

# PROBABLE OCCURRENCE OF A BROWN BEAR (*URSUS ARCTOS*) IN SONORA, MEXICO, IN 1976

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**ABSTRACT**—Measurements taken on the skull of a bear shot in northern Sonora, Mexico, in 1976 revealed that the skull is from a brown bear (*Ursus arctos*). The skull appears to be that of a juvenile (sex unknown) and, to our knowledge, represents only the fourth confirmed record of a brown bear from Sonora, although anecdotal accounts exist from the mid-1800s to early 1900s. The present record also establishes that brown bears, considered extirpated from Mexico since the 1960s, were present in Sonora within the past 30 years.

**RESUMEN**—Las mediciones del cráneo de un oso cazado en el norte de Sonora, México, en 1976, confirman que éste pertenecía a un oso pardo (*Ursus arctos*). Aparentemente el cráneo es de un juvenil (sexo no determinado) y representa, según nuestros conocimientos, el cuarto registro confirmado del oso pardo en Sonora, aunque hay varios relatos no confirmados publicados a finales de los años 1800 y al principio de los años 1900. El registro que se presenta indica que los osos pardos, considerados extirpados de México desde la década de los 1960s, estuvieron presentes en Sonora en los últimos 30 años.

Brown bears (*Ursus arctos*) probably have been extirpated from Mexico, the last recorded sighting listed as 1962 in the Sierra del Nido in central Chihuahua (Koford, 1969 cited in Anderson, 1972). The last occurrences of brown bears in the state of Sonora, Mexico are not precisely known, but historical accounts suggest that they were present at least until the late 1800s (Mearns, 1907). Their former distribution in Sonora is also not known, but is assumed to be delimited by the brush covered foothills and mixed pine-oak forest of the Sierra Madre Occidental that would likely have been their preferred habitat (Fig. 1).

Brown bears also were apparently abundant in the late 19th century in the neighboring state of Chihuahua. In 1899, E. W. Nelson collected in the vicinity of Casas Grandes and Colonia García, in northwestern Chihuahua, and brought back several specimens which were named *Ursus nelsoni* by Merriam (1914). Skulls and skins from eight brown bears from Chihuahua are deposited at the United States National Museum of

Natural History (NMNH) (catalog nos. USNM 20579; 98320, 98323, 98324, 98327; 99657; 99664; 170557). Leopold (1959) visited the area of Casas Grandes and Colonia García in 1937 and found that brown bears were locally extinct, with the last individuals killed in 1928 and 1932 along the Chihuahua-Sonora border west of Pacheco.

Museum holdings and published reports indicate at least three confirmed records for brown bears in Sonora: (1) a specimen taken by C. B. Kennerly in the mountains near Los Nogales (Nogales), Sonora, in June 1855 (Merriam, 1914); the skull is deposited at the NMNH (USNM A2086) and was originally named *U. kennerleyi* Merriam, 1914 in honor of the collector, (2) a brown bear recorded by W. W. Price as having been killed in Guadalupe Canyon in extreme northeastern Sonora along the Arizona border before 1894 (Allen, 1895 cited in Leopold, 1959; also considered an authentic record for Arizona by Hoffmeister, 1986), and (3) a brown bear collected by W. W. Wood in

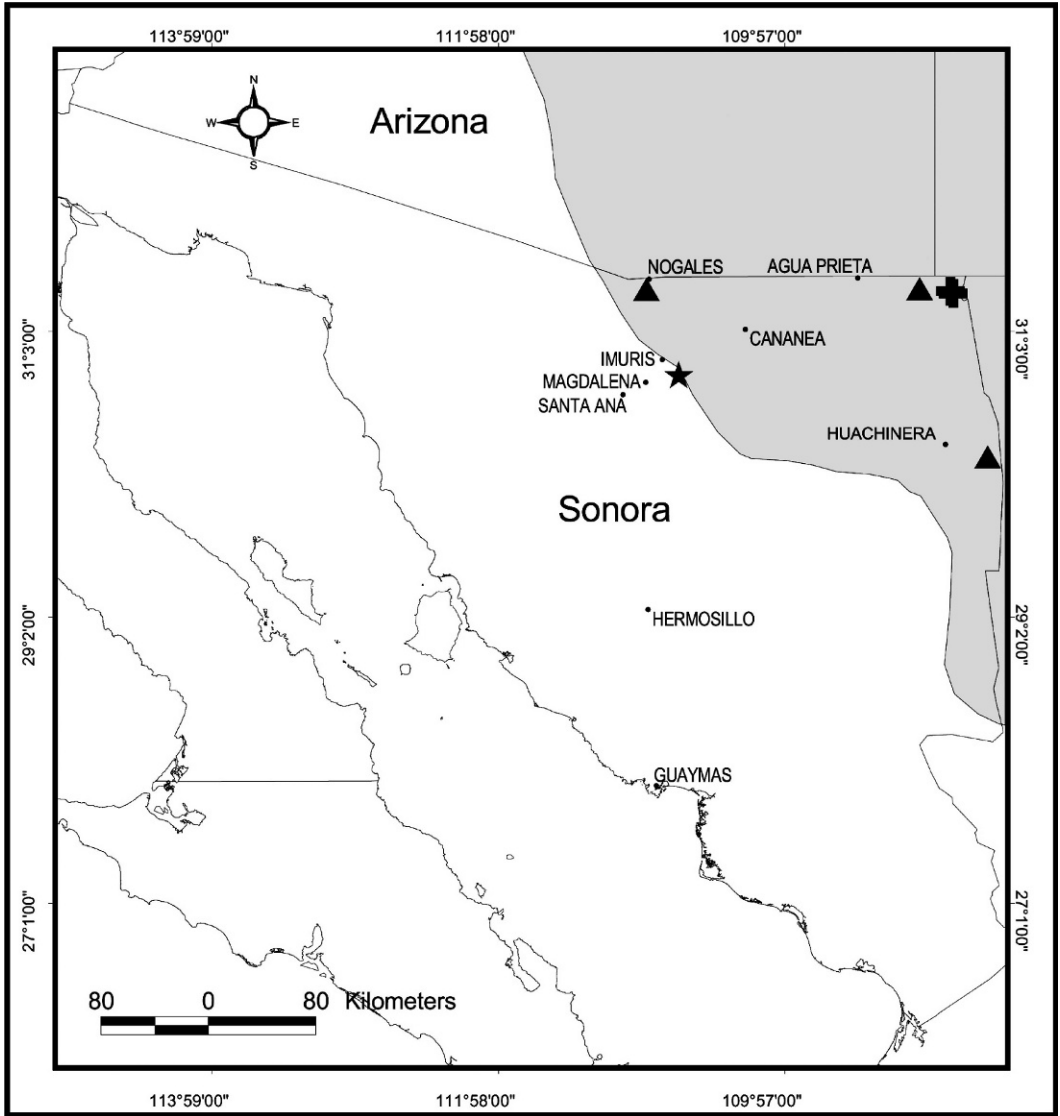


FIG. 1—Assumed former distribution of brown bears (*Ursus arctos*) in Sonora, Mexico, is shown as the shaded area; modified from Leopold (1959). Triangles represent sites of the three historical records of brown bears in Sonora; the plus sign represents the area of sightings reported by Mearns (1907). The star shows location of Arroyo El Oso where the young brown bear described here was killed.

May 1903 ca. 60–70 miles WSW Casas Grandes, Chihuahua (12 miles west of the continental divide); the skull is at the NMNH (USNM 203175).

In May 2005, we received from a Sonoran rancher a bear skull that was collected at Arroyo El Oso in the Sierra de La Madera, Sonora, Municipio de Magdalena de Kino, ca. 4 km SE Rancho Los Tubos (ca. 30°41'N; 110°45'W;

1,600–1,700 m elevation); the habitat was mixed pine (*Pinus chihuahuana*) and oak woodland. The bear was killed in 1976 while feeding at a mountain lion kill (J. Dicochea, pers. comm.). The skull, which was thought by local ranchers to be from a black bear (*Ursus americanus*), had been stored at Rancho Los Tubos. A young brown bear, however, could be confused with an adult black bear because the latter can have

TABLE 1—Skull measurements of adult brown bears (*Ursus arctos*) and American black bears (*U. americanus*) from northern Mexico compared with the skull discovered at Arroyo El Oso, in the Sierra La Madera, Sonora. Measurements were taken with dial calipers. Column headings: (A) specimen from Arroyo El Oso; (B) skull of the Sonoran grizzly originally described as the type of *Ursus kennerleyi* (USNM A2086); measurements taken from Hoffmeister (1986); (C) measurements of five female brown bears from Chihuahua taken from Anderson (1972); (D) measurements of three male brown bears from Chihuahua taken from Anderson (1972); (E) measurements from two male and one female American black bears collected from the Sierra de Huachinera, Sonora. Mean values in mm ( $\pm SD$ ) and range are given for columns C–E.

Skull Measurement (mm)	Brown bear				American black bear
	A	B	C	D	E
	?	♂	♀	♂	♀ + ♂
Condylobasal length	264		272.8 $\pm$ 9.5 261–284	291.3 $\pm$ 10.5 281–302	273.3 $\pm$ 3.3 269–277
Palatal length	134	172.2	141.6 $\pm$ 5.1 135–148	150.3 $\pm$ 4.5 146–155	130.3 $\pm$ 3.3 126–134
Intermaxillary width	48				48 $\pm$ 1.4 46–49
Basilar length	240				236.7 $\pm$ 5.6 229–242
Crown length (P4-M2)	56	72.0			49.1 $\pm$ 0.8 48.5–50.0
Mastoidal width	112.5				119.0 $\pm$ 5.1 112–124
Zygomatic width	ca. 143 <sup>a</sup>	205.5	165.0 $\pm$ 7.6 152–171	166.7 $\pm$ 16.8 156–186	160.0 $\pm$ 1.4 159–162
Braincase width	89		90.1 $\pm$ 2.2 87–92.6	96.7 $\pm$ 1.5 95–98	86.7 $\pm$ 1.8 84.5–89
Interorbital width	55	75.3	58.9 $\pm$ 2.9 55.6–60.7	60.3 $\pm$ 7.7 53–68.4	63 $\pm$ 0.8 62–64
Supraorbital process width	Broken				90.2 $\pm$ 2.1 88–93
Postorbital process width	60	115.2	60.8 $\pm$ 2.4 57.8–63.8	64.4 $\pm$ 2.4 62.0–66.7	64 $\pm$ 0.8 63–65
Rostral width	56.7		60.4 $\pm$ 1.4 58.2–61.6	65.8 $\pm$ 3.3 63.7–69.6	59.6 $\pm$ 1.7 57.3–60.9
Length of P4 left maxillary	19.2 <sup>b</sup>		20.0 $\pm$ 0.5 19.5–20.6	21.7 $\pm$ 0.7 20.9–21.9	16.6 $\pm$ 0.5 16.2–17.3
Length of left maxillary molar (M2)	26.8	35.7			22.8 $\pm$ 0.2 22.5–23.1
Width of left maxillary molar	15.4	18.9			13.6 $\pm$ 0.2 13.4–13.8

<sup>a</sup> Reconstructed on a broken zygomatic.

<sup>b</sup> Right P4 (left P4 was broken).

black, brown, or cinnamon pelage. Also, young brown bears and adult black bears can be the same size. Upon comparing the skull from Arroyo El Oso with three black bear skulls from our vertebrate collection (CIAD-210801-1, -2 and -3) we found several differences that prompted us to examine it in more detail. Here we present evidence that the skull was from a brown bear. The skull has been deposited in the Colección de Vertebrados del Centro de Investigación en

Alimentación y Desarrollo, A.C., Unidad Guaymas (CIAD-00-0076). It should be noted that the previous separation of brown bears into a variety of species and subspecies (Merriam, 1914, 1918; Hall, 1984) is not supported by molecular data, which suggest just a single species, *U. arctos*, in Mexico and elsewhere (Miller et al., 2006).

In Table 1 we present skull measurements for our specimen together with measurements taken on (a) the type of *Ursus kennerleyi* (Hoffmeister,

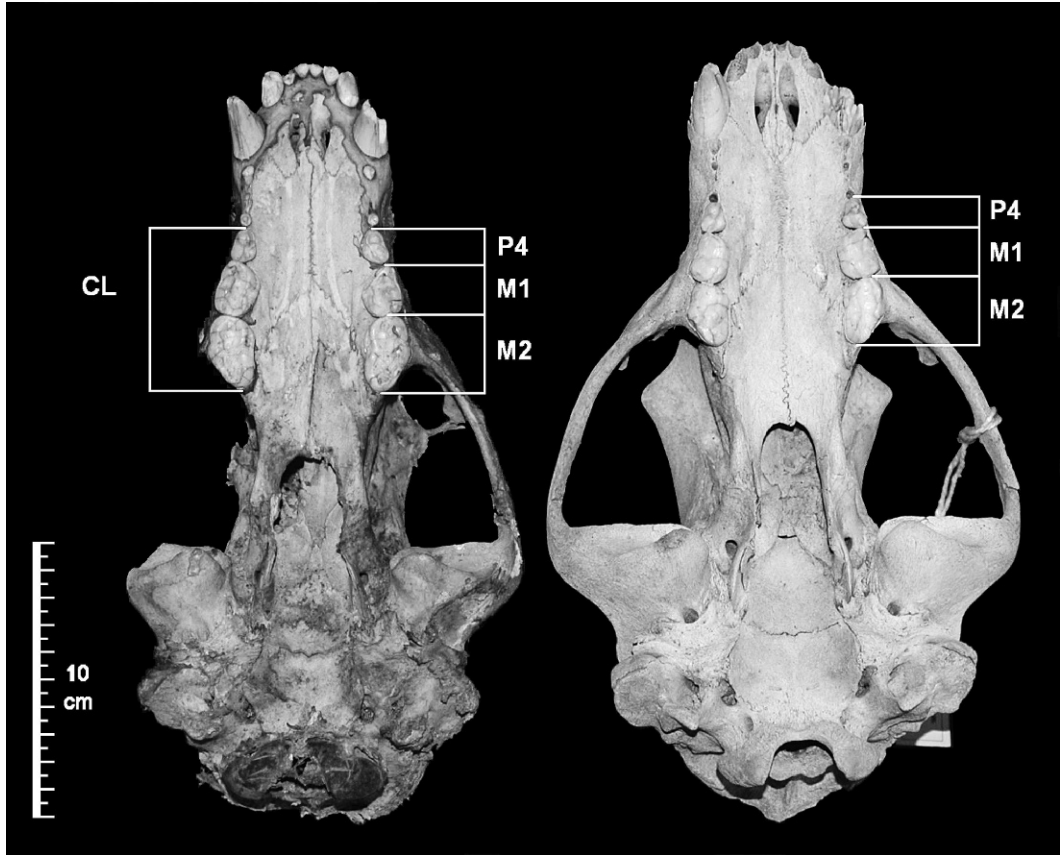


FIG. 2—Ventral views of skull of a juvenile brown bear (*Ursus arctos*) from Arroyo El Oso, Sonora (left, CIAD-000076) and of an adult American black bear (*U. americanus*) from the Sierra de Huachinera, Sonora (right, CIAD-210801-1); CL, crown length.

1986), (b) eight brown bears from Chihuahua, Mexico (Anderson, 1972), and (c) three black bears from Sonora. Although Hoffmeister (1986; Table 5.71) summarizes skull characteristics that can distinguish between adult brown bears and black bears, these were not useful here because our specimen appears to be that of a juvenile in that the pulpar cavity in the left canine was not filled and the skull sutures were not fused. Although skull size in our specimen is about the same as in adult black bears from Sonora (Fig. 2), the measurements and characters that suggest it is from a brown bear are (1) the second upper molar (M2), which is the last tooth in the row, is broadest near its anterior end, whereas in black bears, M2 is broadest near its midpoint (Anderson, 1972); (2) the length of M2, typically  $>31$  mm in adult brown bears, was 26.8 mm which is longer than both the mean

length in Sonoran black bears [ $22.8 \pm 0.2$  mm,  $n = 3$  (two males and one female); Table 1] and the mean lengths (also in mm  $\pm$  SD) recorded by Hoffmeister (1986) for black bears from Arizona and New Mexico [males,  $25.2 \pm 0.6$  ( $n = 3$ ) and  $25.6 \pm 2.4$  ( $n = 6$ ); females,  $23.7 \pm 1.2$  ( $n = 4$ )], again suggesting that it is a juvenile brown bear; and (3) crown length (from P4 to M2; Fig. 2) was 56 mm, longer than both the mean length in black bears from Sonora ( $49.1 \pm 0.8$  mm,  $n = 3$ ; Table 1) and the mean lengths for black bears given in Hoffmeister (1986) [males,  $52.9 \pm 1.0$  ( $n = 3$ ) and  $53.5 \pm 3.0$  ( $n = 6$ ); females,  $49.4 \pm 1.7$  ( $n = 4$ )]. The differences in both the size of M2 and crown length in our specimen compared to a Sonoran black bear are clearly evident in Fig. 2. The fact that crown length is  $>67$  mm in adult brown bears from Arizona and Sonora (Hoffmeister, 1986) again is consistent with our

specimen being a juvenile. Our attempts to obtain molecular confirmation of the identity of the juvenile brown bear from DNA extracted from a sample of dried skin and muscle found attached to the base of the skull were unsuccessful.

The present record, which falls within the assumed historical distribution of brown bears in Sonora (Fig. 1), represents, to our knowledge, only the fourth confirmed record for Sonora. The killing of this young bear in 1976 indicates that at least several brown bears (i.e. the parents and possibly additional offspring) survived in the mountains of Sonora after the supposed extirpation of the species in Mexico in the 1960s (Koford, 1969 cited in Anderson, 1972). According to residents on Rancho Aribabi near Huachinera (Fig. 1), there are still very large, rusty-gray colored bears with large not rounded frontal claws in the foothills of the sky-islands in Sonora and other mountain ranges within the former distribution. Although we have searched for brown bears in likely habitats (i.e. scrub-oak belt and lower fringes of the pine forest), we have found only indirect records of black bear (footprints and scats). Reported records for black bears in Sonora are all to the north of the area where the juvenile brown bear was found (J. P. Gallo-Reynoso and F. Garza-Salazar, in litt.; F. Garza-Salazar, pers. comm.). Although the Sonoran landscape has been intensively modified and used for cattle grazing in the foothills, a large portion of the former brown bear habitat has not been significantly changed and is remote and of difficult access. Nonetheless, the probability of finding extant populations of this species in northern Mexico remains weak.

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