

Yuma mountain lion, *Felis concolor browni*

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Description: The mountain lion is the second largest of the American felids. According to Young and Goldman (1946), the type specimen of *browni* (a male from along the Colorado River 12 mi [19.2 km] below Yuma, Arizona) is 2,235 mm TL, TAL of 724 mm, and weight of 170 pounds. A male from along the Colorado River in California, 20 mi (32 km) north of Picacho, had a TL of 1981 mm. Males of *F. concolor* can be up to 50% larger than females (Dixon 1982). The pelage is usually tawny, although Young and Goldman (1946:225-226) described additional pelage colors of *F. c. browni* ranging from “cinnamon-buff” to “pinkish-buff” to “pure white” on various parts of the body. They describe the pelage as shorter and paler than that of the *californica* subspecies to the west.

Taxonomic Remarks: The Yuma mountain lion was described by C. Hart Merriam in 1903 after examining one specimen. Merriam (1903) named it *F. aztecus browni* after the collector, Herbert Brown. Young and Goldman (1946) examined nine catalogued specimens and revised the name to *F. concolor browni*. In reviews of the Yuma mountain lion, McIvor et al. (1994, 1995) doubted the validity of the subspecies. Morphometric analysis of various skull characters (McIvor et al. 1995) indicated that some separation was possible among *browni* and three adjacent lion populations tested (*F. c. azteca*, *F. c. californica*, and *F. c. kaibabensis*). Although McIvor et al. (1995) “identified sufficient deficiencies in the [morphometric] data set to conclude that the data currently available will not support a rigorous statistical analysis”, they stated “that the existing evidence does not support the subspecific designation of this population”. In contrast, results of an investigation of the genetic differentiation of *P. c. browni* and four neighboring subspecies (*azteca*, *kaibabensis*, *californica*, and *improcera*), (Culver and O'Brien 1997) revealed: *i*) a high degree of genetic similarity among *browni*, *azteca*, and *kaibabensis*; and *ii*) significant genetic deviation between *californicus* and these three subspecies. These results indicate that there may be two distinct lineages of mountain lions in California, represented by the widespread *californicus* and the more restricted *browni*.

Distribution: According to Grinnell et al. (1937), the Yuma mountain lion occurred in the bottomlands and adjacent uplands of the Colorado River Valley at least as far north as the Riverside Mountains. Young and Goldman (1946) described its distribution as the desert plains and low mountains of the Colorado River Valley in southeastern California, southwestern Arizona, northeastern Baja California, and northwestern Sonora (the latter two in Mexico). Since six conflicting range maps have been published for *F. c. browni* (see McIvor et al. 1994, 1995), and the distribution and taxonomy of the subspecies are in question, the map provided here reflects only the one California locality based on a museum specimen.

Life History: Little is known of the life history of the Yuma mountain lion. Mountain lions usually breed at about 2.5 years of age. In other subspecies studied, young are produced year-round, with a peak in parturition from April to August. Gestation is 80-100 days, and litter size is from one to six (Dixon 1982). However, there are no specific data available on *browni*.

Deer (*Odocoileus* sp.) typically are the main prey, although mountain lions are known to take a variety of other large and smaller mammals (Dixon 1982, Currier 1983). The following prey species have been recorded for mountain lions inhabiting arid habitats of Arizona: deer, bighorn sheep (*Ovis canadensis*), coyote (*Canis latrans*), skunk (*Mephitis*, *Spilogale*), badger (*Taxidea taxus*), raccoon (*Procyon lotor*), cattle, and rabbits and hares (*Sylvilagus*, *Lepus*) (Cashman et al. 1992 in McIvor 1994). The most important prey for *browni* is the burro deer, *Odocoileus hemionus eremica*,

although Nelson's bighorn sheep, *Ovis canadensis nelsoni*, are also taken. Bighorn sheep, where present, may constitute a significant prey item. Mountain lion predation on bighorn sheep and subsequent significant reduction of sheep numbers has been documented in the Granite Mountains (eastern Mojave Desert) and Mount Baxter (eastern slope of Sierra Nevada, north of Independence) populations (Wehausen 1996).

The home range of four individuals was reported by Peirce and Cashman (1993) to range widely, from 389 km² to 1621 km². These are comparable to home range estimates for other mountain lions in desert environments (range 122-1032 km²).

Habitat: Grinnell et al. (1937:587) described the habitat of the Yuma mountain lion as "mostly in the heavy riparian growths of the bottom lands, but is reported also from the rocky desert uplands adjacent". Young and Goldman (1946:225) describe the habitat as mainly Lower Sonoran Zone. According to McIvor et al. (1994), the subspecies has been observed in most or all of the habitats within its range. In general, its habitat coincides with the habitat of its principal prey, the burro deer. On the perimeter of their range, Yuma mountain lions used ridge tops of typical Sonoran desert vegetation, and to a lesser extent, adjoining chaparral and arid grasslands. Habitat within the range described for the Yuma mountain lion in California has been modeled and is considered to be of low or no suitability for mountain lions (Torres et al. 1996).

Status: Class II. McIvor et al. (1994) discuss whether the Yuma mountain lion is a "sustainable subspecies". Factors to consider include the following:

i) Is there adequate remaining habitat and prey base to sustain the population? On the basis of their estimated densities of Yuma mountain lions and deer within the total range (i.e., California, Arizona and Mexico) of *browni*, McIvor et al. (1994) calculated a total population of 138 Yuma mountain lions. The pre-hunting season estimated population size of the burro deer herd within the California range of the Yuma mountain lion was 1,500 animals during 1997, with an estimated 1997 hunter harvest of 90 deer. The average estimated deer habitat loss in Imperial County due to conversion to urban/agriculture is 6,300 acres for the years 1990-2000, and 5,500 acres for 2000-2010. For Riverside County, average acreage lost is estimated to be 75,500 acres during 1990-2000, and 68,100 acres for the years 2000-2010 (Calif. Dept. Fish and Game 1997).

ii) Any barriers to the movement of *browni*, either within its reported range or between its range and that of adjacent subspecies, are probably ephemeral in nature (e.g., seasonal lack of water or prey, high seasonal temperatures) (McIvor et al. 1995). What then, is the nature of the difference between the subspecies?

iii) According to McIvor et al. (1995), the fact that no breeding females have been reported from the range of *F. c. browni* has led to speculation (by Peirce and Cashman 1993) that extant prey may not support breeding females, and that the 10:4 ratio of males to females represented in the specimens from *F. c. browni* range also suggests that females are underrepresented. If reproduction rates are low or absent in the range of the Yuma mountain lion, the area would represent a population sink occupied by lions dispersing from surrounding populations (McIvor et al. 1995).

iv) Mountain lions in California have been protected from hunting since 1972 (Torres et al. 1996). As lion numbers increase and formerly vacant habitats and territories become occupied, transient lions are pushed into increasingly marginal habitats. Conditions exist, therefore, that encourage dispersal into *F. c. browni* range from surrounding lion populations (McIvor et al. 1995).

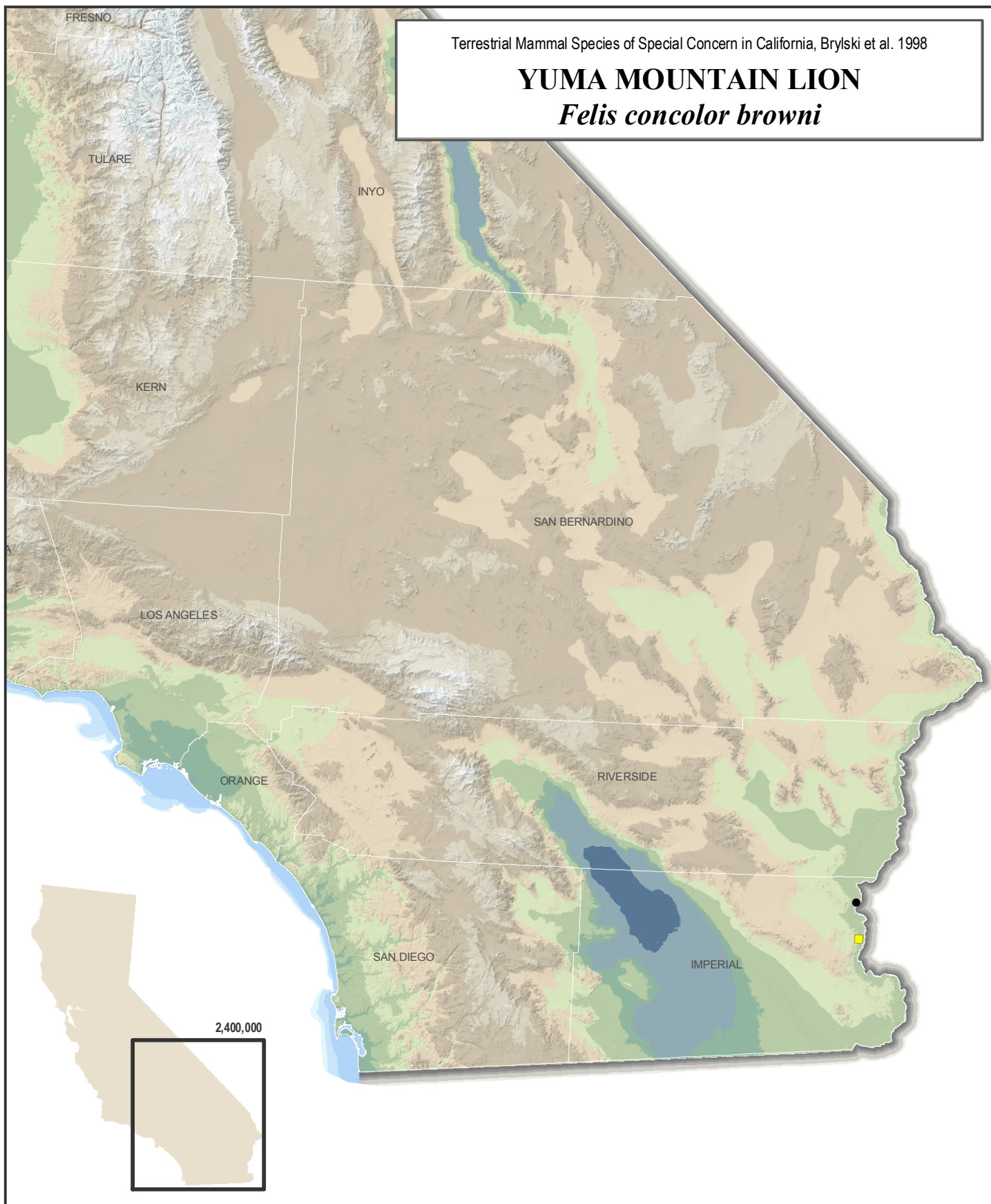
In spite of the questions about the validity of retaining the Yuma mountain lion as a valid subspecies, it should be considered a Species of Special Concern unless and until published results of a genetic analysis indicate that *F. concolor browni* is not a valid subspecies. Habitat loss is a serious concern within the historic range of *F. c. browni*. Native habitats within the former floodplain of the Colorado River and areas adjoining the river corridor have been impacted by water developments, and converted to agricultural and suburban land uses. In a study of burrow deer, Haywood et al. (1984, cited In McIvor et al. 1994) reported previous losses of up to 1,200 ha/yr of riparian vegetation along the lower Colorado River. Although much of the land within *browni*'s historic range is publicly-owned and administered by the Bureau of Land Management and the Department of Defense, as well Indian Reservation lands, the impacts of habitat conversion and the more dispersed land uses such as seasonal patterns of recreational use, have adversely impacted wide-ranging species such as the mountain lion. According to McIvor et al. (1995), "[p]robably the greatest threat to [Yuma] mountain lions... stems from loss of habitat, particularly riparian and wetland communities (Williams and Kilburn 1984), as it relates to loss of prey species, especially deer herds (Duke et al. 1987). Additional threats to lions and their prey stem from agricultural and recreational activities, mining, off-road vehicles, canal mortality, and competition with domestic livestock (Duke et al. 1987)."

Management Recommendations: Management goals for all mountain lions in California include: 1) maintaining viable populations of mountain lions, 2) minimizing conflicts related to public safety, property damage, and other wildlife, 3) protecting important habitats, 4) recognizing their ecological role and value, 5) monitoring populations and conducting research, and improving public awareness (Torres et al. 1996). Genetic studies on the validity of the subspecies should be completed and published in a peer-reviewed journal. Should the subspecific designation prove to be valid, field studies on the status, ecology, and distribution of the Yuma mountain lion should be implemented. Information on diet, movements, and habitat use are needed in order to design management programs. No doubt one of the major components of any management plan will be to maintain and improve habitat quality for the burro deer.

Terrestrial Mammal Species of Special Concern in California, Brylski et al. 1998

YUMA MOUNTAIN LION

Felis concolor browni



- Locations verified by authors
(captures, observations, museum records)

■ CNDDDB 1978 and before