

Additional Reading

Dundas, R.G. 1999. Quaternary records of the dire wolf, *Canis dirus*, in North and South America. *Boreas* 28:375-385.

Harington, C.R. 2010. Ellesmere Island Pliocene fossils. The Canadian Encyclopedia: 1 page. www.thecanadianencyclopedia.com/index.cfm?PgNM=TCE&Params=A1ARTA0010418.

Harington, C.R. 2003. Yukon Quaternary wolves. In: Impacts of late Quaternary climatic change on western shelflands: Insight from the terrestrial mammal record workshop (International Arctic Research Center, Fairbanks, Alaska, May 19-21, 2003). Abstracts, p. 19.

Kurtén, B., Anderson, E. 1980. Pleistocene mammals of North America. Columbia University Press, New York.

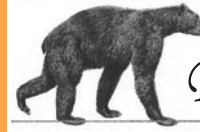
Lange, U.E. 2002. Wolf to woof. *National Geographic*, January: 2-11.

Leonard, J.A., Vilà, C., Fox-Dobbs, K., Koch, P.L., Wayne, R.K., Van Valkenburgh, B. 2007. Megafaunal extinctions and the disappearance of a specialized wolf ecomorph. *Current Biology* 17:1-5.

Nowak, R.M. 1979. North American Quaternary *Canis*. Monograph of the Museum of Natural History of Kansas, Number 6:1-54.

Tedford, R.H., Wang, X.-M., Taylor, B.E. 2009. Phylogenetic systematics of the North American fossil Caninae (Carnivora: Canidae). *Bulletin of the American Museum of Natural History* 325:1-218.

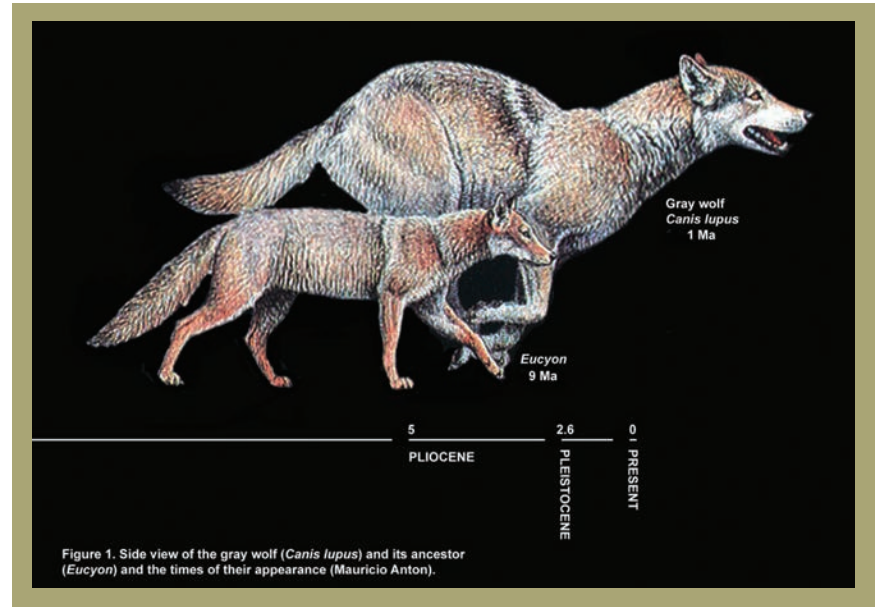
Wang, X.-M., Tedford, R.H. 2008. Dogs: their fossil relatives and evolutionary history. Columbia University Press, New York.



Beringian Research Notes

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Ancient Northern Wolves - Origins, Extinction and Replacement

Introduction

Wolves (*Canis lupus*) are the most common of the larger carnivores represented in Yukon ice age [Pleistocene – about 2.6 Ma (million years ago) – 10,000 BP (radiocarbon years before present)] faunas. So far more than 246 specimens are known – 195 from the Old Crow area, 32 from the Dawson City area, 10 from the Sixtymile area, 9 from Herschel Island plus a few more from other sites. This note draws attention to a Pleistocene wolf skeleton found at Dominion Creek, Yukon. A Pliocene (about 5 – 2.6 Ma) ancestor (cf. *Eucyon davisi*) from Ellesmere Island,

*Dedicated to Ross Sailer, then placer mining for gold on Dominion Creek near Dawson City, Yukon, for preserving the important wolf skeleton that he collected when ripping frozen muck on April 16, 1984. He and his parents Art and Noreen collected many other fossils that they donated to the Canadian Museum of Nature between 1970 and 2000.

Other Wolves

In Canada beyond the Yukon, specimens of wolves or wolf-like animals have been reported from various Pleistocene and Holocene (10,000 BP – present) localities, e.g. Alberta: mid-Wisconsinan deposits at Edmonton, and Sangamonian Interglacial or mid-Wisconsinan deposits at Medicine Hat, and latest Wisconsinan deposits at the Wally's Beach site near Cardston; Saskatchewan: Sangamonian deposits at Fort Qu'Appelle, and the Gower site near Saskatoon. In Alaska, wolf specimens are reported from Eschscholtz Bay (Historic Bluff), Buckland River, and the Fairbanks area. The gigantic (estimated weight 68 kg) dire wolf (Figure 6) is sometimes considered as the archetypal American Pleistocene wolf – and little wonder when one views the wall display of scores of beautifully-preserved Rancho La Brea skulls at the George C. Page Museum in Los Angeles! This large wolf was derived from *Canis armbrusteri* (the first major *Canis* immigrant from Asia) in the heart of North America during the Middle Pleistocene (about 500,000 BP). It was widespread south of the continental ice in southwestern Canada, United States and Mexico, ranging into Andean South America (Figure 2). It had a large head, powerful jaws and teeth capable of crushing large bones and probably scavenged at times. The species died out near the end of the Pleistocene, being replaced by smaller, more generalized gray wolves.

Conclusions

Wolves are the most common of the larger Yukon ice age carnivores numbering more than 246 specimens. They have been recovered from sites as far north as Herschel Island and as far south at the Little John site, appearing in Yukon as early as 400,000 BP. Indeed, the smaller, less specialized replacement species still lives there, although the original northern North American wolves (a distinct ecomorph adapted to Mammoth Steppe conditions) died out about 12,500 BP with other members of the megafauna. It is worth noting that a tooth attributed to its ancestor *Eucyon davisi* was found at the Pliocene Beaver Pond site about 4 Ma on Ellesmere Island – much farther north. This review focuses on a wolf skeleton older than 47,170 BP found at Dawson Loc. 78, that was associated with mammoth, horse, caribou and bison remains characteristic of the Mammoth Steppe fauna.

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Figure 3. Map showing Yukon ice age (Pleistocene – about 2.6 Ma to 10,000 BP) wolf (*Canis lupus*) localities, and the locality of its Pliocene (about 4 Ma) ancestor (cf. *Eucyon davisi*) from the Beaver Pond site near Strathcona Fiord, Ellesmere Island, Nunavut (1); Herschel Island (2); Old Crow Basin (3); Bluefish Caves (4); Sixtymile (5); Dawson City area (6); Little John Site (7).

Geology and Chronology of Yukon Wolf Fossils

In Old Crow Basin, wolf remains have been excavated from Middle Pleistocene deposits dating to about 400,000 BP, and from basal sediments (Units 1b and 2) of Illinoian glacial (about 300,000 BP) or earlier, and Sangamonian Interglacial ages (about 130,000 – 80,000 BP) respectively. Wolf bones of Wisconsinan Glacial age (about 80,000 – 10,000 BP) are reported from many Yukon localities (Figure 3) such as Herschel Island, Bluefish Caves, Old Crow Basin, Dawson City area, and the Little John site (about 10,000 BP). Genetic evidence indicates that ancient wolves of Alaska and Yukon were more closely related to those in Eurasia than modern wolves in the region. Evidently the population of highly specialized wolves that hunted and scavenged the Pleistocene Mammoth Fauna of northern North America was replaced by a more generalized southerly form about 12,500 BP. The wolf skeleton from Dominion Creek near Dawson City is older than 47,140 BP (Beta-89988) according to an Accelerator Mass Spectrometry radiocarbon date on bone collagen from the interior of a rib. It is the oldest Yukon Pleistocene wolf specimen dated by this method.

Dominion Creek Wolf Skeleton

Most of a wolf skeleton (CMN 51772) was found in place in a 5 m-thick unit of frozen peat situated about 1.5 m above a gold-bearing gravel unit at Dominion Creek in the Dawson City area (Dawson Loc. 78). It is the most complete Yukon wolf fossil known (Figure 4). There are no signs of butcher marks, gnaw marks or pathological damage, so the individual may have died of old age – especially since all of the teeth are well worn (Figure 5). Since no baculum (penis bone) was found, an old female may be represented.

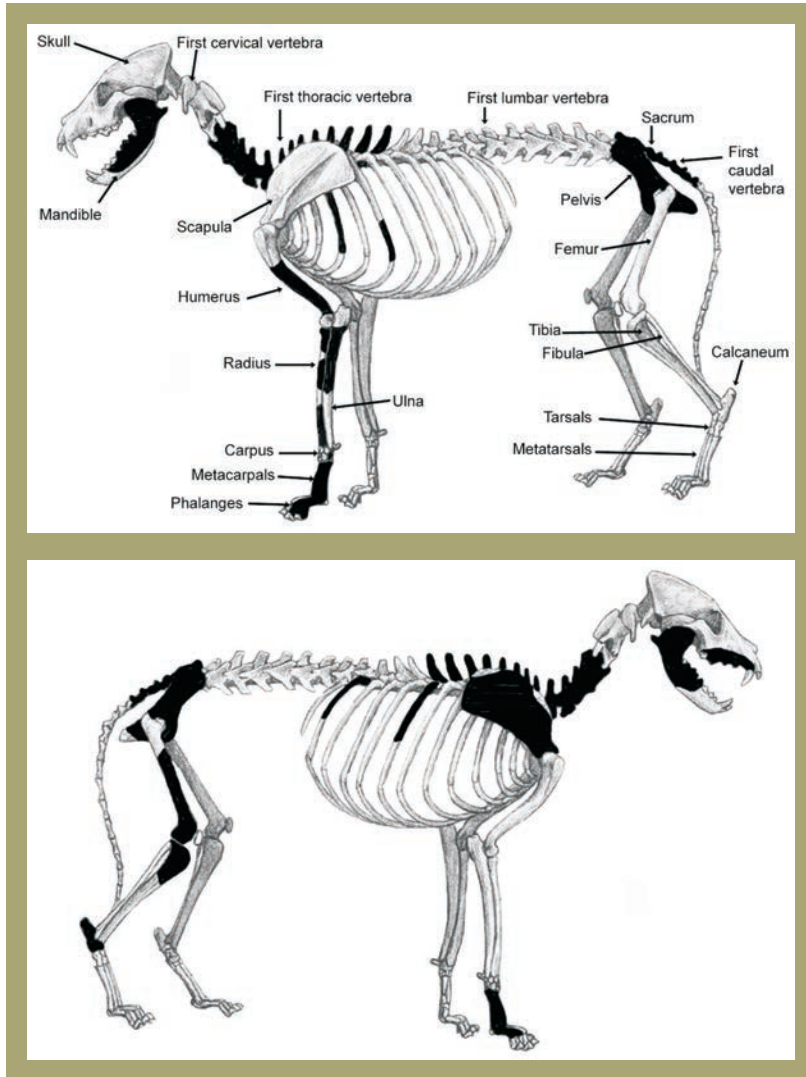


Figure 4. Left and right side views of the skeleton of a gray wolf (*Canis lupus*) with labels showing the key anatomical features (Mauricio Anton). Elements present in the Dominion Creek skeleton are shown in black.

Associated Fauna, Palaeoenvironment and Paleodiet

The fossil-bearing unit at Dominion Creek contained many bones including: a pelvic fragment of a mammoth (probably the woolly mammoth *Mammuthus primigenius*); a right metacarpal of a Yukon horse (*Equus lambei*); a left mandible fragment with cheek teeth of a caribou (*Rangifer tarandus*); and steppe bison (*Bison priscus*) remains (a nearly complete cranium with horncores, part of a humerus, most of a pelvis, a thoracic vertebra and a rib). Presumably these bones are similar in geological age to the wolf skeleton and represent the Mammoth Steppe fauna that was adapted to cool, dry, open grasslands with *Artemisia* shrubs. Eastern Beringian (unglaciated parts of Pleistocene Alaska, Yukon and adjacent Northwest Territories) gray wolves show heavier tooth wear and significantly greater numbers of broken teeth compared to modern wolves reflecting habitual bone consumption. Although Eastern Beringian wolves hunted a wide diversity of species including members of the now extinct megafauna [e.g. the woolly mammoth (*Mammuthus primigenius*)], stable isotope data from the collagen of fossil bone indicate that horse and bison (probably the Yukon horse *Equus lambei* and steppe bison *Bison priscus*) were the commonest prey for these wolves.

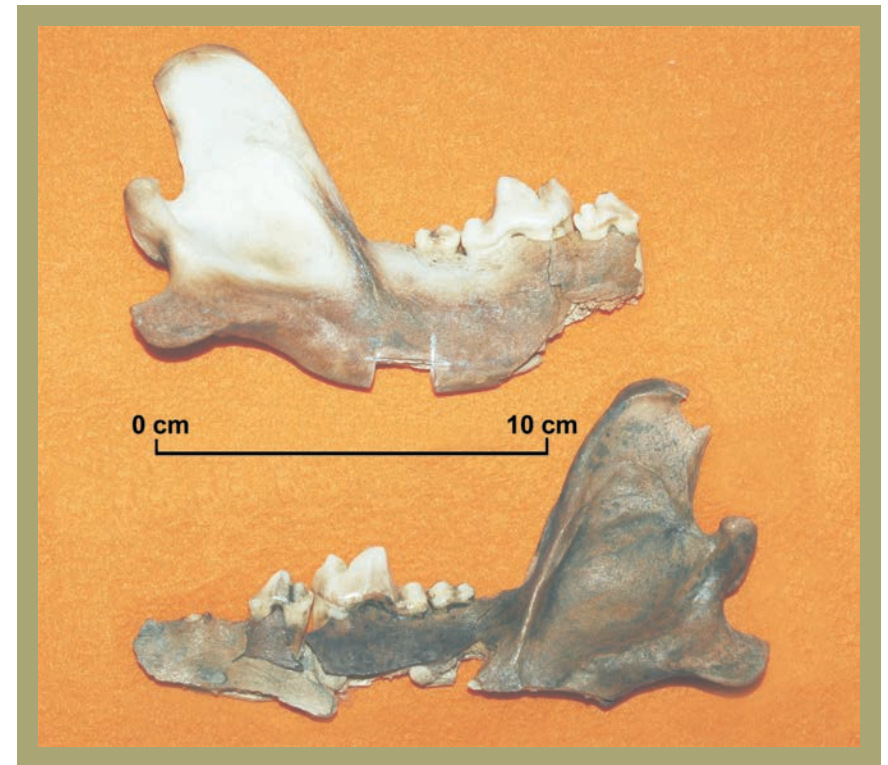


Figure 5. Fragmentary right (above) and left (below) jaws with teeth of the wolf (*Canis lupus*) skeleton (CMN 51772) from Dawson Loc. 78, Yukon, radiocarbon dated to more than 47,170 BP. A sample of bone was taken from the lower margin of the right mandible for analysis of ancient DNA.