

San Joaquin Antelope Squirrel

(*Ammospermophilus nelsoni*)

Legal Status

State: Threatened

Federal: None

Critical Habitat: No critical habitat has been designated for this species.

Recovery Planning: *Recovery Plan for Upland Species of the San Joaquin Valley* (U.S. Fish and Wildlife Service 1998).

Notes: No changes to status proposed or anticipated during the permit term.

Taxonomy

San Joaquin antelope squirrel is considered to be monotypic. It is one of five species of antelope squirrel that occurs in the arid regions of the southwestern United States and Mexico. San Joaquin antelope squirrels have small rounded ears, light-colored striping along the side of the body, relatively short legs and tail. The tail, which is light gray to whitish on the underside, has laterally projecting, thick fringes of hair. San Joaquin antelope squirrels have a body length ranging from 21.8–24.0 centimeters (8.5–9.4 inches) and typically weigh 130–170 grams (4.6–6.0 ounces) (U.S. Fish and Wildlife Service 1998).

Distribution

General

Historically, San Joaquin antelope squirrels were distributed across the western and southern portions of the Tulare Basin, San Joaquin Valley, and the contiguous areas to the west of the upper Cuyama Valley, and on the Carrizo and Elkhorn Plains. They ranged from western Merced County on the northwest, southward along the western side of the San Joaquin Valley to its southern end, and were distributed over the floor of the San Joaquin Valley in Kern County and along the eastern edge of the Valley northward to near Tipton, Tulare County. San Joaquin antelope squirrels occur at elevations ranging from about 50 meters (165 feet) on the San Joaquin Valley floor to about 1,100 meters (3,600 feet) in the Temblor Mountains. The area encompassed by the distribution record prior to cultivation was approximately 1,398,600 hectares (3,456,000 acres) (U.S. Fish and Wildlife Service 1998).

Distribution and Occurrences within the Study Area

Historical

Based on a search of the California Natural Diversity Database (CNDDDB), there is one historical San Joaquin antelope squirrel occurrence (prior to 1990) within the permit area and 78 historical occurrences within the larger study area (California Department of Fish and Game 2012).

Recent

There are no San Joaquin antelope squirrel occurrences on record from 1990 to present in the plan area and there are 92 occurrences in the study area (California Department of Fish and Game 2012). Substantial populations of San Joaquin antelope squirrel are found in and around Lokern and Elk Hills in western Kern County and on the Carrizo and Elkhorn Plains in eastern San Luis Obispo County. Antelope squirrels have been nearly eliminated from the floor of the Tulare Basin and exist mainly in marginal habitat in the mountainous areas bordering its western edge.

The current distribution and trends in spatial distribution has decreased over the years. Recent information suggests that the substantial populations of the species are now limited to two major areas:

- western Kern County, particularly at Lokern and Elk Hills and
- Carrizo and Elkhorn Plains, eastern San Luis Obispo County (U.S. Fish and Wildlife Service 1998; California Department of Fish and Game 2005).

Smaller populations occur in western Fresno, eastern San Benito County, along the fringe of the San Joaquin Valley between Fresno and Kern Counties, and in isolated areas on the San Joaquin Valley floor (U.S. Fish and Wildlife Service 1998).

Natural History

Habitat Requirements

San Joaquin antelope squirrels inhabit arid annual grassland and shrub communities, including saltbush scrub and Valley sink scrub. They are most numerous in areas with a sparse to moderate cover of shrubs. Areas devoid of shrubs are typically only sparsely inhabited. They require areas free from flooding where they can dig ground burrows in friable soils. In the southern and western San Joaquin Valley, San Joaquin antelope squirrels are associated with open, gently sloping land with saltbush shrubs (*Atriplex* sp.) and California ephedra (*Ephedra californica*); however, near Los Banos, Merced County and Mendota, Fresno County, their habitat is mostly devoid of shrubs (U.S. Fish and Wildlife Service 1998).

Table 1. Habitat Associations for San Joaquin Antelope Squirrel

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Rationale
Annual grasslands, saltbush scrub, Valley sink scrub	Breeding, foraging, and denning	Primary	Requires suitable friable soils in which to dig their burrows for denning and predator avoidance. In areas devoid of shrubs, associated with giant kangaroo rats	Presence of burrowing species provides burrows for refugia. Will live in burrow systems created by giant kangaroo rats.
Oil Field	Breeding, foraging, and denning	Primary and secondary	Are found in light-density oil fields (<25% ground cover. Less abundant in moderate-density (25%-75% ground cover developed). Absent from high-density fields (>75% ground cover developed)	Population densities in oil fields decrease as development density increases.

Sources: U.S. Fish and Wildlife Service 1998

Foraging Requirements

San Joaquin antelope squirrels are omnivorous, and the amount and type of food consumed mostly depends upon availability. Green vegetation, fungi, and insects are consumed more often than seeds, even when seeds are relatively abundant. Stalks of filaree (*Erodium cicutarium*) and red brome (*Bromus rubens*) are main food plants along with the seeds of shrubs such as ephedra and saltbush. Insects, principally grasshoppers, are eaten regularly when available and provide a source of protein. When seeds and grasshoppers are scarce, the squirrels will eat harvester ants and the ovaries and developing seeds of ephedra (U.S. Fish and Wildlife Service 1998).

Reproduction

Mating occurs during late winter through early spring (February or March), coinciding with the time of year when green vegetation is present. Females produce one litter per year. Young are born between March and April and are first seen above ground when they are about 30 days of age. Young are weaned beginning in late April through late May.

Table 2. Key Seasonal Periods for San Joaquin Antelope Squirrel

	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Breeding		✓	✓	✓	✓							

Source: U.S. Fish and Wildlife Service 1998

Home Range and Population Density

Of the 275,200 hectares (680,000 acres) of extant, uncultivated habitat estimated in 1979, only 41,300 hectares (102,000 acres) were rated fair to good quality, supporting 3–10 squirrels per hectare (1–4 per acre) (U.S. Fish and Wildlife Service 1998), with half the remaining habitat supporting fewer than 1 animal per hectare (NatureServe 2012). The home range of these squirrels on the Elkhorn Plain is 5–20 hectares (5–49 acres), although another study reported a home range of 4.4 hectares (11 acres). Immature males have been observed moving up to 1.3 kilometers (0.8 mile) and up to 0.9 km (0.56 mile) by an adult female (NatureServe 2012). It was also noted that weaned young were still together in late May, and at least some family groups were still together in mid-July (U.S. Fish and Wildlife Service 1998). The range of San Joaquin antelope squirrel most nearly coincides with that of the giant kangaroo rat (*Dipodomys ingens*) and the short-nosed kangaroo rat, (*Dipodomys nitratooides brevinasus*) (U.S. Fish and Wildlife Service 1998).

Ecological Relationships

San Joaquin antelope squirrels are prey for a number of predators, including coyotes (*Canis latrans*), San Joaquin kit fox (*Vulpes macrotis mutica*), American badgers (*Taxidea taxus*), hawks, and snakes. Predation is unlikely to threaten populations of San Joaquin antelope squirrels. However, predation could adversely affect small, isolated populations.

Population Status and Trends

Global: Imperiled (NatureServe 2012)

State: Stable to declining (California Department of Fish and Game 2005)

Study Area: Same as above

Threats and Environmental Stressors

Reasons for decline of the San Joaquin antelope squirrel are attributed primarily to the loss of habitat due to agricultural conversion, urbanization, and petroleum extraction. Habitat loss and fragmentation are also expected to exacerbate the decline of the species. Excessive grazing by livestock may also have long-term

effects through the elimination of shrubs and soil erosion resulting from heavy use of rangeland communities. The use of insecticides in agriculture to control insect pests might affect antelope squirrels by temporarily reducing the abundance of insects, an important source of food and moisture during the summer (U.S. Fish and Wildlife Service 1998).

Conservation and Management Activities

In 1998, a recovery plan for upland species of the San Joaquin Valley was completed that included a recovery strategy for the San Joaquin antelope squirrel (U.S. Fish and Wildlife Service 1998). The 1998 recovery plan's objective was to achieve long-term conservation of this species. San Joaquin antelope squirrels in the two largest populations on the Carrizo Natural Area and in western Kern County should be protected by appropriate land uses and habitat management. Ensuring that habitat is dedicated to conservation objectives will require purchase of title or easement of some parcels and protection of habitat on existing public lands in western Kern County. The following conservation areas provide currently or previously occupied San Joaquin antelope squirrel habitat and should be managed for the long-term survivability of San Joaquin antelope squirrels (U.S. Fish and Wildlife Service 1998).

- Allensworth Ecological Reserve
- Carrizo Natural Area
- Pixley National Wildlife Refuge
- Western Kern County in the area of the Lokern, Elk Hills, and uplands around McKittrick, Taft, and Maricopa

Data Characterization

This species has been well studied at as few limited sites. Information of the population and trends at most occupied sites is not well known. Therefore, any estimated range-wide numbers for this species could be underestimated or overestimated, though it is unknown to what degree. Additionally, knowledge of the subspecies' behavior and ecology is limited.

Management and Monitoring Considerations

Management and monitoring considerations for the San Joaquin antelope squirrel is based on the Recovery Plan for Upland Species (U.S. Fish and Wildlife Service 1998) include:

- Determine habitat management prescriptions for San Joaquin antelope squirrels on the southern San Joaquin Valley floor.
- Inventory potential habitat for San Joaquin antelope squirrels in the Allensworth, Semitropic Ridge, and Kettleman Hills natural areas, and along the western edge of the Valley between Pleasant Valley, Fresno County, and McKittrick Valley-Lokern Area, Kern County.
- Predict additional habitat for San Joaquin antelope squirrels at sites representative of their existing geographic range.
- Develop and implement a population monitoring program for San Joaquin antelope squirrels at sites representative of their existing geographic range.
- Protect additional habitat for San Joaquin antelope squirrels in the Panoche Region of western Fresno County and eastern San Benito Counties.
- Protect additional habitat for San Joaquin antelope squirrels in western Kern County.
- Protect additional habitat for San Joaquin antelope squirrels in the Semitropic Ridge Natural Area.
- Reevaluate the status of San Joaquin antelope squirrels within 3 years of the recovery plan approval.

Predicted Species Distribution in the Study Area

Model Description

Primary and Secondary Habitat

San Joaquin antelope squirrels are found in areas of sparsely vegetated annual grassland, Valley sink scrub, and saltbush scrub habitats. They are also found in areas of light-density oil fields (<25% ground cover developed). San Joaquin antelope squirrels are known to occur in areas of petroleum development, especially light-density oil fields (<25% ground cover developed). Therefore, these habitats west of Highway 99 were considered to be primary habitat for San Joaquin antelope squirrels. Population densities in oil fields decrease as the density of oil development increases (U.S. Fish and Wildlife Service 1998). Medium-density oil fields (25%-75% ground cover developed) were considered suitable secondary habitat for San Joaquin antelope squirrels. It is assumed that San Joaquin antelope squirrels may be present in medium density oil development areas but at low, sporadic populations. San Joaquin antelope squirrels are presumed to be absent from areas of high density oil development (>75% ground cover developed).

Model Results

Figure D-7 shows the modeled primary habitat for San Joaquin antelope squirrels within the Plan Area and the Study Area. CNDDDB occurrences of this species fall within the modeled habitat.

Literature Cited

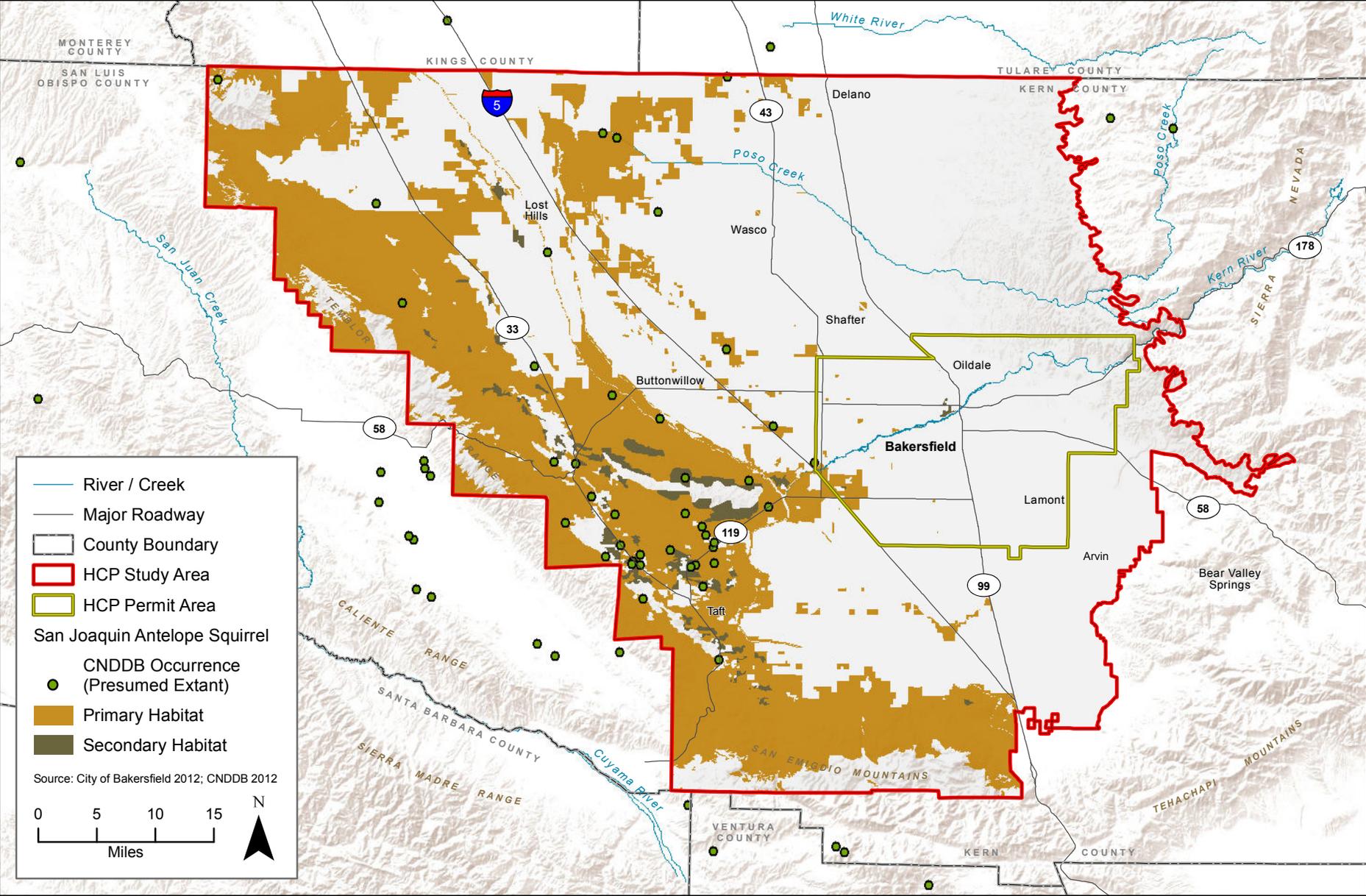
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Bakersfield Conservation Plan



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Figure D-7
San Joaquin Antelope Squirrel Modeled Habitat