

preserved, high impact, ring fractures attributable to butchering by people. These bones are apparently closer to steppe bison than to extinct western bison (*Bison bison occidentalis*) and have been radiocarbon dated between about 10,400 and 9,400 years ago. I suspect that steppe bison were active in the Dawson area (Nugget Gulch) even earlier, for a similar ring fracture has been identified on a bison upper foreleg (radio-ulna) radiocarbon dated to approximately 31,000 years ago.

Probably rapidly changing climate and environment toward the close of the last glaciation resulted in replacement of the steppe-like grassland range of *Bison priscus* by boreal forest and tundra. Presumably these bison would withdraw to "islands" of higher, better-drained country where their habitat would survive longer. In such places, human hunters could have accelerated their extinction - perhaps Engigstciak provides an example. The last known steppe bison evidently survived near Zap, North Dakota until about 8,000 years ago, although they seem to have become extinct a few thousand years earlier in northwestern North America. I think that smaller-horned bison such as the Early Holocene (about 10,000 to 5,000 years ago) western bison (*Bison bison occidentalis*), and wood bison (*Bison bison athabascae*) are descendants of the steppe bison.

C.R. Harington
March, 1996

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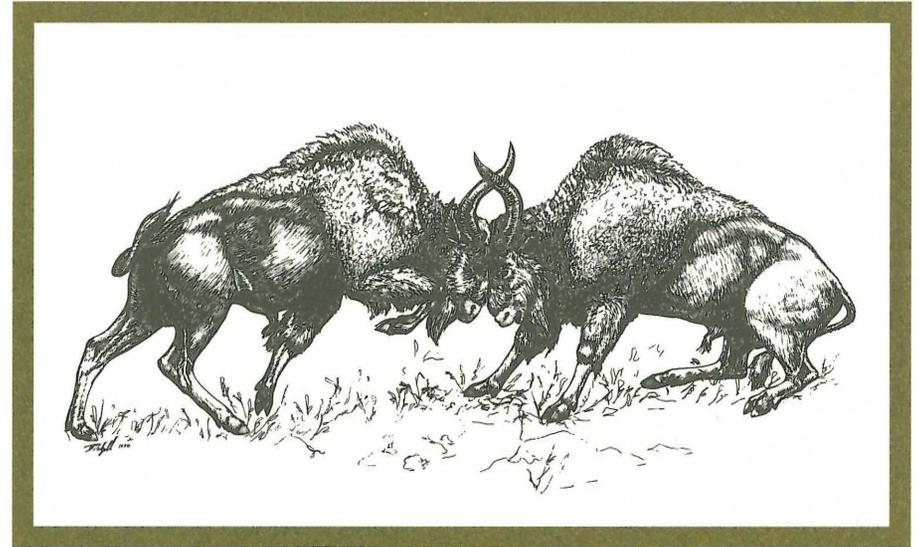
The Beringian Research Notes series presents vignettes of life in the Yukon during the last Ice Age.



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Sketch by Bonnie Dazell

Steppe Bison

The steppe bison (*Bison priscus*), a large-horned species was evidently well-adapted to cool steppe-like grasslands that existed throughout the Holarctic region (northern Eurasia and North America) from England eastward to the Northwest Territories of Canada during the Pleistocene (about 2 million to 10,000 years ago). With the small horse and woolly mammoth, it is one of the commonest species known from Eastern Beringia (unglaciated parts of Alaska, Yukon and adjacent areas of the Northwest Territories). The appearance of this species is well known, based on both Stone Age (Paleolithic) cave images in Europe and carcasses preserved in frozen ground.

Steppe bison (Figure 1) were characterized by their large size [slightly larger than wood bison (*Bison bison athabascae*), with relatively long hindlegs like the European wisent (*Bison bonasus*)], large horns with tips curved back and a second hump. Large adult males have a spread of nearly 1 m between tips of their horncores (Figure 2). Sexes can be identified not only by sizes of horns and metapodials (upper footbones) in the fossils - males being more robust - but sometimes in cave depictions too.

Images from Paleolithic caves provide many insights into the appearance and behaviour of steppe bison. Perhaps the most spectacular groupings are the dozen or more polychrome pictures at Altamira Cave in Spain (Figure 3) and a cluster of polychrome bison at Font de Gaume, France. Regarding behaviour of the species, examples include an engraved bone fragment from Le Morin showing two adults and a calf running; bulls charging each other during the rut (one with raised tail) on the wall of Le Portel Cave (and see Figure 1); two carefully modeled clay bison, about 60 cm long at Tuc d'Audoubert depicting a male following a female. Perhaps the most striking scene in Paleolithic cave art is on the wall of Lascaux Cave. It consists of a man falling back with arms outstretched before a charging bison (with head down and tail raised) that has been wounded and is spilling its entrails. A similar scene, attesting to the aggressiveness of steppe bison confronted by people, is depicted at Villars.

Apart from depictions in cave art, the best evidence for the appearance of steppe bison is "Blue Babe" (named "Babe" for Paul Bunyan's mythical ox, and blue because of the coating of vivianite, a blue iron phosphate, that covered much of the specimen), a nearly complete 8 to 9-year-old male carcass found in 1979 at Pearl Creek, a placer mining site near Fairbanks, Alaska. The specimen was radiocarbon dated to about 36,000 years ago. Evidently it lived during a relatively warm phase (interstadial) of the last glaciation that extended from about 50,000 to 25,000 years ago. Comparing Blue Babe's size with that of living bison, its weight was estimated to be 700 to 800 kg. Its body colouration, as far as could be determined, was mainly a rich dark brown with blackish peripheral regions (e.g. front of face, beard, anterior and posterior humps, tail and legs), as indicated in the clearest Paleolithic cave depictions.

Partial carcasses of other steppe bison have been found in the Yukon, Alaska and Siberia. The Yukon specimens are two lower forelegs - one with abundant blackish-brown fur - from the Dawson City area. In addition to Blue Babe, a large male carcass radiocarbon dated to about 31,000 years ago was found in 1952 at Fairbanks Creek, and two lower legs were found in 1936 at Cleary and Goldstream creeks, Alaska. The only substantial Siberian steppe bison recorded is that of a 2-1/2-year-old female from the Indigirka River that died about 30,000 years ago.

Among the most significant and best-preserved Yukon *Bison priscus* specimens is a series of bones from Old Crow Basin Locality 11(1). Skeletal parts, include excellent skulls with horns sheaths preserved, representing more than seven individuals of both sexes and various ages. Perhaps they are from a herd that broke through thin or rotting ice in early winter or late spring apparently attesting to the gregariousness of this species. Further, their high stratigraphic position in the thick sequence of basin sediments and several overlapping radiocarbon dates indicate that they died about 12,000 years ago. They are the best and latest evidence of steppe bison in the Yukon.



Figure 2: Right side view of steppe bison cranium with horns sheaths preserved from Old Crow Basin, Yukon.

Perhaps advanced cattle close to the genus *Leptobos* gave rise to the first bison in Eurasia during the Pliocene (5 to 2 million years ago). Presumably steppe bison arose from such bison (the *Bison sivalensis-shoetensacki* lineage), and began to spread throughout the Holarctic some 700,000 years ago. The species spread eastward to England and westward to the Beaufort Sea coast of the Northwest Territories, and possibly some herds were forced farther southward and eastward (e.g. Edmonton, Alberta; Roaring River, Manitoba; American Falls, Idaho; Zap, North Dakota; Des Moines, Iowa; Harvard, Massachusetts) near the peak cold period of the last glaciation about 20,000 years ago. Probably steppe bison reached their maximum distribution and numbers during the last (Wisconsinan, about 90,000 to 10,000 years ago) glaciation: it is the typical bison of Yukon and Alaska during that period.

Although extant bison live on a wide variety of forage, they prefer low-growth herbs, particularly grasses. Evidently the same was true for steppe bison that occupied cool, steppe-like grasslands and parklands. For example, the stomach of a Siberian steppe bison carcass was full of grass, and associated pollen was dominated by grasses, composites, chenopods and crucifers. Further, analysis of plant fragments ("tooth jam")

in pits (infundibula) in Alaskan steppe bison cheek teeth - probably indicative of their usual diet - shows that grasses were predominant. The two grasses most commonly found in Blue Babe's tooth jam were *Agropyron*, which occurs in rather dry habitats, and *Danthonia*, presently widespread in the southern Yukon. The tip of a willow twig was also found in the sample.

Approximately 3.5% of more than 3,000 Yukon steppe bison bones examined showed signs of pathological problems, such as abnormally twisted horncores; periodontal disease; suppurative swellings of the lower jaw; bony swellings on vertebrae, including a series of thoracic vertebrae with spines broken, offset and healed - probably resulting from a fall; broken and healed ribs, fractured and healed leg and upper foot bones; and apparent osteoarthritic swellings near the joints of a thigh bone (femur).

Evidently American lions (*Panthera leo atrox*), probably wolves (*Canis lupus*), and humans (*Homo sapiens*) preyed on steppe bison. For example, Blue Babe was killed in winter by lions that fed for several days on the carcass until it froze. Claw marks and parts of canine ("fang") puncture marks (8.5 cm apart indicating lions, rather than other large carnivores) were seen on the pelt. Then, probably, the carcass was scavenged by smaller mammals and birds.

Apart from the graphic evidence of human hunting of steppe bison in Paleolithic cave art, and presence of a caribou antler projectile point lodged in a bison shoulder blade (scapula) at the Kokorevo site in Siberia, we know that people hunted and butchered Yukon *Bison priscus*. At the Engigstciak archaeological site near the Beaufort Sea coast, three bones show well-

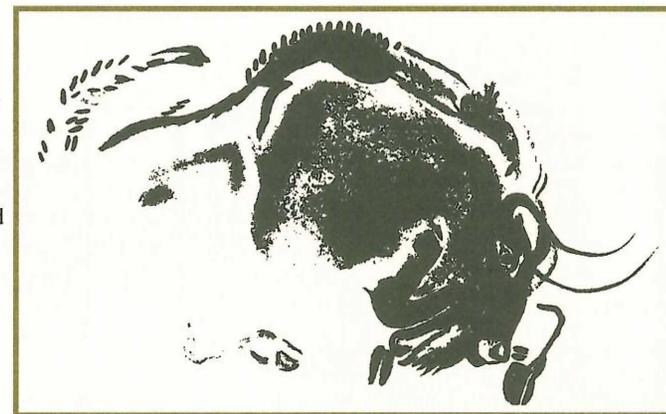


Figure 3: Charging bull steppe bison from the roof of Altamira Cave, Spain.