COPE’S LEOPARD LIZARD

Gambelia copeii (Yarrow 1882)

Status Summary
Gambelia copeii is designated as a Species of Special Concern, although we refrain from assigning a priority score due to a paucity of information. This taxon received a Total Score/Total Possible of 45% (38/85). It was not designated as a Species of Special Concern during the previous evaluation (Jennings and Hayes 1994a).

Identification
Gambelia copeii is a large (maximum 14 cm SVL) lizard, with a robust head and limbs, granular body scales, and a long cylindrical tail (Grismer 2002, Stebbins 2003, Lemm 2006, Mahrdt et al. 2010). The dorsal coloration is variable across the range, changing from dark brown in the north to light golden brown or tan in the south (Grismer 2002, Mahrdt et al. 2010). California populations of G. copeii form the northern edge of the species’ overall range and are dark above with pairs of large, dark paravertebral spots on the dorsal surface that usually fade anteriorly, are almost always absent from the head, and broaden to form transverse bands on the tail (McGuire 1996, Stebbins 2003, Mahrdt et al. 2010). In many individuals, a lighter cream-colored transverse bar separates each pair of these spots along the trunk.

COPE’S LEOPARD LIZARD: RISK FACTORS

<table>
<thead>
<tr>
<th>Ranking Criteria (Maximum Score)</th>
<th>Score</th>
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<tbody>
<tr>
<td>i. Range size (10)</td>
<td>10</td>
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<tr>
<td>ii. Distribution trend (25)</td>
<td>15</td>
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<tr>
<td>iii. Population concentration/ migration (10)</td>
<td>0</td>
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<td>iv. Endemism (10)</td>
<td>0</td>
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<td>v. Ecological tolerance (10)</td>
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<tr>
<td>vi. Population trend (25)</td>
<td>Data deficient</td>
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<td>vii. Vulnerability to climate change (10)</td>
<td>3</td>
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<tr>
<td>viii. Projected impacts (10)</td>
<td>10</td>
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<tr>
<td>Total Score</td>
<td>38</td>
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<tr>
<td>Total Possible</td>
<td>85</td>
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<tr>
<td>Total Score/Total Possible</td>
<td>0.45</td>
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COPE'S LEOPARD LIZARD
Gambelia copeii

PHOTO ON PREVIOUS PAGE: Cope's leopard lizard, San Diego County, California. Courtesy of Rob Schell Photography.

California Department of Fish and Wildlife
Rates of potential gene flow and/or hybridization within the zone of sympatry have not been measured.

**Life History**

Little is known about the natural history of *Gambelia copeii*, and the limited information that is available comes from populations that occur farther south in Baja California, Mexico. We assume that the California populations are similar in most aspects of their life history to populations from the northern regions of Baja California.

*Gambelia copeii* emerges from hibernation as early as mid-March in northern Baja California, with adults remaining active at least until September (Grismer 2002). The breeding season begins in March or April and lasts at least until July (Fitch 1970, McGuire 1996, Grismer 2002, Goldberg et al. 2010). Grismer (2002) reported a single female in breeding coloration in August at the southern end of the species’ range near Todos Santos, Baja California Sur, suggesting that the breeding season could extend much later in the north. Gravid females have been documented in both March and June, providing some evidence that *G. copeii* may produce multiple clutches in optimal years (Fitch 1970, Goldberg et al. 2010). In a sample of 10 museum specimens, the mean clutch size was 5 and did not appear to depend on female body size (Goldberg et al. 2010).

*Gambelia copeii* is primarily an ambush predator that preys upon other lizards, including whiptail lizards (*Aspidoscelis*), zebra-tailed lizards (*Callisaurus*), and side-blotched lizards (*Uta*), as well as arthropods (McGuire 1996, Grismer 2002).

**Habitat Requirements**

*Gambelia copeii* occurs across a wide latitudinal gradient and tolerates a variety of ecological conditions throughout its range. Little published information exists for California populations, although the species appears to prefer open habitat in mixed chaparral and sage scrub (R. Fisher, pers. comm., C. Mahrdt, pers.)
In Baja California, the species occurs across a wider variety of habitat types, although this likely reflects habitat availability throughout the Baja California peninsula rather than specialization of California populations.

In northern Baja California, \textit{Gam\-belia copeii} occurs on mesas and foothills in scattered patches of chaparral and inland sage scrub with coarse sandy soils (C. Mahrdt, pers. comm.) and in an increasingly wide variety of habitat types farther south in Baja California (Grismer 2002). \textit{Gambelia copeii} apparently prefers relatively open habitat throughout the diversity of plant communities in which it is found.

\textit{Distribution (Past and Present)}

In California, \textit{Gambelia copeii} is restricted to an approximately 70 km$^2$ area centered around Campo and Potrero Valleys in extreme southern San Diego County (Mahrdt et al. 2010; C. Mahrdt, pers. comm.). However, recent field surveys have failed to reconfirm this species at several sites in both Potrero and Campo Valleys, and the species may be locally extirpated at some of these sites particularly along the western edge of its range (R. Fisher, pers. comm.).

Outside of California, \textit{G. copeii} occurs from the California border throughout much of the Baja California peninsula south at least as far as Todos Santos (Grismer 2002). Few data exist on changes in distribution, although agricultural expansion and development in northern Baja California are likely to cause declines (R. Fisher, pers. comm.).

\textit{Trends in Abundance}

Few data exist regarding historical or present abundance in California. Unpublished pitfall trapping data collected over a 2-year period indicate that the species occurs at very low densities. Between March 1970 and December 1971, pitfall trapping at a 60 × 60 m study site 2.7 km north-east of Cameron Corners, San Diego County, California, yielded many captures of other lizard species in the area but only a single capture of \textit{Gambelia} (C. Mahrdt, unpublished data). A second individual was captured near this site 3 years later (C. Mahrdt, unpublished data).

\textit{Nature and Degree of Threat}

The principal threat facing \textit{Gambelia copeii} is habitat loss due to development. The species is able to persist in a wide variety of habitats farther south, so long as the habitat remains relatively open and, presumably, abundant prey (primarily arthropods and smaller lizards) remains available. However, the species occurs at the extreme northern limit of its range in California, so even minor changes in environmental conditions could have large impacts here. Development, including habitat degradation and fragmentation, and climate-change-associated increases in wildfire frequency and intensity have the potential to cause these changes. Invasion of exotic grasses may also lead to further habitat degradation by reducing the availability of open habitat that this species prefers.

\textit{Status Determination}

\textit{Gambelia copeii} has an extremely small range in California, which makes it inherently sensitive to any declines. Ongoing habitat loss and potential impacts from climate change may negatively impact the species, but we have relatively few data to assess risk beyond these broad measures of sensitivity, so we refrain from assigning a priority score at this time.

\textit{Management Recommendations}

Within its very limited California range, remaining large blocks of habitat require protection from further development to prevent future declines. In the absence of information to the contrary, we assume that grazing, wood clearing, and activities that might negatively impact the density of prey (including the presence of feral or pet cats) are all threats to \textit{Gambelia copeii}. Frequent high-intensity wildfire should also be prevented, to the extent possible, within the species range.
Monitoring, Research, and Survey Needs

As no population density data are available, presence/absence surveys followed by mark-recapture monitoring programs should be undertaken throughout the species’ range in California to establish baseline information. Loss of habitat across the United States–Mexico border has the potential to isolate the California populations. To begin studying the potential for this to occur, field studies of migration rates and patterns through disturbed and fragmented habitats should be conducted with the aim of identifying and protecting remaining habitat corridors, as well as characterizing this taxon’s sensitivity to various sources of habitat disturbance. Such information will also be useful for developing models of the effects of future climate change scenarios on Gambelia copeii. Additional genetic data from nuclear markers should help confirm the species status of this taxon as well as quantify whether, and to what extent, hybridization occurs between it and G. wislizenii.