

On the Holocene History of *Ursus* in Eastern Washington

Abstract

The Holocene archaeological record for *Ursus* in eastern Washington indicates that (1) *U. americanus* occupied a range during the Holocene similar to its historical range, and (2) *U. arctos* occupied a larger range than that historically documented. Frequencies of ursid remains appear to remain stable throughout the Holocene in spite of major changes in environment and human hunting practices.

Introduction

When Walter Dalquest published his study on the mammals of Washington in 1948, archaeology and paleontology were just beginning to become major research endeavors in the state (Sprague 1973). Today a body of paleomammalogical data is available as a result of those research endeavors over the past 35 years. I summarize those data for the genus *Ursus*, and give some paleoecological and archaeological interpretations for Washington east of the crest of the Cascade Range. This area is physiographically diverse (Franklin and Dyrness 1973), and includes the Columbia Plateau, the eastern flanks of the Cascade Range, the Okanogan Highlands, the western edge of the Selkirk Mountains, and the northern portion of the Blue Mountains.

Hall (1981) recorded 93 extant endemic mammalian species, representing 58 genera, in this study area. The zoogeographic history of these taxa has been dynamic over the past 20,000 years, and several other taxa became locally extinct. Archaeological records of taxa tend to confirm the speculative zoogeographic history outlined by Dalquest (1948). At present, 43 species representing 35 genera have been identified in Holocene archaeological sites in eastern Washington (Lyman and Livingston 1983).

Methods

Data for this study were derived from published and unpublished archaeological and paleontological reports. Because the taphonomic history of a bone assemblage is difficult to ascertain, the extent to which a sample of faunal remains resembles the original fauna from which it derived cannot be determined (Grayson 1981, King and Graham 1981). It is reasonable to assume,

however, that taxa represented in an archaeological faunal assemblage lived in the general area of the site of recovery. Multiple samples of faunal remains from numerous regional sites are required to demonstrate that a taxon was absent (Grayson 1981). I have assumed that the present ecological requirements of the taxa discussed are the same as that in the past. I also assume that palynological data reflect prehistoric environmental conditions.

The available palynological data indicate that prior to about 9500 yr B.P. environments tended to be cooler than at present, with dry conditions in the southern two thirds and humid conditions in the northern one third of eastern Washington. The environment then tended to become warmer and/or drier, with a brief moist interval about 8000 to 8500 yr B.P. in some higher elevations. About 4500 yr B.P. environments shifted to cooler and moister conditions than found today. Subsequent to 2500 yr B.P., environments in all parts of eastern Washington became much like modern environments. There is limited evidence of a drier episode between 1500 and 500 yr B.P. in more arid parts of eastern Washington (see Mehringer in press, and references therein).

Results

Ursus americanus

Hall (1981:950) indicated that *U. americanus* was historically ubiquitous in the state, but Dalquest (1948:175) suggested a more limited distribution (Figure 1). Most recently, Pelton (1982:504) proposed that "the primitive range of *U. americanus* covered the forested areas of North America" and excluded the arid Columbia Plateau of eastern Washington from its range.

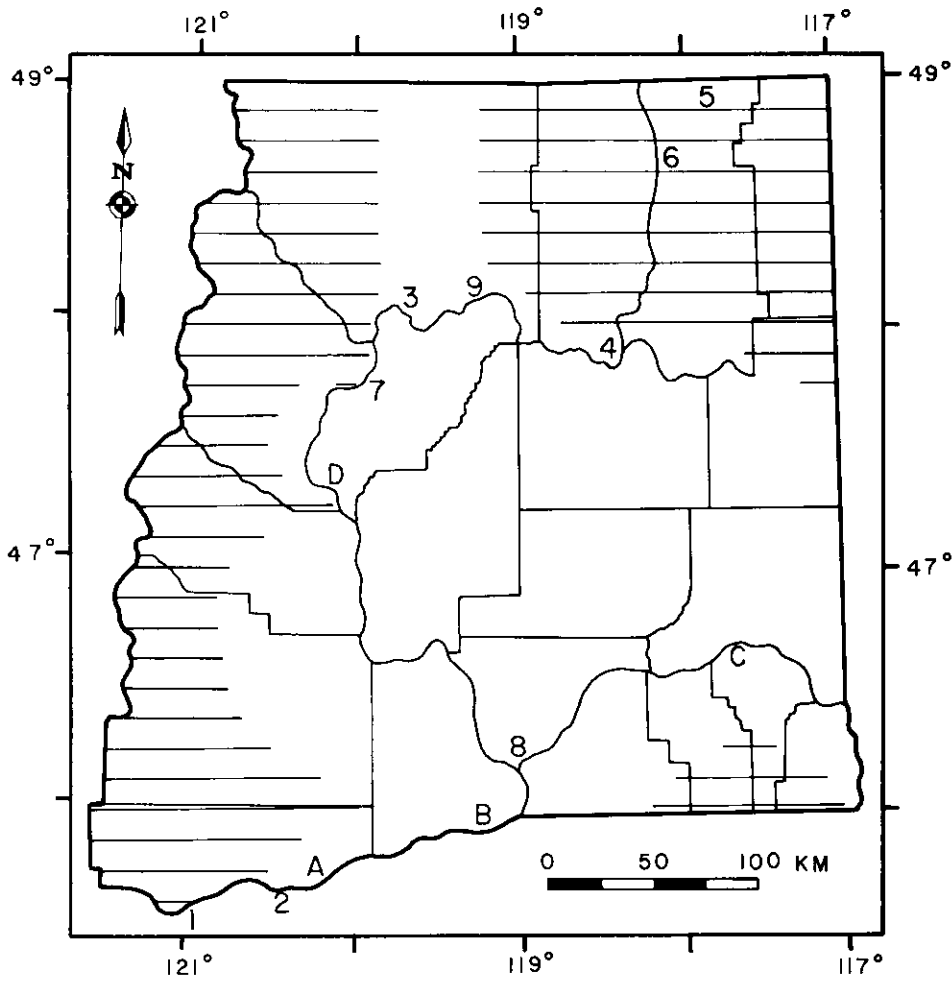


Figure 1. Holocene archaeological and historically documented distributions of *Ursus* sp. and *U. americanus* in eastern Washington. The horizontally cross-hatched area is the historic distribution of *U. americanus* (Dalquest 1948). Numbers indicate recovery sites of *U. americanus* remains, and letters indicate recovery sites of *Ursus* sp.

No ursid specimens have been reported from any of a dozen archaeological sites that have been excavated in the arid Columbia Plateau. The number of specimens from each of these sites tends to be small (range is 5 to 3622; $\bar{X} = 557$), therefore it is possible that future work will recover *Ursus* remains from this area. It is well documented that large samples are required to detect the presence of rare taxa (e.g., Wolff 1975). At present I can only conclude that ursids were rare, if present at all, in the arid Columbia Plateau.

The available Holocene data conform most closely to the distribution indicated by Pelton

(1982). Specimens of bones and teeth recovered from archaeological sites and identified as *U. americanus* have been found in eight sites that are today in forested environments (Table 1). All of these sites are in riverine locations, where trees and brush are more abundant than on contiguous uplands.

Ursus arctos

The grizzly apparently entered the contiguous 48 states during the Wisconsin glacial episode (Kurtén and Anderson 1980:184). Craighead and Mitchell (1982:516) summarized the available North American zoogeographic data for *U. arctos*

TABLE 1. Summary of Holocene archaeological ursid data in eastern Washington. *see Figure 1. **see Figure 2.

TAXON	SITE	YEARS B.P.	NUMBER OF SPECIMENS	REFERENCE
<i>Ursus</i> sp.	*(A)45KLa	late Holocene?	“present”	Garth, 1952
	*(B)45BN55	late Holocene?	“present”	Garth, 1952
	*(6)45FE44	9000-4400	7	Chance and Chance, 1982
	*(C)45Ga17	2330	“present”	Schroedl, 1973
	*(D)45D0176	850	1	Lyman, 1985b
	*(9)450K258	800-600	2	Livingston, unpublished
	*(9)450K258	3500-2200	2	Livingston, unpublished
<i>U. americanus</i>	*(1)35WS4	mid-Holocene?	“present”	Cressman et al., 1960
	*(2)35GM9	6700-0	4	Dumond and Minor, 1983
	*(3)450K52	500	“present”	Grabert, 1968
	*(4)45FE24	late Holocene?	4	Collier et al., 1942
	*(5) 46	late Holocene?	1	Collier et al., 1942
	*(6)45FE45	6000-4400	12	Grayson, 1977
	*(6)45FE45	4400-3200	2	Grayson, 1977
	*(6)45FE45	3200-2800	2	Chance and Chance, 1982
	*(7)45D0408	1450	1	Schalk and Mierendorf, 1983
	*(8)45FR5	500	1	Olson, 1983
*(9)450K11	5000-4400	4	Livingston, unpublished	
<i>U. arctos</i>	** (1)45D0176	850	2	Lyman, 1985b
	** (2)45FE44	9000-4400	4	Chance and Chance, 1982
	** (3)450K11	3900-2800	1	Livingston, unpublished
	** (4)45FR50	unknown	1	Gustafson, 1972
	** (5)45GA17	2330	1	Gustafson, 1972

and noted that “it is clear that this taxon was once native to a far more extensive area of North America than it now inhabits.”

While over 110 Holocene archaeological sites in eastern Washington have produced faunal remains, only 5 of these sites contained the remains of *U. arctos* (Figure 2). This suggests that *U. arctos* was either less abundant than *U. americanus* during the Holocene of eastern Washington or that *U. arctos* was pursued less often by prehistoric human hunters. Although all five sites containing the remains of *U. arctos* are located in riverine settings, four of these appear to be outside of the range historically documented for this taxon. Virtually all Indian groups living in eastern Washington during the late Holocene hunted both species of bear for meat and hides, and many of these groups afforded grizzly bear bones special ceremonial treatment. Therefore, Gustafson (1972:72) sug-

gested that the grizzly bones from sites 45GA17 and 45FR50 “could have been carried to the sites from forested areas in the nearby mountains.” The *U. arctos* bones thus far recovered are: 45FR50—phalanx; 45GA17—metacarpal; 45D0176—left mandible and M₃; 450K11—metapodial; and 45FE44—unknown. The bones of the feet might have been attached to a hide, and the mandible and tooth may have been part of a skull used in a ritual. These elements have little food value to humans (Lyman 1985a), and would not have been transported for this reason. While some of the specimens may in fact have been transported long distances (over 50 km) by people, the suggestion that grizzlies occupied a larger range prehistorically than historically tends to be confirmed by the archaeological data. Because most of the Holocene archaeological sites thus far excavated are located along the banks of the Columbia, Snake, and Okanogan Rivers, and in the most arid parts of

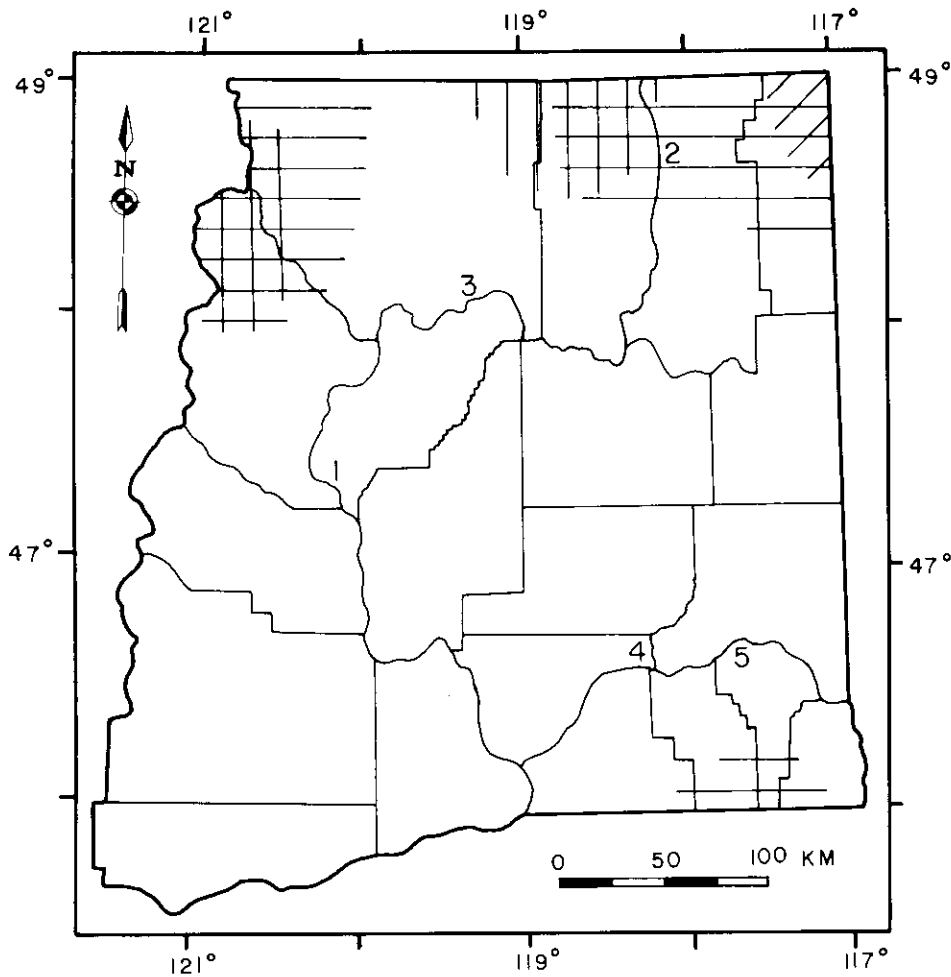


Figure 2. Holocene archaeological and historically documented distributions of *U. arctos* in eastern Washington. The horizontally cross-hatched areas (Dalquest 1948), the vertically cross-hatched areas (Layser 1978), and the diagonally cross-hatched area (Zager 1983) have all been documented for the historic period. Numbers indicate recovery sites of *U. arctos* remains.

the state (Lyman and Livingston 1983), I predict that Holocene records of *U. arctos* will eventually be found in the eastern flanks of the Cascades and in the extreme northeastern part of Washington.

Discussion

The number of *Ursus* specimens recovered ranges from one to 16 per site ($\bar{X} = 4.4$, $\sigma = 4.6$). Precise dating for some of the specimens is lacking, but all date to the last 9000 years. Did the abundance of ursids fluctuate through the

Holocene? Northcott and Elsey (1971) reported that the population of hunter-killed *U. americanus* in Ontario was greatest during years with warm, dry, spring months, and was least in years with heavy autumn snowfall. The former, they suggested, may allow earlier emergence and movement of ursids as well as more hunter activity. In contrast, they suggested that early heavy snowfall would lead to premature denning when ursids are physiologically not ready to hibernate (and survive) an entire winter. If winters were milder between 8000 and 4500 yr B.P., as suggested by the palynological data, and the

intensity of ursid hunting by humans was greater, then a greater number of ursid remains is expected in the faunal record dating to this time period.

If only the ursid specimens with absolute dates prior to 4400 yr B.P. (N = 27) and after 4400 yr B.P. (N = 15) are considered, it appears that ursids may have been more abundant in the pre-4400 yr B.P. interval ($\chi^2 = 3.428$, $p < .075$). If the specimens that *may* date to the late Holocene are added (N = 20), then ursids do not appear to have been more abundant prior to 4400 yr B.P. ($\chi^2 = 1.042$, $p > .3$). If only those specimens dated to 2000 yr or less time periods are considered, the 0 to 2000 yr B.P. temporal segment has 7 specimens from 4 sites, the 2000 to 4400 yr B.P. segment has 8 specimens from 4 sites, and the 4400 to 6000 yr B.P. segment has 16 specimens from 2 sites. Any apparent decrease in ursid abundance may therefore be a function of the sites sampled. For example, 12 of the 16 specimens dated to the 4400 to 6000 yr B.P. segment come from a single site (45FE45) and may represent a single individual animal, while the minimum number of individual animals during the other time intervals is certainly at least four.

A temporally coincident decrease in the abundance of ursid remains and change from harsh to mild winters would suggest a causal relationship. Such an interpretation would, however, be difficult to substantiate because a major change in cultural adaptive strategies occurred about

4500 to 4000 yr B.P. Human occupants of eastern Washington altered their settlement-subsistence practices from following a relatively opportunistic nomadic hunting and gathering lifeway prior to 4500 yr B.P. to a semi-sedentary fishing, plant-gathering, and hunting lifeway wherein people depended more heavily on stored fish and plant resources during winter by about 4000 yr B.P. (Ames 1982, Galm *et al.* 1981, Schalk and Cleveland 1983). This change may have resulted in an altered emphasis on the hunting of ursids for subsistence.

Conclusion

There is no apparent change in ursid abundance coincident with palynologically documented environmental change, perhaps because of one or both of two factors: (1) changing human subsistence practices, and/or (2) the ursid remains considered here are not representative of the prehistoric ursid populations. It is nonetheless significant that the geographic distribution of the remains confirm the zoogeographic histories postulated for ursids in eastern Washington.

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