
Occurrence of the Giant Ice Age Bison, *Bison latifrons*, in North Dakota

by
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Introduction

Although about three-fourths of the State of North Dakota is veneered with glacial deposits, few large Ice Age mammal remains have been found in the state. Mammoth remains, mostly large, durable teeth, have been found at some localities, primarily where sand and gravel in glacial lake beach ridges has been mined. The first report of large, Pleistocene age mammal fossils in North Dakota was by Upham in 1895 when he described the remains of mammoth bones from a beach ridge of glacial Lake Agassiz in Cass County. In 1983, Ashworth and Cvancara reviewed the record of Pleistocene vertebrate fossil finds in eastern North Dakota and also reported the remains of mammoth from another site in Cass County and from a locality in Pembina County. In a review of mammoth fossils in North Dakota, Harrington and Ashworth (1986) listed several sites where mammoth remains have been found. However, their study did not include teeth in collections of several local museums around the state. Kihm (1987) noted the sparsity of Ice Age mammal fossil finds in North Dakota and listed mammoth, horse, stag-moose, and bison as being present in the North Dakota Ice Age fauna.

The first and only report of the occurrence of the giant Ice Age bison, *Bison latifrons*, in North Dakota was by McDonald (1981). A *B. latifrons* horn core was found by Gilbert L. Wilson in 1918 near Independence School along the Missouri River on Fort Berthold Indian Reservation. The exact location cannot be determined because the site was flooded by Lake Sakakawea after construction of Garrison Dam in the early 1950s. This specimen is in the American Museum of Natural History. In 1998, the find of a skull of *B. latifrons* along the shore of Lake Sakakawea was reported to me.

Bison latifrons

The scientific name, *Bison latifrons*, is derived from Latin and refers to this bison's broad cranium and large horns (Fig. 1). *Bison latifrons* was the largest of all North American bison with horn cores that spanned over 7 feet compared with horn-core spans of about 2 feet for the living North American bison, *Bison bison*. The "racks" on these animals must have been truly impressive considering the horns would have had sheaths on them extending each horn several more inches. The large horns functioned as a visual deterrent to competing bison and were used when necessary for combat. Even though *Bison latifrons* had a large head and massive horns, it was probably only 25% to 50% larger than the modern bison based on comparison of limb bones between the two species. It was still a massive animal, which was important to allow it to compete and coexist successfully with other large



Figure 1. A group of giant, Pleistocene age bison, *Bison latifrons*. A skull of *Bison latifrons* was recently discovered in North Dakota and is on exhibit at the North Dakota Heritage Center. These bison had horn-core spans of 7 feet or more and were much larger than today's bison. They lived in North Dakota during the Ice Age with mammoths and other large mammals. (Painting by Fred Lahrman, courtesy of the Royal Saskatchewan Museum, Regina, Saskatchewan.)

Pleistocene herbivores, such as mammoths and mastodons.

The first bison fossil to be reported in North America was by Rembrandt Peale (1803) in a short article in the *Philosophical Magazine*. He called this bison the "Great Indian Buffalo" based on a fragment of skull found at the famous Big Bone Lick mastodon site in Kentucky. This was the original description of what is now called *Bison latifrons*. Peale's specimen still exists in the Academy of Natural Sciences of Philadelphia. In 1825, Harlan further described this fossil bison and named it *B. latifrons*. The geologic age range of *B. latifrons* is not precisely known, but according to McDonald (1981), the species probably appeared during the Illinoian (middle Pleistocene, perhaps as early as about 500,000 years ago), and definitely existed during the Sangamonian and into the Wisconsinan, or during the Rancholabrean land mammal age. Radiocarbon dates indicate that the species existed until at least 30,000 to 20,000 years ago (McDonald, 1981).

Remains of *B. latifrons* have been found throughout much of the United States including the famous Rancho La Brea tar pits site in California (Fig. 2). There have been few reports of *B. latifrons* in Canada. Most paleontologists regard *B. latifrons* as a browser-grazer that lived in woodlands or in forest openings unlike *B. bison*, primarily viewed as a grazing grassland inhabitant. *B. latifrons* was likely not a social animal and lived in small groups unlike the herding modern bison. In many ways, the modern moose, *Alces alces*, a herbaceous, relatively solitary animal with large antlers that inhabits woodland

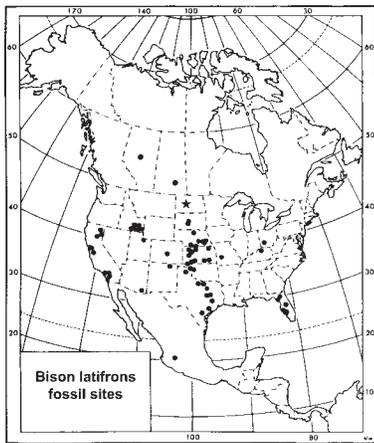


Figure 2. Distribution of *Bison latifrons* fossil sites in North America (modified from McDonald, 1981).

openings, is a modern analog of *B. latifrons*.

Discovery of a *Bison latifrons* skull in North Dakota

In the afternoon of May 26, 1998, I received a telephone call from Kent Pelton, a teacher at Watford City High School. He had found and collected what he believed to be two mammoth tusks while fishing on Lake Sakakawea near New Town (Fig. 3). I was intrigued and excited about this find because of the scarcity of mammoth fossil discoveries in North Dakota. A few days later, I traveled to Watford City to examine these fossils, which were being stored in the school shop. As I walked into the shop, I could see the large “tusks” from across the room and hurried to the bench where they were displayed. I noted a large bison skull, separated from the “tusks.” After a few seconds of confused thought, I realized that the “tusks” were not “tusks” but were the horn cores of the giant Ice Age bison, *Bison latifrons*, and that the skull of the bison had also been collected by Kent. This was an even more exciting and scientifically important find than the remains of a mammoth. As often happens in these kinds of situations, a local newspaper reporter was on the scene when I arrived, and word of Kent’s discovery circulated quickly around the state.

Kent, his friends, Scott Swenson and Ron Anderson, and Johnathan Campbell, the Survey’s paleontology laboratory technician at the time, and I drove that day to New Town. We boarded Anderson’s boat and traveled to the site where the bison fossil was discovered. The site was on a beach along a bay of Lake Sakakawea south of New Town. We found more parts of the skull and a few fragments of other bones from the skeleton. I determined that the bones were entombed in fluvial sandstone, a glacial outwash deposit. This sandstone is mapped as Quaternary and upper Tertiary sediment-undivided, meaning that the age and origin of the deposit is not known. It was also determined that the site was on land administered by the U.S. Army Corps of Engineers and within the borders of the Fort Berthold Reservation.

Because this fossil was found on land administered by the U.S. Army Corps of Engineers, the fossil belongs to the federal government, it is public property. The bison fossil



Figure 3. *Bison latifrons* skull on a table at Watford City High School shortly after it was collected. Kent Pelton on the left discovered the skull. Scott Swenson is on the right.

was transported to Bismarck, because the North Dakota Geological Survey State Fossil Collection at the Heritage Center in Bismarck is a repository for fossils found on Corps of Engineers lands in North Dakota. I contacted the Corps of Engineers to report the find. Shortly thereafter I was contacted by an official from the Three Affiliated Tribes inquiring about the fossil. This began a debate about ownership of the fossil that lasted for several months. In North Dakota, tribal governments of reservations along the Missouri River (or Lake Oahe and Lake Sakakawea) question administrative authority of the U.S. Corps of Engineers along the corridor of land adjacent to the lakes on their reservations. In this case, the Three Affiliated Tribes maintained that the bison fossil belonged to them. Because this was an issue between the tribal government and the federal government, the State of North Dakota took care of the fossil in the State Fossil Collection until the controversy was resolved. It was eventually decided that the *Bison latifrons* specimen (ND 98-44.1) would be cataloged into the State Fossil Collection and restored for exhibit at the Heritage Center. Casts of the skull would be made by the NDGS for exhibit at the U.S. Corps of Engineers office in Riverdale, the Three Affiliated Tribes Museum in New Town, and for the Watford City High School.

Restoration and exhibit of the skull

In 2000, the U.S. Army Corps of Engineers provided funds to the NDGS to restore the *Bison latifrons* skull for exhibit at the Heritage Center and to make three casts for exhibit at their office in Riverdale, the Three Affiliated Tribes Museum, and the Watford City High School. They also provided funds to determine the age of the fossil by radiocarbon dating. Analysis by Stafford Research Laboratories, Inc., in Boulder, Colorado, found the skull to be over 47,500 years old. Later, the National Buffalo Museum expressed an interest in a cast of the skull for display at their museum in Jamestown. The Corps of Engineers paid for that cast too.

Because the skull was disarticulated and some bones were either missing or broken, it took several weeks to restore the skull to three-dimensional form (Fig. 4). The restoration was done by Johnathan Campbell in the Survey’s Johnsru

Paleontology Laboratory at the Heritage Center. Brian Hushagen of the State Historical Society of North Dakota constructed a huge case to display the large, restored skull, which has a horn-core span of 7 feet. The *Bison latifrons* skull exhibit at the Heritage Center premiered on June 15, 2001, and we have subsequently installed exhibits of casts of the skull in the Corps' Riverdale office, the Three Affiliated Tribes Museum, and the National Buffalo Museum (Fig. 5). An exhibit in Watford City will be completed soon.

Scientific and educational value of the skull

Discovery of the *Bison latifrons* skull expands our knowledge of the diversity of large mammals that lived here during the Ice Age. It is also the furthest north occurrence of *Bison latifrons* fossils in the United States, which provides additional information about the geographic range of the species. Field work this past summer has revealed fossils of other Ice Age mammals, mammoth and horse, that appear to be from the same fluvial deposits in which the *B. latifrons* skull was discovered. We will be excavating these sites next summer. The radiocarbon date of the fossil, which is greater than 47,500 years old, provides some information about the antiquity of the fluvial deposits that contained the fossil.

Directors of the museums where the *Bison latifrons* skulls are exhibited inform me that it has been a popular attraction with tourists and classes from several schools. Providing information about the prehistoric life of North Dakota is one of the objectives of the NDGS's Fossil Resource Management Program, and we are pleased to be able to work with museums around the state to develop educational exhibits of North Dakota fossils.

Acknowledgments

I thank and commend Kent Pelton not only for discovery of the fossil but also for reporting it to us. His concern for the fossil will allow many thousands of people to enjoy viewing it and learning about one aspect of the prehistoric life of North Dakota. Johnathan Campbell, through his restoration skills, brought the bison back to life. I thank him, Andrew Weixel,



Figure 4. Johnathan Campbell in the Johnsrud Paleontology Laboratory restoring the *Bison latifrons* skull. Compare the skull of the modern *Bison bison* in the foreground to the huge *B. latifrons* skull.



Figure 5. *Bison latifrons* skull in the First People exhibit area of the North Dakota Heritage Center in Bismarck. The span from horn-core tip to horn-core tip is 7 feet.

Michele Gutenkunst, and Jake Saylor who helped with the restoration. As always, the staff of the State Historical Society of North Dakota did a grand job in designing and constructing the *Bison latifrons* exhibit. I particularly thank Shawn Holz and Brian Hushagen of the State Historical Society. It was a pleasure for me to work with Marilyn Hudson, the Three Affiliated Tribes Museum in New Town, and Donna Zimmerman and Art Todd, the National Buffalo Museum, in developing exhibits in their facilities. Steve Gilbert and the U.S. Army Corps of Engineers, Omaha District, Garrison Project, deserve special thanks. Because of Steve Gilbert's enthusiasm for this project, the Corps provided funding for the *Bison latifrons* exhibits and radiocarbon dating of the fossil.

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