

5-YEAR REVIEW

San Joaquin kit fox (*Vulpes macrotis mutica*)

GENERAL INFORMATION

Species: San Joaquin kit fox (*Vulpes macrotis mutica*)

Date listed: March 11, 1967

FR citation: 32 FR 4001

Classification: Endangered

Most recent status review:

The most recent status review of the San Joaquin kit fox was a 5-year review completed by the Sacramento Fish and Wildlife Office in 2010 (Service 2010).

Methodology used to complete the review:

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a 5-year review is to assess each listed species to evaluate whether or not the species' status has changed and it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The U.S. Fish and Wildlife Service's (Service) Sacramento Fish and Wildlife Office (SFWO) conducted a Species Status Assessment (SSA) and developed an SSA report on the San Joaquin kit fox (Service 2020) which was used to inform this 5-year review. The SSA report represents our evaluation of the best available scientific information, including the habitat and demographic needs and the current and future condition of the San Joaquin kit fox. Independent peer reviewers reviewed the SSA report.

FR Notice citation announcing this status review:

A notice announcing the initiation of the 5-year review for this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on July 26, 2019 (84 FR 36116; Service 2019). We did not receive any responses to our request for comments.

REVIEW ANALYSIS

Updated Information and Species Status

A summary of new information included throughout the SSA report is included in Chapter 1. The SSA report provides a summary of the factors influencing viability of the species, management and conservation measures, and current status of the species in Chapter 3, and projects potential future condition of the species under three plausible scenarios in Chapter 4. The SSA report provides an analysis of the current and future condition of 16 geographic analysis units throughout the current range of the species. A summary of species viability is presented in Chapter 5.

Threats

The final listing rule did not include an analysis of threats to the San Joaquin kit fox; however, information available at the time of listing, and summarized in the 2010 5-year review (Service 2010), identify the following threats: the conversion of habitat to agriculture and industrial

development (Factor A); overutilization due to furbearer trapping (Factor B); competition (Factor C); pesticide use (Factor E); vehicle-caused mortality (Factor E); and accidental shooting by night-hunters (Factor E). Threats identified in the 2010 5-year review include: habitat loss and modification due to agricultural conversion, infrastructure construction, urban development, energy development, mining activities, changes in wildfire prevalence, changes to vegetation structure, and poor grazing regimes (Factor A); predation (Factor C); pesticide use (Factor E); vehicle-caused mortality (Factor E); selenium accumulation (Factor E); off-road vehicle use (Factor E); effects associated with small population size (Factor E); climate change (Factor E); and research-related activities (Factor E). Current or potential future threats to the San Joaquin kit fox include: habitat fragmentation and development due to agricultural production, urban development, and energy development (Factor A); predation (Factor C); disease (Factor C); pesticide use (Factor E); road mortality (Factor E); and climate change (Factor E).

Distribution and Abundance

As described in Chapter 3 of the SSA report, there are no current rangewide survey data available for the San Joaquin kit fox. A patchwork of survey results and data from the California Natural Diversity Database indicate populations have persisted throughout the western portion of the San Joaquin Valley south of San Luis Reservoir to the Buena Vista Valley, in the Panoche and Cuyama Valleys, and Carrizo Plain. Populations also continue to persist in the central portion of the Valley around Kern NWR and Semitropic Ecological Reserve, in Bakersfield, and in the southeastern portion of the Valley north to Porterville. Data from northern portions of the range show an absence from those areas recently (California Department of Fish and Wildlife 2020); however, recent survey efforts have been opportunistic and do not likely cover all of the available habitat.

Cypher *et al.* (2013) calculated that a population of 3,616 foxes might currently remain within the species range; however, this number may over-estimate the effective population size. Prior to the sarcoptic mange epidemic, the Bakersfield population appeared to be stable or expanding with a population of 200–400 animals (Cypher and Van Horn Job 2012), making it one of the largest remaining populations. However, this population is currently undergoing a severe decline. San Joaquin kit foxes can exhibit significant population size variability. Most of the populations in natural areas fluctuate regularly depending on environmental conditions, particularly extremes of rainfall that have effects on prey species. Because of this, measuring changes in occupied areas through surveys has been a more effective way of assessing long-term populations viability rather than population numbers.

Recovery Criteria

Recovery Plan: Recovery Plan for Upland Species of the San Joaquin Valley, California (1998)

The Recovery Plan has downlisting and delisting criteria related to three main components: protected habitat, management plans, and population density (Table 1).

Table 1. Downlisting and delisting recovery criteria for the San Joaquin kit fox (Service 1998)

Recovery Step	Secure and protect specified recovery areas from incompatible uses	Management Plan approved and implemented for recovery areas that include survival of the species as an objective	Population monitoring in specified recovery areas shows
Downlist	The three core populations, Carrizo Natural Area, western Kern County, and Ciervo-Panoche Area; three satellite populations	For all protected areas identified as important to continued survival	Stable or increasing populations in the three core areas through one precipitation cycle; population interchange between one or more core populations and the three satellite populations
Delist	Several additional satellite populations (number dependent on results of research) encompassing as much as possible of the environmental and geographic variation of the historic geographic range	For all protected areas identified as important to continued survival	Stable or increasing populations in the three core areas and three or more of the satellite areas during one precipitation cycle

Our SSA analysis indicated that the criterion related to population growth is not met; the criterion related to habitat protection is partially met, and the criterion for management plans is partially met. Details are provided in Chapter 3 of the SSA report. In summary, the downlisting criteria for the species are not met.

Synthesis

At the time that the San Joaquin kit fox was listed, the conversion of native habitat to agriculture was considered to be the primary threat to species. Habitat loss and the degradation of remaining habitat continue to be primary threats to the species' recovery. After reviewing the best available scientific information and comparing current and future condition with the recovery criteria for the species, we conclude that the San Joaquin kit fox remains an endangered species.

RESULTS

Recommended Classification:

- Downlist to Threatened**
- Uplist to Endangered**
- Delist** (*Indicate reasons for delisting per 50 CFR 424.11*):
 - Extinction*
 - Recovery*
 - Original data for classification in error*
- No change is needed**

New Recovery Priority Number: No change

The Service has determined that the current recovery priority number (3C) should remain unchanged. The current recovery number, "3", indicates that the taxon is a subspecies that faces a

high degree of threat as well as a high potential for recovery. The “C” indicates conflict with construction or other development projects or other forms of economic activity.

RECOMMENDATIONS FOR FUTURE ACTIONS

- The 1998 Recovery Plan identified core and satellite areas where subpopulations of San Joaquin kit fox occur. However, baseline mapping and quantification of the extant habitat remaining in each core and satellite area at the time of Recovery Planning has not yet been completed. Mapping efforts that quantify the acreage of suitable/native habitat and altered or degraded habitat in core, satellite, and linkage areas at 1) the time of the 1998 Recovery Plan, and 2) the current time, will assist the Service and other conservation entities in prioritizing conservation strategies and in determining progress in meeting recovery goals for protection of core and satellite areas. The locations, acreage, and quality (or characteristics) of protected habitat could also be compiled and mapped.
- Studies that assist in determining the population-level effects of contaminants, including first and second generation anticoagulant rodenticides, on San Joaquin kit fox or surrogate species are needed. Studies that test correlations between rodenticide use and San Joaquin kit fox population parameters, measure sublethal effects on behavior, or quantify rodenticide/pesticide effects on availability of prey in relation to the energetic needs of the San Joaquin kit fox would provide information useful to recovery actions.
- Focus land acquisitions on the establishment of large blocks of land (at least 10,000 acres in size) on the San Joaquin Valley floor and western fringes. Such large parcels are critical to supporting sustainable populations of San Joaquin kit fox for long-term conservation, and should be linked with protected broad dispersal corridors. These acquisitions are most likely to aid San Joaquin kit fox recovery if they build on existing protected lands to achieve larger expanses of protected land, if acquired lands possess the vegetative structure and native prey base that are associated with thriving San Joaquin kit fox populations, and if acquired lands are not isolated from extant populations of either the San Joaquin kit fox or its prey species. Large holdings of native habitat are also expected to be less suitable for coyotes and red fox that are responsible for high levels of San Joaquin kit fox mortality. In limited circumstances, lands no longer suitable for agriculture, such as those targeted for land retirement, may be restored and conserved through fee title acquisition, conservation easement acquisition, or conservation banking arrangements from willing sellers or participants. However, on suboptimal habitat, conservation planning should recognize the lag times inherent in restoration of the ecological community needed to support the San Joaquin kit fox. Linkages will be most effective in contributing to San Joaquin kit fox recovery where they link to habitat that retains the characteristics needed to sustain resident populations.
- A rangewide census of San Joaquin kit fox should be conducted using a statistically robust methodology. Collaboration with U.S. Geological Service on methods that utilize occupancy models may be a promising approach, but needs additional consideration. Some biologists have suggested that more northerly satellite areas and/or linkages have become population sinks for the San Joaquin kit fox and this possibility merits further study to determine what factors contribute to population status in these areas, and how

these factors may be altered to promote range-wide recovery.

- Sarcoptic mange (*Sarcoptes scabiei*) has been documented in the Bakersfield kit fox population and a recent outbreak is currently causing a population decline (Deatherage 2020). Current efforts to control and contain sarcoptic mange should continue to be implemented to limit the effect of the outbreak and suppress the spread of the disease within and outside of the Bakersfield population. In addition, research on more effective treatment options and mite control techniques are needed.

REFERENCES

- California Department of Fish and Wildlife. (2020). California Natural Diversity Database (CNDDDB) – Government version dated June 1, 2020. Retrieved June 15, 2020 from <https://map.dfg.ca.gov/rarefind/view/RareFind.aspx>.
- Cypher, B.L., and C.L. Van Horn Job. 2012. Management and conservation of San Joaquin Kit Foxes in urban environments. *Proceedings of the Vertebrate Pest Conference* 25:347–252.
- Cypher, B.L., S.E. Phillips, and P.A. Kelly. 2013. Quantity and distribution of suitable habitat for endangered San Joaquin Kit Foxes: Conservation implications. *Canid Biology & Conservation* 16:25–31.
- Deatherage, N.A. 2020. Urban Landscape Attributes and Intraguild Competition Affect San Joaquin Kit Fox Occupancy and Spatiotemporal Activity. Master's Thesis. Department of Biology, California State University, Bakersfield. 114 p.
- (Service) U.S. Fish and Wildlife Service. 2019. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews for 58 Species in California, Nevada, and the Klamath Basin of Oregon. *Federal Register* 84(144): 36116–36118.
- (Service) U.S. Fish and Wildlife Service. 2020. Species Status Assessment Report for the San Joaquin kit fox (*Vulpes macrotis mutica*) Version 1.0. August 2020. Sacramento, CA.

**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of San Joaquin kit fox**

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

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

FIELD OFFICE APPROVAL:

Field Supervisor, Sacramento Fish and Wildlife Office

Approve **MICHAEL SENN** Digitally signed by MICHAEL SENN
Date: 2020.09.11 16:55:12 -07'00'