Harington, C.R. (editor) 2003. Annotated Bibliography of Quaternary Vertebrates of Northern North America – with Radiocarbon Dates. University of Toronto Press, Toronto.

Harington, C.R. and F.V. Clulow. 1973. Pleistocene mammals from Gold Run Creek, Yukon Territory. Canadian Journal of Earth Sciences 10:697-759.

Harington, C.R. and R.E. Morlan. 2002. Evidence for human modification of a Late Pleistocene bison (*Bison* sp.) bone from the Klondike District, Yukon Territory, Canada. Arctic 55(2):143-147.

Hughes, O.L., C.R. Harington, J.A. Janssens, J.V. Matthews, Jr., R.E. Morlan, N.W. Rutter and C.E. Schweger. 1981. Upper Pleistocene stratigraphy, paleoecology, and archaeology of the northern Yukon interior, Eastern Beringia 1. Bonnet Plume Basin. Arctic 34(4):329-365.

Jackson, L.E., Jr. and C.R. Harington. 1991. Middle Wisconsinan stratigraphy and sedimentology at the Ketza River site, Yukon Territory. Géographie physique et Quaternaire 45(1):69-77.

Leonard, J.A., R.K. Wayne and A. Cooper. 2000. Population genetics of ice age brown bears. PNAS 97(4):1651-1654.

Matheus, P.E. 1995. Diet and co-ecology of Pleistocene short-faced bears and brown bears in Eastern Beringia. Quaternary Research 44:447-453.

Morlan, R.E. 1980. Taphonomy and archaeology in the Upper Pleistocene of the northern Yukon Territory: A glimpse of the peopling of the New World. National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 94:1-380.

Preece, S.J., J.A. Westgate, B.V. Alloway and M.W. Milner. 2000. Characterization, identity, distribution and source of Late Cenozoic tephra beds in the Klondike District, Yukon. Canadian Journal of Earth Sciences 37:983-996.

Shapiro, B. and 26 coauthors. 2004. Rise and fall of the Beringian steppe bison. Science 306:1561-1565.

Storer, J.E. 2003. The Eastern Beringian vole *Microtus deceitensis* (Rodentia, Muridae, Arvicolinae) in Late Pliocene and Early Pleistocene faunas of Alaska and Yukon. Quaternary Research 60:84-93.

Storer, J.E. 2004a. A Middle Pleistocene (Late Irvingtonian) mammalian fauna from Thistle Creek, Klondike Goldfields Region of Yukon Territory, Canada. Paludicola 4(4):137-150.

Storer, J.E. 2004b. A new species of *Mustela* (Mammalia; Carnivora; Mustelidae) from the Fort Selkirk fauna (Early Pleistocene) of Yukon Territory, Canada. Paludicola 4(4):151-155.

Storer, J.E. 2006. Ice age biochronology in Eastern Beringia. Canadian Paleobiology No. 12:5-17.

Tener, J.S. and C.R. Harington. 2003. Paleopathology of Yukon Quaternary mammals: A preliminary review. In: Impacts of Late Quaternary Climatic Change on Western Arctic Shelf-Lands: Insights from the Terrestrial Mammal Record Workshop (Fairbanks, May 19-21, 2003). Abstracts. pp. 50-51.

Westgate, J.A., S.J. Preece and A.S. Sandhu. 2001. Tephra power: Providing a secure chronological framework for Late Cenozoic geologic/paleoenvironmental studies in Eastern Beringia. Occasional Papers in Earth Sciences No. 1 (Heritage Branch, Government of the Yukon):67-68.

Zazula, G.D., D.G. Froese, S.A. Elias, S. Kuzmina and R.W. Mathewes. 2007. Arctic ground squirrels of the mammoth steppe: Paleocology of Late Pleistocene middens (~24 000 – 29 450 ^{14}C yr BP), Yukon Territory, Canada. Quaternary Science Reviews 26:979-1003.

Yukon
TOURISM AND CULTURE

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

Beringian Research Notes

2008 No. 20

Figure 1: The Mammoth Steppe fauna (e.g. woolly mammoth, Yukon horse, tundra muskox and steppe bison) on the dry grasslands near present day Dawson City about 20,000 BP (George Teichmann).

Yukon Ice Age Vertebrates*

The unglaciated parts of Yukon contain the most productive Pleistocene (about 2 million to 10,000 years ago) vertebrate fossil localities in Canada. Geographically the vertebrate faunas (Figure 1) range from the northernmost at Herschel Island to the southernmost at Revenue Creek, and from the westernmost, near the Alaskan border at Sixtymile to the easternmost at Ketza River (Figure 2).

The vertebrate fossils include a wide variety of species (e.g. about 7 species of fishes, 1 amphibian, 40 of birds and 70 of mammals). They extend in age from the earliest known fauna at Fort Selkirk (about 1.6 million years old) to the Old Crow Loc. 11(1) fauna (nearly 12,000 years old) (Figure 3), by which time most of the larger Pleistocene mammals [e.g. woolly mammoths (*Mammuthus* primigenius), American mastodons (*Mammut americanum*), horses (*Equus*), American lions (*Panthera leo atrox*) and short-faced bears (*Arctodus simus*)] had become extinct in Yukon. Although the cause of this extinction is not known, perhaps it can be attributed to rapid climatic change near the close of the Pleistocene, exacerbated by human hunting. Some woolly mammoth fossils have been recovered from islands in the Bering Strait and Arctic Siberia dating to the

*Dedicated to the many placer miners, First Nations members and other Yukoners who have contributed so greatly to building the fossil collections on which this summary is based. Special gratitude is expressed to the late Peter Lord of Old Crow for his outstanding field assistance.

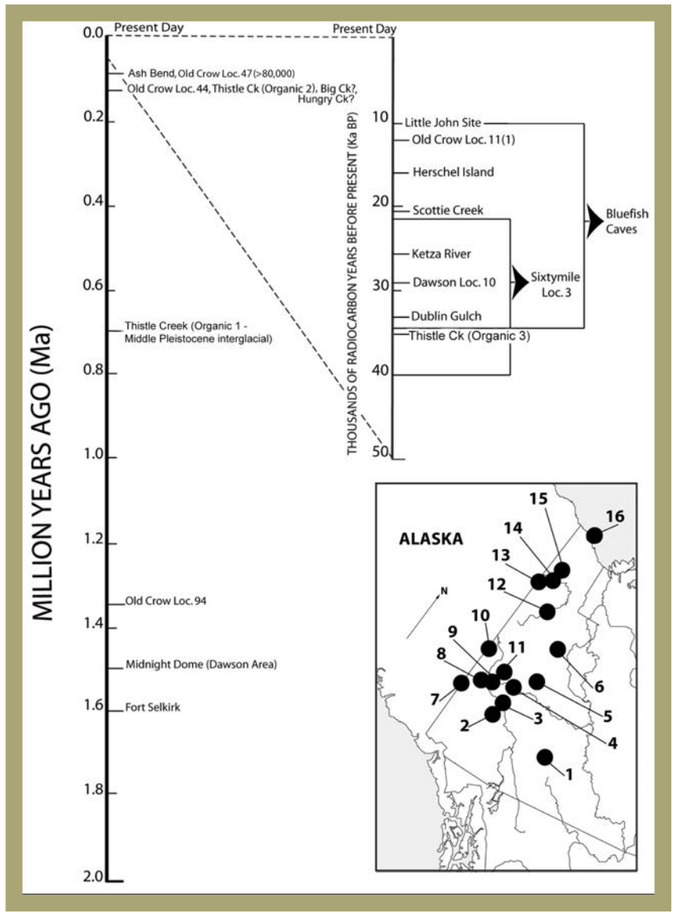

Figure 2 (inset): Main Yukon ice age vertebrate faunal localities. 1. Ketza River, 2. Big Creek area (Revenue Creek, Happy Creek and Boliden Creek), 3. Fort Selkirk area, 4. Ash Bend, 5. Dublin Gulch, 6. Hungry Creek, 7. Scottie Creek and the Little John Site, 8. Thistle Creek, 9. Brewer Creek, 10. Sixtymile area (Loc. 3, etc.), 11. Dawson City area (Midnight Dome, Hunker Creek, Last Chance Creek, Dominion Creek, Sulphur Creek, Gold Run Creek, Eldorado Creek, Quartz Creek, etc.), 12. Whitestone River site, 13. Bluefish Caves, 14. Porcupine Loc. 100, 15. Old Crow Basin (Locs. 11A, 44, 47, 94, etc.), 16. Herschel Island.

Figure 3: Diagram showing the approximate sequence of Yukon Pleistocene vertebrate faunas.

Additional Reading

Barnes, I., P. Matheus, B. Shapiro, D. Jansen and A. Cooper. 2002. Dynamics of Pleistocene population extinctions in Beringian brown bears. Science 295:2267-2270.

Cinq-Mars, J. 1979. Bluefish Cave I: A Late Pleistocene Eastern Beringian cave deposit in the northern Yukon. Canadian Journal of Archaeology 3:1-32.

Cinq-Mars, J. and R.E. Morlan. 1999. Bluefish Caves and Old Crow Basin: A new rapport. In: R. Bonnichsen and K.L. Turnmire, eds. Ice Age People of North America: Environment, Origins and Adaptation. Oregon State University Press for the Center for the Study of the First Americans. Corvallis. pp. 200-212.

Cumbaa, S.L., D.E. McAllister and R.E. Morlan. 1981. Late Pleistocene fish fossils of *Coregonus, Stenodus, Thymallus, Catostomus, Lota* and *Cottus* from Old Crow Basin, northern Yukon, Canada. Canadian Journal of Earth Sciences 18(1):1740-1754.

Easton, N.A, MacKay, G.R., Schurr, P., Young, P.B. and Baker, C. 2007. The Little John Site (KdVo-6), a late-glacial multicomponent (Nenana-Denali Complex) site in the far southwest of Yukon Territory, Canada. Current Research in the Pleistocene 24: 62-84.

Fitzgerald, G.R. 1978. Pleistocene grebes from the Old Crow Basin, Yukon Territory. Canadian Journal of Earth Sciences 15(12):1887-1892.

Fitzgerald, G.R. 1980. Pleistocene loons of the Old Crow Basin, Yukon Territory, Canada. Canadian Journal of Earth Sciences 17(11):1593-1598.

Fitzgerald, G.R. 1991. Pleistocene ducks of the Old Crow Basin, Yukon Territory, Canada. Canadian Journal of Earth Sciences 28(10):1561-1571.

Hare, G. 1994. Field report on the nature and extent of Pleistocene bone deposits at Scottie Creek, Yukon. Heritage Branch, Government of Yukon. pp. 1-22.

Harington, C.R. 1977. Pleistocene mammals of the Yukon Territory. Ph.D. thesis, University of Alberta, Edmonton.

Harington, C.R. 1980. Radiocarbon dates on some Quaternary mammals and artifacts from northern North America. Arctic 33(4):815-832.

Harington, C.R. 1987. Stop 15: Ash Bend Section: Vertebrate fossils. In: S.R. Morison and C.A.S. Smith, eds. INQUA 87 Excursion Guide Book A-20 (a) and (b). Quaternary Research in the Yukon. pp. 51-53.

Harington, C.R. 1987. Stop 27: Pleistocene vertebrates of Old Crow Locality 11A. In: S.R. Morison and C.A.S. Smith, eds. INQUA 87 Excursion Guide Book A-20 (a) and (b). Quaternary Research in the Yukon. pp. 71-75.

Harington, C.R. 1989. Pleistocene vertebrate localities in the Yukon. In: L.D. Carter, T.D. Hamilton, and J.P. Galloway, eds. Late Cenozoic History of the Interior Basins of Alaska and the Yukon. U.S. Geological Survey Circular 1026:93-98.

Harington, C.R. 1990. Vertebrates of the last interglaciation in Canada: A review. Géographie physique et Quaternaire 44(3):375-387.

Harington, C.R. 1996. Pleistocene mammals of Dublin Gulch and the Mayo District, Yukon Territory. In: K.M. Stewart and K.L. Seymour, eds. Palaeoecology and Palaeoenvironments of Late Cenozoic Mammals. Tributes to the Career of C.S. (Rufus) Churcher. University of Toronto Press, Toronto. pp. 346-374.

Harington, C.R. 1997. Pleistocene vertebrates of Sixtymile, Yukon Territory: A preliminary discussion. In: M.E. Edwards, A.V. Sher and R.D. Guthrie, eds. Terrestrial Paleoenvironmental Studies in Beringia. Alaska Quaternary Center, University of Alaska – Fairbanks, Fairbanks. pp. 83-90.

characteristics) with those of known ancient and modern species. Detailed examination of bone surfaces of Yukon ice age vertebrates has yielded valuable data on: human influence (cut, abrasion and impact marks); predation and scavenging (tooth marks); environment (rootlet tracks); physical damage and disease (surface swellings and breaks from blows or falls; and growths, bone fusion and scoring near joints due to osteoarthritis). These animals had similar physical problems to today's species! X-rays of ice age carcasses and limb bones have also provided information on internal structures and fractures, respectively.

How are geological age, relationships among the vertebrates, and ancient diet established for the bones? If the fossils are found in place in a sequence of sediment layers, usually the older specimens are nearer the bottom and the younger nearer the top. So approximate geological age of bones can be roughly determined by their place in such a stratigraphic sequence. John Westgate and his colleagues have contributed over several decades to establishing a handy time framework for the Yukon faunas spanning the last 2 million years through tephrochronology (the use of datable, readily identifiable, widespread volcanic ash deposits as time markers). Finally, Accelerator Mass Spectrometry radiocarbon dating has enabled more precise dating, using minute bone samples, covering the the last 50,000 years. As the number of dates on the various species increases, we gain more information on “who was where, when” during the Wisconsinan.

Ancient DNA analysis of the bones has provided critical information on identification and relationships among species, as well as dispersal history and population changes through time – especially, so far, regarding brown bears and steppe bison (Figure 10). Information on ancient diets and ecology has come from analyses of carbon and nitrogen stable isotopes in bones and teeth, as well as microscopic pits and scratches on the chewing surfaces of teeth, and “tooth-jam” (plant remains left in pits on the surfaces of large herbivore teeth).

C.R. Harington, February 2008

Figure 10: Short-faced bear protecting a steppe bison carcass from a wolf pack. Ravens and woolly mammoths in the background (George Teichmann).

mid-Holocene (the Holocene is the recent geological epoch of the last 10,000 years) indicating that some members of the Beringian (Beringia is the landmass encompassing the unglaciated parts of northeastern Siberia, the Bering Strait region, Alaska, Yukon and adjacent Northwest Territories) fauna continued to live after the Pleistocene.

Yukon holds important evidence of the earliest-known people in North America [e.g. artifacts made from mammoth, caribou (*Rangifer tarandus*) and bison (*Bison priscus*) bones from Bluefish Caves, Old Crow Basin and Dawson areas]. The artifacts show that people had a substantial knowledge of making and using bone tools at least by 25,000 years ago, and possibly as early as 40,000 years ago.

Scientific collecting of these fossils began about 1850 and continues today. Early collections were made by the fur trader Robert Campbell (about 1852), Reverend Robert McDonald (about 1873), R.G. McConnell (1900), A.G. Maddren (1904), Copely Amory, Jr. (1912), D.D. Cairns (1912), O.J. Murie (1926) and Otto Geist (1952). A few longer-term projects followed including those of: the Canadian Museum of Nature, the Northern Yukon Research Programme (University of Toronto), the Yukon Refugium Project (Canadian Museum of Civilization, Canadian Museum of Nature, Geological Survey of Canada and University of Alberta), and presently, the Yukon Government Palaeontology Program.

The Old Crow Basin is the richest area for ice age vertebrate remains in Canada, having yielded more than 50,000 specimens representing nearly 60 mammal species. The bones are mainly exposed through natural erosion of the winding Old Crow River. They range in age from about 1.4 Ma (million years ago) to Late Wisconsinan (about 12,000 BP – radiocarbon years before present). Approximately 150 fossil localities are known within the basin. Among the most interesting mammals represented are: Jefferson's ground sloth (*Megalonyx jeffersonii*), giant pika (*Ochotona whartoni*), giant beaver (*Castoroides ohioensis*), short-faced bear (*Arctodus simus*), short-faced skunk (*Brachyprotoma obtusata*), hyaena (*Adcrocuta* ?), scimitar cat (*Homotherium serum*), giant camel (*Camelini*), and the primitive muskox *Soergelia*. Old Crow Loc. 94, associated with the Little Timber Tephra, is about 1.35 Ma and represents an Early Pleistocene interglacial. This fauna contains mammoth, horse, the primitive rodent *Allophaiomys*, a heather vole (*Phenacomys deeringensis*), red-backed vole (*Clethrionomys*), primitive brown (*Lemmus*) and collared (*Predicrostonyx hopkinsi*) lemmings, as well as the giant pika. Another early in situ fauna is from Old Crow Loc. 47. It is more than 80,000 BP and includes fish (Pisces), bird (Aves), shrew (Soricidae), rodent (Rodentia, including giant beaver), “weasel” and “rabbit” remains, in addition to fossils of primitive mammoth (*Mammuthus* cf. *M. trogontherii*), fox (*Alopex*), wolf (*Canis lupus*), horse, caribou and bison. The in situ Old Crow Loc. 44 fauna of Sangamonian age (about 130,000 BP) contains remains of 7 fish, 7 bird and 31 mammal species. Many of these species [e.g. fish, duck, goose, shorebird, beaver (*Castor canadensis*), giant beaver, muskrat (*Ondatra zibethicus*) and American mastodon] have aquatic affinities, and suggest the presence of ephemeral shallow ponds and lakes in a river floodplain with some sandy margins – perhaps with spruce-larch forest nearby according to identified wood from 15 tree trunks found in place. Two other

localities are of particular interest. Old Crow Loc. 11(1) has produced scores of well-preserved in situ steppe bison (*Bison priscus*) remains – apparently representing a herd that died catastrophically about 12,000 BP. These are the last recorded steppe bison in the region (Figure 4). Old Crow Loc. 11A, a virtual "supermarket" for bones (Figure 5), is a point bar deposit containing hundreds of vertebrate fossils extending in age from Early Pleistocene to Holocene. The following Pleistocene bird species have been collected throughout Old Crow Basin: 2 grebes, 6 loons and 12 ducks. An undated shaft of a right humerus of a Common Loon (*Gavia immer*) was modified by humans. Pleistocene fishes from the Basin include: broad whitefish (*Coregonus nasus*), inconnu (*Stenodus leucichthys*), Arctic grayling (*Thymallus arcticus*), northern pike (*Esox lucius*), longnose sucker (*Catostomus catostomus*), burbot (*Lota lota*) and sculpin (*Cottus*) (Figure 6).

A two-thirds complete skeleton of a female woolly mammoth from nearby Whitestone River, dating to about 30,000 BP, is remarkable because it was found by following up a First Nation legend. A perfect giant beaver mandible was recovered at Porcupine Loc. 100 – a series of high bluffs on Porcupine River about 8 km downstream from Old Crow. These bluffs range in age from Pliocene (5 to 2 million years; remains of a fossil beaver dam was found at the base) to Holocene.

Bluefish Caves (I-III) is one of the most important sites in Canada because it

Figure 4: Back view of a steppe bison skull found in place at Old Crow Loc. 11(1) that was radiocarbon dated to about 12,000 BP - the most recent known steppe bison from Yukon (C.R. Harington).

Figure 9: Placer miner Paul Favron with a complete Yukon horse skull that he found on Dominion Creek near Dawson City and is now housed at the Canadian Museum of Nature (C.R. Harington).

Pleistocene vertebrate remains have been collected from three tributaries of Big Creek: (1) Revenue Creek, where American lion, woolly mammoth and steppe bison may be of last interglacial age; (2) Happy Creek, where mammoth, horse, caribou, steppe bison and Dall sheep were recorded; and (3) Boliden Creek, where brown bear (>43,400 BP), woolly mammoth, Yukon horse, caribou, bison and Dall sheep bones are possibly of last interglacial age.

At Ketza River, Pleistocene species include: hare, ground squirrel, collared lemming, mammoth, Yukon horse, moose and bison (26,350 BP). This fauna, like Dublin Gulch, may be of mid-Wisconsinan age.

Hungry Creek has produced remains (e.g. arctic ground squirrel, brown (?) and collared lemming, vole (?), and Yukon horse), possibly of last inter-glacial age that underlie glacial till. In contrast, Scottie Creek, near the southern border with Alaska, has yielded remains of woolly mammoth, Yukon horse and bison. A Yukon horse mandible dated at 20,650 BP suggests the fauna lived in southwestern Yukon during the LGM. The nearby 10,000 BP Little John Site is important for the presence of Nenana-Denali Complex people, hare, rodents, canines, caribou, wapiti, possibly moose, swan (Cygninae) and other birds at the end of the Pleistocene.

An Early Pleistocene fauna was found by geologists Lionel Jackson and others at Fort Selkirk, near the junction of Yukon and Pelly rivers. There, the fauna from loess (wind-blown silt) enclosed by volcanic deposits, dates to about 1.6 Ma. It includes specimens of the most primitive vole (*Microtus deceitensis*), as well as shrew (*Microsorex*), heather vole (*Phenacomys* cf. *P. intermedius*), primitive collared (*Predicostonyx*), brown (*Lemmus*) and bog (*Mictomys*) lemmings, ground squirrel, bat (Chiroptera), pika (*Ochotona*), hare (cf. *Lepus*), weasel (*Mustela jacksoni*) and caribou. It represents a full-glacial assemblage, and one that, based on characters of *Microtus deceitensis*, is slightly younger than the earliest known Eastern Beringian Pleistocene assemblage (~1.8 Ma) from Cape Deceit, Alaska.

What do these bones and teeth tell us? Most vertebrate fossils are identified using morphological evidence, comparing shape and size of bones (especially tooth

remains of vole (*Microtus*) and lemming (*Dicrostonyx*) groups.

Two Stewart River sites, south of Dawson City, are worth mentioning although they yield few species. At Ash Bend, the fauna (steppe bison, mammoth and moose) immediately underlies Sheep Creek Klondike Tephra – a volcanic ash that dates to about 90,000 BP. Brewer Creek has yielded mainly steppe bison remains.

At Thistle Creek, southwest of Dawson City, three units preserve mammal faunas: Organic 1 (a Middle Pleistocene interglacial about 740,000 BP) contains 14 taxa including two new rodent species (*Microtus morlani* and *Guildayomys matthewsi*), a shrew (*Sorex* cf. *S. cinereus*), mammoth, a small horse like the Yukon horse, the first Beringian record of a chipmunk (*Eutamias* cf. *E. minimus*), two lemmings (*Lemmus* and *Dicrostonyx*) and giant pika; Organic 2 and 3 represent the last (Sangamonian) interglacial (about 130,000 BP), and last interstadial, respectively, and include tundra vole (*Microtus oeconomus*), chestnut-cheeked vole (*Microtus xanthognathus*), white-footed mouse (*Peromyscus leucopus*), collared lemming, ground squirrel, horse and caribou.

Pleistocene vertebrate remains from Dublin Gulch, the Big Creek area, Ketza River and Hungry Creek are of interest because those areas were glaciated. At Dublin Gulch, north of Mayo, species most commonly represented are horse (38 %), bison (36 %), Dall sheep and caribou (10 % each). A horse metatarsal from the site yielded a radiocarbon age of 31,450 BP, indicating that the fauna occupied the area during the mid-Wisconsinan interstadial.

Figure 8: Left side of a black-footed ferret carcass dated at nearly 40,000 BP from Sixtymile Loc. 3. This is the best-preserved ice age mammal carcass from Yukon (C.R. Harington).

Figure 5: A “supermarket” for ice age fossils (e.g. steppe bison, woolly mammoth and horse). A day’s collection (large bones only) from Old Crow Loc. 11A (C.R. Harington).

contains: (1) evidence for some of the earliest people in North America (from about 25,000 – 10,000 BP); (2) a well-marked transition between Pleistocene and Holocene sediments, flora and fauna, and (3) a substantial variety of fossils of both large and small mammals adapted to northern conditions, as well as those of migratory birds. A significant specimen from Cave II is a mammoth limb bone flake and its parent core (both were dated providing an average age of 23,500 BP). Further, a split caribou tibia reminiscent of a broken fleshing tool has been dated to 24,800 BP. The Pleistocene large mammal fauna includes: mammoth, steppe bison, Yukon horse (*Equus lambei*), Dall sheep (*Ovis dalli*), caribou, moose (*Alces*), wapiti (*Cervus elaphus*), saiga (*Saiga tatarica*), tundra muskox (*Ovibos moschatus*), American lion, steppe ferret (*Mustela eversmanni* – at 33,550 BP the earliest dated mammal from the site), cougar (*Felis concolor*), brown bear, wolf and many smaller mammals including 9 species of microtine rodents (Microtini); at least 23 bird species, and 4 fishes. Pollen, plant and insect macrofossils recovered from the nearby Bluefish River indicate the Bluefish Caves fauna lived in a grassy steppe-tundra environment during the cold, dry conditions of the Last Glacial Maximum (LGM, about 18,000 BP).

Between 1975 and 1986, a gold placer site in the Sixtymile area (Loc. 3) yielded hundreds of excellent mid-Wisconsinan (about 60,000 to 25,000 BP) specimens, including remains of the rare western camel (*Camelops hesternus*), helmeted muskox (*Bootherium bombifrons*) and tundra muskox. Carcasses of an arctic ground squirrel (*Spermophilus parryii*; Figure 7) and of a black-footed ferret (*Mustela nigripes*; Figure 8) gave radiocarbon ages of about 47,500 and 39,500 BP respectively. Brown bear bones from Sixtymile Loc. 3 and Dawson Loc. 16 yielded radiocarbon ages between 36,000 and 41,000 BP indicating that this species lived in west-central Yukon before the LGM. The Sixtymile area also provided the first evidence of Late Wisconsinan (about 26,000– 25,000 BP) open spruce forest in Yukon in the form of dated spruce stumps and an American mastodon tooth. Unlike woolly mammoths who inhabited grassy plains, American mastodons evidently preferred open spruce forest habitat.

Ice age vertebrate remains near Dawson City (Figure 9), like those at Sixtymile, Brewer Creek, Thistle Creek, Dublin Gulch and the Big Creek area, are mainly exposed during placer mining for gold. Nearly 70 fossil localities are recorded in the region. Most of the bones, when found in place, occur in frozen organic silt (“muck” is the miners' term) just above the surface of gold-bearing gravel, and most are Late Wisconsinan (about 30,000 – 15,000 BP). One of the most

Figure 6: Screening small vertebrate remains (e.g. fish, bird and mammal) at Old Crow Loc. 29. Gerry Fitzgerald dumps the screened fossils into a specimen bag held by Charlie Thomas, a member of the Vuntut Gwitchin First Nation from Old Crow (C.R. Harington).

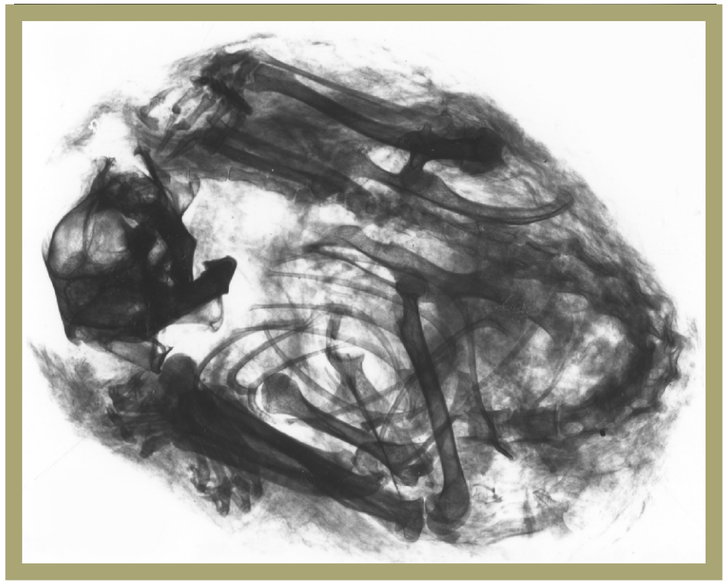

Figure 7: X-ray image of a complete skeleton of a 47,000 BP Arctic ground squirrel from Sixtymile. The animal was mummified and coiled up head to tail, and had presumably died during hibernation (C.R. Harington).

spectacular specimens from the area is a partial Yukon horse carcass from Last Chance Creek that dates to 26,280 BP. Another remarkable Dawson area specimen from Nugget Gulch, Dawson Loc. 63 consists of most of a left forefoot of a steppe bison covered with dried muscle, skin and chestnut brown hair up to 7 cm long. It is similar to a mummified, hairless lower hindfoot of an immature steppe bison from Dawson Loc. 10 dated to 20,370 BP. It is worth noting that Dawson Tephra (about 25,000 BP) has covered original grassy surfaces at several Dawson area localities (e.g. Nugget Gulch where fossils on a grassy terrain surface indicate the presence of humans, wolves, Yukon horses, Dall sheep and bison about 30,000 BP; Quartz Creek; Trail Gulch; Bear Creek; and Goldbottom Creek). Nearly 90 percent of the finds from Dawson Loc. 10 include: steppe bison (46 %), Yukon horse (19 %), mammoth (11 %), Dall sheep (11 %) and caribou (3 %). At many Dawson area localities skeletal remains of Arctic ground squirrels, their nesting grasses, seed caches and droppings have yielded insights concerning the nature of the former Mammoth Steppe environment. Gold Run Creek (Dawson Locs. 31 to 33), 50 km southeast of Dawson yielded type (specimens after which species are named) skulls of the Yukon short-faced bear (*Arctodus simus yukonensis*) and the Yukon horse. Other specimens of interest include: badger (*Taxidea taxus)*, American mastodon, kiang (*Equus* (*Asinus*)), and Alaskan bison (*Bison alaskensis*). At Midnight Dome overlooking Dawson City, fine sands underlying a volcanic ash layer at least 1.5 Ma has produced primitive (Early Pleistocene)