

Fresno Kangaroo Rat
(*Dipodomys nitratoides exilis*)

5-Year Review:
Summary and Evaluation

U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
Sacramento, California

February 2010

5-YEAR REVIEW

Fresno kangaroo rat (*Dipodomys nitratoides exilis*)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

The Fresno kangaroo rat (*Dipodomys nitratoides exilis*) is one of three subspecies of the San Joaquin kangaroo rat (*Dipodomys nitratoides*) (Grinnell 1921). The Fresno kangaroo rat subspecies is limited in distribution to the flat valley floor of the San Joaquin Valley from Merced County to the northern border of Kings County, California and is the smallest of the three subspecies of San Joaquin kangaroo rat (Williams *et al.* 1993). The Fresno kangaroo rat habitat is on elevated grassy patches on alkali plains or in grassy terrain with scattered alkali patches. Both habitat types are characterized by easily dug friable soils in which the Fresno kangaroo rat digs burrow complexes (Culbertson 1946). The primary food source for this kangaroo rat is seeds from native and non-native forbs and grasses. Unlike most rodents including other subspecies of *Dipodomys nitratoides* the Fresno kangaroo rat does not appear to store food (Culbertson 1946).

Methodology Used to Complete This Review:

This review was prepared by a staff biologist within the Sacramento Fish and Wildlife Office of the U.S. Fish and Wildlife Service, following the Region 8 guidance issued in March 2008. We used information from the Recovery Plan for Upland Species of the San Joaquin Valley, California (Recovery Plan) (USFWS 1998), survey information from experts who have been monitoring various localities of this species, and the California Natural Diversity Database (CNDDDB) maintained by the California Department of Fish and Game (CNDDDB 2009). The Recovery Plan and personal communications with experts were our primary sources of

information used to update the species' status and threats. We received no information from the public in response to our Federal Notice initiating this 5-year review. This 5-year review contains updated information on the species' biology and threats, and an assessment of that information compared to that known at the time of listing. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes all this information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

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Federal Register (FR) Notice Citation Announcing Initiation of This Review: A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on March 22, 2006 [Federal Register 71 FR 14538-14542]. No comments were received.

Listing History:

Original Listing

FR Notice: 50 FR 4222

Date of Final Listing Rule: January 30, 1985

Entity Listed: Subspecies: Fresno kangaroo rat (*Dipodomys nitratoides exilis*)

Classification: Endangered

State Listing

Fresno kangaroo rat (*Dipodomys nitratoides exilis*) was listed by the State of California as a rare species on June 27, 1971 and reclassified as endangered on October 2, 1980.

Associated Rulemakings: Critical habitat for the Fresno kangaroo rat was designated in the Federal Register 50 FR 4222-4226.

Review History: No previous status reviews have been conducted for this species.

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for the Fresno kangaroo rat is 3C according to the Service's 2009 Recovery Data Call for the Sacramento Field Office, based on a 1-18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 FR 43098, September 21, 1983). This number indicates that the taxon is a subspecies that faces high degree of threat and has a high potential for recovery. The "C"

indicates conflict with construction or other development projects or other forms of economic activity.

Recovery Plan or Outline

Name of Plan or Outline: Recovery Plan for Upland Species of the San Joaquin Valley

Date Issued: September 1998

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy

The Endangered Species Act defines “species” as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate fish or wildlife. This definition of species under the Act limits listing as distinct population segments to species of vertebrate fish or wildlife. The 1996 Policy Regarding the Recognition of Distinct Vertebrate Population Segments under the Endangered Species Act (61 FR 4722, February 7, 1996) clarifies the interpretation of the phrase “distinct population segment” for the purposes of listing, delisting, and reclassifying species under the Act.

There is no new information regarding the application of the DPS policy to the Fresno kangaroo rat.

Information on the Species and its Status

Species Biology and Life History

Spatial Distribution: The estimated historic distribution of the Fresno kangaroo rat (kangaroo rat) included the alkali-sink scrub and arid alkali grasslands of the San Joaquin Valley Floor between the San Joaquin River to the north, the Fresno Slough to the west, the Kings River to the South and the towns of Fresno and Selma to the east (Hoffman 1974). This area encompassed an estimated 250,000 acres of potential habitat. By the time of the listing rule, published in 1985 only 6,417 acres of suitable habitat remained (USFWS 1985). This is less than 3 percent of the original suitable habitat estimate. Field studies in 1981-1982 found only 857 acres of habitat occupied by the kangaroo rat (Hoffman and Chesemore 1982).

In the Recovery Plan (USFWS 1998) the historical range of the Fresno kangaroo rats was expanded to include historical alkali-sink scrublands and grasslands found in Madera and Merced Counties, north of the San Joaquin River, but south of the Merced River. The expansion of historical range to encompass lands north of the San Joaquin River occurred after the discovery of a small population of Fresno kangaroo rats on the West Grasslands, southeast of Los Banos in Merced County (Johnson and Clifton 1992). The addition of these lands increased the estimated historic range to approximately 888,000 acres (Williams 1987) but not all of this 888,000 would have contained suitable habitat for Fresno kangaroo rats. The Recovery Plan did not estimate the total amount of remaining suitable habitat. However, Williams (1990) identified

the largest remaining portion of natural lands in the expanded historic Fresno kangaroo rat range. This 30,000 acre section in western Madera County is in private ownership and has not been comprehensively surveyed for suitable Fresno kangaroo rat habitat or for occupancy by Fresno kangaroo rats. However, the Endangered Species Recovery Program surveyed two parcels totaling 3,000 acres (10 percent of the 30,000 acre portion). The surveyed parcels contained suitable habitat but no Fresno kangaroo rats were found (Williams 1990). It is highly likely that the remaining 90 percent of the parcel also contains suitable habitat for Fresno kangaroo rats.

Greater than 90 percent (808,850 acres out of 888,000 acres) had been converted to urban or irrigated agricultural by 1984 (S. Phillips, Endangered Species Recovery Program, *in litt.* 2008). Additionally, not all of the remaining 79,651 acres remaining in natural habitat would be suitable habitat for the Fresno kangaroo rat and with the exception of a few large parcels in western Madera and Merced Counties, these natural habitat patches are fragmented and separated by large expanses of habitat unsuitable for Fresno kangaroo rat (P. Kelly, Endangered Species Recovery Program, *in litt.* 2008). As of December 2009, there has been no assessment of how much of the 79,650 acres remaining within the historical range of the Fresno kangaroo rat contain suitable habitat.

There is uncertainty regarding the subspecies status of the population of San Joaquin kangaroo rats at the Lemoore Naval Air Station (J. Patton, University of Berkeley, *in litt.* 2010) which is located just south of the Kings River, the historic southern boundary for the Fresno kangaroo rat. This population could be Tipton kangaroo rats (*Dipodomys nitratooides nitratooides*), Fresno kangaroo rats, or some intergrade between the two subspecies (P. Kelly, Endangered Species Recovery Program, pers. comm. 2010). The population of San Joaquin kangaroo rats at Lemoore Naval Air Station is discussed in the Tipton kangaroo rat 5-year review.

Abundance: At the time of listing in 1985, there were two confirmed populations of Fresno kangaroo rats both of them on the Alkali Sink Ecological Preserve in Fresno County. An intensive trapping effort in 1982 of 4,808 trap-nights identified seven individuals at these two sites (Hoffman and Chesemore 1982). A trap-night equals one trap set for one night. Prior to Hoffman and Chesemore (1982), four studies documented population abundance for Fresno kangaroo rats. The information from these studies is summarized in Table 1.

By the time of publication of the Recovery Plan, there were no known populations of Fresno kangaroo rats. In 1985, Hoffman reported trapping Fresno kangaroo rats at the Alkali Sink Ecological Reserve and on adjacent public lands (Hoffman 1985). In 1992, only one male Fresno kangaroo rat was trapped at the Alkali Sink Ecological Reserve and no Fresno kangaroo rats were captured during 1993, 1994, and 1995 (USFWS 1998). Between 1988 and 1996, biologists surveyed the Kerman Ecological Reserve and five other isolated parcels of suitable habitat in Fresno County but failed to locate evidence of Fresno kangaroo rats (USFWS 1998).

In Merced and Madera County, biologists trapped selected suitable sites between the years 1988 and 1995 but failed to locate Fresno kangaroo rats (Chesemore and Rhodehamel 1992; Williams and Kilburn 1992). However, these surveys and trapping sessions were not comprehensive. Not all suitable habitat in Madera, Merced and Fresno Counties was surveyed or trapped between 1988 and the publication of the Recovery Plan (USFWS 1998). Additionally, a population of

San Joaquin kangaroo rats discovered on the South Grasslands Water District in Merced County contained structural characteristics intermediate between the Fresno kangaroo rat and the subspecies, short-nosed kangaroo rat (*Dipodomys nitratooides brevinasus*) (Johnson and Clifton 1992). Future research such as genetic analysis may clarify the classification of this population.

Table 1. Results from Fresno kangaroo rat trapping studies from 1974 to 2009, showing study area location, year of trapping, number of individual Fresno kangaroo rats captured, number of trap-nights, the percentage of captures of Fresno kangaroo rat per trap-night and the reference for each study.

Location	Year	# Trapped	# of Trap-nights	Percent of captures per trap-night	Estimated density Fresno kangaroo rats	Reference
Henderson Avenue, north of Raisin City in Fresno County (population extirpated, location plowed and currently in agricultural production)	1974	112	1800	6.22 percent	6.8 to 10.1 per acre	Hoffman 1974
Three parcels along California Highway 180 (Whitebridge Road) between James Avenue and the Fresno Slough in Fresno County. Two parcels now are the Kerman Ecological Reserve and one is in agriculture	1975	17	987	1.72 percent	not estimated	Knapp 1975
Alkali Sink Ecological Preserve	1975	25	548	4.56 percent	not estimated	Knapp 1975
Alkali Sink Ecological Preserve	1976	unknown	unknown	unknown	2.4 to 6.0 per acre	Koos 1977
Alkali Sink Ecological Preserve	1977	18	1408	1.28 percent	2.0 to 2.5 per acre	Koos 1977
Alkali Sink Ecological Preserve	1982	7	4808	0.14 percent	not estimated	Hoffman and Chesemore 1982
Alkali Sink Ecological Reserve	1985	present / unknown #	unknown	unknown	unknown	Hoffman 1985
Alkali Sink Ecological Reserve	1992	1	unknown	unknown	unknown	K. Thomlinson <i>in litt.</i> 2009
Kerman Ecological Reserve	1988-1996	0	unknown	unknown	unknown	USFWS 1998
Alkali Sink Ecological Reserve	1993, 1994, 1995	0	unknown	unknown	unknown	K. Thomlinson <i>in litt.</i> 2009
Alkali Sink Ecological Reserve	2008, 2009	0	unknown	unknown	unknown	K. Thomlinson <i>in litt.</i> 2009
James Slough southeast of Mendota Wildlife Refuge near Town of San Joaquin	2008	0	425	unknown	unknown	Halstaed and Associates, unpubl. data 2008

Since the publication of the Recovery Plan in 1998, no populations of Fresno kangaroo rat have been found. As mentioned above, the last capture of a Fresno kangaroo rat was at the Alkali Sink Ecological Reserve in 1992. Subsequent surveys by California Department of Fish and Game biologists at the Alkali Sink Ecological Reserve and the Kerman Ecological Reserve in 1993, 1994, and 1995 found no Fresno kangaroo rats (K. Thomlinson, California Department of Fish and Game, *in litt.* 2009). In 2004, the biologists at the Endangered Species Recovery Program conducted a scent dog survey at the Alkali Sink Ecological Preserve that was followed up with trapping in areas where the scent dog displayed positive ‘hits’ but no Fresno kangaroo rats were found. In 2008 and 2009, California Department of Fish and Game biologists again surveyed at the Alkali Sink Ecological Preserve but there were no detections of Fresno kangaroo rats (Tomlinson, *in. litt.* 2009). The ultimate cause for the potential extirpation of these two populations is unknown.

In 2008, Halstead and Associates surveyed for Fresno kangaroo rats southeast of the Mendota Wildlife Refuge and near the town of San Joaquin in Fresno County on a parcel of grazed land belonging to the James Irrigation District. This was a parcel identified in the 1970s as containing burrows of an appropriate size and configuration for Fresno kangaroo rats (CNDDDB 2009). Although the trapping team captured 86 Heerman’s kangaroo rats (*Diplodomys heermanni*) no Fresno kangaroo rats were captured during 425 trap-nights (Halstead and Associates, unpubl. data 2008).

The absence of Fresno kangaroo rats during these surveys is of great concern. It is probable that the populations on the preserved lands at the Alkali Sink Ecological Preserve and the Kerman Ecological Preserve have been extirpated. Despite the setbacks for the populations of Fresno kangaroo rat at the Alkali Sink Ecological Reserve and the Kerman Ecological Reserve, there are several locations that may contain persisting populations. The large tracks of natural land such as the Madera Ranch in Madera County and the South Grasslands Waterfowl Area in Merced County have not been adequately surveyed. Additionally, the endangered Tipton kangaroo rat (*Dipodomys nitratooides nitratooides*), another subspecies of the San Joaquin kangaroo rat, is known to persist on small parcels of appropriate habitat such as along canal road right of ways, and to maintain healthy populations of over 100 individuals in parcels as small as 20 acres (D. Germano, California State University Bakersfield, pers. comm. 2010). Small pockets of isolated fragmented habitat in private ownership are scattered throughout the range of the Fresno kangaroo rat. It is critical that a comprehensive survey of these habitat parcels be undertaken to determine occupancy by Fresno kangaroo rats (Germano, pers. comm. 2010; L. Saslaw, Bakersfield Office of the Bureau of Land Management, pers. comm. 2010). Measures will need to be quickly taken to protect any remaining populations of Fresno kangaroo rats persisting on these habitat islands to prevent their extirpation due to habitat conversion, disease, or random events.

Changes in Taxonomic Classification or Nomenclature There have been no changes in taxonomic classification or nomenclature since the taxon was listed.

Genetics In 1994, the Bureau of Reclamation funded a population genetics study of the three subspecies of the San Joaquin kangaroo rat, which includes the Fresno kangaroo rat (Patton, unpubl. data 1994). This work is in final draft and expected to be submitted for publication soon (Kelly, pers. comm. 2010).

Species-specific Research or Grant-supported Activities There have been no species specific research or grant supported activities for Fresno kangaroo rat since the publication of the Recovery Plan.

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

When the Fresno kangaroo rat was listed in 1985, we identified conversion of native habitat for crop production as the major threat to the Fresno kangaroo rat. Modification of habitat caused by grazing as reported by Warner (1976) and Koos, (1979) was also identified in the listing rule (50 FR 4222) as a factor adversely affecting the Fresno kangaroo rat. As stated in the Recovery Plan (USFWS 1998), by 1974 Fresno kangaroo rat habitat in Fresno County was reduced to 14,629 acres (loss of greater than 80 percent) by land conversion to agriculture, urbanization and transportation infrastructures. Habitat conversion continues to be a threat to the Fresno kangaroo rat (P. Kelly, unpubl. data 2010). Grazing is discussed under Factor E: Other Natural or Manmade Factors Affecting Its Continued Existence.

Destruction, modification and fragmentation of potential Fresno kangaroo rat has continued since the publication of the Recovery Plan. An unknown number of acres of appropriate habitat for Fresno kangaroo rats have been converted to agriculture. In 2003, California Transportation (Caltrans) began widening Highway 180 between Fresno and Mendota in Fresno County (Biological Opinion File Number 1-1-03-F-0096). The project destroyed approximately 0.6 acre of alkali sink habitat suitable for Fresno kangaroo rats (USFWS 2003). In 2008, a water bank was proposed for approximately 13,000 acres of natural lands in the area known as Madera Ranch, Madera County (Service files). The project site contains alkali sink habitat and grasslands suitable for Fresno kangaroo rat. In October 2008, the US Fish and Wildlife Service requested that the project proponents survey for Fresno kangaroo rats. As of December 2009 comprehensive surveys have not occurred. If this project proceeds, the 13,000 acres of natural habitat will be periodically flooded; this would make the habitat unsuitable for Fresno kangaroo rats. In 2009, James Irrigation District proposed a water banking project on natural lands south of the Mendota Wildlife Refuge near the town of San Joaquin in Fresno County (Service files). This project has the potential to eliminate 250 acres of potential Fresno kangaroo rat habitat.

Some progress has been made to protect habitat suitable for Fresno kangaroo rats. In 1985, the California Department of Fish and Game established 732 acres as the Alkali Sink Ecological Reserve in western Fresno County. Subsequently, this Reserve was expanded to 945 acres. However, only approximately 400 acres are suitable for Fresno kangaroo rats (Chesemore and Rhodehamel 1992). The Kerman Ecological Reserve in west central Fresno County protects 1,788 acres of habitat historically occupied by Fresno kangaroo rats. In 2009, the approximately 943 acre Alkali Sink Conservation Bank (Conservation Bank) was proposed for San Joaquin kit fox and vernal pool species. This proposed Conservation Bank is located on the northeast corner

of West Whitebridge Avenue and North San Mateo Avenue in Fresno County and is less than one mile to the northwest of the Alkali Sink Ecological Preserve. Although examination of aerial photos suggest that approximately 30 percent (283 acres) of the proposed Conservation Bank is alkali sink habitat with the majority of the remaining habitat non-native grasslands. Alkali sink habitat is ideal habitat for Fresno kangaroo rats but the entire parcel is potentially suitable for Fresno kangaroo rats. This area has yet to be surveyed for kangaroo rats (Service files).

In summary, the loss and modification of habitat continues to be the primary threat to the Fresno kangaroo rat. Even in areas where habitat is protected, the development for agriculture, or industry of surrounding lands results in the fragmentation of protected habitats, likely preventing dispersal of existing populations of Fresno kangaroo rat within and between populations. Acquisition of land and conservation easements has resulted in the preservation of an estimated 2,471 acres of Fresno kangaroo rat habitat in three parcels all in Fresno County all bordering Whitebridge Avenue (Highway 180). However, it is unknown if any of this habitat is occupied and there is evidence to suggest that historical populations on two of the parcels have been extirpated. Despite the recent proposal to protect a portion of historical alkali sink and grassland habitat as part of the Alkali Sink Conservation Bank, the trend of habitat loss and modification continues.

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization for commercial purposes was not known to be a factor in the 1985 final listing rule (50 FR 4222). Overutilization for any purpose does not appear to be a threat at this time.

FACTOR C: Disease or Predation

The 1985 listing rule did not identify disease or predation specifically as a factor contributing to the endangered status of the Fresno kangaroo rat (50 FR 4222). However, both the listing rule and recovery plan mention that disease and predation are a general threat to small isolated populations of Fresno kangaroo rats. It is unknown if disease or predation is a factor at this time because there is no known population of Fresno kangaroo rats.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At the time of listing, regulatory mechanisms thought to have some potential to protect the Fresno kangaroo rat included: the listing of the Fresno kangaroo rat as endangered by the California Fish and Game Commission.

Currently, there are several State and Federal laws and regulations that are pertinent to federally listed species, each of which may contribute in varying degrees to the conservation of federally listed and non-listed species. These laws, most of which have been enacted in the past 30 to 40 years, have greatly reduced or eliminated the threat of wholesale habitat destruction.

The State's authority to conserve rare wildlife is comprised of three major pieces of legislation: the California Endangered Species Act, the California Environmental Quality Act and the Natural Community Conservation Planning Act.

California Endangered Species Act (CESA): The CESA (California Fish and Game Code, section 2080 *et seq.*) prohibits the unauthorized take of State-listed threatened or endangered species. The CESA requires State agencies to consult with the California Department of Fish and Game on activities that may affect a State-listed species and mitigate for any adverse impacts to the species or its habitat. Pursuant to CESA, it is unlawful to import or export, take, possess, purchase, or sell any species or part or product of any species listed as endangered or threatened. The State may authorize permits for scientific, educational, or management purposes, and to allow take that is incidental to otherwise lawful activities.

California Environmental Quality Act (CEQA): The CEQA requires review of any project that is undertaken, funded, or permitted by the State or a local governmental agency. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

Natural Community Conservation Planning Act: The Natural Community Conservation Program is a cooperative effort to protect regional habitats and species. The program helps identify and provide for area-wide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity. Many Natural Community Conservation Plans (NCCPs) are developed in conjunction with Habitat Conservation Plans (HCPs) prepared pursuant to the Federal Endangered Species Act.

Federal authority to conserve rare species that are applicable to the Fresno kangaroo rat include the National Environmental Policy Act, the Sikes Act, the Clean Water Act, and the Endangered Species Act.

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq.*) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigation alternatives that would offset those effects (40 C.F.R. 1502.16). These mitigations usually provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

Sikes Act: The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans with the Secretaries of Agriculture and the Interior for natural resources on public lands. The Sikes Act Improvement Act of 1997 requires Department of Defense installations to prepare Integrated Natural Resource Management Plans (INRMPs) that provide for the conservation and rehabilitation of natural resources on military lands consistent with the

use of military installations to ensure the readiness of the Armed Forces. INRMPs incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military land uses. While INRMPs are not technically regulatory mechanisms because their implementation is subject to funding availability, they can be an added conservation tool in promoting the recovery of endangered and threatened species on military lands.

As stated above, the taxonomic status of the San Joaquin kangaroo rat at Lemoore Naval Air Station is uncertain. These kangaroo rats may be the subspecies *Dipodomys nitratooides exilis*, Fresno kangaroo rat or *Dipodomys nitratooides nitratooides*, Tipton kangaroo rat. However, both of these species are federally listed as endangered and therefore benefit from the authorities of the Sikes Act.

Clean Water Act: Under section 404, the U.S. Army Corps of Engineers (Corps or USACE) regulates the discharge of fill material into waters of the United States, which include navigable and isolated waters, headwaters, and adjacent wetlands (33 U.S.C. 1344). In general, the term “wetland” refers to areas meeting the Corps’s criteria of hydric soils, hydrology (either sufficient annual flooding or water on the soil surface), and hydrophytic vegetation (plants specifically adapted for growing in wetlands). Any action with the potential to impact waters of the United States must be reviewed under the Clean Water Act, National Environmental Policy Act, and Endangered Species Act. These reviews require consideration of impacts to listed species and their habitats, and recommendations for mitigation of significant impacts.

Although the Fresno kangaroo rat is an upland species typically found in landscapes with limited jurisdictional waters under the Clean Water Act, the Corps has frequently assumed the role of the Federal nexus for both large and small projects in their entirety, even though these projects may only impact a minor amount of jurisdictional water. This approach by the Corps has facilitated numerous consultations under section 7 of the Act that would have otherwise likely required a section 10 permit.

Historically, the Corps interpreted “the waters of the United States” expansively to include not only traditional navigable waters and wetlands, but also other defined waters that are adjacent or hydrologically connected to traditional navigable waters. However, recent Supreme Court rulings have called into question this definition. On June 19, 2006, the U.S. Supreme Court vacated two district court judgments that upheld this interpretation as it applied to two cases involving “isolated” wetlands. Currently, Corps regulatory oversight of such wetlands (e.g., vernal pools) is in doubt because of their “isolated” nature. In response to the Supreme Court decision, the Corps and the U.S. Environmental Protection Agency (USEPA) have recently released a memorandum providing guidelines for determining jurisdiction under the Clean Water Act. The guidelines provide for a case-by-case determination of a “significant nexus” standard that may protect some, but not all, isolated wetland habitat (USEPA and USACE 2007). The overall effect of the new permit guidelines on loss of isolated wetlands, such as vernal pool habitat, is not known at this time.

Endangered Species Act of 1973, as amended (Act): The Act is the primary Federal law providing protection for this species. The Service’s responsibilities include administering the

Act, including sections 7, 9, and 10 that address take. Since listing, the Service has analyzed the potential effects of Federal projects under section 7(a)(2), which requires Federal agencies to consult with the Service prior to authorizing, funding, or carrying out activities that may affect listed species. A jeopardy determination is made for a project that is reasonably expected, either directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing its reproduction, numbers, or distribution (50 CFR 402.02). A non-jeopardy opinion may include reasonable and prudent measures that minimize the amount or extent of incidental take of listed species associated with a project.

Section 9 prohibits the taking of any federally listed endangered or threatened species. Section 3(18) defines “take” to mean “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Service regulations (50 CFR 17.3) define “harm” to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The Act provides for civil and criminal penalties for the unlawful taking of listed species. Incidental take refers to taking of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity by a Federal agency or applicant (50 CFR 402.02). For projects without a Federal nexus that would likely result in incidental take of listed species, the Service may issue incidental take permits to non-Federal applicants pursuant to section 10(a)(1)(B). To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved Habitat Conservation Plan (HCP) that details measures to minimize and mitigate the project’s adverse impacts to listed species. Regional HCPs in some areas now provide an additional layer of regulatory protection for covered species, and many of these HCPs are coordinated with California’s related Natural Community Conservation Planning program.

In summary, the Endangered Species Act is the primary Federal law that provides protection for this species since its listing as endangered in 1985. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Endangered Species Act.

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

In the listing rule, drought (Hoffman and Chesemore 1982), competition with Heerman’s kangaroo rats (*Dipodomys heermanni*) and grazing (part of Factor A in listing rule) were identified as factors affecting the continued existence of Fresno kangaroo rats. The Recovery Plan identified flooding, and elimination of grazing as threats to the Fresno kangaroo rats (USFWS 1998). Additionally, the Recovery Plan citing Williams and Germano (1993) considered the illegal use of rodenticides, and competition with Heerman’s kangaroo rats (*Dipodomys heermanni*) to be potential threats to the Fresno kangaroo rats. Other factors that

may be adversely affecting Fresno kangaroo rats include climate change, and the resulting changes in vegetation, and water regime (Kelly, pers. comm. 2010).

Currently, flooding, illegal rodenticide use, competition with Heerman's kangaroo rats and climate change are threats to Fresno kangaroo rats. The effects of grazing on Fresno kangaroo rat are complex with both overgrazing and elimination of grazing having detrimental effects on Fresno kangaroo rats (D. Germano, pers. comm. 2010). The effects of drought are considered within the context of climate change.

Both of the parcels of land protected for the Fresno kangaroo rat are within proximity of the San Joaquin River (USFWS 1998). In 1986 a levee break on the south side of the San Joaquin River and the subsequent flooding of the Alkali Sink Preserve may have caused or contributed to the potential extirpation of the Fresno kangaroo rat from this location. Although flooding of these preserves caused by natural factors or failure of man-made levees are rare events they could be catastrophic to Fresno kangaroo rats.

The U.S. Fish and Wildlife Service has identified the following vertebrate control agents as detrimental to the existence of kangaroo rats: aluminum phosphide, magnesium phosphide, chlorophacinone, potassium nitrate, sodium nitrate, and zinc phosphide (USFWS 1993). However, limited reporting is required for rodenticide use. This and the lack of information regarding locations of existing populations of Fresno kangaroo rats combine to make this threat impossible to measure.

Three populations of San Joaquin kangaroo rats (two Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) populations and one short-nosed kangaroo rat population (*Dipodomys nitratoides brevinasus*)) have persisted in the San Joaquin Valley without human interference despite drought, fire and other adverse factors. All three of these populations are in areas without Heerman's kangaroo rats. Tennant and Germano (unpubl. data 2010) are conducting a controlled study to assess the effects of excluding Heerman's kangaroo rats from areas occupied by Tipton kangaroo rats, at the Allensworth Ecological Reserve in Tulare County. Results of this study will provide additional information on the extent of the threat posed by the Heerman's kangaroo rat on Fresno kangaroo rats. The study is ongoing.

Climate change models predict for California an overall warming of 1.7°C – 5.8°C (3.0°F – 10.4°F) by 2100 (Cayan *et al.* 2006), but they vary in their predictions for precipitation. VanRheenen *et al.* (2004) predict a decrease in precipitation in the southern San Joaquin Valley. Climate change will likely result in changes in the vegetative communities of Fresno kangaroo rat habitat and potentially increase exotic species. However, there is insufficient data available at this time to predict the effects of climate change on the Fresno kangaroo rat.

Although earlier studies identified grazing as a threat to Fresno kangaroo rats (Warner 1976; Koos 1977) recent work with giant kangaroo rats (*Dipodomys ingens*) suggests that both overgrazing and complete lack of grazing are detrimental for populations of kangaroo rats (Germano *et al.* 2005). Germano *et al.* (2005) determined that areas in which grazing is eliminated develop a heavy thatch of nonnative grasses that impedes the activities of the kangaroo rats and competitively excludes the native forbs that are the preferred food source for the kangaroo rats. Grazing that occurred at the Alkali Sink

Ecological Reserve and the Kerman Ecological Reserve was suspended once these lands were purchased by the California Department of Fish and Game (USFWS 1998). This action resulted in the development of a heavy thatch of nonnative grasses. It was after the suspension of grazing that population numbers of Fresno kangaroo rats began to decline (Table 1). As recently as 2008, heavy thatch buildup was observed at the Kerman Ecological Reserve (Service files). California Fish and Game is currently working on a contract to begin grazing in the Kerman Ecological Reserve. They are also contracting with California Department of Forestry and Fire Protection to conduct a prescription burn in the Alkali Sink Ecological Reserve. Both of these measures are intended to reduce vegetation cover and thatch buildup and thereby benefit San Joaquin kit fox and Fresno kangaroo rat (C. Bailey, California Department of Fish and Game, pers comm. 2010).

III. RECOVERY CRITERIA

Recovery plans provide guidance to the Service, States, and other partners and interested parties on ways to minimize threats to listed species, and on criteria that may be used to determine when recovery goals are achieved. There are many paths to accomplishing the recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, we may determine that, over all, the threats have been minimized sufficiently, and the species is robust enough, to downlist or delist. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on progress that has been made toward recovery since the species was listed (or since the most recent 5-year review) by eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated.

Downlisting Criteria

Reclassification to threatened status will be evaluated when the species is protected in specified recovery areas from incompatible uses, management plans have been approved and implemented for recovery areas that include survival of the species as an objective, and population monitoring indicates that the species is stable. Downlisting criteria include:

- 1) Establishment of one hundred percent of occupied habitat on public or conservation lands at three or more distinct sites, with each no less than about 950 acres of usable habitat. Addresses Listing Factor A: *The present or threatened destruction, modification, or curtailment of its habitat or range.*
- 2) Management plans approved and implemented for all inhabited areas identified as important to continued survival. Addresses Listing Factor D: *The inadequacy of existing regulatory mechanisms.*
- 3) Population densities in three or more populations do not fall below two kangaroo rats per hectare (one per acre) and have a mean density of ten or more per hectare (4 per acre) during

one precipitation cycle. Addresses Listing Factor E: *Other natural or manmade factors affecting its continued existence.*

These criteria are up to date and relevant as benchmarks for recovery, but they are moot if populations of Fresno kangaroo rats have been extirpated. If an extant population is discovered, the managing state and federal agencies utilizing scientific expertise, such as is found in the Endangered Species Recovery Program, will need to determine the best methods to manage the population to ensure progress towards achieving the recovery criteria (P. Kelly, pers. comm. 2010).

- 1) Establishment of one hundred percent of occupied habitat on public or conservation lands at three or more distinct sites, with each no less than about 950 acres of usable habitat.

This criterion has not been met. No known occupied sites have been identified since 1992. As mentioned in the Recovery Plan, suitable habitat has been protected at two sites, both located in western Fresno County. The Alkali Sink Ecological Reserve, administered by the California Department of Fish and Game totals 945 acres but suitable habitat in this area totals approximately 400 acres (Chesemore and Rhodehamel 1992). The second site Kerman Ecological Reserve totals 1,778 acres. It is unknown what amount of Kerman Ecological Reserve is suitable habitat for Fresno kangaroo rats.

The Recovery Plan indicates that protecting the large area of habitat between the Alkali Sink Ecological Reserve and the San Joaquin River would be highly beneficial to the Fresno kangaroo rat (Williams 1990). The protection of approximately 280 additional acres in this area identified by the Recovery Plan is in process as part of the proposed Alkali Sink Conservation Bank. However, it is unknown if the proposed Conservation Bank is occupied by Fresno kangaroo rats. Currently, the largest area of historically suitable habitat is located in several connecting parcels in western Madera County (P. Kelly unpubl. data 2010). This area consists of about 30,000 acres in adjacent parcels.

- 2) Management plans approved and implemented for all inhabited areas identified as important to continued survival.

This criterion has not been met. As with criterion number one, there is no known occupied habitat. In 1984, the California Department of Fish and Game drafted management plans for the Alkali Sink Ecological Reserve and the Kerman Ecological Reserve (CDFG unpubl. data 1984). These plans included goals to protect native alkali sink communities and listed species therein. These management plans included measures to control grazing, restrict hunting, and collecting, and maintain native species. No development is planned. The proposed Alkali Sink Conservation Bank has developed a draft management plan that protects the native alkali sink habitat and the listed species therein. However, as with the properties protected by the California Department of Fish and Game, there are no known populations of Fresno kangaroo rat on the property.

- 3) Population densities in three or more populations do not fall below two kangaroo rats per hectare (one per acre) and have a mean density of ten or more per hectare (4 per acre) during one precipitation cycle

This criterion has not been met. The last known Fresno kangaroo rat was captured during trapping at Alkali Sink Ecological Reserve in 1992.

Delisting Criteria

Delisting criteria will be considered when in addition to the criteria for downlisting all of the following conditions have been met:

1. One additional site with about 2,500 acres or more of occupied habitat, and
2. With a total of no less than 5350 acres of occupied habitat.

Both of these criteria address listing factor A.

Due to the lack of protection of sufficient habitat in specified recovery areas, the downlisting criteria for the Fresno kangaroo rat have not been met. Therefore, the delisting criteria for the Fresno kangaroo rat have also not been met.

IV. SYNTHESIS

Since 1974 over 80 percent of the suitable habitat for Fresno kangaroo rats has been lost to agriculture and development. The Fresno kangaroo rat continues to be threatened by degradation to its habitat from the on-going modification and conversion of existing habitat to agriculture, water banking projects, and development. The Fresno kangaroo rat is also threatened by factors such as the buildup of vegetation and thatch on preserved lands. However, planned measures such as controlled grazing at Kerman Ecological Reserve and prescribed fire at Alkali Sink Reserve will reduce this threat on these protected lands.

Some progress has been made toward the downlisting criteria with the preservation of 2188 acres of Fresno kangaroo rat habitat (400 acres at the Alkali Sink Ecological Reserve and 1,788 acres at the Kerman Ecological Reserve) and the potential for preservation of between 220 and 943 acres of suitable habitat at the proposed Alkali Sinks Conservation Bank. This progress however is moot if populations of the Fresno kangaroo rat cannot be found. Unsurveyed habitat exists in the heart of the range of the Fresno kangaroo rat in western Madera, eastern Merced and in Fresno County. It is critical that a substantial effort be undertaken to survey these remaining parcels of habitat before they are converted to developed conditions. Until such time as these surveys are undertaken the status of the Fresno kangaroo rat remains unknown. Therefore, the Fresno kangaroo rat still meets the definition of endangered, and no status change is recommended at this time.

V. RESULTS

Recommended Listing Action:

- Downlist to Threatened
- Uplist to Endangered
- Delist (indicate reason for delisting according to 50 CFR 424.11):
 - Extinction*
 - Recovery*
 - Original data for classification in error*
- No Change**

New Recovery Priority Number and Brief Rationale: 6C.

Due to absence of known populations, there is now a low potential for recovery while the threat of extinction remains high. Therefore, the recovery priority number should be changed from 3C (high probability of recovery) to 6C: a subspecies with high degree of threat and low potential for recovery.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

The highest priority recovery actions are as follows:

1. Comprehensively survey and trap all remaining habitat within the range of the Fresno kangaroo rat and locate any remaining populations or population remnants (Germano, pers. comm. 2010; Saslaw pers. comm. 2010).
2. Protect additional parcels of alkali sink scrub and grasslands within the Fresno kangaroo rat range (USFWS 1998); particularly any parcels on which Fresno kangaroo rats are discovered.
3. Consistently manage protected alkali sink scrub habitat for Fresno kangaroo rats (Saslaw pers. comm. 2010).

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**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW**

Fresno kangaroo rat (*Dipodomys nitratoides exilis*)

Current Classification: Endangered

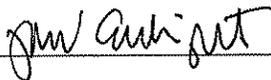
Recommendation Resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Review Conducted By: Sacramento Fish and Wildlife Office staff

FIELD OFFICE APPROVAL:

Lead Field Supervisor, U.S. Fish and Wildlife Service

Approve  Date 2-16-10