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AN ADDITION TO THE KNOWN RANGE OF STEPHENS' KANGAROO RAT, *DIPODOMYS STEPHENSI*, IN SAN DIEGO COUNTY, CALIFORNIA

The Stephens' kangaroo rat, *Dipodomys stephensi*, currently is listed as Threatened by the California Fish and Game Commission and is known only from a limited range in northern San Diego County, western Riverside County, and southwestern San Bernardino County, California (Bleich 1977). Recently, *D. stephensi* was believed to have been taken from Warner Springs (APEC 1981). In 1983, while performing a focused constraint analysis for a proposed solar energy development, we positively confirmed the existence of *D. stephensi* in the same valley. A single specimen identified as *D. stephensi* was located in the Museum of Vertebrate Zoology, University of California, Berkeley; the animal was collected 7 February 1922 at Warner's, San Diego Co., but has been previously unreported in the literature. Studies are underway to assess the impact of solar development on the species. These offer a preliminary evaluation of the distribution within the valley.

The current distribution of *D. stephensi* including that of the present report is known (Figure 1). The unnamed valley in question lies at the southeastern base of the Palomar Mountains (T10S, T11S and R2E, R3E, SBBM) and is comprised of the San Jose del Valle and the Valle de San Jose Mexican land grants. These land grants form the Warner Ranch which is administered by Vista Irrigation District. The occurrence of *D. stephensi* in this valley adds to the known range, the nearest point of which is approximately 42 airline km over chaparral- and forest-covered mountains.

The topography of the valley consists of rolling grassland from the eastern shore of Lake Henshaw to the oak woodland, chaparral, or coastal sage scrub of the foothills around the fringe of the valley (835 to 975 m elevation). The San Luis Rey River, Agua Caliente Creek, and Buena Vista Creek cross the valley, yielding riparian, marsh, and salt grass-rush vegetation associations. The grassland changes composition from predominantly annual species in the southwestern half of the valley, grading into primarily perennial species in the northeastern portion. Dominant annual species consists of wild oat, *Avena fatua*; brome grass, *Bromus* spp.; dove weed, *Eremocarpus setigerus*; filaree, *Erodium* spp.; and vinegar weed, *Trichostema lanceolatum*. Dominant perennial species are triple-awned grass, *Aristida* sp., and dropseed, *Sporobolus airoides*. Most of the grassland is used for cattle grazing, although there are scattered portions in active agriculture, mainly alfalfa and potatoes.

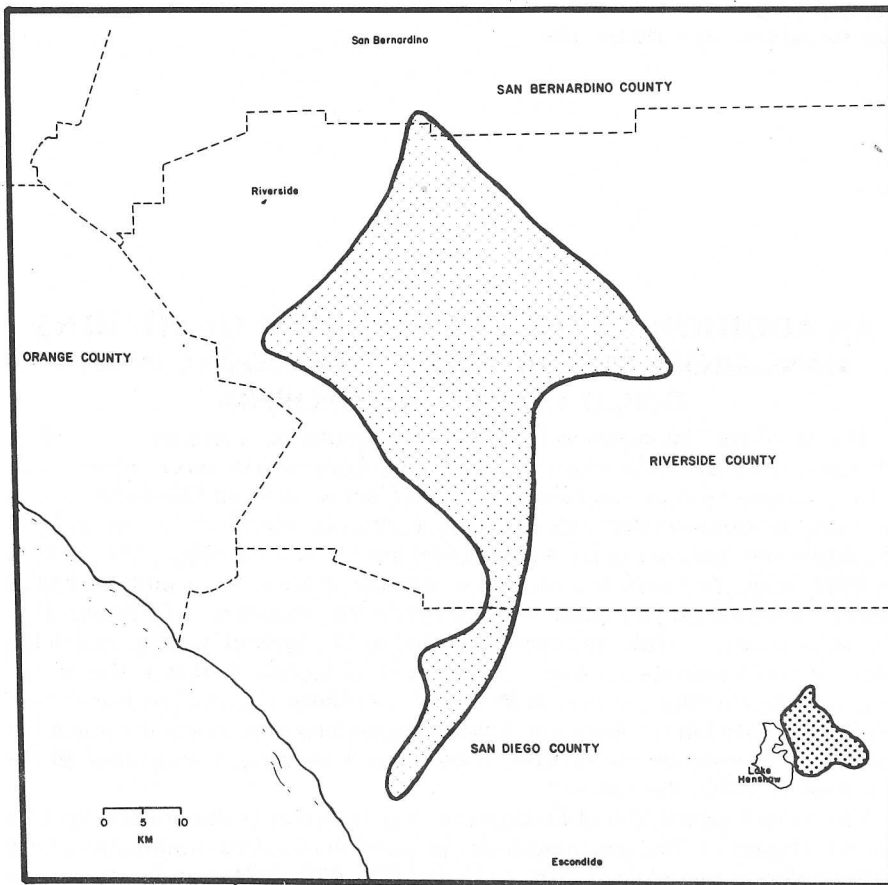


FIGURE 1. The known range of the Stephens' kangaroo rat, *Dipodomys stephensi* (Thomas 1973) shown in crosshatch and the new location shown by stipling.

The Stephens' kangaroo rat is distributed throughout the grassland, but is absent from the drainages, shrublands, and agricultural areas. Relative abundance within the grassland, based upon counts of active burrows, is patchy, ranging from 8/1000 m² to 94/1000 m². This is not to imply one kangaroo rat per one burrow, but rather is a crude index of potential population size. Studies in progress are attempting to determine the habitat factors which limit the species' abundance and distribution. Preliminary 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 (1973) presented estimates of the quantity of suitable habitat at 16 locations. Areas ranged from 0.4 to 40.5 ha but only 3 sites exceeded 15 ha. He further reported that only 3 previously known sites were still extant. Extirpation was attributed to urban development with recreation and agriculture as secondary factors. Using information presented by Bleich (1973) we estimate roughly

2000 ha of potential habitat at the Fallbrook Naval Weapons Annex. We examined the main site on the Santa Rosa Plateau reported by Bontrager (1973) and found no remaining kangaroo rat habitat because of recent housing and pasture development. Our location consists of about 5100 ha of suitable habitat known to harbor the species. The Lake Henshaw population of Stephens' kangaroo rat represents a major addition to the known boundaries and abundance of the species.

It is evident that *D. stephensi* is only patchily distributed within the relatively narrow geographic confines in areas where it occurs (Figure 1). 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.

ACKNOWLEDGMENTS

We wish to thank J. C. Fisher, Jr. for his botanical expertise and field assistance. P. Dory of Vista Irrigation District kindly granted access to the Warner Ranch properties. J. L. Patton provided the information on the museum specimen. R. Friesen reviewed the manuscript. T. B. O'Farrell prepared the range map. The field effort was supported by Lajet Energy Company. Permission to capture Stephens' kangaroo rats was granted by the California Department of Fish and Game.

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- Michael J. O'Farrell, 4241 S. Ridgeview Dr., Las Vegas, Nevada, Stephen M. Juarez, and Curt E. Uptain, CWESA, 620 W. Holland, Clovis, California 93728. Accepted for publication February 1986.

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