

The Occurrence of Muskoxen, *Ovibos moschatus* in Labrador

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Muskoxen were first observed in Labrador in 1988 and have since been recorded at several locations in two separate river valleys in northern Labrador. The occurrence of Muskoxen in Labrador is attributed to the dispersal of captive releases from Québec in 1973 and 1983. Here we document observation records and examine the future management of the species in Labrador and speculate on its possible effect on this northern ecosystem.

Key Words: Muskox, *Ovibos moschatus*, range, distribution, management, Labrador, Québec.

The Muskox (*Ovibos moschatus*) is a relic from the Pleistocene and is native to northern Canada, northwestern Greenland, and the northern coast of Alaska (Banfield 1974; Reynolds 1988). The elimination of the species from Alaska and the reduction of Muskox numbers in Canada by the early 1900s resulted in efforts to introduce and restore populations in several arctic areas (Klein 1988; Reynolds 1988). At present, Muskox populations are experiencing a period of success, with high numbers throughout most of their range (Groves 1997). Muskox apparently did not colonize the Québec-Labrador peninsula after the last glaciation as no remains have been found at archaeological sites (Banfield 1975).

In 1967, 15 Muskoxen (12 females, 3 males) were captured near Eureka, Ellesmere Island (Centre D'Études Nordique 1981*), and brought to the Umingmaqautik farm, near Kuujjuaq in northern Québec (Figure 1) for Inuit to establish a Muskox farm, create employment, and build up a stock to introduce the species into northern Québec (Le Hénaff and Crête 1989; Nault et al. 1993). A project of raising the animals to collect their quiviut (Muskox wool) was unsuccessful. Subsequently, from 1973 to 1983, 54 animals were released at three different locations in northern Québec (Le Hénaff and Crête 1989). The first release sites were located to the north of Kuujjuaq and to the southwest of Tasiujaq (Le Hénaff and Crête 1989). In 1983, Muskoxen were released east of Kuujjuaq near the outlet of the Whale River. The Umingmaqautik farm was closed in 1983 and the remaining animals were given to the St-Félicien and the Orsainville zoos in Québec (Jean and Rivard 2005*).

The introductions in Québec proved successful. In 1983 a total of 148 Muskoxen were counted and by 1986, with a finite rate of increase of 1.25, the population had increased to 290 animals. By 1986, individuals and mixed groups of Muskoxen had dispersed in all cardinal directions up to 650 km from the origi-

nal release sites throughout the province of Québec (Le Hénaff and Crête 1989).

In 2003, the Muskox population around Kuujjuaq and Tasiujaq was estimated to be 1400 animals, including calves (Jean and Rivard 2005*). In June 2005, aerial surveys on Diana Island, near Quaqtaq, counted a total of 112 adults and 25 calves. This new population apparently originated from the Tasiujaq area (Jean and Rivard 2005*).

Study Area

Over the past two decades, Muskoxen have been observed on several occasions in the Low Arctic Alpine-Torngat ecoregion in northern Labrador. This ecoregion has short, cool summers and long, cold winters with mean average daily temperatures ranging from -19 to -22°C in February and 7 to 9°C in July. Average annual precipitation is 500 to 700 mm with a total average snowfall of 3 m (Meades 1990*). The vegetation is tundra (Alpine heath) with sedge meadows dominating plateaus and Mountain Alder (*Alnus crispa*) and willow (*Salix* spp.) thickets dominating on the lower slopes and river valley slopes. Groves of White Birch (*Betula papyrifera*) and Balsam Poplar (*Populus balsamifera*) occur sporadically in some river valleys. Graminoids occur on the valley bottoms but are sparse to absent on the upper slopes and at high elevations. Dwarf Birch (*B. glandulosa*), Labrador Tea (*Ledum groenlandicum*) and Black Crowberry (*Empetrum nigrum*) dominate drier mountain ridges. Conifer trees are absent from this region (Meades 1990*). Major features of the terrain include braided east-flowing rivers, foothills, elevated plateaus, rugged coastal cliffs and inland mountains.

Methods

We recorded Muskox sightings during remote aerial field surveys in northern Labrador. We queried residents from remote communities throughout northern

Labrador and helicopter and fixed-wing aircraft pilots for sightings of Muskoxen. We found only one record of Muskoxen in other areas of Labrador apart from our own observations. We classified individual Muskox to age and sex from oblique aerial photographs. When possible, animals were classified as adult male or female, based on body size, coat color and size and shape of horns.

Observations

Five sightings of Muskoxen have been recorded in Labrador over the past two decades in three different river valleys, approximately 340 km apart. Four sightings were made from a helicopter in different years (1988, 1995, 2000, 2005) and included three sightings of a single Muskox, likely different animals, and one sighting of a group of three. The fifth sighting (2006 – 2008) was reported by residents of Nain while travelling by snowmobile to Voisey's Bay.

Site 1. Komaktorvik River Valley

The first sighting of Muskoxen in Labrador was recorded on 24 July 1988 at approximately 59°14'N, 63°56'W along the Komaktorvik River valley, which flows into Seven Islands Bay (Figure 1). Three individuals were observed in a large patch of willows (*Salix* spp.) in the river valley. All individuals had horns with a slight separation in the butte and were all approximately the same size indicating that these animals were likely adult males, although definite sex and age remain uncertain (J. Brazil, personal observation).

On 28 July 1995, one Muskox was again observed in the Komaktorvik River valley (59°14.65'N, 63°55.51'W) very near the original 1988 sighting. From a photograph, this animal, browsing in a large thicket of willows (*Salix* spp.) along the north slope of the river valley, appeared to be an adult male.

On 30 July 2000, during aerial surveys for Harlequin Ducks (*Histrionicus histrionicus*) and Peregrine Falcons (*Falco peregrinus*), we observed and photographed a lone Muskox in Seven Islands Bay at (59°14.16'N, 63°57.66'W) 3 to 4 km west of the previous sightings in 1988 and 1995. This animal was large, had well formed horns, and light coloration on the back and saddle and was identified as a sub-adult male (Olesen and Thing 1989).

The sightings along the Komaktorvik River valley occurred approximately 250 km northeast of the release site at Whale River providing a straight-line rate of dispersion of 50 km/year. The most probable dispersion route was along the Koroc River valley, which traverses the Labrador Peninsula.

Site 2. Hebron Fiord

On 9 June 2004, a single Muskox was observed near the outlet of Hebron Fiord (58°03.82'N, 63°12.71'W) (Figure 1, Site 2). This animal was feeding in a thicket of alders (*Alnus* spp.) and Willows (*Salix* spp.) at the foot of a small plateau on the north side of Hebron Brook where it flows into Hebron Fiord. A photo-

graph identified this animal as an adult male > 4 years old (D. Jean, personal communication). The straight-line dispersal from the Whale River release site was a distance of 220 km providing a rate of dispersion of approximately 11 km/year. The most probable route of dispersion was south along the George River valley and then the Tasirlaq River to Hebron Fiord.

Site 3. Voisey's Bay

In April 2006, the fifth Muskox reported in Labrador was observed on a small unnamed island south of Tabor Island in Voisey's Bay at approximately 54°20'N, 61°43'W (Figure 1, Site 3). This animal was readily identifiable as its right horn tip was broken at the curl. This 4-5 year old male has remained on the island and is in its second winter at this location. The straight-line dispersal from the Whale River release site is a distance of 400 km providing a rate of dispersion of approximately 17 km/year. The most probable route of dispersion was south along the George River valley and then along either the Fraser or Kogaluk river to Voisey's Bay.

Discussion

Muskoxen have successfully dispersed and colonized many remote regions of northern Québec. The dispersal of Muskoxen from Québec into Labrador may have been influenced by unoccupied habitat and lack of dispersal barriers.

No mixed-aged groups (the reproductive segment of the population) have been observed to date in Labrador. It is thus likely that the separate observations at Komaktorvik River valley, Hebron Fiord and Voisey's Bay are of different animals that immigrated to Labrador through separate overland routes and at different times. Based on the dispersion of Muskox south along the George River in Québec through 1986 (Le Hénaff and Crête 1989), it is possible that other individuals or groups have traveled eastward into Labrador as far south as Nain along the numerous river valleys extending inland.

Although Muskoxen and Caribou (*Rangifer tarandus*) are occasionally found together on the same vegetation type, caribou usually move through an area rapidly, feeding on willows and flowering forbs whereas Muskoxen are more sedentary and forage on sedges and grasses (Parker 1978). Abundance and distribution of Muskoxen on many of the islands of the High Arctic appear to be related to the abundance and distribution of sedge-producing meadows (Parker et al. 1975; Parker and Ross 1976).

Initial colonization by Muskox may be slow and sporadic consisting mainly of adult males (Le Hénaff and Crête 1989; Reynolds 1988). This may explain why reproductive, mixed-aged groups have not appeared to have been observed yet in Labrador. As Muskoxen had populated many remote regions of Québec in all cardinal directions north of 54°30'N latitude by 1986 (Le Hénaff and Crête 1989) and populations continue

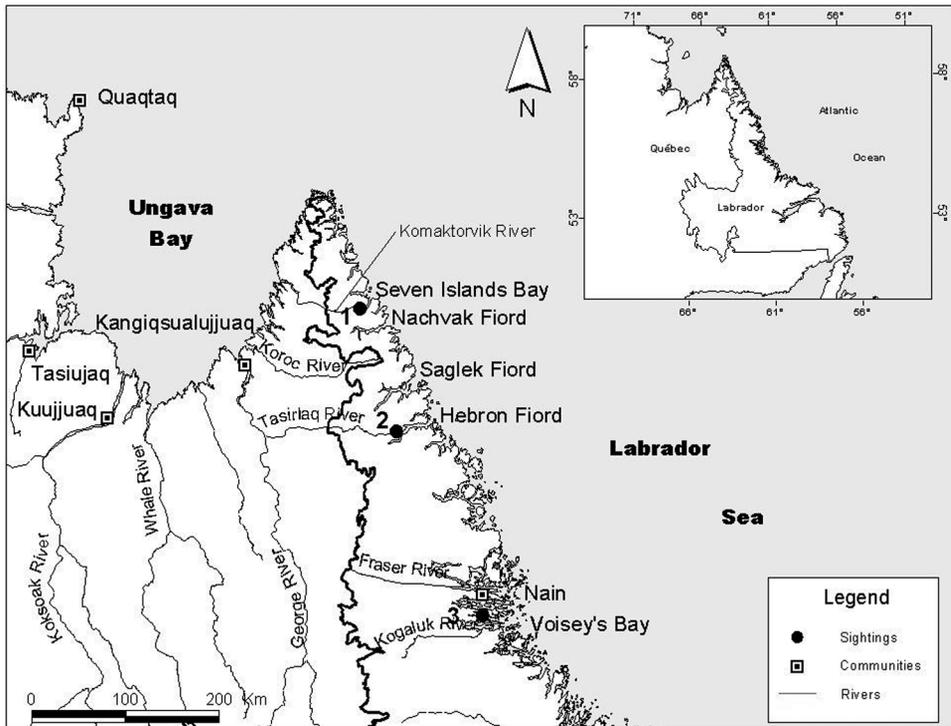


FIGURE 1. Location of Muskox (*Ovibos moschatus*) sightings in northern Labrador. The two release sites were near Tasiuq and Kuujuaq in Québec.

to grow ($\lambda = 1.25$) near their maximum finite rate of increase (1.30), breeding groups may have become established in Labrador but have gone undetected. Emigration of mixed-sexed groups out of regions first occupied may result in shifts in population distribution and range expansion (Reynolds 1988). The dispersal and colonization of Muskoxen to adjacent ranges can be slow. However, with the present high rate of population increase (Jean et al. 2004*) in northern Québec, we believe that emigration may soon result in a shift in an expansion of the distribution and range of Muskoxen into Labrador. Reynolds (1988) identified three stages in the expansion of Muskox into new range: (1) slow growth following release (2) the irruptive phase and (3) decline and stabilization. It is likely that in the next decade during the decline and stabilization of Muskox numbers in Québec that the dispersal of mixed groups into Labrador will occur and a breeding population be established.

In Alaska, where Muskoxen were extirpated and later reintroduced, range expansion occurred only over 20% of the former Muskox range and populations grew to fewer than 1000 individuals over nearly 30 years (Reynolds 1988).

Management Implications

Hunting of Muskox under a limited permit system is conducted on Nunivak and Nelson islands and in

the Arctic National Wildlife Refuge of Alaska and in Nunavut, Northwest Territories, and Québec in Canada. Muskoxen are considered a unique and valuable trophy by the outfitting industry and Muskox meat is highly valued as an exported delicacy. This survivor of the ice ages is an important attraction for tourists, photographers, researchers and students of wildlife in areas where the species is endemic or introduced.

The establishment of a Muskox population in Labrador may provide an alternative to Caribou as a source of protein for northern communities as well as a new resource for developing the regional economy through sport hunting similar to northern Québec and Alaska (Le Hénaff and Crête 1989; Jean et al. 2004*; Reynolds 1988).

It appears that habitat for Muskoxen is widely distributed and largely unchanged in northern Labrador. With public support and proper management, Muskoxen may eventually become a more visible and familiar wildlife species in Labrador. We recommend that systematic aerial surveys be conducted to document the current and future status and distribution of Muskoxen in Labrador.

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