

Tipton Kangaroo Rat

(Dipodomys nitratoides nitratoides)

Legal Status

State: Endangered

Federal: Endangered

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: In 2010, U.S. Fish and Wildlife (USFWS) issued the *Tipton Kangaroo Rat* (*Dipodomys nitratoides nitratoides*) *5-Year Review: Summary and Evaluation*. In the 5-Year Review, USFWS recommended no change to the federal status of the species.

Taxonomy

The Tipton kangaroo rat is a subspecies of the San Joaquin kangaroo rat (*Dipodomys nitratoides*). Kangaroo rats have long rear legs and relatively short front legs that are used for digging burrows, a long tufted tail for balance, and a large head and large auditory bullae. Kangaroo rats are adapted for bipedal locomotion (U.S. Fish and Wildlife Service 1998). Tipton kangaroo rats are a small kangaroo rat with a body length averaging 10.0–11.0 centimeters (3.9–4.3 inches), a tail length of about 12.5–13.0 centimeters (4.9–5.1 inches), and a weight of 35–38 grams (U.S. Fish and Wildlife Service 1998).

Distribution

General

Historically, Tipton kangaroo rats were distributed in the southern San Joaquin Valley. The northern extent of the range was along the southern margins of Tulare Lake in the vicinity of the towns of Leemore and Hanford. Then range extended south along the eastern edge of the valley floor in Tulare and Kern Counties. The range extended south and west to the foothills of the Tehachapi Mountains. The marshes and open water of Kern and Buena Vista Lakes and the sloughs and channels of the Kern River alluvial fan were unsuitable Tipton kangaroo rat habitat (U.S. Fish and Wildlife Service 1998).

Within occupied habitat, Tipton kangaroo rat distributions are not continuous. Instead, Tipton kangaroo rats occur in a mosaic pattern of small and isolated patches that are dynamic over time and are separated by distances well beyond any reported dispersal distance. Additionally, Tipton kangaroo rat populations frequently are separated by physical barriers such as roads and canals that cannot be crossed. Therefore, the net occupied habitat is much less than either the gross size of the occupied habitat or the approximate size of the site (e.g., reserve size). There is very little habitat remaining where this subspecies could possibly occur, making future discoveries unlikely. At the same time, the potential for reintroduction becomes more limited as suitable habitat is lost and converted to other uses (U.S. Fish and Wildlife Service 2010).

Distribution and Occurrences within the Study Area

Historical

Based on a search of the California Natural Diversity Database (CNDDDB), there are three historical Tipton kangaroo rat occurrences (prior to 1990) within the permit area and 33 historical occurrences within the larger study area (California Department of Fish and Game 2012).

Recent

There are five recent Tipton kangaroo rat CNDDDB occurrences (1990 to present) in the plan area and 12 recent occurrences in the study area (California Department of Fish and Game 2012). The current distribution and trends in spatial distribution have not increased much over recent years. Current information suggests that the subspecies is now limited to about 10 major sites, as well as several smaller locations.

- Naval Air Station Lemoore
- Highway 41 and Jackson Avenue
- Pixley National Wildlife Refuge
- Allensworth Ecological Reserve
- North Kern State Prison
- Kern National Wildlife Refuge
- Northern Semitropic Ecological Reserve
- Buttonwillow Ecological Reserve
- Coles Levee Ecosystem Preserve
- Other smaller locations scattered throughout its range

Natural History

Habitat Requirements

Tipton kangaroo rats inhabit valley saltbush scrub, valley sink scrub, and grassland habitats located on the San Joaquin Valley floor to 300 feet in elevation. They occur on level to nearly-level terrains with alluvial fan and floodplain soils ranging from fine sands to clay-sized particles with high salinity. Although Tipton kangaroo rats occur in terrace grasslands devoid of woody shrubs, sparse to moderate shrub cover is associated with populations of high density. Densities typically are low, but populations are known to fluctuate greatly in response to climatic conditions (e.g., precipitation) and to vary across habitat type. Seasonal/short-lived invasion of vegetation, particularly by nonnative grasses, can exacerbate Tipton kangaroo rat declines. (U.S. Fish and Wildlife Service 2010).

Table 1. Habitat Associations for Tipton Kangaroo Rat

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Rationale
Annual grassland, saltbush scrub, and valley sink scrub	Year-round	Primary	Natural valley floor habitats that provide food base. Requires friable soils for digging burrows.	Grassland plant species provide seeds which are the primary food base. Friable soils allow for digging of burrows.

Sources: U.S. Fish and Wildlife Service 1998; U.S. Fish and Wildlife Service 2010.

Foraging Requirements

Tipton kangaroo rats eat a wide variety of annual and perennial grass and forb seeds. These include wild oat (*Avena fatua*), wild barley (*Hordeum murinum leporinum*), brome grasses (*Bromus* sp.), alkali sacaton (*Sporobolus airoides*), filaree (*Erodium cicutarium*), peppergrass (*Lepidium virginicum*), and spikeweed (*Hemizonia* sp.). Seeds from saltbush shrubs (*Atriplex* sp.), iodine bush (*Allenrolfea occidentalis*), and bush seepweed (*Sueda moquini*) are also important food sources. In the fall and winter, grass sprouts and new shoots of grasses and forbs provide important food sources. The seeds are collected and carried in their cheek pouches. When seeds are available, kangaroo rats collect them and cache them for later consumption. Caches are often in small depressions in the soil and are scattered throughout the home range of the individual. Tipton kangaroo rats also consume insects on occasion (U.S. Fish and Wildlife Service 1998).

Reproduction

Mating occurs in winter and peaks in early spring (late March to early April). Females usually produce one litter per season, though some females have been known to have two or more litters in a single season. The young are born in a burrow where they remain until they are fully furred and able to move about on their own, which is generally at about 6 weeks of age.

Table 2. Key Seasonal Periods for Tipton Kangaroo Rat

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

Home Range and Population Density

Studies conducted at the Lemoore Naval Air Station calculated densities of 3.5 animals per hectare (January; rainy season) and 5.5 animals per hectare (May; dry season). Other studies at Lemoore calculated densities of 1.5 ± 0.5 animals per hectare overall and 13.5 ± 4.4 animals per hectare in focus areas. A study at the Highway 41 and Jackson Avenue site near Naval Air Station Lemoore calculated densities for the year 2002 of 11.7 Tipton kangaroo rats per hectare, 14.5 per hectare for 2003, and 13.4 per hectare for 2004. These results are for small sites at locations known to be occupied more or less continuously over the years by the Tipton kangaroo rat; therefore, these densities likely are greater than at sites temporarily unoccupied or experiencing a temporary population decline.

Population densities at other sites (excluding perhaps Coles Levee Ecosystem Preserve, Northern Semitropic Ridge Preserve, and Allensworth Ecological Reserve) probably do not exceed 3.5–5.5 animals per hectare on average and may be much lower. It is difficult to generalize densities or population sizes because environmental factors such as drought and above-average rainfall can affect the density of Tipton kangaroo rats and can vary over time. Periods of heavy precipitation can result in tall grasses and accumulation of dense litter, which can limit the foraging ability of Tipton kangaroo rats, thus reducing numbers (U.S. Fish and Wildlife Service 2010).

Ecological Relationships

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

Population Status and Trends

Global: Critically Imperiled (NatureServe 2012)

State: Declining (California Department of Fish and Game 2010)

Study Area: Same as above

None of the areas where Tipton kangaroo rats occur have large tracts of suitable habitat and have populations that are stable or increasing. Most populations continue to have low densities and instabilities, and the species continues to be threatened by degradation and loss of habitat throughout its range (U.S. Fish and Wildlife Service 2010).

Threats and Environmental Stressors

The decline of the Tipton kangaroo rat is attributed primarily to the loss of habitats due to agricultural conversion, including the cultivation of the alkaline soils of the saltbush and valley sink scrub communities and urban development. Construction of dams and canals has led to a substantial increase in the amount of land that is available for agriculture and development. Current threats of habitat destruction or modification continue (U.S. Fish and Wildlife Service 2010).

It is also possible that the use of rodenticides used to control California ground squirrels has contributed to the elimination of small, isolated populations of Tipton kangaroo rats (U.S. Fish and Wildlife Service 2010).

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 Tipton kangaroo rat (U.S. Fish and Wildlife Service 1998). The 1998 recovery plan's objective was to secure a down listing of the species' status from endangered to threatened.

A down listing may be possible when sufficient acreage is secured to maintain self-sustaining populations in representative valley floor habitat. The recovery plan requires that three or more areas of at least 4,940 acres each of contiguous, occupied habitat be secured. Thirty percent of each of the secured habitat areas should be on public lands or lands under conservation ownership. The secured lands should also have populations that are stable or increasing through a precipitation cycle. All areas protected must also have a management plan that identifies the survival of Tipton kangaroo rats as an objective (U.S. Fish and Wildlife Service 2010).

Conservation areas that provide currently or previously occupied Tipton kangaroo rat habitat include (U.S. Fish and Wildlife Service 2010):

- Naval Air Station Lemoore

- Pixley National Wildlife Refuge
- Allensworth Ecological Reserve
- Kern National Wildlife Refuge
- Northern Semitropic Ridge Ecological Reserve
- Buttonwillow Ecological Reserve
- Coles Levee Ecosystem Preserve
- Naval Petroleum Reserve
- Lokern Preserve
- Kern Water Bank

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 Tipton kangaroo rat based on the 5-year review (U.S. Fish and Wildlife Service 2010) include:

- Determine current distribution and population status throughout range.
- Identify priority sites that should be acquired and protected.
- Develop monitoring plan to monitor abundance and population trends at selected sites.
- Develop adaptive management program based on results of population surveys.
- Develop a genetic profile to differentiate the distribution of the three *D. nitratooides* subspecies.

Predicted Species Distribution in the Study Area

Model Description

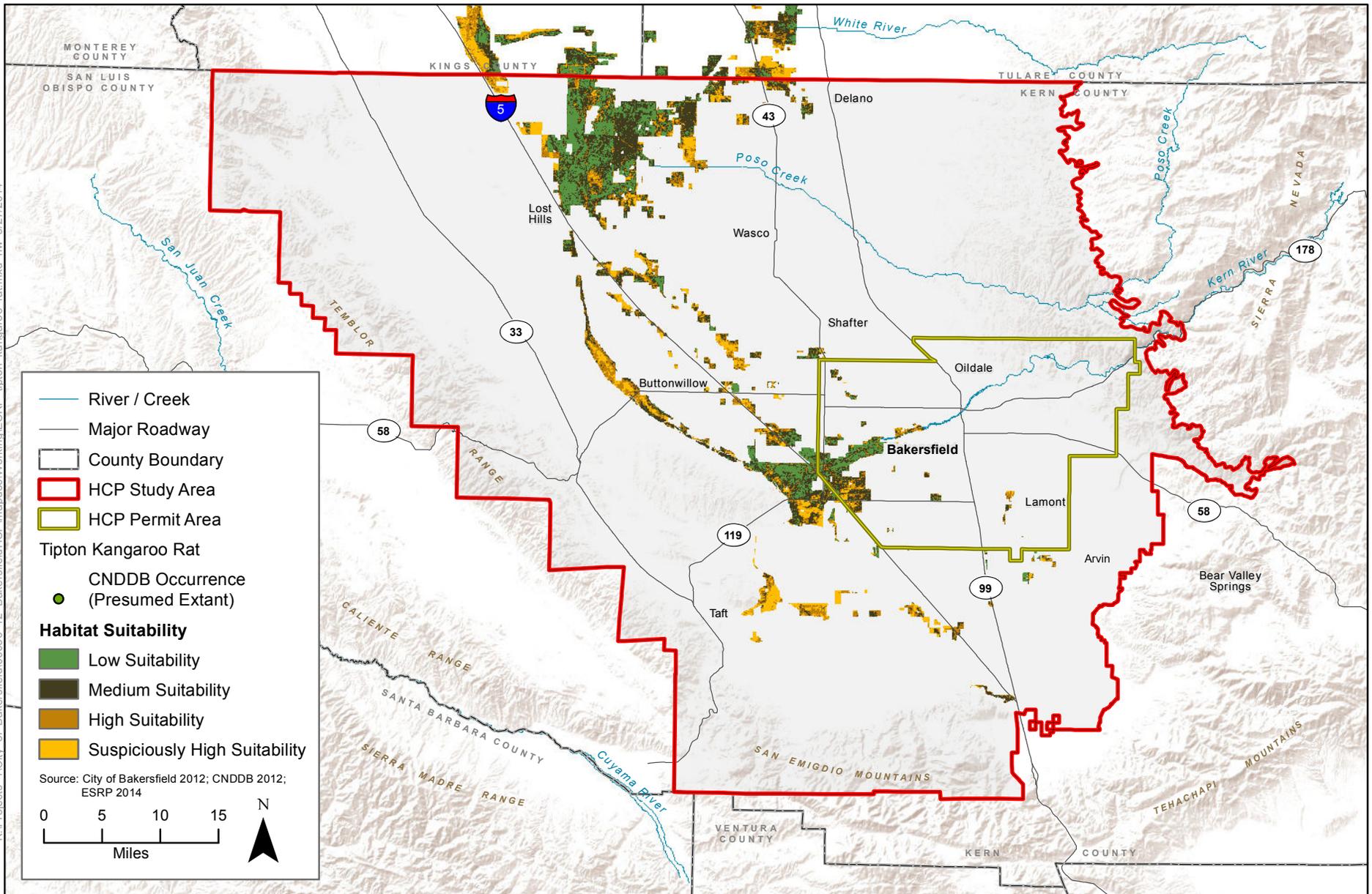
An initial estimate of habitat quality was created by looking at the amount of bare ground on rangeland within what we estimate as the range for Tipton kangaroo rat (TKR). A boundary was then created defining the TKR range as east side of the San Joaquin Valley floor (east of Tulare Lake and the California Aqueduct) floor, south of the Kings River. Within that range boundary, both current land use GIS layers (DWR 2012, FMMP 2012) and historical (early 1980's) land use GIS layers (USGS 2007) were used to identify lands that are both undeveloped now and in the past. Within areas of undeveloped rangeland with a minimum area of 10 acres, the amount of peak growing season bare ground cover was estimated using the Web-Enabled Landsat Data (WELD), *Peak growing season Bare Ground cover per 30m pixel* dataset (USGS 2013).

Using information from previous studies and field observations, 30 sites around the TKR range were identified that were of low, medium or high quality habitat. The amount of ground cover at the 30 sites was then compared and divided into percentages of bare ground and into four habitat quality classes of *Low*, *Medium*, *High*, and *Likely Disturbed*. Low quality was defined as having less than 29% ground cover, medium between 29% and 42% ground cover, and high quality between 42% and 60% ground cover. Areas with greater than 60% ground cover appeared to be highly disturbed by oil development or disking.

Literature Cited

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Bakersfield Conservation Plan



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Figure D-8
ESRP Tipton Kangaroo Rat Habitat