FIVE-YEAR STATUS REPORT

I. COMMON NAME: Stephens' Kangaroo Rat
   SCIENTIFIC NAME: Dipodomys stephensi
   CURRENT CLASSIFICATION: Threatened

II. RECOMMENDED ACTION:
   Change Threatened classification to Endangered

III. SUMMARY OF REASONS FOR RECOMMENDED ACTION:

   The Threatened classification of the Stephens' Kangaroo Rat (SKR) was
   based on the knowledge of the status of the species when it was
   originally classified in 1971. Since that time, information including
   that assembled by the U.S. Fish and Wildlife Service (FWS) in support of
   a federal listing package indicates that the SKR is in danger of
   extinction. Thus, the Department of Fish and Game (DFG) recommends that
   the classification be changed to Endangered.

IV. NATURE AND DEGREE OF THREAT:

   The greatest single threat to the continued existence of the SKR
   continues to be the destruction or degradation of its grassland or
   sparsely vegetated shrubland habitat. This habitat is being lost at an
   alarming rate, particularly in Riverside County. "The extensive habitat
   loss throughout the range of D. stephensi...has resulted in only
   isolated populations of the animal. These populations occupy small
   areas and are vulnerable to habitat loss" (Thomas 1975). "Agricultural
   development of the low-lying lands of the San Jacinto Valley and
   vicinity has destroyed much of the preferred habitat of stephensi"
   (Bleich 1977). The SKR is found in annual grasslands and "the narrow
   ecotonal area formed at the transition between annual grassland and sage
   scrub habitat. This latter usually occurs at the base of hills. Much
   of the existing grassland has been disked for pasture for livestock,
   which effectively removes Stephens' kangaroo habitat. Thus, the species
   has been pushed into marginal ecotonal areas that are becoming disjunct
   in distribution due to various agricultural practices and other forms of
   human disturbances. The resulting situation has produced a patchy
   dispersion with little or no movement corridors between isolated
   patches. These islands of habitat are, in many cases, extremely small
   (less than 4 acres) and the threat of extirpation or critical inbreeding
   is great" (O'Farrell et al. 1985).
Although most of the early habitat loss was due to agricultural development (and that development continues today), the more recent loss is due largely to urban and suburban development. The SKR seems to prefer relatively flat areas, either in the valleys or on tops of hills or on saddles between hills. These flat areas are particularly desirable for the building of single family homes.

The question of the impact on the SKR of the use of rodenticides has been raised. It is not known whether the SKR is being impacted by such use.

V. HISTORIC AND CURRENT DISTRIBUTION:

Grinnell (1922) reported the distribution of the SKR as "San Jacinto Valley and vicinity, western Riverside County and extreme southern San Bernardino County." Lackey (1967) found that the SKR was also present in the Bonsall area of northern San Diego County. Thomas (1973) found additional populations in the San Luis Rey River area of San Diego County, west of the Bonsall location. Bleich and Schwartz (1974) reported the SKR from the Fallbrook Annex of the Seal Beach Naval Weapons Station, which is west of locations established by Thomas (1973). Bleich (1977) thus summarized the known distribution of the SKR as "the San Jacinto Valley and adjacent areas of western Riverside, southwestern San Bernardino, and northwestern San Diego counties." In a survey of U.S. Bureau of Land Management lands, Hicks and Cooperrider (1977) found the SKR at nine sites not previously reported. These sites did not appreciably change the limits of the known range.

O'Farrell et al. (1986) have reported an addition to the known range of the SKR in an unnamed valley near Lake Henshaw in San Diego County. This population is approximately 42 km from the nearest point of the previously known range.

Several significant populations of the SKR are located in the central portions of Camp Pendleton Marine Corps Base and are currently under study.

The discovery of previously unknown sites does not balance the loss of known sites. Ongoing habitat destruction for residential, agricultural, and other purposes has resulted in smaller and disjunct populations which have a greater probability of extinction than did populations in the once large and interconnected habitats.

The FWS (1987) has stated that sites from which the SKR has been recorded can be grouped into eight general areas. "From north to south, these areas are: (1) March Air Force Base to the Moreno Valley, (2) Lake Perris to the eastern side of the San Jacinto Valley, (3) Lake Mathews to Estelle Mountain, (4) the Lakeview Mountains, (5) the vicinity of Lake Elsinore, (6) Lake Skinner to Temecula, (7) Fallbrook Naval Weapons Annex to the San Luis Rey River, and (8) the vicinity of Lake Henshaw. The first six areas are in Riverside County and the last two in San Diego County" (FWS 1987).
"Only three of these areas still contain substantial habitat for D. stephensi. O'Farrell (1986) indicated that approximately 12,600 acres (5,100 hectares) of suitable habitat remain at Lake Henshaw, and that another 4,940 acres (2,000 hectares) appear suitable on the Fallbrook Naval Weapons Annex. The species, however, has probably been extirpated between the latter facility and the San Luis Rey River. Another area of about 17,000 acres (6,800 hectares), between Lake Mathews and Estelle Mountain, still contains some suitable habitat, though much of this acreage has been lost to agriculture and urban development and some of it has too great a vegetation cover to support the kangaroo rat. The species is likely to be extirpated from this entire area because of several planned housing and agricultural developments, except for 2,500 acres of habitat within a State ecological reserve" (FWS 1987).

"Of the remaining five areas, two, March Air Force Base to Moreno Valley and Lake Skinner to Temecula, evidently no longer support viable populations of D. stephensi. The species also has not been recorded at Lake Perri since 1973, and, on the east side of the San Jacinto Valley, it is now restricted mainly to insular patches at the edges of plowed fields. It is similarly restricted in the Lakeview Mountains, where only a few thousand acres are now thought to contain adequate habitat. The last area, in the vicinity of Lake Elsinore, contains some U.S. Bureau of Land Management parcels, but survival of the kangaroo rat there is tenuous because of rapid surrounding urbanization and an expected increase in casual human use (off-road-vehicles already have been noted). Outside of these parcels, the species will be unlikely to survive extensive housing developments. The Devers-Serrano Power line right-of-way passes through this area, but is probably not wide enough to accommodate a viable kangaroo rat population" (FWS 1987).

"Further compounding the fragmented nature of the current distribution is the fact that Stephens' kangaroo rat does not occupy all apparently suitable habitat. Grazing, off-road-vehicle activity (common in southern California), and rodent control programs all reduce habitat suitability" (FWS 1987).

VI. HISTORIC AND CURRENT ABUNDANCE:

There is no estimate of historic abundance. As with most small mammals, the numbers of the SKR probably change significantly over time as climatic factors vary. Few population data are available. Thomas (1973) reported summer densities no higher than 12.5 SKR per ha. Bleich and Schwartz (1974) reported summer population density in annual grassland as 7.5 SKR per ha and in the Haplopappus association of the coastal sage scrub community as 33.8 per ha. O'Farrell and Clark (1985) estimated 3.88 to 9.71 SKR per ha on six sites in western Riverside County during the summer. However, techniques for determining abundance and density values have varied, and it is difficult to compare the results of any study to others. In addition, trappability of the SKR is highly variable, depending on behavior and season of year.
VII. SPECIES DESCRIPTION AND BIOLOGY:

The SKR is a member of the mammalian Family Heteromyidae, which includes kangaroo rats, kangaroo mice, and pocket mice.

The SKR, like all kangaroo rats, has extremely long hind legs, small front legs and feet, and a white belly. The SKR has 5 toes on each rear foot. It is difficult to separate in the hand from the very similar Pacific Kangaroo Rat (D. agilis).

As with all kangaroo rats, the SKR burrows into the ground for living sites and is nocturnal. It eats seeds and probably fruits, leaves, stems, buds, and insects.

VIII. HABITAT REQUIREMENTS:

"The close association between [the SKR] and sparsely vegetated habitats has been well documented (Grinnell, 1933; Lackey, [1967]; Bleich, 1973; Bontrager, 1973; Thomas, 1973; Bleich and Schwartz, 1974; Thomas, 1975). [The SKR has been found] in a mixture of sagebrush and annual grasslands in the Santa Ana Mountains. Bleich (1973) captured *stephensi* in the Annual Grassland Community, and in the *Haplopappus* Association of the Coastal Sage Scrub Community; these habitats are characterized by sparse perennial vegetation. Bontrager (1973) reported *stephensi* from the annual grassland plant formation on the Santa Rosa Plateau, Riverside County. Lackey [1967] found *stephensi* in open types of habitat, taking only a few specimens in light chaparral immediately adjacent to a field in which that species was abundant" (Bleich 1977).

"Stephens' kangaroo rat is restricted to gravelly soils in the Santa Ana Mountains.... Near Fallbrook, *stephensi* was found on soils containing high percentages of granule gravel (Bleich 1973). Lackey [1967] reported *stephensi* from habits having soils neither extremely dense nor largely sand. Bontrager (1973) found *stephensi* most abundantly in areas having extremely sandy soil. Bleich (1973) and Thomas (1975) hypothesized that soil types or vegetation density, or a combination of the two, may be ecological factors limiting the distribution of *stephensi*" (Bleich 1977).

In their San Diego County study, O'Farrell et al. (1985) stated that "[p]reliminary results indicate *D. stephensi* avoids soils high in clay content. Abundance appears to be inversely related to vegetative ground cover and standing litter height, and appears to be greater when there is a greater contribution of *Erodium* and *Eremocarpus* as opposed to annual grasses."

"Thomas (1975) noted that the *stephensi* commonly inhabited previously disturbed areas, and offered explanations for this observation. He also speculated that *stephensi* utilizes old pocket gopher (*Thomomys bottae* burrows" (Bleich 1977).

"There are two primary plant species found in the *stephensi* habitat type, *Eriogonum fasciculatum* and *Artemisia califonia*. Coincidentally these species, especially *E. fasciculatum*, are prime invaders where
secondary succession is occurring. This gives an idea of the past status of the habitats where *stephensi* is found to occur today" (Thomas 1973).

O'Farrell et al. (1986) state that the SKR "is restricted to annual grasslands (Bleich, 1977) and the narrow ecotonal area formed at the transition between annual grassland and sage scrub habitat." They go on to say that "[i]t is evident that *D. stephensi* is only patchily distributed within the relatively narrow geographic confines in areas where it occurs. Part of this is due to the patchy distribution of suitable habitat and part is due to habitat alteration or destruction. The former possible connections between these disjunct populations are currently occupied with urban and agricultural development. Although new locations may be found, the number of extirpations due to human encroachment speaks eloquently for the need to protect the remaining populations of this species."

IX. CURRENT AND RECOMMENDED MANAGEMENT:

The chief management need in conservation of the SKR is protection of habitat in as many sites of meaningful size as possible. The most critical need is in the San Jacinto Valley of western Riverside County.

Since 1985 the DFG has participated with the Sierra Club, FWS, and private individuals in an effort to convince the County of Riverside to begin habitat conservation planning for the SKR. The concept which the parties would like to see the county embrace is one of protected areas. These areas might initially be those already protected in public ownership, and which might be added to through the use of mitigation purchases. In other words, the county might allow project proponents to develop in certain SKR habitats if the proponents agreed to mitigate for the loss of these habitats by purchasing land adjacent to the core areas. These protected areas would grow in size over time. A working list of areas in public ownership within Riverside County includes Lake Mathews Ecological Reserve and the San Jacinto Wildlife Area/Lake Perris State Recreation Area complex. Thus, protection of the SKR habitat on these state-owned or state-managed areas is of utmost importance. Habitat on lands in public ownership must be managed to achieve and maintain optimal habitat characteristics.

In 1986 the Laguna Niguel office of the FWS submitted a listing package for the SKR, proposing the animal as Endangered, to the Portland and Washington D.C. offices. In preparing the proposal, the FWS evaluated all available information, including that found in a number of Environmental Impact Reports (EIR's), and made field checks of previously known sites occupied by the SKR. The FWS's conclusion, from analysis of all data, was that the species is deserving of federal protection. The Service found that the SKR, as a state-listed species, is virtually ignored in EIR's.

In the analysis, the FWS determined that many, possibly more than half, of the historic sites for the SKR have been destroyed. Most of the remaining sites have no protection, i.e., they are not in public ownership and the present zoning is adverse. Because of the present
situation, the publicly-owned areas assume much greater importance to
the survival of the SKR than might have been previously thought. Even
if private sites could be protected, through zoning, fee purchase, or
conservation easement, many of these sites may not be suitable due to
small size. The average size of existing sites which currently have the
SKR may be too small to support a self-sustaining population. In
addition, there is a question about the impact of rodenticide use on the
SKR, particularly in Riverside County.

"An examination of Riverside County's general plan guidelines revealed
that 78 percent of the sites where the kangaroo rat has been trapped are
zoned for use incompatible with preservation of the species. Only 3
percent of the sites were zoned for vegetation or wildlife protection,
and much of this land is not suitable for the kangaroo rat. Within the
overall range of Stephens' kangaroo rat, only 8 percent of the land is
zoned for uses compatible with the preservation of the species. Because
not all of the habitat in the 6 percent is suitable, much less is really
protected for the kangaroo rat. Although biological consultants have
sometimes located the species and informed appropriate land owners or
project proponents, the sites have nonetheless been disked or plowed" (FWS 1987).

The advantage of a federal classification of Endangered or Threatened
for the SKR is that federal agencies which permit, finance, or undertake
projects would be required to avoid or compensate for impacts to the SKR
and its habitat. In addition, the habitat on non-federal lands would
have a measure of protection under the federal Endangered Species Act, if
an action to destroy or alter SKR habitat on these lands required
federal approval, funding, or a permit. No such habitat protection is
available under the California Endangered Species Act.

The FWS recently has published (19 November 1987) in the Federal
Register a proposed rule to determine Endangered status for the SKR (FWS
1987). After a 60-day comment period, the FWS will have until 19
November 1988 in which to take final action on the proposed rule.

Surveys are necessary to determine the current status of the SKR within
its range, in terms of numbers and distribution of occupied sites, extent and quality of habitat at each site, abundance of the SKR, and
threats to the occupied areas. In addition, to more completely
understand the biology of the species, specific studies are required to
determine various aspects of life history, such as food habits, periods
of activity, and dispersal.

Another subject of needed investigation is the restoration of degraded
or former habitat (i.e., old fields), especially that adjacent to
occupied areas. Experimental plots could be established to determine
whether the SKR moves more readily into old fields under natural
succession or into old fields which are seeded or planted to native
vegetation.

The DFG has attempted to obtain federal Endangered Species Act grant-in-
aid funds (popularly known as Section 6 funds) for surveys and studies
of the SKR as described above. Because the SKR is not yet classified as
a federal Endangered or Threatened species, the priority for funds is
low within the FWS. The state endangered species tax check-off program is a possible source of funds for some of the needed SKR work. Indeed, funds from this program are available for studies in FY 87-88.

A recovery plan which would incorporate elements of the management needs discussed herein should be prepared.

In summary, the management needs of the SKR in priority area as follows:

1. Protection and management of habitat on public lands, including degraded habitat and former habitat recently in agriculture.

2. Protection and management of habitat not currently in public ownership through establishment of a series of preserves, particularly in Riverside County.

3. Classification of the SKR as an Endangered species by the federal government.

4. Determination of the current status of the SKR, in terms of distribution, numbers, quality and extent of habitat at all sites, and threats to the sites; and periodic surveys (at least every five years) to repeat the status determination.

5. Preparation of a recovery plan which would incorporate the elements of protection and restoration of habitat, the establishment of core preserves, and surveys and studies.

6. Restoration of degraded or suitable former habitat.

7. Studies to determine various aspects of the life history of the SKR.

8. Investigation of the impacts of rodenticides on the SKR.

9. Reclassification of the SKR by the Fish and Game Commission to Endangered from Threatened.

X. SOURCES OF INFORMATION:


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