California. Current threats to survival are largely associated with the loss of suitable habitat. Modern water impoundments have greatly reduced lower foothill stream habitats. Water management and reservoir operation make these lakes unsuitable for turtles for a variety of reasons. The reclamation of valley floor wetlands and marshes as well as the channelization of most valley floor streams and rivers have also resulted in significant habitat loss.

APPENDIX F6

Special Status Birds of Kings County

Species Information

Special Status Birds of Kings County
Species Information

This appendix provides summary technical data for special status bird species as recognized in the BRS and by the state and federal resource and regulatory agencies. The species are treated alphabetically by common name. Information is organized in the following format: common name of species, habitat affinities, occurrence in the county, seasonality and breeding status, and special considerations. Additional information and photographs of these species can be found at the CDFG's website (www.dfg.ca.gov) and the USFWS's website (www.sacramento.fws.gov).

Maps for the Species

A general range map of special status arthropods in Kings County is provided in Appendix A6. CNDDB maps showing the specific locales in Kings County are presented in Appendix A7. A table in Appendix B2 shows basic information for the species and references the CNDDB maps where the species is recorded. For species without records in the CNDDB, no range maps are presented and they are not listed in Appendix B1. Distribution information for such species is presented in the text. A list of special status species for each quadrangle map is presented in Appendix B4. Critical habitat for special status species and habitats is mapped in Appendix A4.

American Peregrine Falcon

Habitat Affinities. -The falcon nests on steep rock cliffs and skyscrapers. It hunts for birds in flood basins, pre-irrigated fields, agricultural drainwater evaporation basins, urban wastewater treatment facilities, and marshes.

Occurrence in the County. -The falcon is a far-ranging predator that follow flocks of migrating shorebirds and ducks. While they do not breed in the County, summer sightings may be of birds nesting in the Coast Ranges or the Sierra Nevada. Typical locations of transient (spring and fall migrants from other areas) and foraging (summer and winter) birds include the South Wilbur Flood Area, the Hacienda water storage reservoirs, and pre-irrigated fields and agricultural drainwater evaporation basins in the Tulare Lake Basin.

Seasonality and Breeding Status. -Seasonal occurrence corresponds with the local movements of their migratory prey base. Sightings of the falcon may occur in any month.

Special Considerations. -There is concern that the falcon may be exposed to high concentrations of heavy metals and other potentially toxic chemicals (such as selenium, boron, arsenic, and uranium) when they feed on waterbirds at local agricultural drainwater evaporation basins. These chemicals, which are natural components of local soils, are concentrated in agricultural drainwater and are biologically amplified in the aquatic food chains of evaporation basins. When such compounds accumulate in the tissue of predatory birds, such as the falcon, they can cause reproductive failure and death. A range of options, including the establishment of alternative (high-quality water) wetlands, is being considered in an effort to minimize the risk to wildlife from exposure to agricultural drainwater.

American White Pelican

Habitat Affinities. -The pelican inhabits aquatic environments such as large ponds, lakes, and wastewater impoundments.

Occurrence in the County. -The pelican can be found on most of the larger, deeper bodies of water in the county. Typical locations of large concentrations are South Wilbur Flood Area, West-, Mid-, and East-Hacienda, Corcoran Irrigation District Reservoir, the Kings River near Highway 198, and pre- irrigated fields in the Tulare Lake Basin. Some pelicans also frequent agricultural drainwater evaporation basins.

Seasonality and Breeding Status. -Pelicans are most often encountered in fall, winter, and spring with peak abundance during the migratory periods of March through April and September through October (but individuals and small groups can be expected at any season on larger bodies of water). Wintering birds are traditional in the Tulare Lake Basin. This species formerly nested on islands (or segments of levees isolated by lake water) in Tulare Lake, but no breeding has been documented there since the late 1940's.

Special Considerations. -This species thrives in aquatic locations which support stable populations of small fish. Pelicans often form into lines or coordinated bands and drive fish before them, scooping up their prey as they reach shallow water. Historical colonies were established on islands which were inaccessible to most land predators and which were relatively free of vegetation.

Black-crowned Night-Heron

Habitat Affinities. -The heron forages at the margins of lakes, ponds, rivers, canals, ditches, and pre-irrigated fields near calm water. Roosting may be in trees or where other dense cover (such as emergent marsh vegetation) is present. Roosts may be some distance from the aquatic foraging habitat.

Occurrence in the County. -The heron is recorded in the CNDDB in Kings County from the Hacienda Ranch, Lone Tree Well, and Westhaven quadrangle maps. See CNDDB map in Appendix A7. The heron is expected in most areas of the county except the Coast Range foothills and desert scrub habitats. As a breeding species, it has been known to establish heronries at the South Wilbur Flood Area, Corcoran Irrigation District Reservoir, and at various locations along the Kings River. They are common around farm and tile drain ponds, sewage treatment ponds, and have even been known to roost in shade trees in suburban Corcoran.

Seasonality and Breeding Status. -Herons are found in suitable habitat throughout the county in all seasons with numbers being greatest following the breeding season (March to July) and in winter. Approximately 1,500 pairs nested at South Wilbur Flood Area in 1983 (Ivey 1983).

Special Considerations. -Dense cattail and tule marshes and other breeding and roosting sites are worthy of protection as night herons are sensitive to disturbance during these activities.

Black-shouldered Kite

Habitat Affinities. -The kite inhabits open country where grasslands, agricultural fields, marshes, and even roadside borders provide sufficient rodent prey. Orchards and other stands of medium-large trees are favored sites for winter roosts.

Occurrence in the County. -The kite is widespread in the lowlands of the county. It is seldom observed in the Kettleman Hills or in the Coast Range foothills in the southwest corner of the county.

Seasonality and Breeding Status. -Kites are more widespread and common in the county during the non-breeding seasons when birds from outside of Kings County join the resident population. In some years they are quite scarce, indicating that populations are quite dynamic.

Special Considerations. -Nest sites, when discovered, are worthy of protection as they are sensitive to disturbance.

Black Skimmer

Habitat Affinities. -The skinner inhabits aquatic environments such as lakes, ponds, agricultural drainwater evaporation basins, canals, and streams. This species requires low islands surrounded by water for successful breeding. Freshwater wetlands with adequate populations of small fish are required for foraging.

Occurrence in the County. -Skimmer records in the county are rare. It has nested on a small island
with a large, mixed breeding colony of Caspian terns at Tulare Lake Drainage District- South in an agricultural drainwater evaporation basin.

Seasonality and Breeding Status. -The skinner records show breeding in late spring, but this is rare.

Special Considerations. -Breeding islands are worthy of protection as they are sensitive to disturbance and predation.

Burrowing Owl

Habitat Affinities. -The owl inhabits dry, open grasslands, rolling hills, desert floor of saltbush scrub, savannas, agricultural land, and open bare ground. The owl also lives in open areas near human habitation such as airports, golf courses, shoulders of roads, railroad embankments, and the banks of irrigation ditches and reservoirs.

Occurrence in the County. -The owl is recorded in the CNDDB in Kings County from the Avenal, Avenal Gap, Burris Park, Corcoran, Hacienda Ranch, Hacienda NE, Huron, Kettleman City, Kettleman Plain, La Cima, Los Viejos, Riverdale, Traver, and West Camp quadrangle maps. See CNDDB maps in Appendix A7. This rare resident owl can be found in small numbers in many parts of Kings County wherever soil type is conducive to burrowing and an insect prey base is available. In Kings County, these owls are probably only absent from heavily wooded or chaparral-covered portions of the Coast Range foothills and from the most intensively cultivated agricultural areas in the northern part of the county.

Seasonality and Breeding Status. -The owls are resident species and are breeders; some individuals wander outside their breeding range in the winter. Burrowing owls breed from early March to late August, with a peak from mid-April to mid-May.

Special Considerations. -The owl was formerly a common, even locally abundant, permanent resident throughout much of California. A decline noticeable in the Fresno area by 1903 (Miller) and 1913 (Tyler) and statewide by the 1940's (Grinnell and Miller 1944) has continued through to the present time (Remsen 1978). In recent years their numbers have been declining throughout California. For example, Remsen (1978) reported that there had been an estimated 70%

reduction in suitable habitat in Tulare County between 1968 and 1978. Conversion of grasslands and pasturelands, extensive agriculture, increasing urban development, and destruction of ground squirrel colonies have been the main factors causing the decline of the burrowing owl population (Zarn 1974). Assimilation of poisons applied to ground squirrel colonies has probably also taken a toll (Remsen 1978). Their propensity for nesting in roadside banks makes burrowing owls particularly vulnerable to roadside shooting, being hit by cars, road maintenance operations, and general harassment. Burrowing owls are usually tolerant of human activity, but are vulnerable to predation by domestic cats and dogs. They are also vulnerable to burrow loss, so construction or maintenance activity that compacts soil or otherwise destroys burrows should be avoided. The CDFG and other groups have developed special survey and mitigation measures for the owl and these are included as appendices in the BRS.

California Condor

Habitat Affinities. -The condors forages over open grassland (range land) and scattered oak savannah. Nests are located in caves on cliff faces in rugged mountains. The presence of tall trees in sheltered areas (protected from strong winds) is important for roosting at all seasons.

Occurrence in the County. -Although there are few published records of California condor from Kings County, Tyler (1913) wrote, "This great bird was no doubt common at one time [along the eastern slopes of the Coast Range mountains and] on the plains along the western side of [Fresno] county; but that day has passed, probably forever." The last 27 wild birds were all trapped in 1987 for captive breeding purposes. Between 1987 and 1992, there were no California condors living in the wild; every individual of this species resided in either the Los Angeles Zoo or the San Diego Zoo. The first captive-hatched condors were released back into the wild in Southern California in January 1992. Prior to the 1987 trapping program, individuals and small groups of condors were seen occasionally along the west side of the San Joaquin Valley as far north as the Pinnacles in neighboring San Benito County (Willet 1931).

Seasonality and Breeding Status. -Reported sightings of condors on the westside of the county are scattered throughout the year. There are no known breeding records from Kings County.

Special Considerations. -Steinhart (1990) maintains that "Keys to successful management include
continuation of the livestock-based economy in the foothills of the southern San Joaquin Valley, and establishment of large areas where condors can feed, roost, and nest with minimal human disturbance."

California Yellow Warbler

Habitat Affinities. -The warbler inhabits deciduous riparian forest and woodland of a cottonwood-tree willow composition with a thick undergrowth.

Occurrence in the County. -Yellow warblers of several races pass through the county as

migrants. This species is a common transient in many widespread habitats (including agricultural and suburban areas) in the valley and foothill portions of Kings County. Goldman, in his article, Summer Birds of the Tulare Lake Region (1908), described California yellow warbler as "a common breeding species among the willows near the mouth of Kings River.

Seasonality and Breeding Status. -The warbler was formerly a very common nesting songbird in riparian habitats in this part of the San Joaquin Valley. Since there have been no breeding records in Kings County since the 1950's or 1960's, this subspecies is considered to be extirpated as a breeding bird in Kings County. Migrants are present from early April to early October. The species was formerly more wide spread and common as a breeder, but habitat destruction has reduced its success.

Special Considerations. -Major threats to California yellow warbler include the continued loss and degradation of its riparian habitat by clearing for agriculture and flood control along with nest parasitism by brown-headed cowbirds (*Molothrus ater*). Management measures which have been taken to encourage recovery of California yellow warbler populations include: restoration and enhancement of riparian habitat, control of exotic vegetation, cowbird control, elimination of grazing, and elimination of the application of pesticides within or adjacent to riparian areas.

Caspian Tern

Habitat Affinities. -The tern inhabits aquatic environments such as lakes, ponds, agricultural drainwater evaporation basins, canals, streams, sloughs, and rivers. This species requires low islands surrounded by water for successful breeding. Freshwater wetlands with adequate populations of small fish are required for foraging.

Occurrence in the County. -The tern has occurred at virtually all wetland and aquatic locations in Kings County. In Kings County, foraging birds are most often seen over wetlands at the south end of the Tulare Lake Basin, at Corcoran Irrigation District Reservoir, and along large canals (such as those
adjacent to Highway 41 northeast of Kettleman City, adjacent to 10th Avenue, and in the vicinity of the "pocket" where Kings River, Cross Creek, and Tule River come together) in the Tulare Lake Basin. The only breeding location in the county is at the Tulare Lake Drainage District-South. The colony is on a small island in an agricultural drainwater evaporation basin.

Seasonality and Breeding Status. -While some terns are present throughout the year, the few winter records come from the vicinity of the "pocket" where the Tule River crosses 6th Avenue. The breeding colony at the Tulare Lake Drainage District-South is a large, mixed breeding colony of Caspian terns and Forster's terns.

Special Considerations. -Breeding islands are worthy of protection as they are sensitive to disturbance and predation.

Cooper's Hawk

Habitat Affinities. -Transient and wintering hawks are found in any habitat, including orchards and vineyards, where small songbirds are abundant. Foothill woodland and riparian groves are characteristic habitats used for breeding in this part of California.

Occurrence in the County. -The hawk is still relatively a common winter visitor (August through April) in many habitats throughout the lowlands and foothills of Kings County.

Seasonality and Breeding Status. -Typically, the hawk is found during the fall, winter, and early spring. If breeding occurs in the County, it probably takes place in either foothill woodland or in riparian groves along the Kings River between March and July.

Special Considerations. -The breeding status of the hawk is of primary concern in Kings County. Nest sites, when discovered, are worthy of protection as they are sensitive to disturbance.

Double-crested Cormorant

Habitat Affinities. -The cormorant inhabits rivers, ponds, canals, and lakes. Nests are built in flooded willow and Tamarisk trees (and rarely in large tree stands in riparian habitat).

Occurrence in the County. -The cormorant is widespread in the Tulare Lake Basin and occasional along the Kings River. Typical locations are the water storage reservoirs in the southern Tulare Lake Basin, major canals, and Corcoran Irrigation District Reservoir.

Seasonality and Breeding Status. -Numbers are highest during the fall, winter, and early spring, but individuals may be present throughout the year. Breeding has occurred at South Wilbur Flood Area and at Corcoran Irrigation District Reservoir.

Special Considerations. -The cormorant thrives in aquatic locations which support stable fish populations. Trees are required for nesting. Nests are built in medium to large trees standing in or near water.

Forster's Tern

Habitat Affinities. -The tern inhabits aquatic environments such as lakes, ponds, agricultural drainwater evaporation basins, canals, streams, sloughs, and rivers. This species requires low islands surrounded by water for successful breeding. Freshwater wetlands with adequate populations of small fish are required for foraging.

Occurrence in the County. -Terns have occurred at virtually all wetland and aquatic locations in Kings County. In Kings County, foraging birds are most often seen over wetlands at the south end of the Tulare Lake Basin, at Corcoran Irrigation District Reservoir, and along large canals in

the Tulare
Lake Basin. The only breeding location in the county is at the Tulare Lake Drainage District-South. The colony is on a small island in an agricultural drainwater evaporation basin.

Seasonality and Breeding Status. -Most local sightings of the tern occur between March and November; winter records are scarce. The breeding colony at the Tulare Lake Drainage District-South is a large, mixed breeding colony of Caspian terns and Forster's terns.

Special Considerations. - Breeding islands are worthy of protection as they are sensitive to disturbance and predation.

Ferruginous Hawk

Habitat Affinities. -The hawk inhabits open grassland, scrub habitats, and some cultivated farmland (usually grain stubble or fallow ground).

Occurrence in the County. -The hawk is seldom seen in the northern one-third of the county east of the Kings River. This hawk is most often observed in grassland habit in the vicinity of the Kettleman Plain and the Kettleman Hills, in grassland and scrub habitat south of Tulare Lake Basin, in grassland habit in the vicinity of the Corcoran Irrigation District Reservoir, and in other grassland and scrub habitats north and west of Corcoran. Occasional individuals are also seen in the vicinity of grainfields and fallow land in the Tulare Lake Basin.

Seasonality and Breeding Status. -The hawk is strictly a Fall and Spring transient and Winter visitor. Records from this part of the Valley extend from late September through late March.

Special Considerations. -The hawk depends on larger rodent prey such as ground squirrels and rabbits.

Fulvous Whistling-Duck

Habitat Affinities. -The duck inhabits marshlands and pond borders with emergent vegetation (tules, rushes, and cattails).

Occurrence in the County. -The duck is recorded in the CNDDB in Kings County from the Hacienda ranch and Lone Tree Well quadrangle maps. See CNDDB maps in Appendix A7. This species is near the limits of its northern range in Kings County. Whistling ducks are absent in most years, but in wet years they have been recorded at the South Wilbur Flood Area.

Seasonality and Breeding Status. -In years when whistling-ducks are present, they are primarily summer visitors (all local records are between April and October) to marshy wetlands at the south end of the Tulare Lake Basin where they are rare breeders.

Special Considerations. -Historically, the San Joaquin Valley was the center of this species'

abundance in California. Goldman (1908) recorded this species as a breeding bird at Summit Lake. With the major reduction in Central California wetlands, South Wilbur Flood Area represents one of only two extant fulvous whistling-duck breeding sites in the San Joaquin Valley south of Merced
County. This species is sensitive to human activity, especially cattail and tule eradication.

Golden Eagle

Habitat Affinities. -The eagle inhabits open grassland, saltbush scrub, and rolling foothills with or without scattered oaks and pines. Nesting may occur in cliff-walled canyons or in large foothill pines in the Coast Range foothills.

Occurrence in the County. -The eagle is recorded in the CNDDB in Kings County from the Hacienda Ranch NE quadrangle map. See CNDDB maps in Appendix A7. The eagle is a wide-ranging predator and may be observed in any part of the county, but they are most often observed in the Kettleman Hills, the Coast Range foothills in the southwest corner of the county, and in scrub and grassland habitats south of Tulare Lake Basin.

Seasonality and Breeding Status. -Two segments of the population include local, resident birds and birds visiting the county from areas to the north during winter. Local breeding may occur in cliff-walled canyons or in large foothill pines in the Coast Range foothills.

Special Considerations. -Individuals of this species require sizeable foraging ranges with populations of mammalian prey such as jack rabbits and ground squirrels. Nest sites, when discovered, are worthy of protection as they are sensitive to disturbance.

Great Blue Heron

Habitat Affinities. -The heron forages in a variety of habitats: aquatic margins, canals, ditches, pre-irrigated fields in the Tulare Lake Basin, pastures and dry upland areas. Breeding takes place in stands of large trees in riparian habitat or in flooded willow and Tamarisk trees.

Occurrence in the County. -The heron is expected in most areas of the county except the Coast Range foothills and desert scrub habitats. As a breeding species it has been known to establish heronries at the South Wilbur Flood Area, Corcoran Irrigation District Reservoir, and at various locations along the Kings
River.

Seasonality and Breeding Status. -Non-breeding birds are found throughout the county in all seasons with populations being greatest in the winter months. Breeding takes place from March to mid-summer.

Special Considerations. -Breeding sites are worthy of protection as they are sensitive to disturbance during this activity.

Great Egret

Habitat Affinities. -The egret forages in a variety of habitats: aquatic margins, canals, ditches, pre-irrigated fields in the Tulare Lake Basin, pastures, and dry upland areas. Breeding takes place in flooded willow and Tamarisk trees and in stands of large trees in riparian habitat.

Occurrence in the County. -The egret is expected in most areas of the county except the Coast Range foothills and desert scrub habitats. As a breeding species it has been known to nest in mixed colonies of other herons and wading birds at South Wilbur Flood Area and Corcoran Irrigation District Reservoir and at least historically, at various locations along the Kings River near Laton and Riverdale (Tyler 1916).

Seasonality and Breeding Status. -Non-breeding egrets are found throughout the county in all seasons with populations being greatest in the winter months. Breeding takes place from March to mid-summer.

Special Considerations. -Breeding sites are worthy of protection as they are sensitive to disturbance during this' activity.

Greater Sandhill Crane

Habitat Affinities. -Favorable winter roost sites (shallow, flooded agricultural fields or marshes) and an abundance of cereal grain crops (chiefly corn) characterize the cranes' Central Valley wintering ground. Irrigated pastures are chosen as loafing sites throughout the wintering ground. A communal roost site consisting of an open expanse of shallow water is a key feature of wintering habitat. In their California breeding range, which may have once included Kings County (see below), sandhill cranes establish nesting territories in wet meadows that are often interspersed with emergent marsh.

Occurrence in the County. -The great majority of sandhills wintering in this region are undoubtedly *Grus canadensis canadensis* (the "little brown" or "lesser sandhill" crane). Greater sandhill cranes *C. tabida*) probably comprise part of the local wintering flocks, but the relative abundance of the two forms is imperfectly known (Garrett and Dunn, 1981). Occasional individuals of this subspecies are seen among flocks of lesser sandhill cranes; Grinnell and Miller (1944) list a November 1918 record from Corcoran. Most recent records of cranes in Kings County are of birds seen in grassland and scrub plant communities south of the Tulare Lake Basin, but there were several records of up to 300 birds seen on the Kettleman Plain between 1944 and 1948 (Wilson 1950).

Seasonality and Breeding Status. -This subspecies does not currently breed in Kings County. Cranes (unspecified subspecies) seen in Kings County are present on their Tulare Basin wintering grounds from early October to early April. Flocks seen on the Kettleman Plain during the 1940's were usually heard and seen between late October and mid-February (Wilson 1950). Although there are no documented breeding records from the Tulare Lake Basin, cranes were "observed sparsely in summer of earlier years south through the Great Valley as far as the

neighborhood of Buttonwillow, Kern County" (Grinnell and Miller 1944). Goldman (1908) saw three in the marshy land at the south end of Tulare Lake on 8 July 1907. The current California population of greater sandhill cranes breeds mainly in the northeastern corner of the state and in south central Oregon, but winters entirely in the Central Valley (Steinhart 1990).

Special Considerations. -Since no crane roosts are known from Kings County, the major local threat to this subspecies is the loss of foraging habitat through the conversion of native grassland and scrub communities to poultry ranches, dairies, and other incompatible land uses. Collisions with fog-shrouded power lines are also a major cause of death in winter.

Least Bell's Vireo

Habitat Affinities. -The vireo inhabits deciduous riparian forest and woodland of a cottonwood-tree willow composition with a thick undergrowth.

Occurrence in the County. -Goldman, in his article, Summer Birds of the Tulare Lake Region (1908), described least Bell's vireo as "Very common and in full song, among willows bordering marshes and streams from Summit Lake to Buena Vista Lake." Since there have been no vireo breeding records in Kings County since the 1940's or 1950's, this subspecies is considered to be extirpated as a breeding bird in Kings County.

Seasonality and Breeding Status. -The vireo was formerly the most common nesting songbird in riparian habitats in this part of the San Joaquin Valley. Since there have been no breeding records in Kings County since the 1940's or 1950's, this subspecies is considered to be extirpated as a breeding bird in Kings County. Since there have been no least Bell's vireo breeding records in Kings County since the 1940's or 1950's, this subspecies is considered to be extirpated as a breeding bird in Kings County.

Special Considerations. -Major threats to the vireo include the continued loss and degradation of its riparian habitat by clearing for agriculture and flood control along with nest parasitism by brown-headed cowbirds (*Molothrus ater*). Management measures which have been taken to encourage recovery of least Bell's vireo populations include: restoration and enhancement of riparian habitat, control of exotic vegetation, cowbird control, elimination of grazing, and elimination of the application of pesticides within or adjacent to riparian areas.

Least Bittern

Habitat Affinities. -The bittern inhabits marshlands and pond borders with emergent vegetation (tule and cattail beds) of sufficient size and extent for isolation.

Occurrence in the County. -The few records come from the South Wilbur Flood Area.

Seasonality and Breeding Status. -Primarily a summer visitor to marshy wetlands in the Tulare Lake Basin where it is probably a rare breeder.

Special Considerations. -This species is sensitive to human activity, especially cattail and tule eradication.

LeConte's Thrasher

Habitat Affinities. -The thrasher inhabits saltbush scrub habitat and occurs chiefly along edges of arroyos and washes where shrub cover is 25% or greater.

Occurrence in the County. -In Kings County, the thrasher occurs only in the Kettleman Hills where it reaches the northern limit of this species' range.

Seasonality and Breeding Status. -Thrashers that inhabit the Kettleman Hills are part of a resident, sedentary breeding population.

Special Considerations. -Like most populations further south in the desert portions of the Tulare Basin, the Kettleman Hills population numbers have declined as saltbush scrub habitat has been eliminated. While remote locations are preferred, this species tolerates moderate levels of human activity and a limited amount of oilfield development (providing surface vegetation is extant). Breeding sites are worthy of protection as they are sensitive to disturbance during this activity.

Loggerhead Shrike

Habitat Affinities. -The shrike inhabits broken woodlands, savannah, Pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub and washes.

Occurrence in the County. -The shrike is recorded in the CNDDB in Kings County from the La Cima quadrangle map. See CNDDB map in Appendix A7. The shrike is widely distributed throughout the county in grassland and saltbush scrub habitats.

Seasonality and Breeding Status. -From January to June, pairs build cup-shaped nests of twigs and bark in lemonade berry, island cherry, toyon, and, occasionally, low-lying sagebrush. Males bring food to their mates, who incubate the clutches of 4-6 eggs for about sixteen days. The young fledge 16-19 days later but remain nearby and are fed by their parents for another month.

Special Considerations. -Breeding sites are worthy of protection as they are sensitive to disturbance during this activity.

Long-eared Owl

Habitat Affinities. -The owl inhabits riparian forests of cottonwood, willow, and live oak.

Occurrence in the County. -The distribution of the owl in Kings County is poorly known. Old records from Kings County (see below) and recent records from other parts of the Tulare Basin

suggest that this species is most likely to be encountered along the Kings River, Tule River, Kern River, and perhaps in the oak woodlands in the Coast Range foothills.

Seasonality and Breeding Status. -The owls is thought to be resident in small numbers in Kings County but seasonal movements occur. Wintering roosts have been found in other parts of the Tulare Basin. Goldman's (1908) account of "several" seen during summer in "a heavy growth of large willows near the mouth of the Kings River," probably refers to breeding birds. There is also a historical breeding record of "as many as fifteen of these resident owls found roosting and later nesting in one willow clump" from just outside of Kings County in an arroyo near Coalinga (Arnold 1937).

Special Considerations. -When breeding sites are discovered, they are worthy of protection as they are sensitive to disturbance.

Merlin

Habitat Affinities. -The merlin inhabits seacoast tidal estuaries, open woodlands, savannahs, edges of grasslands and deserts, farms and ranches. Nesting occurs in abandoned corvid or hawk nests which are in conifer or mixed tree stands or on cliff-faces.

Occurrence in the County. -The merlin is recorded in the CNDDB in Kings County from the Huron quadrangle map. See CNDDB map in Appendix A7.

Seasonality and Breeding Status. -Most Merlins will use abandoned corvid or hawk nests which are in conifer or mixed tree stands or on cliff-faces. Three to five (usually four) eggs are laid. The rusty brown eggs average at about 40 x 31.5 mm (1.58 x 1.24 in). The incubation period is 28 to 32 days. The female does almost all of the incubating, while the male hunts and feeds both her and their young. Hatchlings are about 13 g and are brooded for about 7 days. The fledging stage is reached at about 29 days and are dependent on their parents for up to 4 weeks. Sometimes first-year Merlins (especially males) will choose to serve as a "nest helper" for an adult pair. Corvids are the primary threat to eggs and nestlings.

Special Considerations. -Breeding sites are worthy of protection as they are sensitive to disturbance during this activity.

Mountain Plover

Habitat Affinities. -The plover inhabits arid, sparsely-vegetated grasslands, alkaline flats, sparse saltbush scrub, sprouting grain fields, grazed pastures, fallow agricultural land, and freshly plowed fields (Terres 1980).

Occurrence in the County. -The plover is recorded in the CNDDB in Kings County from the Hacienda ranch and Lone Tree Well quadrangle maps. See CNDDB maps in Appendix A7. The plover's breeding range is entirely outside of California. Plovers winter in flocks along the

western edge of the Tulare Basin (including much of Kings County). Typical locations of wintering flocks in Kings County include grassland and scrub communities south of the Tulare Lake Basin, Kettleman Plain and the Kettleman Hills, grasslands near the Corcoran Irrigation District Reservoir, and fallow fields in the Tulare Lake Basin.

Seasonality and Breeding Status. -Wintering flocks are present in Kings County from mid-October to March.

Special Considerations. -The major threat to the plover in the Tulare Basin is the loss of foraging habitat through the conversion of native grassland and scrub communities to incompatible land uses. Such changes have already occurred on a grand scale in southern California. Conversion and fragmentation of extensive agricultural land (grazed pasture) to irrigated row crops, conversion of rotated, cultivated field crops (including grain) to permanent crops (orchards and vineyards), and conversion of suitable agricultural foraging areas to urban uses further reduces the available foraging habitat. Pesticides and shooting may also have contributed to their decline (Tyler 1916). USFWS and CDFG are both concerned about declining numbers of mountain plovers in the Tulare Basin.

Northern Harrier

Habitat Affinities. -The harrier inhabits grasslands, irrigated farmland, fallow fields, marshes, saltbush scrub, and open desert.

Occurrence in the County. -The harrier is found in many open habitats in the fall, winter, and spring. Breeding birds in the spring and summer are linked to marshes and irrigated farmlands.

Seasonality and Breeding Status. -Harriers are more widespread and common in this area during the non-breeding seasons when birds from outside of Kings County join the resident population. As a breeding species, it is rare. Breeding has occurred in alfalfa fields, in saltbush scrub, and in marshes.

Special Considerations. -Nest sites, when discovered, are worthy of protection as they are sensitive to disturbance. Breeding success in alfalfa fields is affected by cutting, and few marshes exist away from the water storage reservoirs in the southern Tulare Lake Basin.

Prairie Falcon

Habitat Affinities. -The falcon inhabits open grassland and saltbush scrub and shun heavily wooded areas. Most breeding occurs in cliff- walled foothill canyons. In the breeding season, foraging is concentrated in grasslands near nest sites. Foraging birds shift much of their activity to agricultural lowlands during winter months.

Occurrence in the County. -The falcon is recorded in the CNDDB in Kings County from the Garza peak, Pyramid Hills, Tent Hills, and The Dark Hole quadrangle maps. See CNDDB maps

in Appendix A7. The falcon is a wide-ranging predator and may be observed in any part of the county, but they are most often seen in the hills and adjacent valleys southwest of the California Aqueduct and in grassland and scrub habitats south of Tulare Lake Basin and in the vicinity of Corcoran Irrigation District Reservoir.

Seasonality and Breeding Status. -The falcon is more widespread and common in the county during the non-breeding seasons when birds from outside the county join the resident population. In Kings County, prairie falcons nest in remote locations where habitat is suitable.

Special Considerations. -A small number of falcons breed in Kings County. Successful reproduction depends on minimal human disturbance in the vicinity of these traditional canyon nest sites. Nest sites, when discovered, are worthy of protection as they are sensitive to disturbance.

Short-eared Owl

Habitat Affinities. -The owl inhabits alfalfa fields, grassland, saltbush scrub, and marshes.

Occurrence in the County. -A small number of owl records are scattered across the county.

Seasonality and Breeding Status. -The owl is relatively uncommon in winter. Management measures which have been taken to encourage the owl include: restoration and enhancement of riparian habitat, control of exotic vegetation, elimination of grazing, and elimination of the application of pesticides within or adjacent to riparian areas. Breeding is presumed to occur irregularly in Kings County, but is poorly known.

Special Considerations. -When breeding sites are discovered (including those in alfalfa fields), they are worthy of protection as they are sensitive to disturbance.

Snowy Egret

Habitat Affinities. -The egret forages in a variety of habitats: marshes, aquatic margins, canals, ditches, and pre-irrigated fields in the Tulare Lake Basin. Breeding takes place in flooded willow and Tamarisk trees and in marsh vegetation (tules and cattails).

Occurrence in the County. -The egret is recorded in the CNDDB in Kings County from the Hacienda ranch and Lone Tree Well quadrangle maps. See CNDDB maps in Appendix A7. The egret is expected in almost any wetland areas of the county. As a breeding species, it has been known to nest in mixed colonies of other herons and wading birds at South Wilbur Flood Area and Corcoran Irrigation District Reservoir.

Seasonality and Breeding Status. -Non-breeding egrets are found throughout the county in all seasons with populations being greatest in the winter months. Breeding takes place from March to mid-summer.

Special Considerations. -Breeding sites are worthy of protection as they are sensitive to disturbance during this activity.

Snowy Plover

Habitat Affinities. -In Kings County, the plover is restricted almost entirely to wastewater impoundments and agricultural drain-water evaporation basins within the Tulare Lake Basin.

Occurrence in the County. -The plover is recorded in the CNDDB in Kings County from the Dudley Ridge, Hacienda Ranch, Hacienda Ranch NE, Lone Tree Well, and Stratford quadrangle maps. See CNDDB maps in Appendix A7. Breeding has been documented at several of the Tulare Lake Basin evaporation ponds. Other, non-breeding individuals have been seen at Corcoran Irrigation District Reservoir and at the Lemoore Sewage Pond (Page and Bruce 1989).

Seasonality and Breeding Status. -The plover breeds and forages on the periphery of the ponds. In Central California, snowy plovers breed from late March to early August with peaks in mid-May and early June (Roster et al. 1987). Although winter records from the interior of California are rare, these evaporation ponds are currently the only places where snowy plovers regularly winter in the Central Valley (Shuford, et al. 1993). There is documented movement of individuals between Coastal California snowy plover populations and the populations that breed in the Tulare Basin.

Special Considerations. -In our area, the plovers once relied on alkaline lakes that were present on the floor of the Tulare Basin. Now, they are dependent on agricultural drainwater evaporation basins. Even though these new artificial habitats have been created in the Tulare Basin, the water quality in these agricultural drainwater impoundments is very poor. Waterbirds, like snowy plover, that linger seasonally to feed and raise young in these evaporation pond systems are exposed to high levels of heavy metals and other potentially toxic chemicals such as selenium, boron, arsenic, and uranium. Most of these birds are very faithful to their breeding territory and seldom forage or drink from distant wetlands with acceptable water quality so their exposure to contaminants is of long duration. The deleterious effect of these contaminants on the breeding success of other waterbirds (grebes, coots, and stilts) has been documented at Kesterson National Wildlife Refuge and in parts of the southern Tulare Basin, but is not well known for snowy plovers. Because many of the nests in the vicinity of agricultural drainwater impoundments are located on driveable levees, maintenance vehicle traffic represents a potential threat during the incubation period. Remsen (1978) recommends restricting human and dog access to suitable habitat during the breeding season.

Swainson's Hawk

Habitat Affinities. -Transients hawks are closely associated with alfalfa fields for foraging. During the breeding season, the hawks may be found in open agricultural fields with scattered trees, sparse
woodlands, and along strips of riparian habitat.

Occurrence in the County. -The hawk is recorded in the CNDDB in Kings County from the Burrel, Corcoran, Goshen, Guernsey, Hacienda Ranch, Huron, lone Tree Well, Remnoy, Riverdale, Vanguard, and Waukena quadrangle maps. See CNDDB maps in Appendix A7. Almost all recent sightings of the hawk in Kings County (especially during the breeding season) are from the northeast portion of the county east of the Kings River (north of the Tulare Lake Basin) and along the east side of the Tulare Lake Basin north of the Tule River. This species was formerly encountered regularly as a spring transient (and possibly as a breeding species) in the vicinity of Kettleman Plain and along the edges of the Kettleman Hills (Arnold 1937; Wilson 1950).

Seasonality and Breeding Status. -This highly migratory hawk may be found between early March and late October. Spring migrants pass through the county from mid-March into May. Nest-building may begin in late March; most young are fledged by July. Most fall records are from mid-August to early October.

Special Considerations. -The hawks dramatic population declines are attributed to loss of native nesting and foraging habitat, conversion of alfalfa and pastureland to incompatible agricultural uses and to urban areas, and possibly to disturbances on the species' winter range in South America. Nest sites are worthy of protection as they are sensitive to disturbance. The CDFG has developed special survey and mitigation measures for the hawk and these are included as appendices in the BRS.

Tricolored Blackbird

Habitat Affinities. -For breeding, the blackbird usually requires dense tule marshes or patches of tules, cattails, or other emergent vegetation; breeding marshes may be wet or dry. They also nest in willows, blackberries, grain fields, thistles, and other low vegetation in wet areas (Verner and Boss 1980). Tricolored blackbird nest colonies have also been observed in dense stands of nettles and grainfields on dry ground when tules are not available (Bent 1958). Nesting and roosting activities occur in such habitats whereas foraging usually occurs in grasslands, marshes, and agricultural areas. Thus, the birds are mostly associated with large marshes, but they are also found in small tule patches that line the edge of canals and small irrigation reservoirs (Williams 1989).

Occurrence in the County. -The blackbird is recorded in the CNDDB in Kings County from the Burrel, Corcoran, Dudley Ridge, El Rico Ranch, La Cima, Lone Tree Well, West Camp quadrangle maps. See CNDDB maps in Appendix A7. Practically a California endemic, the blackbird occurs primarily in the Sacramento and San Joaquin Valleys where they are sporadic, but locally abundant (Peterson 1965, DeHaven et al, 1975). The number of tricolored blackbird nesting colonies decreases as one travels from the Sacramento-San Joaquin Delta south through progressively more arid (less wetland) habitat. Foraging tricolored blackbirds may be seen among mixed blackbird flocks almost anywhere in the county. Breeding sites range in size and location from small marsh-lined ponds at Chem Waste Management's facility in the Kettleman Hills to larger colonies in agricultural areas on the floor of the Valley.

Seasonality and Breeding Status. -Year-round residents gather into dense breeding colonies in the spring and early summer. Blackbirds breed from early April to mid-July, with a peak from early May to late June. Its status as a breeding species in Kings County fluctuates from year to year since flocks of this opportunistic breeder are nomadic and range widely.

Special Considerations. -DeHaven et al. (1975) estimated that in the 35 years prior to 1972, the Central Valley population of tricolored blackbird had declined, "perhaps by more than 50%." Van Remsen (1978) called for further study to determine whether this decline is continuing, particularly since this species is virtually endemic to California and is a potentially vulnerable, colonial breeder. It is feared that populations of colonial breeders may reach a lower threshold level when all breeding may cease. According to Terres (1980), the number and size of breeding colonies is declining because of the drainage of marshes. In the Kings County portion of the Tulare Valley, breeding opportunities for this species are limited by the unpredictable, seasonal, and localized nature of suitable habitat. Unreliable water supplies (in wetlands) and inopportune grain harvest dates further confound efforts by tricolored blackbirds to establish colonies and to successfully complete a breeding cycle in this part of the species' range.

Western Yellow-billed Cuckoo

Habitat Affinities. -The cuckoo inhabits deciduous riparian forest and woodland of a cottonwood-tree willow composition with a thick undergrowth.

Occurrence in the County. - The cuckoo formerly nested in small numbers in riparian habitat along Tulare Lake's tributary rivers. Goldman, in his article, Summer Birds of the Tulare Lake Region (1908), stated that cuckoos were "rather common in willow thickets from Summit Lake [vic. Riverdale] to Buena Vista Lake".

Seasonality and Breeding Status. -The cuckoo winters in South America and returns to California in the summertime for one of the shortest journey of any California breeding bird. Cuckoos usually don't return to this part of Central California until late May at the earliest and the last southbound stragglers leave the state by mid-September. By 1987, the population of cuckoos in California had dropped to an estimated 31-42 pairs, all of them along the Sacramento, Feather, Kern, Axnargosa, Santa Ana, and lower Colorado rivers. Since there have only been one or two records of cuckoos anywhere in the southern San Joaquin Valley since the l950s and since there is so little high-quality riparian habitat remaining in this part of the Valley, this subspecies is considered to be extirpated as a breeding bird in Kings County.

Special Considerations. -The major threat to the cuckoo is the continued loss and degradation of its riparian habitat by clearing for agriculture and flood control. Cuckoo populations have made a modest recovery in some parts of California such as the South Fork of the Kern River near Weldon, Kern County. Management measures which have been taken to encourage recovery of cuckoos populations include: restoration and enhancement of riparian habitat, control of exotic vegetation, elimination of grazing, and elimination of the application of pesticides within or adjacent to riparian areas.

White-faced Ibis

Habitat Affinities. -The ibis forages in shallow marshy areas, flood-irrigated agricultural land, sewer ponds, and agricultural drainwater evaporation basins. Nests in Kings County have been built in flooded willow and Tamarisk trees amidst marshes where tules, rushes, and cattails grow.

Occurrence in the County. -The ibis is recorded in the CNDDB in Kings County from the Hacienda Ranch, Hacienda Ranch NE, and Lone Tree Well quadrangle maps. See CNDDB maps in Appendix A7. Transients and foraging birds may appear at suitable habitat almost anywhere in the county. The only known breeding site is at South Wilbur Flood Area.

Seasonality and Breeding Status. -Transients while scarce, may be present in spring, summer, and fall. Nesting occurs at South Wilbur Flood Area and other suitable marshes.

Special Considerations. -The ibis population has declined throughout its range. Historically, the San Joaquin Valley was the center of this species' abundance in California. With the major reduction in Central California wetlands, South Wilbur Flood Area represents one of the important breeding sites in the southern San Joaquin Valley.

Willow Flycatcher

Habitat Affinities. -The flycatcher inhabits deciduous riparian willow scrub.

Occurrence in the County. -The flycatcher (and other races of willow flycatcher) are fairly common transients in many widespread habitats (including agricultural and suburban areas) in the valley and foothill portions of Kings County. Goldman, in his article, Summer Birds of the Tulare Lake Region (1908), described willow flycatcher as "rather common in willow thickets and tule marshes."

Seasonality and Breeding Status. -Transient, non-breeding migrant flycatchers are seen annually from late May through September. Flycatchers formerly nested in riparian willow scrub along Tulare Lake's tributary rivers. Since there have been no breeding records in Kings County since the 1940's or 1950's, this subspecies is considered to be extirpated as a breeding bird in Kings County.

Special Considerations. -Major threats to the flycatcher include the continued loss and degradation of its riparian habitat by clearing for agriculture and flood control along with nest parasitism by brown-headed cowbirds (*Molothrus ater*). Management measures which have been taken to encourage recovery of the flycatcher populations include: restoration and enhancement of riparian habitat, control of exotic vegetation, cowbird control, elimination of grazing, and elimination of the application of pesticides within or adjacent to riparian areas.

Yellow-breasted Chat

Habitat Affinities. -The chat inhabits deciduous riparian forest and woodland of a cottonwood-tree willow composition with low, dense ground cover vegetation.

Occurrence in the County. -Small numbers of chat still pass through major riparian corridors in Kings County as spring and fall transients.

Seasonality and Breeding Status. -Formerly a common summer visitor from April to August; the chat is now only a very rare and local breeder in the best remaining dense riparian habitat such as certain portions of the Kings River in Kings County. This species was formerly more widespread and common as a breeder, but habitat loss and cattle grazing has reduced its success.

Special Considerations. -Major threats to the chat include the continued loss and degradation of its riparian habitat by clearing for agriculture and flood control along with nest parasitism by brown-headed cowbirds (*Molothrus ater*). Management measures which have been taken to encourage recovery of yellow-breasted chat populations include: restoration and enhancement of riparian habitat, control of exotic vegetation, cowbird control, elimination of grazing, and elimination of the application of pesticides within or adjacent to riparian areas.

APPENDIX F7

Special Status Mammals of Kings County

Species Information

Special Status Mammals of Kings County
Species Information

This appendix provides summary technical data for special status mammal species as recognized in the BRS and by the state and federal resource and regulatory agencies. The species are treated alphabetically by common name. Information is organized in the following format: common name of species, description and natural history information, habitat affinities, current status in the county, potential threats, management concerns, or special considerations. Additional information and photographs of these species can be found at the CDFG's website (www.dfg.ca.gov) and the USFWS's website (www.sacramento.fws.gov).

Maps for the Species

A general range map of special status arthropods in Kings County is provided in Appendix A6. CNDDB maps showing the specific locales in Kings County are presented in Appendix A7. A table in Appendix B2 shows basic information for the species and references the CNDDB maps where the species is recorded. For species without records in the CNDDB, no range maps are presented and they are not listed in Appendix B1. Distribution information for such species is presented in the text. A list of special status species for each quadrangle map is presented in Appendix B4. Critical habitat for special status species and habitats is mapped in Appendix A4.

American Badger

Description and Natural History Information. -The body of the badger is depressed, with short stout legs having long recurved foreclaws and short shovellike hind claws. Its color may vary form yellowish brown to silver gray on the dorsal surface and from a light cream to buff ventrally. The feet are black to bark brown. The sides of the face are shite with a black triangular patch anterior to the ears. A white medial stripe extends dorsally form the nose. Badgers can measure up to 3 feet in length and weight upwards of 40 pounds. Breeding occurs in late July and August. Birthing occurs in March and April and litter size ranges from one to five young. See species description in Jameson and Peeters (1988) and Burt and Grossenheider (1976). Badgers are predatory specialists on burrowing rodents such as gophers, ground squirrels, and kangaroo rats, but will catch and eat a wide variety of other animals including mice, reptiles, birds and their eggs, bees and other insects (Williams 1986).

Habitat Affinities. -Badgers are burrow-dwellers occupying a variety of habitats including; grasslands, desert scrub, and mountain meadows.

Current Status in Kings County. -The badger is recorded in the CNDDB in Kings County from the Avenal, Garza Peak, Hacienda Ranch, Huron, Kettleman City, Kettleman Plain quadrangle maps. See CNDDB maps in Appendix A7. Almost all records from the county come primarily from west of the California Aqueduct (Kettleman Hills), lands south of the Tulare Lake Basin, and from the isolated native scrub/grassland habitat west of Guernsey. These animals are seldom seen in cultivated areas.

Potential Threats, Management Concerns, or Special Considerations. -Although American badger is considered a fur-bearing mammal under state hunting regulations, it is also listed as a Species of Special Concern by CDFG. Badger populations have declined drastically in California within the last century (Grinnell et al 1937, Longhurst 1940). In the Central Valley and adjacent lowlands, suitable badger habitat is now fragmented resulting in low numbers.

Buena Vista Lake Shrew

Description and Natural History Information. -The shrew is a small, rather delicate mouse-like insectivore. It is grayish-brown in color. Head plus body length is about 2.5 inches and the tail length is about 1.5 inches. This shrew is distinguished from the common ornate shrew by its larger size and its restricted geographic distribution. Shrews breed from February to early summer. They eat small insects, worms, and other soil-dwelling invertebrates.

Habitat Affinities. -Although little information is known about the prehistoric distribution of Buena Vista Lake shrews, Grinnell (1933) speculated that they were restricted to the valley-floor marshlands of the Tulare Lake Basin. The type locality reported by Grinnell is an elevated slough just outside the eastern levee of Buena Vista Lake. Researchers report that ornate shrews as a group, which includes the Buena Vista Lake shrew, live in dense vegetation along stream and sloughs and around the margins of tule marshes (Grinnell 1932).

Current Status in Kings County. -Little is known or reported about the current distribution of Buena Vista Lake shrews (Williams 1986). The only known occurrence is at The Nature Conservancy's Kern Lake Preserve in Kern County. Suitable habitat may be found on the Kern National Wildlife Refuge, and in Kings County along the margins of the lower Kern River Channel, in the flood basins at the south end of the Tulare Lake Basin, and in patches of marshy vegetation along the lower reaches of the Kings River. There are no known specimens or occurrence records from Kings County, but shrews of unknown identity have been observed at the Nature Conservancy's Creighton Ranch Preserve (just two miles east of Kings County).

Potential Threats, Management Concerns, or Special Considerations. -Destruction of its marshy habitat apparently is the major factor in this subspecies' decline. Suitable habitat throughout the Tulare Lake Basin portion of the lower San Joaquin Valley has been greatly reduced. Once-extensive tule marshes, sloughs, and seasonal flood plains found in the lake basins of the lower San Joaquin Valley have been converted primarily to intensive agriculture and, secondarily, to urban and resource extraction uses. As a result, there is limited information about the habitat preference and the extant distribution of this species.

California Mastiff Bat

Description and Natural History Information. -The bat is chocolate brown, a 6 inch body length, and has a wing span of about 9 inches. It is the largest of California bats and is easily distinguished by its size. The bat occurs from central California southward to central Mexico. In California, they have been recorded from Butte county southward in the western lowlands through the southern California coastal basins and the western portions of the southeastern desert region. There are some records from Yosemite Valley. Historical roosts in central California are no longer occupied by the bat. It inhabits rugged, rocky areas with suitable crevices in rocks or trees for day roosts. They also roost in buildings. The crevices are also used as birthing areas and hibernaculae in winter. Diet consists of flying insects. Mastiff bats have great difficulty taking flight, and must drop at least 2 to 3 meters for launching. Mastiff bats make loud, audible (to humans) vocalizations that are distinctive from other bats. Mastiff bats probably forage for considerable distances from their roosting sites. For example, colonies roosting in suitable sites in the Diablo and Temblor ranges, flanking the San Joaquin Valley, likely foraged over the Valley floor where insects were more abundant.

Habitat Affinities. -Mastiff bats favor rugged, rocky areas where suitable crevices are available for day roosts. Characteristically, day roosts are located in large cracks in exfoliated slabs of granite or sandstone. Mastiff bats also frequently roost in buildings, provided these have sheltering spaces.

Current Status in Kings County. -The bat is recorded in the CNDDB in Kings County from the Traver quadrangle map. See CNDDB maps in Appendix A7.

Potential Threats, Management Concerns, or Special Considerations. -Available records show that mastiff bats were widespread in the San Joaquin Valley. Incidental information suggests that populations of the bat have undergone significant declines in recent years. Historically known

roosts in central California are no longer occupied (Williams 1986). Reasons for their decline are only conjecture. Extensive loss of habitat due to marsh drainage and cultivation of major foraging areas are likely factors in their decline. Widespread use of insecticides may have also reduced insect abundance and poisoned some bats.

Fresno Kangaroo Rat

Description and Natural History Information. -The Fresno kangaroo rat is one of three subspecies of the San Joaquin kangaroo rat (*Dipodomys nitratoides*). The subspecies has specialized hind limbs for hopping locomotion and external cheek pouches for transport of grass and forb seeds (the principal food items) to the underground burrow systems. Like all kangaroo rats, this subspecies has, in addition to long hind legs, a long, tufted tail for balance, a short neck and a comparatively large head. Efficient kidneys maximize retention of water to the point where animals seldom require moisture in the form of free water, obtaining what they require metabolically from the foods they eat. The Fresno kangaroo rat is the smallest of the San Joaquin kangaroo rats with a total length of 8.9 inches, including a 4.9 inch tail. Adults weigh about 1.2 ounces. Pelage is dark yellowish-buff dorsally and white ventrally. A white stripe extends along the flanks and on the sides of the tufted tail. San Joaquin kangaroo rats have four toes on the hind foot. Other similar species have five hand foot toes except for Merriam's, which also has four. This local race of the San Joaquin kangaroo rat is relatively small with a head plus body length of 3.6 to 4.0 inches with a tail 4.8 to 6.0 inches long. They have four toes on their hind feet. Reproductive activity starts in late February and continues until September, with a peak in April. In one study, females with embryos were found in all months except June, August, and December. The historic range of the Fresno kangaroo rat extended from north-central Merced County, south through southwestern Madera and central Fresno counties.

Habitat Affinities. -The kangaroo rat occurs primarily east of the Fresno Slough and north of the Kings River. Its habitat includes those areas where Valley Sink Scrub plant community typical of western Fresno County still exists. Its burrow systems are apparently restricted to areas of slight elevation. Fairly open vegetation seems to be preferred, since one study found higher numbers of kangaroo rats in moderately to heavily grazed areas.

Current Status in Kings County. -The kangaroo rat is recorded in the CNDDB in Kings County from the Vanguard quadrangle map. See CNDDB maps in Appendix A7. The kangaroo rat is extremely rare (if still present) in Kings County. The only known occurrences in the county are from remnant parcels of native vegetation on Lemoore Naval Air Station.

Potential Threats, Management Concerns, or Special Considerations. -Populations of the kangaroo rat have been greatly reduced by conversion of their habitat to cropland. Habitat conversion and rodenticide use are probably the greatest long-term threats to populations of this subspecies. Construction or maintenance work that further reduces or fragments their habitat may adversely affect the remaining populations.

Giant Kangaroo Rat

Description and Natural History Information. -Giant kangaroo rats are small nocturnal mammals with elongated hind limbs for hopping and external cheek pouches for carrying food (principally grass seeds) to their burrows. The giant kangaroo rat is the largest of all kangaroo rats and weighs from 4.6 to 6.4 ounces. The total length is 12.2 to 13.7 inches, with a tail that is 6.2 to 7.8 inches. The presence of five toes on the hind foot in conjunction with the size and weight of this species are diagnostic characteristics. Giant kangaroo rats subsist almost entirely on the seeds of annual plants such as brome grasses (*Bromus* spp.) and filaree (*Erodium* spp). The animals harvest, stack, and dry caches of grasses and forbs near the entrance of their burrows. Giant kangaroo rats inhabit a territory (known as a precinct) that averages 20 feet in diameter where a shallow burrow system (about 12 inches deep) is constructed. Each rat maintains and defends an individual territory in a colony that may consist of from two to thousands of precincts.

The historic range extended from Merced County south to Kern County, then west to eastern San Luis Obispo and northern Santa Barbara Counties. Populations were most numerous in areas with sparse vegetative cover and low annual precipitation. Intense livestock grazing often was associated with the range of this species. Between 1972 and 1980 most of the habitats inhabited by giant kangaroo rats were converted from native vegetation to cultivated agricultural crops due, in part, to an abundance of irrigation water supplied by the recently completed water delivery systems of the State Water Project and the Central Valley Project. Today, only remnant acreages of suitable habitat still remain in an undisturbed state. Huge colonies described in the literature no longer exist. Small colonies are found in portions of western Kern County and on the Elkhorn and Carrizo plains in eastern San Luis Obispo county. The loss of original habitat to agricultural conversion may be as much as 97-98 percent. Five relatively small areas totaling 12 square miles remain that support population densities typical of those existing prior to 1950 (Williams 1980).

Habitat is protected and preserved to varying degrees at Elkhorn Plain, Carrizo Plain Natural Heritage Reserve, certain BLM lands, certain TNC reserves, and certain State and Federal lands within the remnant range of the giant kangaroo rat. An inventory of native lands of the southern San Joaquin Valley conducted from 1986 to 1988 by the California Energy Commission identified a number of habitats suitable for giant kangaroo rats and also documented small colonies at some locales. This information will be used to assist in developing priorities for land acquisition. This information will also be useful in regional planning and endangered species recovery efforts. However, no recovery plan for the giant kangaroo rat currently exists.

Habitat Affinities. -The kangaroo rat requires native annual grassland and shrubland habitats with sparse vegetative cover and soils that are well-drained, fine sandy barns with a slope of generally less than 10 percent. Areas of low annual precipitation and infrequent flooding are preferred by this species for establishment of permanent colonies. CDFG studies have documented dense populations on the Elkhorn Plain Ecological Reserve, eastern San Luis Obispo County, in habitat consisting of Arabian grass (*Schismus arabicus*) and ephedra (*Ephedra viridis*).

Current Status in Kings County. -The kangaroo rat is recorded in the CNDDB in Kings County

from the Avenal Gap quadrangle map. See CNDDB maps in Appendix A7. Locales are from one colony located in 1979. A second colony was located in the Avenal Gap area approximately 5 miles WSW of the first colony. This colony and several small satellite colonies, when visited in 1979, covered approximately 50 acres. By 1985, all but the "core" colony had disappeared. This core colony consisted of approximately 30 precincts over 2-3 acres. The current status of these colonies is unknown but researchers have expressed concern about rodenticide use in the area (Dan Williams, pers. comm.).

Potential Threats, Management Concerns, or Special Considerations. -The giant kangaroo rat continues to be endangered by habitat loss, primarily due to conversion of native habitat to intensive agriculture. In addition, the widespread application of rodenticides within the range of this species could have a significant impact on small populations. In most cases the "target" animal in rodent control programs is the California ground squirrel (*Spermophilus beecheyi*) however, there have also been attempts to eradicate kangaroo rat populations because they are believed to seriously compete with cattle for forage. If extinction of this species is to be prevented, use of rodenticides within its range on both public and private lands needs to be curtailed and additional habitat must be acquired and preserved. Populations of this animal are considered to be declining.

Hoary Bat

Description and Natural History Information. -The bat is yellowish brown to mahogany brown, or mixed dark brownish and grayish and strongly frosted with white. The venter is whitish on belly, pale brown on chest, and yellowish on throat. The bat is about 5 inches in body length and has a wingspan of about 5 inches. The entire upper surface of interfemoral membrane is heavily furred. The ears are rimmed with black. Young are born in June. Like other bats, it forages on insects at night.

Habitat Affinities. -The bat prefers open habitats or habitat mosaics, with access to trees or cover and open areas or habitat edges for feeding. It roosts on dense foliage of medium to large trees and feeds primarily on moths. It occasionally uses caves for roosting.
Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Corcoran and Hanford quadrangle maps. See CNDDB maps in Appendix A7.
Potential Threats, Management Concerns, or Special Considerations. -Need to avoid disturbing breeding colony sites.

Pallid Bat

Description and Natural History Information. -The bat is yellowish brown, a 4 inch body length, and has a wing span of about 5 inches. The bat ranges throughout the western United States and throughout the entire state of California, excluding the high Sierra Nevada. The pallid bat is most often found in low and middle elevation areas (< 6,000 ft) throughout California. It occurs in a variety of habitats including scattered desert scrub, grassland, shrub land, woodland, and coniferous forests. Roosts for the bat include caves, mine tunnels, cracks in rock cliffs,

buildings, holes in trees, and bridges. The bat hibernates at these sites in the winter. Diet consists mainly of Jerusalem crickets, indicating that the bat forages on the ground. Large beetles and other arthropods such as scorpions, moths, and grasshoppers are also consumed. The bat uses a night roost during feeding which is a different location than its day roost. Young bats are born in April to June. The bat is very sensitive to roost site disturbance. -

Habitat Affinities. -The bat inhabits caves, mine tunnels, crevices in rocks, buildings, and trees for roosts.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Traver quadrangle map. See CNDDB map in Appendix A7.

Potential Threats, Management Concerns, or Special Considerations. -Need to avoid disturbing breeding colony sites. Pallid Bat populations have declined due to habitat loss, the loss of insect producing lands, and the use of insecticides.

San Joaquin Antelope Squirrel

Description and Natural History Information. -The San Joaquin Antelope squirrel is one of five species of antelope squirrels (*Ammospermophilus* spp.). This genus is confined to arid grasslands and shrublands in the southwestern U.S. and norther Mexico. This species is about nine inches long, grayish-brown with one white stripe on each side. The tail is about three inches long and typically held closely over the back while running, exposing the white underside of the tail. The squirrel is considered to be monotypic.

The species is omnivorous with a diet consisting primarily of seeds (chiefly of grasses and *Erodium* but also *Atriplex*) and insects. Insects, especially grasshoppers, are eaten when available and may be an important component of the diet in summer months. Antelope squirrels are fossorial animals that are not seen when ambient temperatures drop below 50 degrees fahrenheit, but these diurnal animals have been observed all hours of the day when temperatures are in excess of 100 degrees fahrenheit. The general active period during the spring and summer months coincides with air temperatures of 68 to 86 degree fahrenheit. Burrows used by this species are either dug by them or by other rodents including giant kangaroo rats (*Dipodomys ingens*).

Historically, San Joaquin antelope squirrels ranged from the western and southern portions of the Tulare Basin, San Joaquin Valley and areas to the west in the Cuyama Valley, Carrizo Plain and Elkhorn Plain. They were distributed from western Merced County on the northwest, southward along the western San Joaquin Valley to its southern end. They occupied the valley floor in Kern County and along the eastern edge northward to Tipton. Within the above distribution, squirrel relative abundance was tied to differences in soil texture and salt concentration (highly friable loam and sandy loam soils where both alkalinity and organic content are relatively low), vegetative composition, and precipitation (Hawbecker 1953). Recent surveys indicate that 80 percent of the original geographic range of the squirrel has been converted to agricultural developments. No prime habitat remains within the remnant habitats of the San Joaquin Valley.

Populations now exist primarily in marginal habitats of the low foothills and mountains of the western edge of the valley. Significant populations exist only in the drier portions (5 to 9 inches of annual precipitation) of western Kern County at Elk Hills and on portions of the Carrizo and Elkhorn plains (Williams 1980).

Populations in the northern part of the range are found only in the Panoche and Kettleman Hills and appear to have low densities. Home range sizes of San Joaquin antelope squirrels on the Elkhorn Plain range from 5 to 20 hectares, with a mean of 14.4 hectares. Densities in good habitat in the Elkhorn Plain area are generally 4 animals per hectare, and are lower in most other areas.

Habitat Affinities. -Habitats of antelope squirrels consist of grasslands with moderate shrub cover which includes such species as salt bush (*Atriplex* spp.), ephedra (*Ephedra viridis*), bladder pod (*Isomeris arborea*), goldenbush (*Haplopappus* spp.), snakeweed (*Gutierrezia californica*) and others. Antelope squirrels tend to avoid either shrub-free or dense scrub habitat. Low-density populations have also been located in iodine bush (*Allenrolfea occidentalis*) and spiny saltbush (*Atriplex spinifera*) dominated habitats with alkaline soils. Antelope squirrel populations of moderate density have also been found in areas lacking shrubs, but containing populations of giant kangaroo rats. Most burrows are placed under shrubs, in the banks of arroyos (Grinnell and Dixon 1918), and in road cuts and other berms. These tiny squirrels can sometimes be observed in the tops of Atriplex shrubs where they utter a shrill alarm call when too closely approached. Shrubs, then, offer observation posts, a food source, escape cover, and a shady burrow location.

Current Status in Kings County. -This species is recorded in the CNDDB in Kings County from the Avenal Gap, Garza Peak, Huron, La Cima, Ten Hills, The Dark Hole, and West Camp quadrangle maps. See CNDDB maps in Appendix A7. The squirrel is restricted to scattered scrub/grassland communities in the Kettleman Hills and on the southwest edge of the Tulare Lake Basin. Overall numbers of antelope squirrels in the county are very low.

Potential Threats, Management Concerns, or Special Considerations. -Rodenticide use, common in the entire range of the species, poses a significant threat and may be responsible for major population declines. Over-grazing by livestock and conversion of habitat to intensive agricultural practices are the greatest long-term threats to populations due to habitat degradation, erosion and consequent lowering of carrying capacity. Type conversion of saltbush scrub habitats to grassland has probably had a serious impact on the status of this species in grazed portions of western Kings County including the Kettleman Hills. The other major threat to San Joaquin antelope squirrels in Kings County pertains to the insularization of the Valley floor population center (it is becoming isolated from the Coast Range populations). Maintenance of habitat corridors between these population areas is an important biological consideration.

San Joaquin Kit Fox

Description and Natural History Information. -The delicately built, cat-sized San Joaquin kit fox is the smallest North American member of the dog family. San Joaquin kit foxes have an

average body length of 20 inches, an average tail length of 21 inches, and stand about 9 to 12 inches at the shoulder. These slender-built animals are characterized by relatively long legs and large, conspicuous ears. Adult males weigh about 5 pounds, and adult females weigh about 4.6 pounds. Pelage color differs with season, being tan to buffy gray dorsally in summer and silver gray dorsally in winter. Ventral coloration is white year-round. The long bushy tail is black-tipped, and the insides of the ears are covered with white hairs. Kit foxes attain adult size and pelage at about five months of age. This species is mostly nocturnal, and hunts jackrabbits, cottontails, kangaroo rats, ground squirrels, and mice.

Kit foxes were once common on the dry plains of the San Joaquin Valley from the vicinity of Tracy, San Joaquin County southward to southern Kern County. By 1930 this range may have already been reduced by 50 percent and kit foxes that formerly occupied portions of their northern, northeastern, and eastern range were restricted to the southern and western parts of the valley. Kit foxes occur in the remaining native vegetation associations of the valley floor and surrounding foothills from southern Kern County north to Los Banos, Merced County. Depending on extent of agricultural development, distribution is spotty within this broad range. In addition, smaller, less dense populations may be found further north and in the narrow corridor between Interstate 5 and the Interior Coast Range from Los Banos to Contra Costa County. Portions of Monterey, Santa Clara, San Benito and Santa Barbara counties are also included in the range of the San Joaquin kit fox.

Studies and information from various sources indicate that a density of one kit fox per square mile in suitable habitat is a reasonable figure to use to estimate populations based on known acreage of habitat, although densities can range from less than one to over six foxes per square mile. A responsible population estimate is about 7,000 animals in the 14 counties included within the range. Based on lost habitat and range, a population decline of about 20 to 43 percent has been estimated. Recent efforts to delineate the range of the San Joaquin kit fox indicate that most of the range defined in 1975 still supports some kit foxes. However, in certain areas there has been significant loss of habitat. The problem is particularly acute where urban expansion extends onto surrounding agricultural lands, in areas of intensive agricultural expansion, and where extensive petroleum exploration operations continue. These lands include the areas surrounding Bakersfield, in western Kern County, and near Avenal in Kings County. Northern portions of the range, particularly in the areas to the east and south of the San Francisco Bay area are becoming increasingly urbanized, and
kit fox habitat may be lost to residential developments and public works projects such as reservoirs.

Habitat Affinities. -The kit fox cannot construct its dens in shallow or hardpan soils, or areas where the water table is high. For ease of digging burrows, it has preferred areas on the western side of the valley where the soil is loose-textured. During the day it occupies dens; a mated pair may have more than thirty dens over nearly six hundred acres of territory. San Joaquin kit foxes are frequently found on cultivated ground and in pastures, although they probably cannot survive indefinitely in intensely cultivated and irrigated land (Williams 1989).

Current Status in Kings County. -The fox is recorded in the CNDDB in Kings County from the Avenal, Avenal Gap, Burrel, Burris Park, Cholame Valley, Corcoran, Dudley Ridge, Guernsey,

Hacienda Ranch NW, Hacienda Ranch NE, Hanford, Huron, Kettleman City, Kettleman Plain, La Cima, laton, Lemoore, Lone Tree Well, Los Viejos, Pyramid Hills, Remnoy, Riverdale, Traver, Vanguard, and Waukena quadrangle maps. See CNDDB maps in Appendix A7. In the 1970's, kit foxes were still denning along Cross Creek from east of Hanford into Tulare County and individual animals were still seen occasionally in portions of the county north of Hanford. There have not been any recent records from those areas. Current kit fox records from the county come primarily from native plant communities (scrub/grasslands) west of the California Aqueduct (Kettleman Hills), lands south of the Tulare Lake Basin, and from the isolated native scrub/grassland habitat west of Guernsey. These wide-ranging predators often forage on land outside of native plant communities including dry-farmed and irrigated agricultural areas and even urban areas, such as Avenal.

Potential Threats, Management Concerns, or Special Considerations. -Agricultural and residential development of the San Joaquin Valley has eliminated most of the San Joaquin kit fox's habitat. By 1979, less than 7 percent of its original habitat remained. While foxes occasionally are found in cities, or denning in road culverts, orchards, equipment yards, and abandoned pipelines, few can survive in irrigated agricultural settings, where rodents are routinely poisoned and other food items are scarce. Although CDFG banned hunting and trapping of fur bearing species in the San Joaquin kit fox range in 1972, shooting and trapping, along with off-road vehicles, attacks by dogs, and poisoning by rodent bait, still threaten the species. Coyote predation (in undeveloped areas) and deaths caused by vehicles (in developed areas) are the two major sources of mortality for kit fox (Berry et al. l987).

The kit fox's large territorial demands-about one square mile per animal-make protecting the species difficult. Individuals may cover great distances while foraging and especially while dispersing. Because of their mobility, San Joaquin kit foxes require secure denning areas, foraging areas with adequate prey, and safe migration corridors that connect denning and foraging areas. With proper wildlife management, lands set aside in the Carrizo Plain should provide excellent kit fox habitat. Additional acreage may be purchased using development fees under a Habitat Conservation Plan being implemented in Bakersfield with the participation of local business interests. The California Department of Fish and Game manages ecological reserves in the San Joaquin Valley that support San Joaquin kit foxes, and there are foxes on the Kern and Pixley National Wildlife Refuges. Nonetheless, biologists are uncertain whether enough habitat can be saved to sustain San Joaquin kit foxes into the next century.

San Joaquin Pocket Mouse

Description and Natural History Information. -This nocturnal mouse is about 3 inches in length, has a 3 inch tail, and is buff colored. The San Joaquin Pocket Mouse vocalizes with low grunts, growls, and squeals, and communicates aggression by tooth-chattering. This species will consume earthworms and soft-bodied insects, but its diet is mainly very tiny seeds of grasses, forbs, and shrubs. Its burrows are conspicuous in the short grass where it lives, in west-central California. To groom their fur, the mouse sand-bathe, digging into the loose sandy soil and then sliding and rubbing their bodies in the sand.

Habitat Affinities. -Typically found in grasslands, Blue Oak savannahs, and scrub habitats.

Current Status in Kings County. -The mouse is recorded in the CNDDB in Kings County from the Avenal Gap, Kettleman City, Kettleman Plain, La Cima, and Pyramid Hills quadrangle maps. See CNDDB maps in Appendix A7.

Potential Threats, Management Concerns, or Special Considerations. -Cultivation of native communities has been the principal reason for loss of habitat. Rodenticide use and destruction of precincts by sheep, cattle, and off-highway vehicle use are probably the greatest long-term threats to populations of this subspecies.

Short-nosed Kangaroo Rat

Description and Natural History Information. -Short-nosed kangaroo rats are nocturnal, fossorial rodents which feed primarily on seeds. This subspecies is very similar in appearance to two other local subspecies of San Joaquin kangaroo rat. They require friable soils in desert and alkali playa communities in which to construct their precincts or burrow systems. Short-nosed kangaroo rat is a key species in local natural communities: serving as food for the endangered San Joaquin kit fox and other predators; harvesting and planting seeds of herbaceous and woody plants through seed-caching
behaviors; and digging burrows that are used as refuges for many small animals, including the endangered blunt-nosed leopard lizard.

Habitat Affinities. -They are found in a variety of upland habitats in grassland and arid shrubland associations. Most inhabited areas support sparse or moderate ground cover of desert and alkali sink shrubs *(Atriplex, Allenrolfea, Suaeda*). This species does not inhabit cultivated fields although they can recolonize formerly cultivated sites.

Current Status in Kings County. -The kangaroo rat is recorded in the CNDDB in Kings County from the Avenal Gap and Pyramid Hills quadrangle maps. See CNDDB maps in Appendix A7. The kangaroo rats are primarily found on hilly terrain west of the California Aqueduct (the Kettleman Hills). They are fairly widespread and, except for the common Heermann's kangaroo rat (*Dipodomys heermanni*), are probably more numerous than any of the other kangaroo rat taxa in Kings County.

Potential Threats, Management Concerns, or Special Considerations. -Cultivation of native communities has been the principal reason for loss of habitat. Rodenticide use and destruction of precincts by sheep, cattle, and off-highway vehicle use are probably the greatest long-term threats to populations of this subspecies.

Tipton Kangaroo Rat

Description and Natural History Information. -Tipton kangaroo rats are small mammals with specialized hind limbs for hopping and external cheek pouches for transport of food, principally

grass and f orb seeds. They live in arid, open country where they construct underground burrows for shelter and food storage. Adult Tipton kangaroo rats weigh about 1.2 to 1.3 ounces. Total length of the animal is 8.7 to 9.4 inches including a 4.8 to 5.1 inch tail. The dorsal pelage is dark yellowish-tan, while underparts are white. A white stripe extends laterally across each flank and on the side of the tufted tail.

The subspecies originally occupied a range that included the Tulare Lake Basin in portions of Fresno, Kings, Tulare and Kern counties. This geographic range encompassed about 1,716,500 acres. By July 1985, this historic range had been reduced primarily by agricultural conversion of native habitats to about 63,400 acres-only about 3.7 percent of the original size. Based on analyses by Boolootian (1954), Hoffman (1974), Hafner (1979), and Williams (1985) the accepted range of Tipton Kangaroo rat lies east of the California Aqueduct. Today only about 6,400 acres of publicly-owned land (five separate parcels) support low- to moderate-density populations of Tipton kangaroo rats. However, none of these parcels are large enough to prevent declining genetic diversity and ultimate extinction (Williams 1985).

Total population numbers during historic times are difficult to estimate due to lack of appropriate data collected during that era. However, a crude estimate of historic population based on today's density data and the estimated extent of former range is about 17,164,800 individuals. Today approximately 190,200 individuals, about 1 percent, remain. Most of this habitat and population loss leading to the endangerment of the Tipton kangaroo rat was caused by the increase in conversion of native arid grassland and shrubland communities of the southern San Joaquin Valley to intensive, irrigated agricultural crops. The completion of water delivery systems associated with the Central Valley Project prompted much of this agricultural expansion.

Habitat Affinities. -Tipton kangaroo rats are limited to arid land communities of the valley floor in the Tulare basin in level to nearly level terrain at an elevation of 200 to 300 feet. Woody shrubs such as *Atriplex spinifera*, *L. polycarpa*, *Allenrolfea occidentalis*, *Haplopappus acradenius* and *Prosopis luliflora* are sparsely scattered over the terrain with scant to moderate ground cover of grasses and forbs. Soils are typically fine-textured and alkaline. Tipton kangaroo rats sometimes colonize areas that are flooded in winter and spring. Favored areas may included seepweed (*Suaeda fruticosa*) shrublands which are flooded seasonally or where alkaline water lies close to the surface of the soil year-round. Kangaroo rats in these areas either drown or escape to higher ground during floods.

Current Status in Kings County. -The kangaroo rat is recorded in the CNDDB in Kings County from the Guernsey, Hacienda Ranch, Hacienda Ranch NE, Kettleman City, Lemoore, Lone Tree Well, Los Viejos, and Stratford quadrangle maps. See CNDDB maps in Appendix A7. In Kings County, this valley endemic inhabits remnant stands of native scrub/grassland habitats west of Guernsey, just east of the California Aqueduct, and some small remnant patches of Valley Sink Scrub south of Lemoore.

Potential Threats, Management Concerns, or Special Considerations. -Conversion of native arid grassland and shrubland communities to intensive, irrigated agricultural crops is the major ongoing threat to this subspecies. Another major threat to Tipton kangaroo rats in Kings County pertains to the insularization of the Valley floor population centers (they are becoming isolated

from one another by expanses of agricultural land). Maintenance of habitat corridors between these population areas is an important biological consideration. This species does not inhabit actively cultivated fields although they can disperse into and colonize formerly cultivated sites.

Townsend's Western Big-Eared Bat

Description and Natural History Information. -The bat is chocolate brown, a 3 inch body length, and has a wing span of about 4 inches. The ear of this bat is about 1 inch in length. The bat is found throughout California from low desert to mid-elevation montane habitats. It is associated with mines and caves in desert scrub, mixed conifer, pinyon-juniper or pine forest. The bat is a cavern dwelling bat that uses mines, caves, and buildings with suitable "cave-like" spaces. It will also use more open settings for night roost, including under bridges. In the summer, males roost alone or in small groups (6 individuals). Nursery colonies may contain 17 to 40 adult females, and winter hibernacula may have 1to 60 individuals. The bat eats primarily small moths. It forages near vegetation and other surfaces and prey is probably gleaned from these surfaces. In California, it has been shown to forage preferentially in association with native vegetation.

Habitat Affinities. -The bat inhabits a variety of communities including coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands, and high-elevation forests and meadows. Throughout most of its geographic range, they are commonest in mesic sites. Known roosting sites in California include limestone caves, lava tubes, mine tunnels, buildings, and other human-made structures (Williams, 1986). Habitat for the bat must include roosting, maternity, and hibernacula sites free from disturbances by humans.

Current Status in Kings County. -Unknown.

Potential Threats, Management Concerns or Special Considerations. -A single visit by humans can cause the bats to abandon a roost. Females typically roost in large maternity colonies that are highly susceptible to such disturbances. Males usually roost singly or in small groups and are probably not affected as much as females by disturbances. The bat has suffered substantial population declines in past forty years in parts of California. Its largest threats are mine reclamation, renewed mining, water impoundments, recreational caving, loss of building roosts, and bridge replacement.

Tulare Grasshopper Mouse

Description and Natural History Information. -In general mice of the genus *Onychomys* have stout bodies with short, relatively thick tails. The pelage is sharply bicolored with the head, back, and upper sides pale-brown to grayish or pinkish cinnamon and the underparts white and distinctly different from the upper parts. The tail is usually bicolored with a white tip. Juvenile pelage is gray. Adult pelage is buffy or tawny. The pelage of older individuals may be gray, closely resembling sub-adults in color. The total body length of the mouse ranges from 4.69 to 6.42 inches and the tail is 1.03 to 2.44 inches in length. The tail length is usually more than half

the length of the body (48 to 56 percent).

Habitat Affinities. -Hot, arid valleys and scrub deserts in the southern San Joaquin Valley.

Current Status in Kings County. -The mouse is recorded in the CNDDB in Kings County from the Avenal, Garza Peak, Kettleman City, Kettleman Plain, La Cima, Lone Tree Well, and Los Viejos quadrangle maps. See CNDDB maps in Appendix A7.

Potential Threats, Management Concerns, or Special Considerations. -Habitat fragmentation and loss to cultivation, and, perhaps, inappropriate land management, are the most serious threats to Tulare grasshopper mice. The naturally low reproductive rate, low population density, and large home range characteristics of southern grasshopper mice make this species particularly vulnerable to loss and fragmentation of habitat. There are no current overall estimates of population size for this subspecies.