



SAN DIEGO BANDED GECKO

Coleonyx variegatus abbotti Klauber 1945

Status Summary

Coleonyx variegatus abbotti is a Priority 3 Species of Special Concern, receiving a Total Score/Total Possible of 54% (59/110). It was not considered for Species of Special Concern status during the previous evaluation (Jennings and Hayes 1994a).

Identification

Coleonyx variegatus abbotti is a small (maximum 5.8 cm SVL) lizard with slender padless toes, moveable eyelids, vertical pupils, and soft skin covered in fine granular scales (Klauber 1945, Grismer 2002, Stebbins 2003). The dorsal ground coloration is variable and ranges from pale yellow to grayish pink. A series of contrasting darker-brown or tan lateral cross-bands extend down the length of the body and are approximately the same width or narrower than the intervening areas of ground coloration. Areas between bands occasionally contain spots of the darker coloration. The head is dark and usually unmarked or only lightly mottled

with a narrow light nuchal crescent extending backward from the eyes (Klauber 1945). The ventral surface is semi-translucent and immaculate white to faint pink. The juvenile pattern is similar to that of adults, but the

San Diego Banded Gecko: Risk Factors

Ranking Criteria (Maximum Score)	Score
i. Range size (10)	10
ii. Distribution trend (25)	15
iii. Population concentration/ migration (10)	0
iv. Endemism (10)	3
v. Ecological tolerance (10)	7
vi. Population trend (25)	10
vii. Vulnerability to climate change (10)	7
viii. Projected impacts (10)	7
Total Score	59
Total Possible	110
Total Score/Total Possible	0.54

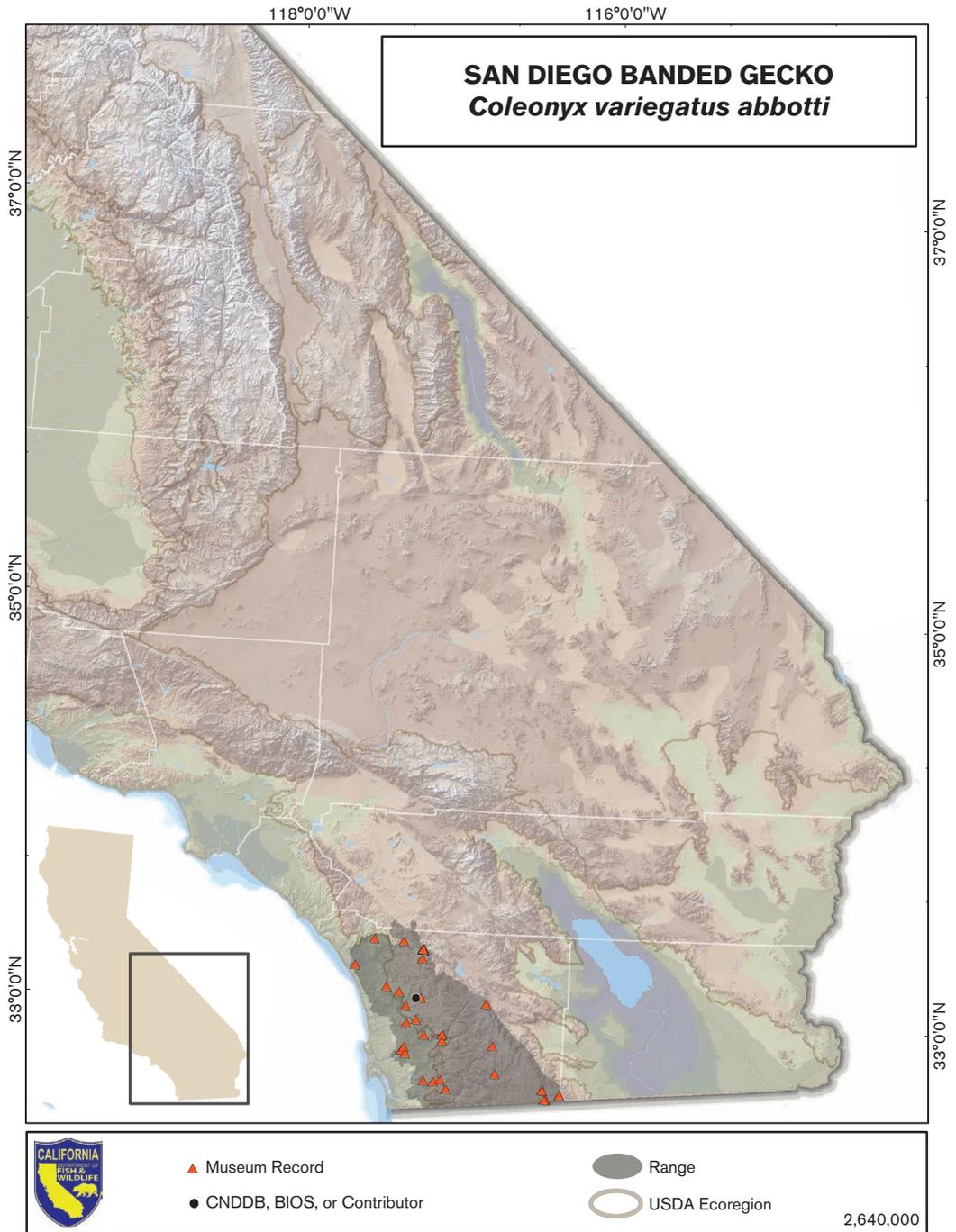


PHOTO ON PREVIOUS PAGE: San Diego banded gecko, San Diego County, California. Courtesy of Jeff Lemm.

coloration is often more pronounced and contrasting.

In California, this subspecies is only likely to be confused with other geckos that occur nearby. The closely related desert banded gecko (*C. v. variegatus*) is parapatric with *C. v. abbotti* along the Peninsular Ranges of Southern California and adjacent Baja California, Mexico. The two taxa are best distinguished based on color pattern, locality, and size. Although color and pattern in both subspecies are variable, *C. v. variegatus* generally lacks the nuchal collar, often has wider and less well-defined dark bands, has extensive spotting on the head, and attains larger overall body sizes (up to 7.1 cm) (Klauber 1945, Grismer 2002, Stebbins 2003, Lemm 2006). The two subspecies intergrade across narrow contact zones in Baja California and probably also in southern California, with *C. v. abbotti* occurring on the coastal side of the Peninsular Range mountains and *C. v. variegatus* on the inland side (Klauber 1945; D. Leavitt, pers. comm.). In some areas, animals that are morphologically referable to *C. v. abbotti* are genetically more similar to *C. v. variegatus* (D. Leavitt, unpublished data; see the “Taxonomic Relationships” and “Distribution” sections). The barefoot banded gecko (*C. switaki*) also has a superficially similar appearance but is more rarely encountered. In California, it has only been found in a narrow area of the Peninsular Range. Other geckos in southern California have expanded toe pads and immovable eyelids and are often extreme habitat specialists (Stebbins 2003).

Taxonomic Relationships

Coleonyx variegatus abbotti is a close relative of *C. v. variegatus*. Its initial description was based primarily on coloration, pattern, and scalation (Klauber 1945). Sequence data from seven nuclear DNA markers confirm the distinctiveness of *C. v. abbotti* but also restrict the known range (see the “Distribution” section). The two taxa are not genetically isolated but have an abrupt genetic and morphological contact zone

in Baja California and possibly also in Southern California (D. Leavitt, unpublished data).

Life History

The life history of *Coleonyx variegatus abbotti* is poorly studied, although it is likely similar to that of the better-studied *C. v. variegatus* in many respects. *Coleonyx variegatus abbotti* is active from March until September or October (Lemm 2006). It is nocturnal, emerging from rock crevices and burrows usually within 2 hours following sunset. Like other geckos, it is a predator, presumably taking a variety of small invertebrates, although the diet has not been studied in detail (Kingsbury 1989, Grismer 2002).

Reproduction takes place in late spring. Females lay one or two eggs at a time (Lemm 2006). Other subspecies of *C. variegatus* are known to lay up to three clutches per year between May and September (Stebbins 2003), and this may also occur in *C. v. abbotti*. Juveniles have been found as late as September (Lemm 2006).

Habitat Requirements

Coleonyx variegatus abbotti is restricted to rocky coastal sage and chaparral habitat, usually in areas between 150 and 900 m in elevation (Lemm 2006). Klauber (1945) noted that the subspecies seems to prefer areas with granite outcrops, though it is not restricted to them and has been found in dry rocky riverbeds. Most specimens have been found under cover objects or on roads at night. It is more frequently found under large cap rocks than under the small rock flakes favored by other small lizard species such as the granite night lizard (*Xantusia henshawii*) (Klauber 1945). Extensive pitfall trapping data indicate that *C. v. abbotti* is absent from areas with a high intensity of artificial night lighting (Perry and Fisher 2006; R. Fisher, unpublished data).

Distribution (Past and Present)

Ongoing genetic analyses of the *Coleonyx variegatus* complex are revising our understanding

of *C. v. abbotti*'s distribution, and thus our current concept of its range may change as these studies are completed. Historically, all *Coleonyx* ranging from the United States–Mexico border north along coastal and cismontane Southern California were considered *C. v. abbotti*. However, genetic data indicate that the range is more limited and primarily restricted to San Diego County, with populations farther north belonging to *C. v. variegatus* (D. Leavitt, unpublished data). The extent of the potential intergrade zone between the two subspecies is not yet well understood. In Mexico, *C. v. abbotti* ranges from the border south along coastal and cismontane Baja California to the vicinity of Cataviña, then extends east across the peninsula and south, eventually intergrading with the Peninsular banded gecko (*C. v. peninsularis*) in the Vizcaíno mid-peninsula region.

Geckos have disappeared from much of coastal San Diego County, primarily in areas with high-intensity artificial night lighting (Perry and Fisher 2006). Whether night lighting itself or other habitat changes associated with artificial night lighting drove the declines is not well studied. Development and agricultural impacts have also extirpated geckos from some areas (R. Fisher, pers. comm.).

Trends in Abundance

Few quantitative data on historical or current abundances are available, although *Coleonyx variegatus abbotti* is less frequently encountered than *C. v. variegatus* farther east (Lemm 2006). This was apparently also the case historically. Klauber (1945) specifically noted that *C. v. abbotti* was less common throughout its range than *C. v. variegatus*. Bogert (1930) also reported that the geckos were rare in Los Angeles County, although genetic data suggest these might actually have been *C. v. variegatus*. Pitfall surveys indicate that the subspecies is found at a small number of sites within southern California (7 out of 21 survey areas, 15 individuals in total) compared to lizard species occupying similar habitats (Case and Fisher 2001). However, these surveys were not designed to specifi-

cally target *Coleonyx*, and no historical baseline data exist with which to compare current abundances.

Nature and Degree of Threat

The primary threat facing *Coleonyx variegatus abbotti* is apparently habitat loss due to agricultural and urban development, including deaths from automobile traffic. Some data further suggest that artificial night lighting is correlated with declines, although no causal link has been established. Climate change within its limited range is expected to increase the frequency and intensity of wildfires, which could degrade some currently suitable habitat. Finally, *C. v. abbotti* is encountered relatively rarely even in suitable habitat, which poses significant challenges in monitoring population trends and the impacts of habitat disturbance.

Status Determination

Coleonyx variegatus abbotti has a restricted range in California that falls within an area that is currently experiencing a large amount of development. Some data suggest that the subspecies has disappeared along the coast in a substantial fraction of its range. This, coupled with the ongoing habitat loss due to development and wildfire, could reduce the current distribution further and justifies a Priority 3 Species of Special Concern designation.

Management Recommendations

The most important management priority for *Coleonyx variegatus abbotti* is to protect remaining habitat. Our current understanding of habitat requirements and this taxon's sensitivity to habitat degradation is unfortunately weak, and there is a strong need for additional study before a thorough and informed management strategy can be developed.

Monitoring, Research, and Survey Needs

The relative rarity with which this subspecies is encountered makes the detection of past and ongoing declines difficult. A comparison of survey protocols for this subspecies, including

time-constrained searches and pitfall trapping should be initiated. A goal of this comparison should be to develop a survey protocol that is capable of detecting changing abundances. A mark-recapture study would help determine whether the apparently low population densities currently observed reflect detectability or true population numbers. This should include a power analysis to clarify the trapping intensity needed in order to detect changes of varying magnitude. Surveys should include relatively pristine sites, moderately disturbed habitats, and those with varying degrees of artificial night lighting. Survey data should also be utilized to inform our understanding of habitat preferences, seasonality, and life history in this taxon.

Additional genetic surveys should also be undertaken to further clarify the range limits and genetic differentiation among members of the *Coleonyx variegatus* complex. In particular, contact zones between different subspecies should be further studied in order to develop a clear understanding of the range for both taxa in southern California. Landscape genetic studies would help to inform management in terms of connectivity of remaining populations and potentially help identify habitat corridors. Information from genetics, morphology, and survey data should be integrated to develop a more comprehensive understanding of differentiation between this subspecies and other members of the *C. variegatus* complex.