

Additional Reading

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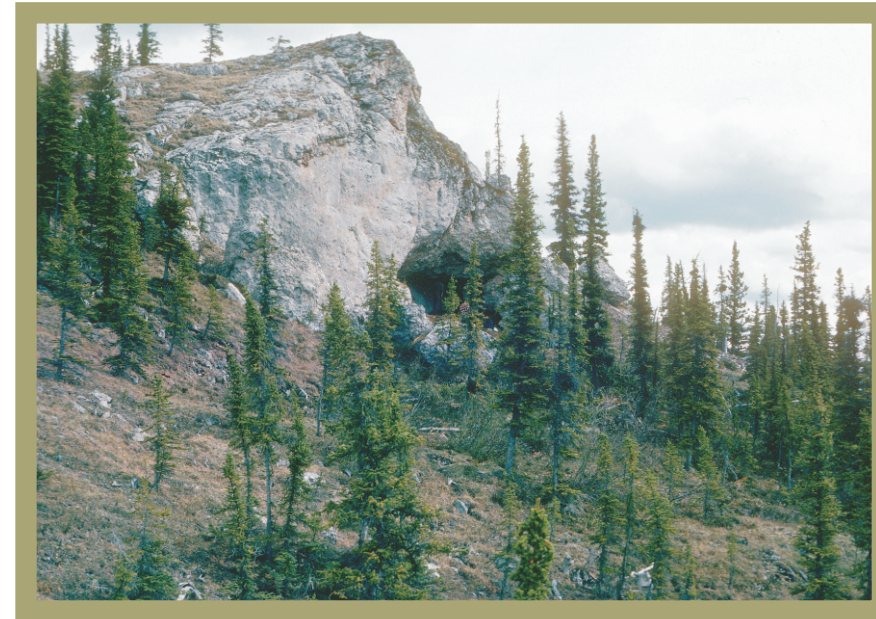


Figure 1: Bluefish Cave I (Ruth Gotthardt).

Bluefish Caves - Fauna and Context

Bluefish Caves (Figure 1), located 54 km southwest of the village of Old Crow in northern Yukon has yielded evidence of episodic human activity from about 25,000 to 12,000 BP (radiocarbon years before present). It may be the most significant of Late Pleistocene Eastern Beringian and Canadian cave faunas because the caves contain: (1) *in situ* evidence for the earliest people in North America; (2) a well-marked transition between Pleistocene (approximately 2 million to 10,000 years ago) and Holocene (about the last 10,000 years) sediments, flora and fauna; and (3) remains of a substantial variety of both smaller and larger mammals adapted to northern conditions, as well as migratory birds, that lived during the last 30,000 years. The vertebrate fossils are thought to have accumulated as a result of carnivore, raptor and human activity, as well as natural deaths occurring in the caves. The site was discovered from the air in 1975 by the University of Toronto's Northern Yukon Research Programme. Excavations at the site, carried out under the direction of Jacques Cinq-Mars with the help of student assistants, various researchers, and Old Crow Gwitchin participants, began in 1977 and lasted until 1987. Bluefish Caves is acknowledged as an Archaeological Reserve.

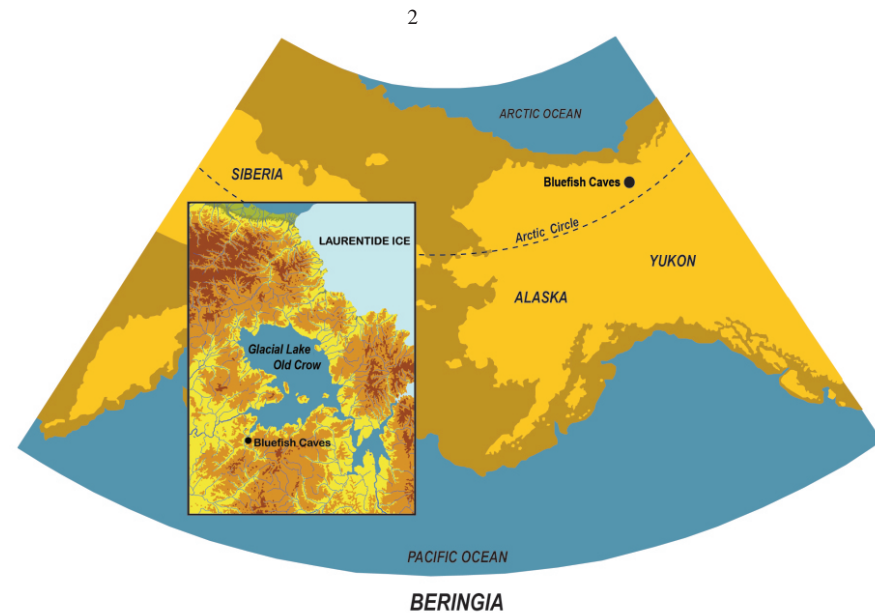


Figure 2: Beringia during the Last Glacial Maximum about 20,000 BP, showing the location of Bluefish Caves, Yukon, and (inset) the approximate limits of the Laurentide glacial ice. (J. Cinq-Mars).

Bluefish Caves (I, II and III; 67°09'N 140°45'W; elevation 250 m) overlook the middle course of Bluefish River, which flows north out of the Keele Range (Figure 2). In Late Wisconsinan time, the nearby valley was occupied by a long, narrow delta formed where the proto-Bluefish River reached a receding glacial lake occupying the Bluefish Basin.

The three small cavities, situated near the base of a Devonian (about 408 to 362 million years ago) limestone ridge (Figure 3), are what is left, following the downcutting of the Bluefish River, of an ancient karst system formed by water solution. These cavities range in volume from about 10 to 30 m³, and contain sediments varying in depth from 30 cm to 2 m. Cave floor deposits comprise four sedimentary units (Figure 4) as follows (from bottom to top). Unit A – frost-spalled and lag-covered bedrock. Unit B – beginning before 33,500 BP a series of three windblown silt (loess) layers were deposited. Bones of fish, birds, small and large mammals of the Late Pleistocene “Mammoth Fauna”, are preserved within Unit B, and in Caves I and II, the unit contained stone artifacts and altered bones reflecting butchering, bone-tool production, and bone flaking. The unit's fossil pollen record indicates a shift from dry, herbaceous steppe-tundra to moist shrub-tundra about 13,500 BP. Unit C – thick, humus-rich sediment, incorporating rockfall, suggests a wetter boreal forest environment beginning about 10,000 years ago. It contains Holocene biotic remains that typify the modern northwestern Cordilleran interior. Unit D – modern humus, litter and vegetation. No cultural material is known from Units C and D, except for a probably intrusive microblade core recovered from Unit C.

Exotic, high-quality chert artifacts (e.g. microblade cores, burins and their

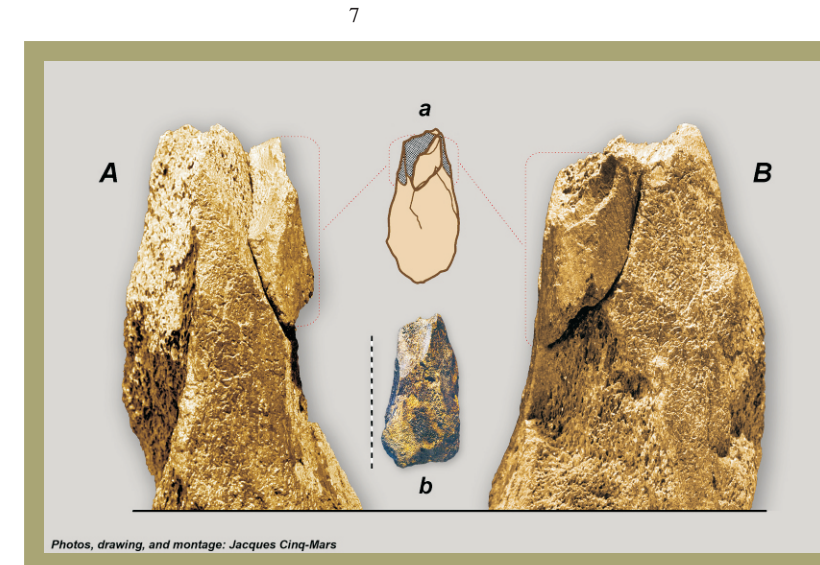


Figure 5: A flaked mammoth bone core and its refitted flake from Bluefish Cave II. Both specimens were found in the Lower Loess unit and dated at around 24,000 BP (see Fig.4). A and B: detailed side-views of the core and refitted flake; a: schematic sketch of frontal view of the core showing the position of three flake scars and the refitted flake; b: frontal view of the bone core with scale (25 cm).

rodents, medium to large-sized herbivores and carnivores. Microtine rodents from the lowermost loess represents a herb-tundra zone with collared lemming, brown lemming and singing vole. The higher, dwarf-birch zone shows a decreased brown lemming population, absence of other herb-tundra fauna, and an increase in red-backed and yellow-cheeked voles. The uppermost loess yielded few fossils – all typical of recent faunal communities.

The rest of the mammals of Bluefish Caves round out what is one of the most important Pleistocene vertebrate assemblages found together *in situ* in Canada. These represent the now-extinct Mammoth Fauna community which has been described based on fossils across Beringia, from Siberia to Yukon. This diverse Pleistocene community contrasts sharply with the limited array of large mammals found at northern latitudes through the Holocene and present-day. Together, mammals such as the saiga antelope, tundra muskox, and Yukon horse suggest prevailing dry, cold steppe conditions during the last glaciation. Cutmarks and evidence of human modified bone indicate this fauna was important to Late Pleistocene people of Bluefish Caves.

Ice age vertebrates from Bluefish Caves comprise 4 fish species, 1 amphibian species, at least 23 bird species; and 35 mammal species. Evidently most of these vertebrates lived in grassy tundra surroundings. Two independent studies, one based on Yukon horse bones and the other on bird bones, support the idea that during the Last Glacial Maximum the Bluefish Caves environment was a diverse, productive ecosystem. Humans occupied the Bluefish Caves area as early as 25,000 years ago.

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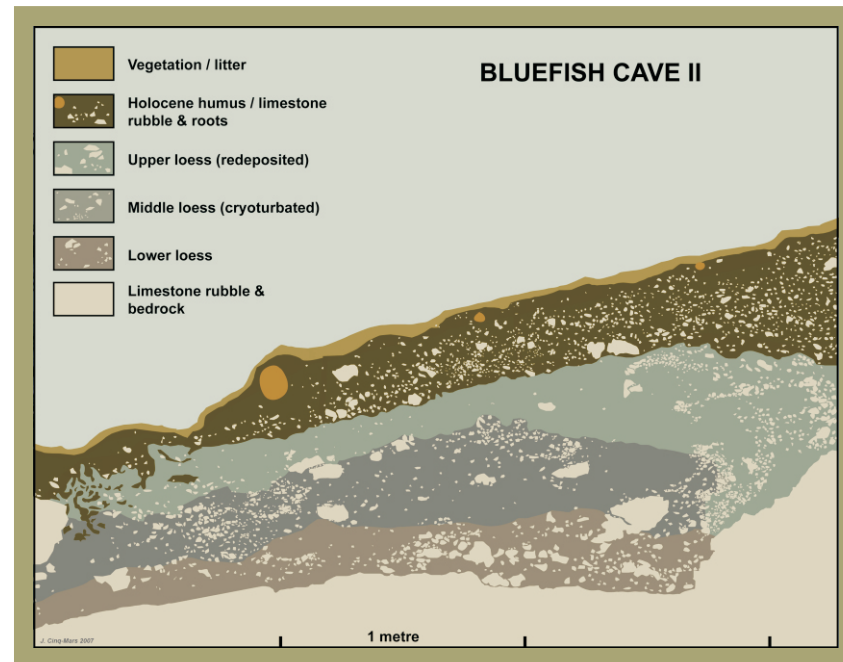


Figure 4: West profile (sequence of sediments) of the downslope portion of the Cave II deposit. (J. Cinq-Mars).

was fractured when fresh by human agency. Also, archaeologists Jacques Cinq-Mars (Figure 5) and Richard Morlan have noted, following a program of AMS dating on bone cores and flakes from Old Crow Basin, that the ages were restricted to a 15,000-year time span, beginning around 40,000 BP and ending around 25,000 BP implying that human tool-making began in Eastern Beringia as early as 40,000 years ago. So, this glimpse of the early archaeological record from Bluefish Caves and other parts of unglaciated Yukon shows that the existing archaeological picture farther west (e.g. Alaska and Chukotsk Peninsula of Siberia) is woefully incomplete. It also supports the view that human dispersals farther east and south in the New World could have occurred prior to the LGM.

Finally, it is worth considering the kinds of Pleistocene vertebrates that have been recovered from Bluefish Caves excavations and some of their implications (Table). This fauna includes 4 fish species, 23 bird species and 35 mammal species.

Remains of migratory birds were found in all three caves, although they are sparse in the shallower deposits of Caves II and III. One of the most interesting of these bones is the Snow Goose scapula from Cave II. It has cutmarks indicating human modification. It is worth noting that the Snowy Owl bone indicates high, rolling tundra in the area toward the end of the Pleistocene, and that Snow Buntings (Cave I – the earliest record in North America) nest in rock cavities in rocky tundra regions.

The mammalian fauna from Bluefish Caves is extensive and includes microtine

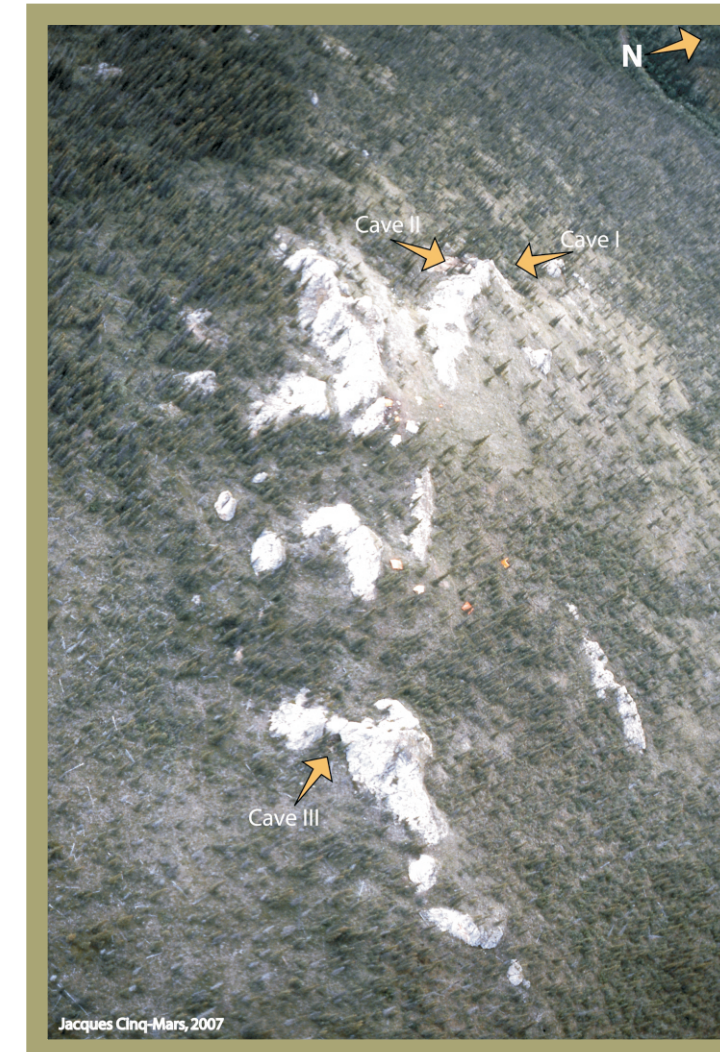


Figure 3: Aerial view of the Bluefish Caves ridge showing the location of the three caves.

byproducts) were found mainly in Cave II, although some microblades were found in Cave I. Similar artifacts from nearby Alaska have been dated to about 10,500 BP. Microflakes, also made of exotic chert (about 1-3 mm in size), were found in sieved sediment samples throughout Unit B from all three caves, but were mostly concentrated in deposits near the transition from herbaceous steppe-tundra to moist shrub-tundra about 13,500 BP.

Perhaps more significant are bone artifacts indicating that very early human groups made use of the caves and exploited the local Pleistocene fauna. A well-preserved core and associated flake of a mammoth limb bone (Figure 5) found on bedrock at the base of Unit B, Cave II indicates a well-developed bone technology in this region some 23,500 BP [separate, close Accelerator Mass

Table -- BLUEFISH CAVES (I,II,III) FAUNA

(Note: cf. -- closely comparable specimen identified; * -- extinct;
 ** -- not recently reported in Yukon; *** -- extinct in Yukon or reintroduced)

Fishes

Arctic grayling (*Thymallus arcticus*)
 Longnose sucker (*Catostomus* sp.)
 Inconnu (cf. *Stenodus leucichthys*)
 Northern pike (*Esox lucius*)

Amphibians

Frog (*Rana* sp.)

Birds

Ptarmigan or grouse (Tetraonidae)
 Snow Goose (*Chen caerulescens*)
 American Widgeon (*Anas americana*)
 Harlequin Duck (*Histrionicus histrionicus*)
 Red-tailed Hawk (*Buteo jamaicensis*)
 American Golden Plover (*Pluvialis dominica/fulva*)
 Black-bellied Plover (cf. *Pluvialis squatarola*)
 Small sandpiper (*Calidris* sp.)
 Species like the Eskimo Curlew (cf. *Numenius borealis*) **
 Species like the Solitary Sandpiper (cf. *Tringa solitaria*)
 Snowy Owl (*Nyctea scandiaca*)
 Hawk Owl (*Surnia ulula*)
 Phoebe like Say's Phoebe (*Sayornis* cf. *S. saya*)
 Flycatcher like the Olive-sided Flycatcher (*Contopus* cf. *C. borealis*)
 Swallows (Hirundinidae)
 Common Raven (*Corvus corax*)
 Chickadee (*Parus* sp.)
 Robin (*Turdus migratorius*)
 Thrush like the Hermit Thrush or the Gray-cheeked Thrush
 (*Catharus guttatus/minimus*)
 Waxwing (cf. *Bombycilla* sp.)
 Common or Hoary Redpoll (*Cardualis flammea/hornemanni*)
 Tree Sparrow or Chipping Sparrow (*Spizella arborea/passerina*)
 Sparrow like Lincoln's Sparrow (cf. *Melospiza lincolnii*)
 Snow Bunting (*Plectrophenax nivalis*)

Table (cont.)

Mammals

Red-backed vole (*Clethrionomys rutilus*)
 Collared lemming (*Dicrostonyx torquatus*)
 Brown lemming (*Lemmus sibiricus*)
 Singing vole (*Microtus miurus*)
 Tundra vole (*Microtus oeconomus*)
 Meadow vole (*Microtus pennsylvanicus*)
 Yellow-cheeked vole (*Microtus xanthognathus*)
 Muskrat (*Ondatra zibethicus*)
 Northern bog lemming (*Synaptomys borealis*)
 Shrew (Soricidae)
 Indirect human evidence (*Homo sapiens*)
 Snowshoe hare (*Lepus americanus*)
 Arctic hare (*Lepus arcticus*) **
 Marmot (*Marmota* sp.)
 Arctic ground squirrel (*Spermophilus parryii*)
 Wolf (*Canis lupus*)
 Arctic fox (*Alopex lagopus*)
 Brown bear (*Ursus arctos*)
 Ermine (*Mustela erminea*)
 Least weasel (*Mustela nivalis*)
 Beringian ferret (*Mustela eversmanni*) ***
 American marten (*Martes americana*)
 Short-faced skunk (*Brachyprotoma obtusata*) *
 Cougar (*Felis concolor*)
 American lion (*Panthera leo atrox*) *
 Woolly mammoth (*Mammuthus primigenius*) *
 Yukon horse (*Equus lambei*) *
 Wapiti (*Cervus elaphus*) ***
 Moose (*Alces* sp.)
 Caribou (*Rangifer tarandus*)
 Steppe bison (*Bison priscus*) *
 Saiga antelope (*Saiga tatarica*) ***
 Tundra muskox (*Ovibos moschatus*) ***
 Dall sheep (*Ovis dalli*)

Spectrometry (AMS) radiocarbon dates on core and flake provide this average age] – just before the Last Glacial Maximum (LGM). Furthermore, split long bones from the Caves showing traces of whittling and polishing seem to have been shaped and used as tools. One, a split caribou tibia that could be a broken fleshing tool, yielded an AMS date of 24,800 BP, making it the earliest dated artifact from a documented stratigraphic context in Eastern Beringia (unglaciated parts of Alaska, Yukon and Northwest Territories), as well as North America.

Further evidence of this kind of early bone technology is seen in a 31,000 BP steppe bison radio-ulna from Nugget Gulch near Dawson City showing a “ring-crack” considered to be a human-made impact resulting in exposure of marrow.

That ring-crack is similar to features on two approximately 10,000 BP bison bones from Lost Chicken Creek, Alaska and Engigstciak, near the Yukon Arctic coast. A 29,300 BP long bone fragment of a mammoth from Old Crow Basin