



DISTRIBUTION of MUSKOXEN DETERMINED by

INCIDENTAL OBSERVATIONS and AERIAL SURVEYS
in GATES of the ARCTIC NATIONAL PARK
and PRESERVE, ALASKA: 1999-2002

[Project Report]

James P. Lawler

Resource Report, NPS / AR / NR/NRTR-2003-41

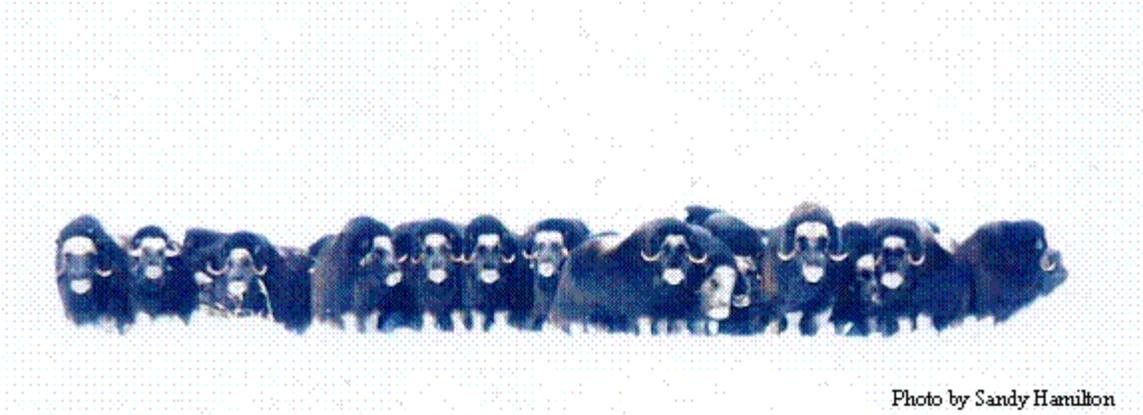


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Distribution of Muskoxen Determined by Incidental Observations and Aerial Surveys in Gates of the Arctic National Park and Preserve, Alaska: 1999-2002

PROJECT REPORT

February 7, 2003

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SUMMARY:

Muskox distribution and relative numbers of muskoxen in Gates of the Arctic National Park and Preserve were documented over a 4-year period from observations reported by park visitors, and winter and summer aerial surveys (Table 1). The maximum number of muskoxen observed during any single survey was 7 during the winter of 2001. The frequency of muskox observations has increased since the initial sighting in 1989. Muskoxen are most commonly seen, both as incidental observations and during aerial surveys, in the Noatak River drainage. Observations of muskoxen in other locations however, suggest that muskoxen are becoming established in other areas of the park. The sighting of an adult female in 2001 and 2002 is significant as the potential for a breeding population of muskoxen now exists.

Table 1. Summary of aerial surveys and total number of incidental muskoxen in Gates of the Arctic National Park and Preserve, Alaska 1999 – 2002.

Year	No. Observed during winter survey		No. Observed during summer survey		No. of incidental Observations ^a	Maximum number in Park ^b
	Bulls	Cows	Bulls	Cows		
1999	0	0	0	0	11	3
2000	3	0	N/A	N/A	17	3
2001	6	1	1	0	5	7
2002	5	1	N/A	N/A	17	6

^a Observations during the entire calendar year for both bulls and cows.

^b Maximum number in the park is based on observations of individuals in widely dispersed areas or on maximum number of

individuals observed during an aerial survey.

INTRODUCTION:

Muskoxen (*Ovibos moschatus*) were extirpated from northern Alaska in the middle of the 19th century (review in Lent 1999). Historical information indicates muskoxen were found in small numbers in the mountains and foothills of the Brooks Range (Rausch 1951, Ingstad 1954) and that these populations were the last to disappear from the state (Reed 1946). Muskoxen were reintroduced into northeastern Alaska in 1969 and 1970. Following their release, muskoxen populations increased and expanded rapidly (Reynolds 1998; J. Dau, Alaska Department of Fish and Game, personal communication; Fig. 1). Current evidence suggests population growth of muskoxen in northeast Alaska has slowed or declined, and muskoxen from the population continue to disperse into new areas (Lenart 1999, 2002; P. Reynolds, personal communication). Muskoxen were also reintroduced into northwestern Alaska in the Cape Thompson region in 1970, 1977, and 1981 (Smith 1989) and in western Alaska in the Seward Peninsula in 1970 and 1981 (Smith 1989). Growth and range expansion of the Cape Thompson population has occurred at a slower rate than those observed elsewhere in Alaska (B. Schults, National Park Service, personal communication). In contrast, muskoxen populations on the Seward Peninsula have grown at rapid annual rate (currently estimated at 16%; B. Schults, unpublished data) and animals from this population are also dispersing into new areas. As a result of the dispersals, muskoxen are being seen with increasing frequency in Gates of the Arctic National Park and Preserve (GAAR). Reestablishment of populations of muskoxen within GAAR would be a desirable outcome of the natural dispersal and range expansion currently taking place in muskox populations in Alaska.

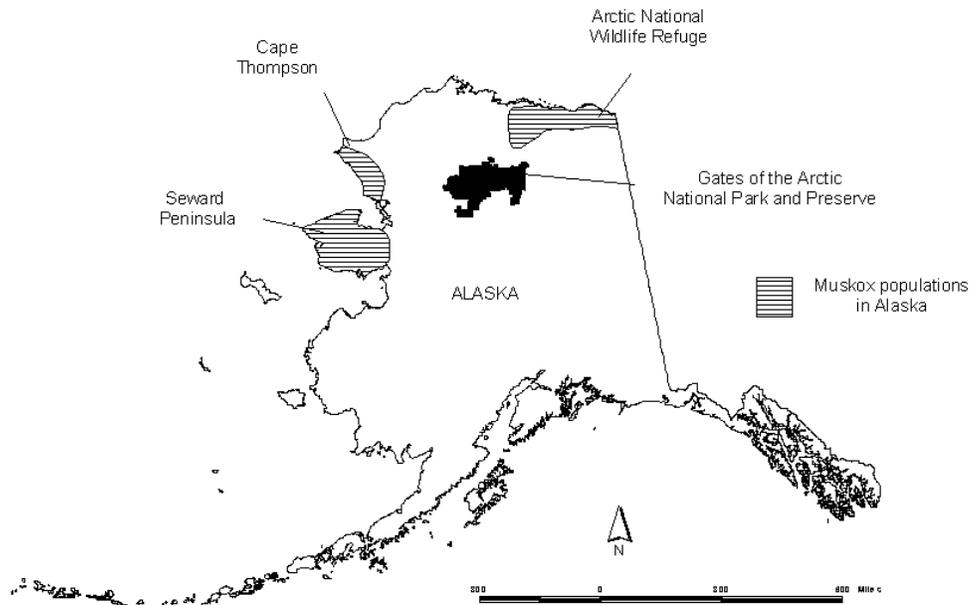


Fig. 1. Locations of muskox populations that may be sources of muskoxen observed in Gates of the Arctic National Park and Preserve from August 1986 - August 2001. Locations of muskox populations were derived from Smith (1987), Reynolds (1986), and Dau (Alaska Department of Fish and Game, personal communication).

Current muskox distribution within the Alaska is generally limited to arctic regions characterized by low snow levels. In alpine areas, with greater amounts of snowfall, available habitat may be patchy in distribution because muskoxen are poorly adapted to crater through deep snow (Nellemann 1998). Therefore, data collected on muskoxen distribution patterns and habitat use in other locations in Alaska may not be applicable to GAAR due to the mountainous character of the park. However, the ability of muskoxen to use mountainous habitat in Alaska is supported by historical records. For example, the last two reported mixed-sex groups of indigenous muskoxen in Alaska were killed in mountainous terrain in the eastern Brooks Range in 1892-1893, and 1897-1898 (Reed 1946).

Management of muskox populations has been a controversial issue for many years in northern Alaska. Many residents of the North Slope Borough (NSB), which includes GAAR, have concerns about the presence of muskoxen. Some feel muskoxen have a detrimental effect on caribou populations and therefore, caribou hunting (North Slope Muskox Harvest Plan 1998).

Muskoxen have been designated by the Federal Subsistence Board as a species of customary and traditional use by residents of the communities of Anaktuvuk Pass, Atkasuk, Barrow, Nuiqsut, Point Hope, Point Lay, and Wainwright (Federal Subsistence

Management Regulations 2002). Harvest regulations for game management units (GMUs) 26 and 23 have the potential to influence muskox dispersal into GAAR. Federal subsistence regulations for 2002 did not allow muskoxen to be harvested on federal public lands in the areas immediately adjacent to GAAR. In regards to state regulations, the Alaska Board of Game determined that a harvest of up to 20 muskoxen (i.e., Tier II Hunt TX108) was necessary to provide a reasonable harvest opportunity level for subsistence users in GMU 26B west of the Dalton Highway and north of GAAR. In GMU 26B east of the Dalton Highway, the Alaska Board of Game determined that up to 5 muskoxen was a reasonable harvest level for subsistence use (i.e., Tier I Hunt RX110). In addition, 3 muskoxen permits in GMU 26B were available through a drawing system (i.e., Drawing Hunt DX112). In GMU 26A, northwest of the park and around the community of Anaktuvuk Pass (located within the park boundaries), muskoxen can be harvested under emergency order issued by the Alaska Department of Fish and Game (ADF&G). Interest in increasing harvest limits is strong. At this time, the National Park Service lacks basic information on historical and current availability of muskox habitat within GAAR. This information is needed for informed decisions regarding this species within the park.

Distribution and abundance information gathered on muskoxen in GAAR has been opportunistic and basic. Muskoxen were observed along the Anaktuvuk River as early as 1986 (P. Reynolds, U.S. Fish and Wildlife Service, personal communication). The first reported observation of a muskox in GAAR was in 1989. A number of years followed without any recorded observations. In 1997, muskox observations were frequent enough that the National Park Service began maintaining a database of observations and locations of muskoxen within GAAR.

METHODS:

Beginning in 1997, incidental observations of muskoxen within GAAR were tabulated in a database and mapped (Fig. 2). When possible, information regarding sex and age of animals and location of observation were obtained. Sightings have been collected from a variety of sources including word of mouth from park visitors, park employee trip reports, and reports from residents of Anaktuvuk Pass.

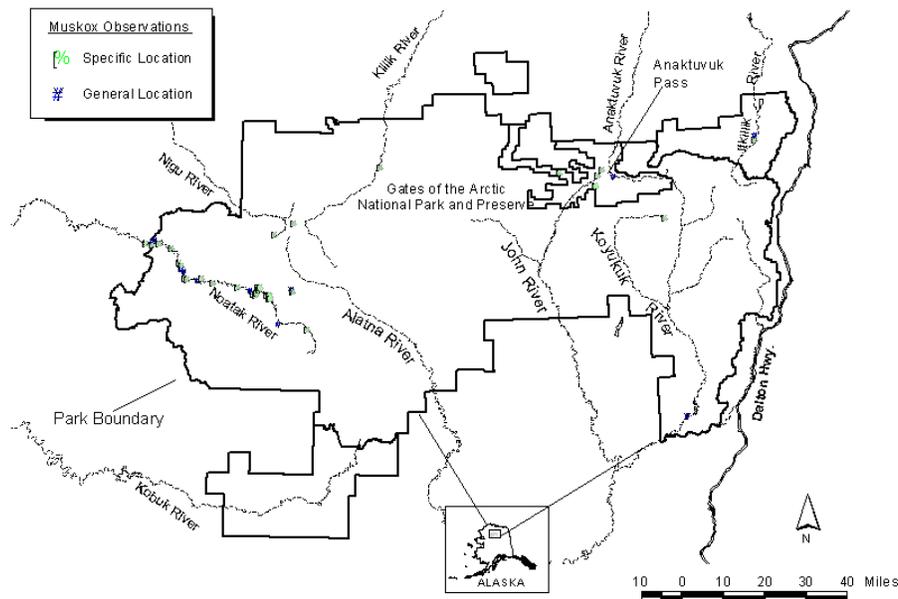


Fig. 2. Incidental muskox observations in Gates of the Arctic National Park and Preserve from August 1986 through August 2001. Locations were classified as specific or general based on the accuracy of location information provided by the observer.

Winter surveys were conducted 1999-2002, and summer surveys were conducted during 1999 and 2001. Surveys were conducted in 1999 from 26-28 April, and from 21 - 23 June. During 2000, surveys were conducted from 25-28 April. In 2001, a winter survey was conducted on 26-27 April, and completed on 27-28 May and a summer/calf survey was conducted from 7-8 July. In 2002, a winter was initiated on 23-24 April, and completed on 3 May. Survey efforts were concentrated in major river drainages on the north and west side of GAAR. All surveys were flown with a Cessna 185. Survey pilots were Sandy Hamilton (Arctic Air Alaska) and Don Glaser (Arctic Wings). National Park Service employees Jane Bryant, John Burch, Nikki Guldager, Jim Lawler and Debbie Nigro served as observers. Survey dates were chosen to approximately coincide with those of muskox surveys conducted by other natural resource agencies (P. Reynolds, US Fish and Wildlife Service, personal communication; B. Lenart, ADF&G, personal communication).

Surveys were conducted by flying up one side of river drainages and down the other at low altitudes (i.e., below 500 feet above ground level). In some instances, the size of the drainage required a zig-zag flight pattern to adequately survey the terrain. All surveys were concentrated in valley bottoms since these areas were expected to be the most favorable habitat for muskoxen.

Aerial surveys conducted to systematically locate muskoxen during winter covered 1,293 km in 1999 (Fig. 3), 1,519 km in 2000 (Fig. 4) 1,875 km in 2001 (Fig. 5), and 2,025 km

in 2002 (Fig. 6). Weather conditions during the 1999 winter survey were generally good. During the winter 2000 survey, an additional day was required to cover the survey area due to low clouds and fog. Poor weather ended surveys in April 2001 and 2002 prematurely and schedules and weather conditions did not allow the completion of the survey until May of both years. However, in both instances, good snow cover and weather conditions in May allowed completion of the survey under conditions similar to the April surveys. During all winter surveys, sufficient snow cover was present to provide excellent sightability. Summer surveys covered 2,297 km in 1999 (Fig. 7) and 395 km in 2001 (Fig. 8). Flying conditions for both surveys were excellent with high broken clouds and calm winds. Sightability on these surveys was much lower than during the winter surveys due to the lack of snow.

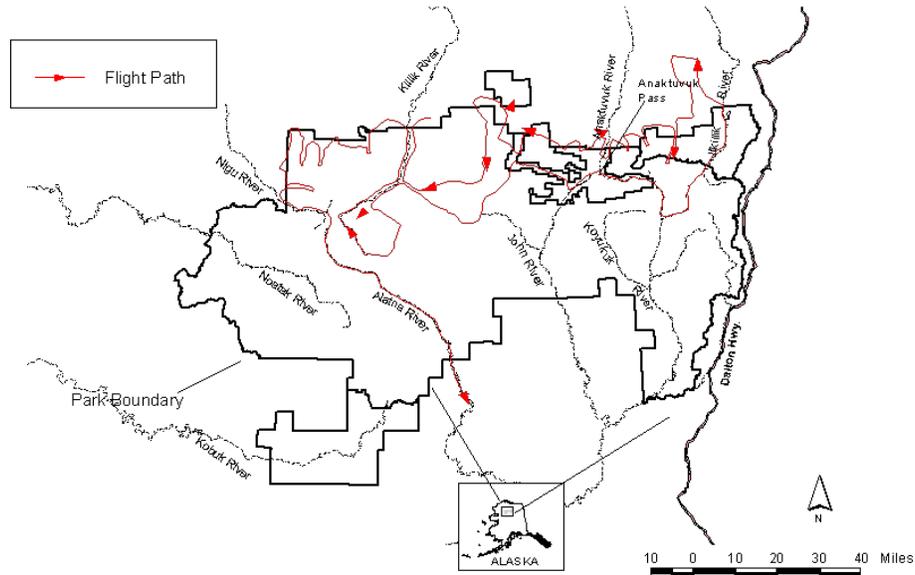


Fig. 3. Flight path of muskox survey conducted 26-28 April, 1999 in Gates of the Arctic National Park and Preserve, Alaska.

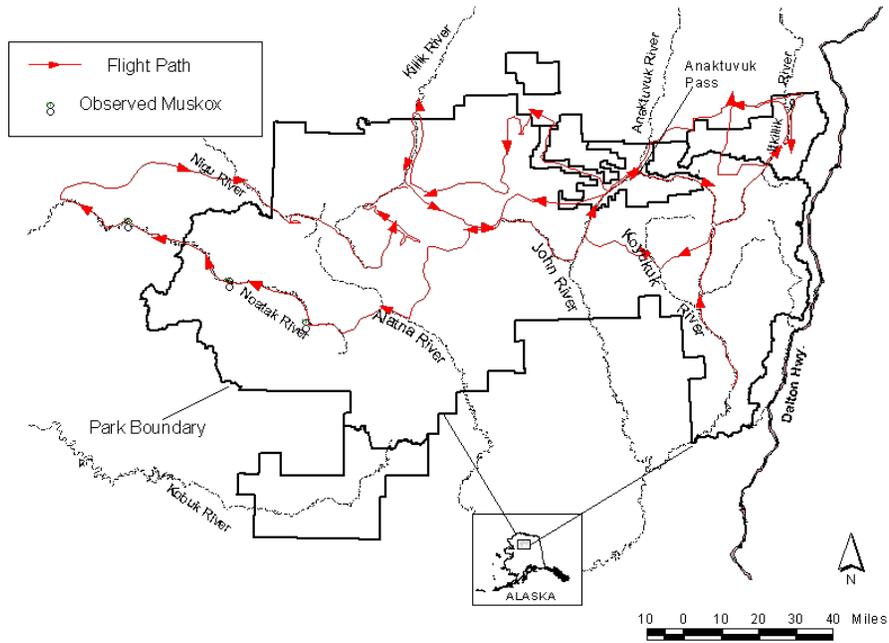


Fig. 4. Flight path of muskox survey conducted 25-28 April, 2000 in Gates of the Arctic National Park and Preserve, Alaska.

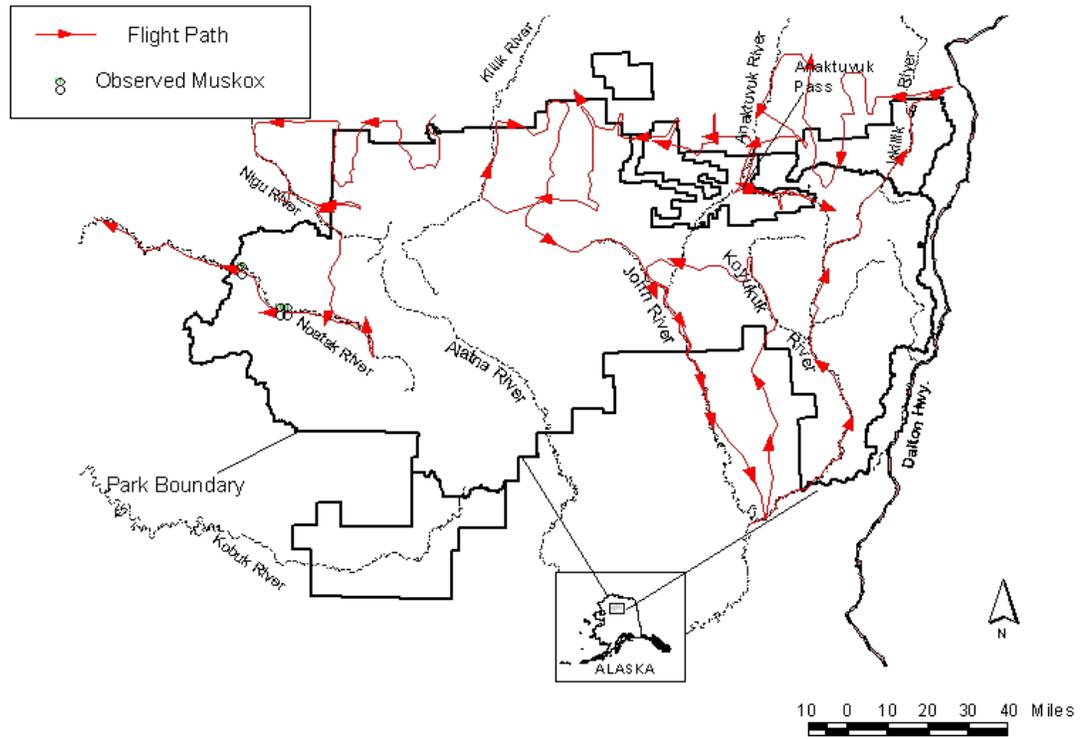


Fig. 5. Flight path of muskox survey conducted 26-27 April and 27-28 May, 2001 in Gates of the Arctic National Park and Preserve, Alaska.

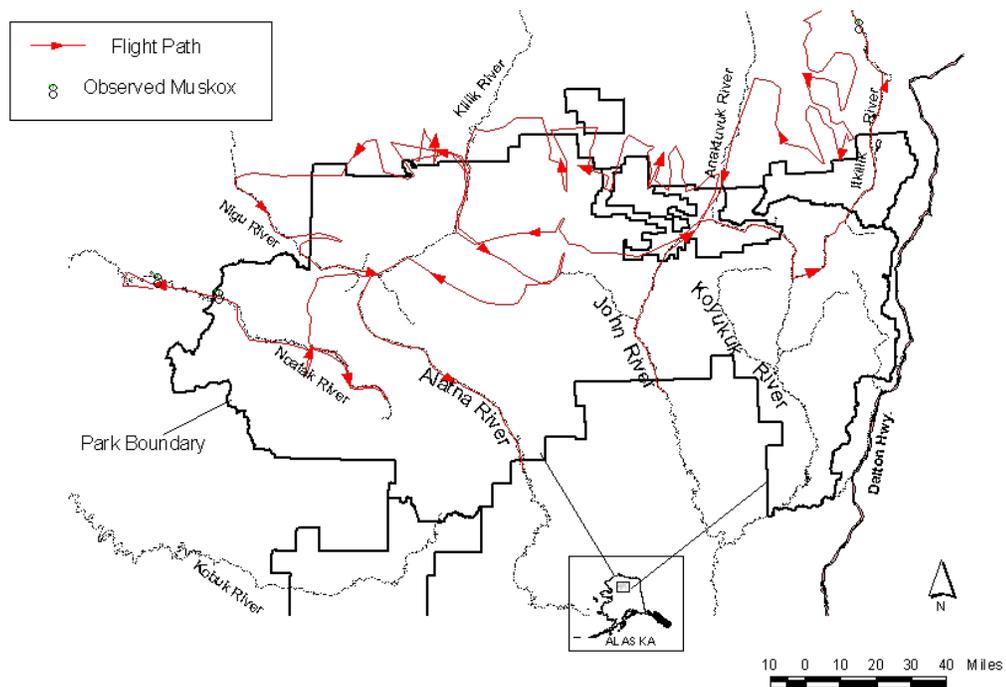


Fig. 6. Flight path of muskox survey conducted 23-24 April and 3 May, 2002 in Gates of the Arctic National Park and Preserve, Alaska.

RESULTS:

The majority of muskox observations within GAAR occur in the summer months when the greatest number of visitors and staff are in the park. Currently, 65 observations of muskoxen have been recorded in GAAR (Fig. 2). Observations along the Noatak River account for 75% of the total and observations near Anaktuvuk Pass account for 12% (Table 1). Most observations on the Noatak River are reported by transient groups of recreationists, likely resulting in multiple records for a single animal. In contrast, information from Anaktuvuk Pass tends to be more community-based in nature and although multiple people may have observed muskoxen in specific areas, only a few records have resulted. Both sets of sightings, therefore, are likely multiple observations of a few animals in each location. In few of the reported observations of muskoxen was the sex of the animal noted. Of 65 records, 26 reported seeing bull muskoxen, and one reported seeing a cow. The cow observation was not within the boundaries of GAAR but rather within a 10 mile perimeter.

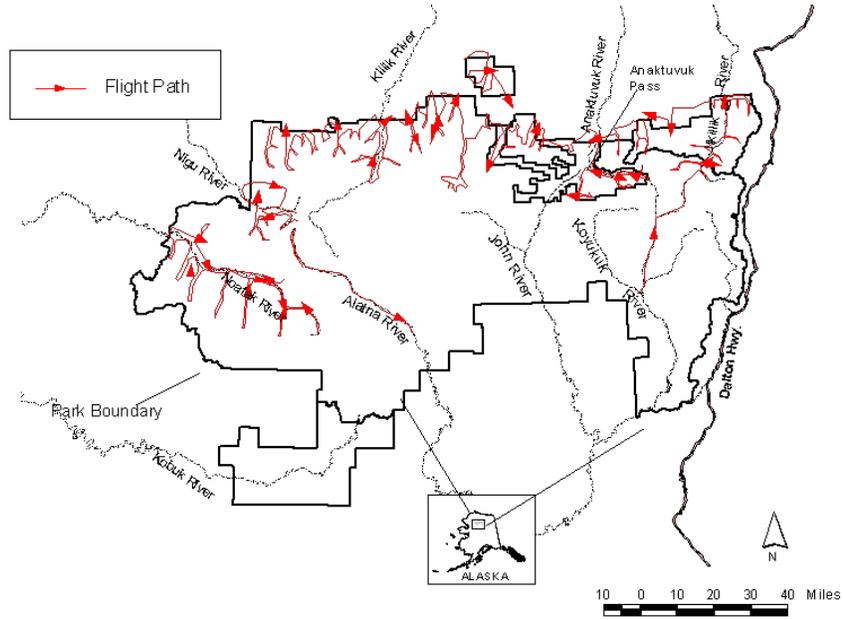


Fig. 7. Flight path of muskox survey conducted 21-23 June, 1999 in Gates of the Arctic National Park and Preserve, Alaska.

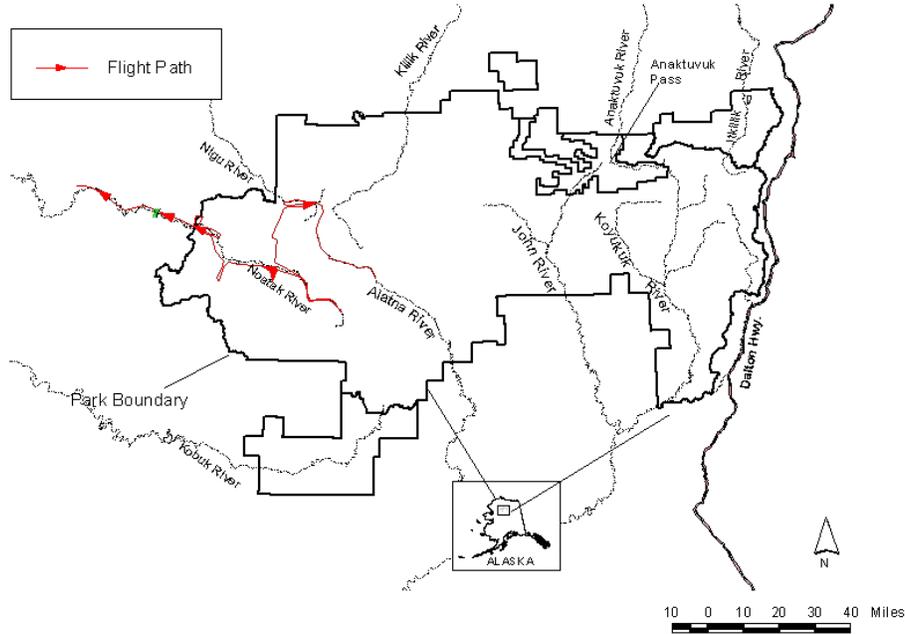


Fig. 8. Flight path of muskox survey conducted 7-8 July, 2001 in Gates of the Arctic National Park and Preserve, Alaska.

Table 2. Summary of incidental muskox observations in Gates of the Arctic National Park and Preserve, Brooks Range, Alaska (1989-2002).

Year	General Location	Number of Observations	Minimum Number of Muskoxen ^a
1989	Tinayguk	1	1
1994	Noatak	1	1
1997	Noatak	4*	2
	Anaktuvuk	1	2
1998	Noatak	7	2
	Anaktuvuk	1	1
	Nigu	1	1
	Itkillik	2	1
	North Fork Koyukuk	1	1

1999	Noatak	7	1
	Anaktuvuk	3	1
	Killik	1	1
2000	Noatak	12	2
	Alatna	1	1
2001	Noatak	3	1
	Anaktuvuk	1	1
	Wild Lake	1	1
2002	Noatak	15	3
	Anaktuvuk	2	1

^a Minimum numbers of muskoxen were determined by considering geographical location to ensure an individual was not counted more than once, or by the observation of more than one animals at a given location.

* One of the four observations was of a muskox carcass.

No muskoxen were observed during 1999 winter and summer surveys. During the 2000 winter survey, 3 bull muskoxen were observed in 3 separate locations (Fig. 4). Two animals were in the park and one animal was west of the park boundary. All animals observed were along the Noatak River. Seven muskoxen in 3 groups were observed in the park in 3 locations in the Noatak River valley during the winter 2001 survey (2 bulls, a bull and a cow, and a group of 3 bulls; Fig. 5). During the summer 2001 survey one bull muskox was observed just outside the park boundary (Fig. 8). In the winter of 2002, 3 groups of muskoxen were observed along the Noatak River and in the Itkillik river drainage (Fig. 6). Two bulls, and a bull and a cow were in the Noatak river drainage and 2 bulls were in the Itkillik River drainage.

DISCUSSION:

The minimum number of muskoxen occurring in GAAR (including a 10 mile buffer around the park boundary) was in winter of 2001 when 7 muskoxen were observed along the Noatak River during the winter aerial survey. More significant than the number of muskoxen observed was the observation of a female muskox. This is the first documented observation of a female muskox in GAAR and is a significant step in the re-establishment of a breeding population within the park. Another observation of a female muskox, during the winter 2002 survey is also significant indicating either a dispersal of a single female into the Noatak River drainage in which she now stays (and probability of breeding muskoxen) or 2 sightings of dispersing animals into this area. Both observations suggest that the Noatak River drainage may support a breeding population of muskoxen. A park-wide population estimate of 7 muskoxen is conservative. The large size of the park, combined with logistical and financial constraints dictates a relatively low level of survey intensity as the need to cover a large area is important. By necessity,

some areas are missed and survey intensity increases in areas where muskoxen have been seen before. A similar situation occurs with the data gathered from the incidental observations because areas of the park with the most intense human activity are those where muskoxen are most commonly seen. Animals occupying less frequented portions of the park would be less likely to be seen and reported.

It is probable that most animals being observed in GAAR are mature adult males since this class of animal is more likely to disperse into non-traditional areas and pioneer new habitats. During 1998 in Alaska, bull muskoxen were observed in areas far from established herds such as along the Yukon River near Ruby, Galena (T. Seaton, Alaska Department of Fish and Game, personal communication), Rampart (S. Hamilton, Arctic Air Alaska, personal communication) and fifty miles downstream from Eagle (S. Swanson, National Park Service, personal communication). Dispersal by males has been suggested as a primary mechanism by which muskoxen colonize discontinuous habitat (Smith 1989) as females are rarely seen alone or far from other muskoxen (P. Reynolds, US Fish and Wildlife Service, personal communication). This pattern of bulls colonizing an area followed by the arrival of female muskox is the pattern observed in GAAR. Bull muskox were first reported in the Noatak River drainage in 1994 and have been consistently seen there since. Eight years elapsed before the first female was observed in the same area and now, females have been observed on 2 consecutive years.

It is unlikely, that any large groups of muskoxen currently occupy GAAR.

Singles and small groups however, could easily have been missed, particularly during the June 1999 survey and the July 2001 survey when no snow cover existed. No cow muskoxen with calves have been observed in GAAR but they could be present in some of the larger and wider drainages on the north and west side of the park. In addition to the female muskoxen observed along the Noatak River during 2001 and 2002, mixed-sex groups of muskoxen occur 30 miles to the northeast of the park in the Ribdon River drainage (B. Lenart, ADF&G, personal communication). Dispersal of animals from the Ribdon group may eventually lead to the presence of a breeding population in the north-east corner of the park. Therefore, re-establishment of this species within the park may simultaneously occur in more than one area and the re-establishment of a breeding population may be imminent.

RECOMMENDATIONS:

The largest barrier to muskox re-establishment in Gates of the Arctic National Park and Preserve is perceptions from members of local communities that populations of muskoxen and caribou are incompatible. Local historical knowledge of this species needs to be documented and examined to ascertain the basis of this perception. In addition, information from studies of muskox/caribou interactions should be made available to local residents in an acceptable and palatable manner.

Winter aerial surveys have provided valuable information on the speed and nature of muskox re-colonization of GAAR. Although the documentation of a reproducing

population of muskoxen in the park is important, summer aerial surveys are difficult to justify at this time given the low density and low sightability of individual muskox. In addition, the only known female muskoxen observed within the park is along the Noatak River. It is likely that a calf produced from this animal would be detected by recreationists during the summer. The park needs to encourage the reporting of incidental observations from park visitors in order to capture this type of valuable information. Development of educational material to this end would encourage reporting and enhance visitor's appreciation of this rare wildlife resource.

ACKNOWLEDGMENTS:

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