

A PETITION TO THE STATE OF CALIFORNIA FISH AND GAME COMMISSION

for action pursuant to section 670.1, Title 14, California Administrative Code, and sections 2072 and 2072.3 of the Fish and Game Code, relating to listing and delisting endangered and threatened species of plants and animals.

I. SPECIES BEING PETITIONED:

Common Name: Tipton Kangaroo Rat

Scientific Name: Dipodomys nitratooides nitratooides

II. RECOMMENDED ACTION:

(Check the appropriate categories.)

Endangered: X                      List: X  
Threatened:                             Delist:       

III. SUMMARY OF REASONS FOR RECOMMENDED ACTION:

(Provide a brief statement on why the action is being recommended. This should include an account of the status of the species involved and any factors listed in Section 670.1, Title 14, California Administrative Code, that threaten its survival. If the species is being recommended for delisting, tell why any one or a combination of the aforementioned factors no longer threaten its existence.)

The Tipton Kangaroo Rat is a key species of the San Joaquin desert communities. It serves as food for the Endangered San Joaquin Kit Fox (Vulpes macrotis mutica) and other natural predators. It serves other important functions by 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 (Gambelia silus) (burrowing also turns and mixes the soil) (Williams 1985).

The historical geographic range of the Tipton Kangaroo Rats was estimated to cover approximately 1,716,480 acres. By July, 1985, the area inhabited had been reduced, primarily by cultivation, to about 63,367 acres, only about 3.7% of the historical acreage. The loss of habitat is expected to continue until there is none privately owned, perhaps within the next four or five years. Only 6,137 acres of federally administered land is known to have historically supported populations; Tipton Kangaroo Rats may have been extirpated from 2,608 acres of this total within the past few years. Of all local, state and federal government-administered lands, only about 6,434 acres, divided among five separate parcels, have low to moderate-density populations of Tipton Kangaroo Rats that are relatively secure from loss of habitat to cultivation or extirpation due to flooding. None of these areas are probably large enough to support a population sufficient in numbers to prevent continuing loss of

genetic diversity and subsequent extinction. Other potential threats to small, isolated, remnant populations include diseases, predation and poisoning by rodenticides (Williams 1985).

The Tipton Kangaroo Rat is threatened by the continuing loss of native habitat primarily due to agricultural and other forms of human-induced development. Clearing and conversion of the species' grassland-shrub habitat has resulted in a precipitous decline in populations of Tipton Kangaroo Rats throughout the remnant of its range in the Tulare Lake Basin of the southern San Joaquin Valley. Chances are excellent that continued loss of this habitat will result in the extinction of the Tipton Kangaroo Rat by the turn of the century.

Because the Tipton Kangaroo Rat is a native species endemic to its small remnant range in California, and because it is threatened with extinction in all or a significant portion of that range due to habitat destruction, flooding, and rodenticide poisoning, it should be classified as endangered pursuant to Section 2062 of the California Fish and Game Code.

#### SUPPORTING INFORMATION

#### IV. NATURE AND DEGREE OF THREAT:

(Discuss types of direct or indirect threat to each population, significant portion of range or habitat. Indicate immediacy of threat and magnitude of loss or rate of decline expected without protective measures.)

Threat to extant Tipton Kangaroo Rat habitat is primarily due to destruction and modification of valley grassland, San Joaquin saltbush, and alkali sink scrub plant communities to various forms of agricultural development. A secondary threat to populations may result from flooding. An additional threat of habitat loss may result from construction of salt-drainage and evaporation ponds.

Poisoning is a potentially serious threat to Tipton Kangaroo Rats in all parts of their range on private and some public lands. Virtually every parcel of land in private or corporate ownership that is currently inhabited by Tipton Kangaroo Rats is surrounded by cultivated fields where this animal cannot exist. Nearly all of this remaining land is of poor agricultural potential, having alkaline soils and high water tables, and is subject to winter flooding regularly. An aerial survey conducted in late 1983, together with selected ground inspections and other sources of information provided an estimate of 110,031 acres of undeveloped land out of a total of 2,556,288 acres on the floor of the Tulare Basin. Williams (1985) found only about 75,430 acres undeveloped in June, 1985. Remaining lands represent the least desirable lands for agricultural development in the basin. As recently as 1970, just after the completion of the Central Valley and State Water Projects, only about 3.5 million acres (41%) in the San Joaquin Valley were cultivated and most of this was in the San Joaquin Basin (northern half of the San Joaquin Valley). By 1978, however, only about 370,000 acres (4.3%) out of a total of about 8.5 million acres on the San Joaquin Valley floor remained in native plant communities (Williams 1980).

The general unsuitability for farming and the lack of a market for cotton, the principal crop grown on lands surrounding uncultivated parcels, has not prevented cultivation. During surveys in June, 1985, Williams (1985) noted additional lands were being leveled and surveyed for leveling; drainage and irrigation ditches were being dug across uncultivated parcels; and other forms of agricultural development of uncultivated lands were in progress. This activity continues to the present.

Because of the large amount of salts in soils on the Tulare Basin floor, lack of natural drainage to the ocean, and the desert climate, build up of toxic levels of salts in the soil and saline-saturated fields threatens agriculture over large areas. Most of the remaining habitat of Tipton Kangaroo Rats is in areas that are already flooded periodically. These lands will be primary targets for evaporation ponds into which salt-laden drain waters will be diverted. Recently several such ponds have been constructed on lands formerly supporting the whole array of threatened and endangered species of central California (Williams 1985).

This trend of habitat loss if allowed to continue unchecked is likely to result in further decline of the Tipton Kangaroo Rat population and may well lead to its extinction on private lands by 2000.

#### V. HISTORIC AND CURRENT DISTRIBUTION:

(Historic- Indicate historical range by county and physiographic description and number of historical sites of species occurrence. Attach California range map.)

(Current- Describe number and quality of known extant populations and assess potential for introduction to historical sites. Attach detailed maps (15' scale topographic) of extant occurrences.)

The historic range of the Tipton Kangaroo Rat encompassed about 1,716,480 acres within the Tulare Basin in the southern San Joaquin Valley, extending from Lemoore and Hanford, Kings County on the north; southeast along Highway 99 from Tipton to Pixley, Tulare County, and Delano, Bakersfield, and Arvin, Kern County; westward to the southern, eastern and northern shores of the former Buena Vista Lake, Kern County; and then northward through the Antelope plain along a line marked by Buttonwillow, Lost Hills, Kern County, Kettleman City, Kings County; and Westhaven, Fresno County (Figure 1).

The current range is estimated to be that described as of July, 1985 when only 63,367 acres, 3.7 percent of the historic range, was still occupied by the species (Williams 1985). Of this remaining habitat, approximately 6,434 acres are in public ownership. These lands support low to moderate density (1 to 3 animals per acre) populations of Tipton Kangaroo Rats.

Present populations of Tipton Kangaroo Rats are limited to scattered, isolated lands near Lemoore and Hanford, Kings County; west of Tipton, Pixley and Earlimart, Tulare County; between the Kern National Wildlife Refuge and Delano, Kern County; and other scattered areas to the south in Kern County (Figure 2).

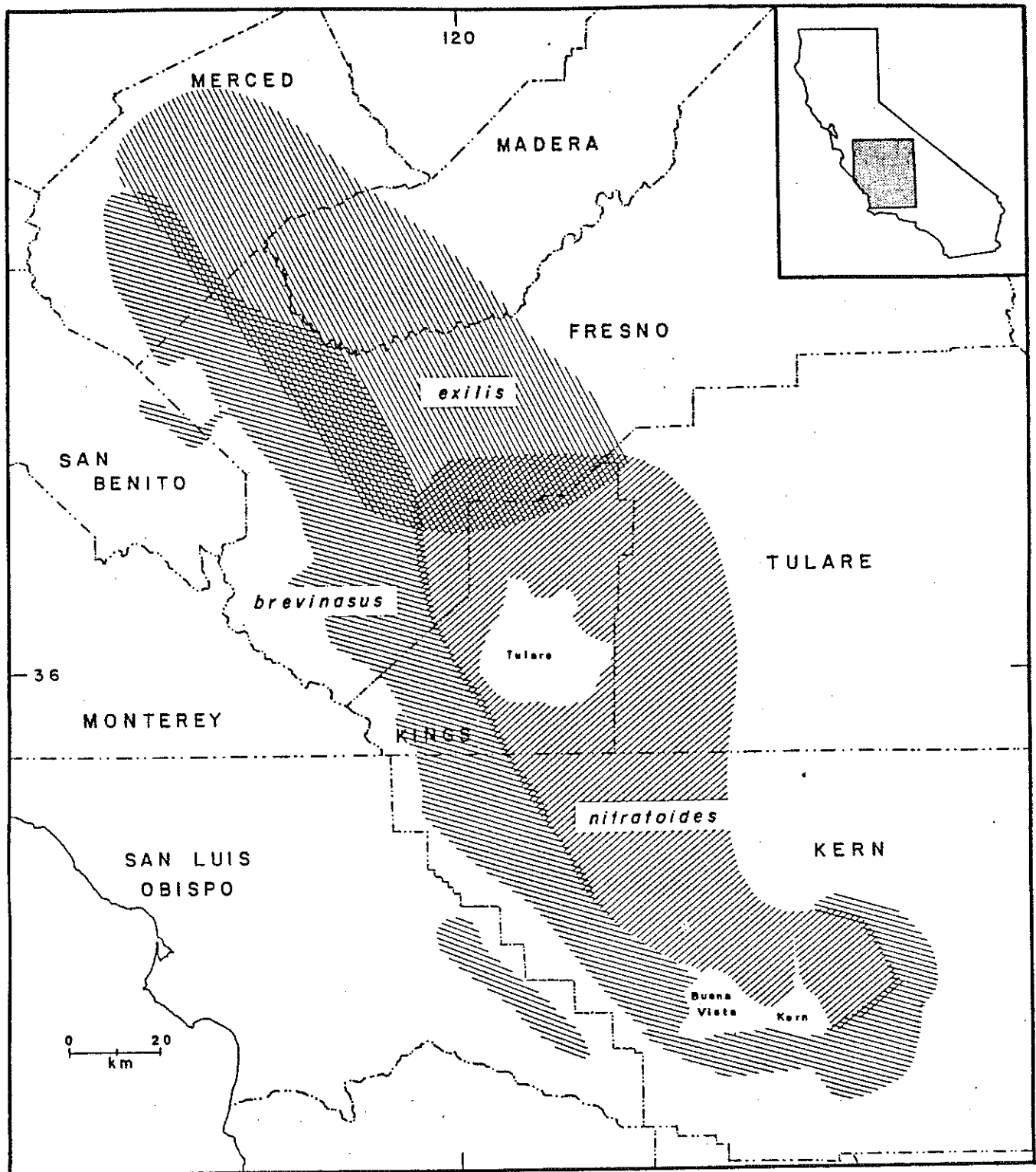


Figure 1.—Historical distribution of the San Joaquin kangaroo rat, *Dipodomys nitratoides*; Fresno kangaroo rat (*D. n. exilis*); Tipton kangaroo rat (*D. n. nitratoides*); short-nosed kangaroo rat (*D. n. brevinasus*). Overlapping distributional areas shown as checkered patterns were mostly areas that flooded seasonally and which supported wetland or woodland communities: habitats that were probably only infrequently occupied by dispersing kangaroo rats (Williams 1985).

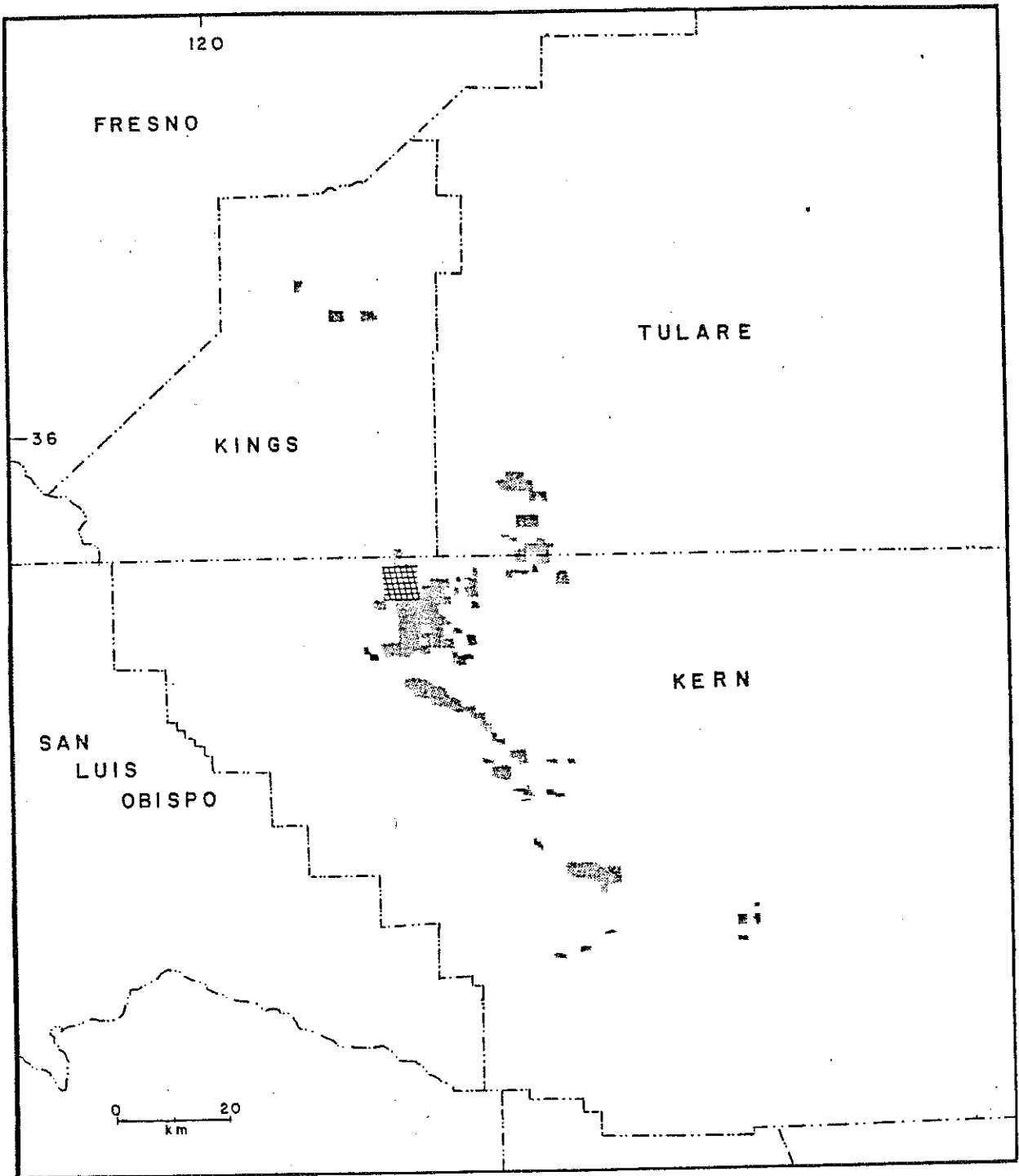


Figure 2.—Approximate distribution of the Tipton kangaroo rat, *Dipodomys nitratoides nitratoides*, based on field surveys conducted in June, 1985. The area marked by a checkered pattern is Kern National Wildlife Refuge, a site where Tipton kangaroo rats were known to occur, but where they may have been recently extirpated by flooding (Williams 1985).

## VI. HISTORIC AND CURRENT ABUNDANCE:

(Provide historic and current population numbers, densities, vigor, sex and age structures and explanation of population fluctuations relative to natural events or threats.)

The total population numbers and densities for Tipton Kangaroo Rats during historic times are not known precisely but can be crudely estimated based on density data derived from current studies and applied to the total known historic range. Since much of the prime habitats that once supported dense populations of Tipton Kangaroo Rats have long since been destroyed, estimates based on densities found in extant habitat may somewhat underestimate the historic figure. We have estimated that approximately 1,716,480 acres constituted the historic range of the species (Williams 1985). A density of about 20 animals per acre would constitute a fairly dense and vigorous population with a healthy age and sex structure at the present time on good habitat. Allowing for some poor to marginal habitat during historic times, a range-wide mean density of 10 animals per acre may be a reasonable estimate. Hence a population of approximately 17,164,800 individuals can be estimated to have existed in historic times prior to the massive destruction of habitats that have necessitated this recommendation to list the Tipton Kangaroo Rat as Endangered in California.

Unfortunately, the current range of the Tipton Kangaroo Rat consists primarily of fair to poor habitat and few if any areas support densities of the animals that approach historic levels. Research by Hafner (1979), Clark et. al. (1982) and Williams (1985) reveal densities ranging from less than one animal per acre up to 20 animals per acre. Densities ranged from a low of about 1 animal per acre in alkaline and terrance grasslands with sparse cover of Suaeda frutescens to a high of about 3.2 animals per acre in Atriplex shrublands. Applying an admittedly optimistic density figure of about 3 animals per acre to the 63,367 acres of extant habitat that existed in 1985 (most certainly the total for the present is lower) a crude population estimate for the present is 190,101 animals or 1.1 percent of the historic level. The astounding fact is that the Tipton Kangaroo Rat may have suffered almost a 99 percent loss of population due to destruction of habitat concurrent with the expansion of agriculture in the Tulare Basin.

## VII. SPECIES DESCRIPTION AND BIOLOGY:

(Include applicable information on species identification, seasonal activity or phenology, reproductive biology, mortality/natality, longevity, growth rate, food habits and use of habitat.)

Although it is the smallest species of kangaroo rat, the Tipton Kangaroo Rat does not differ substantially in coloration or general appearance from other forms. On the average, adult Tipton Kangaroo Rats weigh about 35 to 38 gm., have a head and body length of about 100 to 110 mm and a tail about 125 to 130 mm in length. The Tipton Kangaroo Rat is adapted for bipedal locomotion, having greatly enlarged hind limbs, a long, thickened tail, a short neck and a large head. The head is flattened in a dorsal-ventral plane, has large eyes, and small, rounded ears. The eyes and ears are placed on the upper sides of the head. The eyes are positioned so that potential enemies can be seen

above, behind or to the sides and front. Fur-lined pockets of skin open on each side of the mouth. These cheek pouches are used to hold seeds and other food for transport to caches, located in or near the burrow. The forelimbs are short, with long, stout claws on the fingers of the dexterous front feet. The sides and upper surfaces of the pelage are dark, yellowish-tan (buff) color and the undersides are white. Blackish whisker patches are connected by a dark band of fur across the nose. There are also blackish patches on the upper eyelids. Areas surrounding the eyes and ears are whitish. A white stripe extends across the flank to a whitish ring at the base of the tail and is continuous with the white stripe along the side of the tail. The upper and lower surfaces of the tail are dark colored. The terminal portion of the tail has a crest of long hairs above and below, culminating in a large tuft at the tip (Williams 1985).

Tipton Kangaroo Rats are nocturnal and fossorial small mammals. Burrows of the species are commonly located in slightly elevated mounds, the berms of roads, canal embankments, railroad beds, and the bases of shrubs and fences where wind blown soils accumulate above the level of surrounding terrain.

Many aspects of the biology of the Tipton Kangaroo Rat have not been investigated. However, more extensive information on the biology and ecology of the Fresno Kangaroo Rat D. n. exilis is available from various sources in the literature. It appears that in most respects the habits of the Tipton and Fresno Kangaroo Rat are similar to identical (Williams 1985). The average number of young per litter ranges from 1 to 3 with 2 probably the average litter size. Gestation period is 32 days. The Tipton Kangaroo Rat is primarily a seed-eater although some green vegetation and insects are also consumed. Unlike many species of Dipodomys, D. nitratoides apparently constructs few caches of seeds in the walls of its burrows. This is probably because the burrow walls remain damp year round and such dampness would result in rapid spoilage of stored seed supplies (Williams 1985).

Tipton Kangaroo Rats, like most small mammals, have a relatively short life span in the wild. Disease, predation, and availability of adequate food supplies all have a bearing on the survival of this species. Neither disease nor predation are known to result in significant population declines. However, the high rate of habitat fragmentation and isolation that currently exists could make Tipton Kangaroo Rats inordinately susceptible to being decimated by epidemics and heavy predation in a local area.

Tipton Kangaroo Rats require friable soils in desert and alkaline playa communities, free from flooding, on the floor of the Tulare Basin. Most areas inhabited support a sparse to moderate cover of desert or alkaline sink woody shrubs (Atriplex spp., Allenrolfea, Suaeda). Although they can reinvade formerly cultivated fields, the Tipton Kangaroo Rat cannot exist in continuously cultivated areas. The species may benefit from some light to moderate livestock grazing of its grassland habitats but current heavy levels of grazing may be harmful.

## VIII. HABITAT REQUIREMENTS:

(Describe physical habitat required for all life history stages of species including plant community, soils, microhabitat, slope, aspect, elevation, setting, climate and any other specific requirements.)

Tipton Kangaroo Rats are limited to arid-land communities occupying the valley floor of the Tulare Basin in level or nearly level terrain typically at an elevation of 200 to 300 ft. They occupy alluvial fan and floodplain soils ranging from fine sands to clay-sized particles (because of the high alkalinity of these soils, some of the finer-textured soils tend to be powdery when dry rather than hard-packed). Generally, woody shrubs of one or more species are sparsely scattered over occupied terrain with scant-to-moderate ground cover of grasses and forbs. Woody shrubs commonly associated with Tipton Kangaroo Rats are: Atriplex spinifera, A. polycarpa, A. phyllostegia, A. lentiformis, Allenrolfea occidentalis, Haplopappus acradenius, and Prosopis juliflora. A conspicuous semiwoody species is Suaeda fruticosa (Williams, 1985).

In areas with vernal pools and alkaline playas, Tipton Kangaroo Rats place their burrows in any elevated terrain available, such as where wind-blown soil particles have accumulated around some obstruction or on slight ridges, usually no more than 3 feet above the playa beds. Tipton Kangaroo Rats sometimes colonize areas that are flooded in winter and spring. Favored areas include iodine bush shrublands which are flooded seasonally and where alkaline water lies close to the surface of the soil, year-round. Presumably, these individuals are either drowned or escape to higher ground when the floods return (Williams, 1985).

## IX. CURRENT AND RECOMMENDED MANAGEMENT:

(Explain existing state, federal, local or private management of known populations and available protection mechanisms. Indicate any methods or procedures useful for protecting the physical and biological features of the environment for conservation of the species. Describe activities necessary to insure the survival of the species.)

On 10 July 1987, the U.S. Department of the Interior, Fish and Wildlife Service, published in the Federal Register its proposed rule to add the Tipton Kangaroo Rat to the list of Endangered species. On 24 September 1987, the Department of Fish and Game, commenting on the proposed rule, sent a letter supporting the Service's decision to list the Tipton Kangaroo Rat. In June 1986 the Department published a report on Mammalian Species of Special Concern (Williams 1986) and included the Tipton Kangaroo Rat on the Highest Priority list for species that appear to face a high probability of extinction or extirpation from their entire geographic range in California if current trends continue. In that report Dr. Williams recommended both federal and state Endangered Species designation be sought for the Tipton Kangaroo Rat.

The Environmental Protection Agency is moving to restrict the use of certain pesticides and rodenticides within the range of federal Endangered and Threatened animals and plants in California and elsewhere in the nation.



Although difficult to accomplish, the ban of certain rodenticides within the range of Endangered small mammals such as the Tipton Kangaroo Rat will be critical to the conservation and recovery of these species as well as many other life forms occupying similar range. The Department should play an active role in the effort to accomplish this important task for the preservation of several Endangered and Threatened animals and plants statewide.

Aside from the above issue, the most important need is for preservation of relatively large blocks of habitat on the valley floor in the Tulare Basin where populations of Tipton Kangaroo Rats still exist. Unfortunately, most remaining uncultivated parcels of habitat may be too small to support populations of Tipton Kangaroo Rats indefinitely (Williams, 1985).

There are no existing regulatory mechanisms that provide protection for Tipton Kangaroo Rats. Only scientists, operating under regulations of the California scientific collection permit are under restraint from taking or harming Tipton Kangaroo Rats. Current pesticide-use regulations provide no protection for Tipton Kangaroo Rats nor require that agencies or persons broadcasting treated grain or other rodenticide bait first determine presence of Tipton Kangaroo Rats, or take actions to avoid treating areas where they occur. Nor are such agencies or persons required to confer first with agencies knowledgeable about the distribution of Tipton Kangaroo Rats. For anticoagulant rodenticides, (potentially devastating to Tipton Kangaroo Rats), individuals are under no restrictions as to purchase or use on privately owned land, and are not required to consult with governmental agencies prior to use.

Governmental agencies have a long history of using rodenticides to control California Ground Squirrels (Spermophilus beecheyi), kangaroo rats, and other mammals they regarded as pests or competitors in cultivated fields and range lands. California Ground Squirrels are most numerous in highly disturbed areas, such as heavily grazed land and sites where topsoil has been removed or disturbed and where weedy, herbaceous plants predominate. An uncultivated parcel, surrounded by irrigated fields with roads, canals, and piles of excavated earth, is an ideal site to support a high density of California Ground Squirrels. Such sites are frequently targeted by rodent-control specialists for application of rodenticides such as compound 1080, zinc phosphide, or anticoagulants in more site specific cases and human-inhabited areas. Kangaroo rats are highly susceptible to all of these pesticides. Nearly all small, uncultivated parcels on the eastern side of the historic range of Tipton Kangaroo Rats, adjacent to areas under cultivation, showed no evidence of kangaroo rats. Many showed no evidence of any extant species of small mammal except pocket gophers. Investigations comparing data on prior application of rodenticides and species diversity and abundance in such areas with data from similar areas where no rodent-control measures have been undertaken are needed. Species-specific rodent-control measures, including shooting, trapping, and use of fumigants placed in burrows observed to be inhabited by the target-species offer effective alternatives to poisoned grain bait.

There is no evidence that Tipton Kangaroo Rats cause any economic damage to agriculture or seriously compete with human endeavors; nevertheless, all kangaroo rats are considered agricultural pests by the California Department of Food and Agriculture and other agencies involved in rodent control operations (e.g., see "Study guide for agricultural pest control advisors on

vertebrate pests." Publ. 4049, Division of Agric. Sci., Univ. California, 1976) (Williams 1985).

Present regulatory mechanisms are inadequate to prevent poisoning of Tipton Kangaroo Rats along with target species such as the California Ground Squirrel, especially on private land. Process for prior notification and review of proposals to use rodenticides within the Tulare Basin area by both governmental agencies and individuals are needed. Full consultation with an agency with detailed knowledge of the distribution and habitat of Tipton Kangaroo Rats should be a prerequisite to all rodenticide use on uncultivated lands or adjacent to uncultivated lands within the range of Tipton Kangaroo Rats (Williams 1985).

Information presented thus far documents the precipitous loss of habitat for Tipton Kangaroo Rats, the low quality of remaining habitat, and serious threats to remaining populations from cultivation and other types of development of habitat and from flooding. Habitat fragmentation, disease, predation, and possible use of rodenticides for control of California Ground Squirrels may compound the threats to small, isolated populations. The trends in habitat loss and modification are expected to continue, and the few parcels devoted to maintenance of native species in the Tulare Basin are not secured from flooding or other real or potential catastrophes that could easily extirpate small and relatively immobile species such as Tipton Kangaroo Rats (Williams 1985).

Because most land supporting Tipton Kangaroo Rats is in private or corporate ownership, existing federal and state laws and regulations governing protection of native species and their habitats are difficult to enforce. Native communities, in many cases, can be extensively altered without requiring consultation with state or federal wildlife authorities. Although habitat for species with federal Threatened or Endangered status are protected under the Endangered Species Act, these regulations have been largely ineffective in slowing the loss of native plant communities on the floor of the Tulare Basin (Williams 1985).

The only practical way to secure populations of Tipton Kangaroo Rats and other jeopardized members of desert and wetland communities of the San Joaquin Valley is to acquire private lands that can be managed to support native biota. Unfortunately, the lands adjacent to the largest blocks of state and federal lands supporting Tipton Kangaroo Rats are either cultivated or contain poor habitat for the species. Possibly, however, modifications to provide sites for burrows above flood levels would enhance the habitat for Tipton Kangaroo Rats. Decisions on acquisition of lands for preservation of Tipton Kangaroo Rats should be part of a broader plan to maximize the chances for survival of all of the Endangered and Threatened species of the Tulare Basin lowlands (Williams 1985).

Detailed information is needed on the location and size of vernal pools and other flooded areas during the wet season so refuges above flood levels can be constructed in critical areas where they are now lacking or of limited extent. This is especially important for lands in the Kern River percolation areas, on the Kern Wildlife Refuge and lands to the south and east, between the Refuge and State Highway 46, and on lands north of the Tulare Lake bed that serve as percolation basins for tributaries of the Kings River (e.g. Clark Slough, Mussel Slough).

Tipton Kangaroo Rats face an imminent threat of extinction from loss and modification of habitat and fragmentation and isolation of remaining populations. Neither current regulatory mechanisms nor past conservation measures have been effective in halting or slowing the decline in numbers and lessening the threat of extinction. Furthermore, the trends in development of land and loss of habitat are expected to continue to a point where virtually no private lands will remain uncultivated, perhaps as soon as 1990.

#### X. INFORMATION SOURCES:

(Cite literature, specimen collection records and other pertinent reference materials. Attach documents critical to recommended action. List names, addresses and telephone numbers of persons cited.)

#### References Cited:

Clark, W. A., S. M. Juarez, and D. L. Chesmore. 1982. Nature conservancy small mammal inventory of Paine Wildflower Preserve and the Voice of America in Kern County, California. Unpubl. Rept., The Nature Conservancy, San Francisco, California, 47 pp.

Hafner, M. S. 1979. Density, distribution, and taxonomic status of Dipodomys nitratoides nitratoides Mirriam, 1984 (Rodentia-Heteromyidae). Draft Final Report, California Dept. Fish and Game, Nongame Wildl. Invest., 17 pp.

Williams, D. F. 1980. Distribution and population status of the San Joaquin Antelope Squirrel and Giant Kangaroo Rat. California Dept. Fish and Game, Nongame Wildl. Invest., Draft Final Rep., E-W-4, IV-10-1, 48 pp.

Williams, D. F. 1985. A review of the population status of the Tipton Kangaroo Rat, (Dipodomys nitratoides nitratoides). Final report prepared for the U.S. Fish and Wildlife Service, Sacramento Endangered Species Office. 44 pp. (copy attached)

Williams, D. F. 1986. Mammalian Species of Special Concern in California. California Department of Fish and Game, Nongame Bird and Mammal Section, Final Report. 112 pp. (copy attached)

#### Other References:

Federal Register, Vol. 52, No. 132, Friday, July 10, 1987, Proposed Rules, 50 CFR Part 17, Endangered and Threatened Wildlife and Plants; Proposed Endangered Status for the Tipton Kangaroo Rat. (copy attached)

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