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STATUS AND DISPERSAL OF AN INTRODUCED MUSKOX POPULATION ON THE SEWARD PENINSULA

By

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PROGRESS REPORT (RESEARCH)

State: Alaska

Cooperator: Scott Robinson, U.S. Bureau of Land Management, Fairbanks, Alaska

Project No.: W-22-4 W-22-5 Project Title: Big Game Investigations

Job No.: 16.1R Job Title: Status and Dispersal of an Introduced Muskox Population on the Seward Peninsula

Period Covered: 1 July 1984-30 June 1985
(With additional information to September 1985.)

SUMMARY

Muskoxen from Nunivak Island were transplanted to the Seward Peninsula in 1970 and 1981. In April 1985, 271 animals were located using an aerial photocensus technique aided by radiotelemetry. Radio collars were first placed on Seward Peninsula muskoxen in 1981. From April 1981 to December 1985, 25 muskoxen on the Seward Peninsula were instrumented. As of 24 September 1985, 12 radio collars were still functioning. One adult male muskox was instrumented during this reporting period. The costs and benefits of using radiotelemetry as an aid in censusing the population are compared with those of the standard visual search.

Key Words: capture, home range, mortality, movements, muskox, *Ovibos moschatus*, population identity, radiotelemetry, Seward Peninsula, transplants.

CONTENTS

BACKGROUND

Muskoxen (Ovibos moschatus wardi Zimmerman) were first introduced to the Seward Peninsula in 1970 with the release of 19 males and 17 females captured on Nunivak Island. Although muskoxen once occupied the region and left remains at many locations on the Seward Peninsula, Beechey (1831) was unable to verify the occurrence of living individuals when he visited in 1828. No sightings of muskoxen on the Seward Peninsula were reported by subsequent authors, and it appears that the extinction of muskoxen on the Seward Peninsula occurred before the 1st quarter of the 19th century.

Establishment and growth of the muskox population introduced in 1970 demonstrated the suitability of the habitat for the species. In 1981, when the Seward Peninsula population numbered about 100 animals, an additional 10 males and 26 females taken from Nunivak Island were released at Port Clarence (68 km northwest of Nome).

Five adult female muskoxen transplanted to the Seward Peninsula in 1981 were fitted with radio collars. These animals, and muskoxen instrumented later, have proven invaluable in our efforts to monitor the Seward Peninsula muskox population. The history of muskox radio tagging on the Seward Peninsula is presented in Smith et al. (1985) and in Appendix A.

OBJECTIVES

To increase accuracy of muskox censuses on the Seward Peninsula through use of radiotelemetry.

To determine individual home ranges, habitat selection, seasonal movements, and productivity of the herd.

To determine if discrete subpopulations or persistent associations of individuals occur.

STUDY AREA

The Seward Peninsula is approximately 53,000 km^2 (20,463 mi^2) in area and extends from the northwestern coast of Alaska into the Bering Sea. Topography varies from coastal lowlands to rugged mountain ranges with a maximum elevation of 1,438 m (4,714 ft).

The climate is strongly influenced by surrounding water, and temperature, rainfall, snow, and icing conditions are typical of maritime areas in northwestern Alaska. The climate of the Peninsula's interior is more continental, with greater temperature extremes and lower precipitation. Mean annual precipitation is approximately 36 cm (14 in), measured at Nome. Snow-cover usually persists from November through May and can be hard-packed and include ice layers, particularly near the coast.

The land surface is almost completely vegetated except for hills and mountains composed of calcareous rubble, located primarily on the southwestern border of the Peninsula. The York Mountains typify these landforms and support very little vegetation on their unstable, alkaline surface.

Mountainous terrain, even though sparsely vegetated, is important winter habitat for muskoxen on the Seward Peninsula, primarily because of its tendency to retain less snow than the lowlands. Isolated, rounded or flat-topped hills are most frequently selected by muskoxen. Windswept hills with a surface composed of small pieces of frost-shattered rock and soil interspersed with dry tundra/alpine tundra plant communities are preferred. These areas may be used by muskoxen during any part of the year but are of primary importance in winter. Productive, mixed plant communities in the raised depressions formed by melting ice lenses underlying pingos are important winter and summer habitat on the northwestern portions of the Seward Peninsula. These areas are used intensively until snow becomes too deep for foraging. The rounded mountains described above are the final refugia when snowfall restricts access to most Seward Peninsula range. Muskox/snow-cover relationships have been discussed previously by Smith (1984).

MATERIALS AND METHODS

Animal handling, marking, and data collection procedures have been described by Smith et al. (1985). For the present study, we attempted to relocate radio-collared muskoxen on a monthly basis. One adult bull was immobilized and radio-tagged during this reporting period (animal No. 50, Appendix A). This animal was darted after a ground stalk near Nome.

RESULTS AND DISCUSSION

Cost/Benefits of Radiotelemetry as an Aid to Censusing a Muskox Population

From April 1981 to December 1985, 25 muskoxen on the Seward Peninsula were instrumented with radio transmitters (Telonics, Mesa, AZ) (Appendix A). By 24 September 1985, only 12 of the radio collars on Seward Peninsula muskoxen were known to be functioning. Four of these had reached or exceeded their rated lifespan and are likely to fail before the end of the study. Eleven of 20 radio collars purchased for this project have been placed on muskoxen to date. It may be possible to place additional collars on muskoxen by using fixed-wing aircraft or snowmachines for transportation and by darting the animals from the ground, with the aid of a dog, as described by Smith et al. (1985).

A significant benefit of having radio-tagged muskoxen in the population has been reduced search time and increased accuracy of population censuses. A photocensus conducted on 4 April 1985, prior to calving, produced a count of 271 muskoxen. Historical census data and numbers of radio-collared muskoxen available at the time of the census are shown in Table 1. The proportion of radio-tagged animals in the population (6%) in 1984 and 1985 appeared to be nearly optimal, and we believe few animals were missed in the area censused. If the sample of radio-collared animals declines, so will census accuracy unless flying time is increased to compensate.

The costs of aircraft operation and staff time are such that radiotelemetry can provide substantial economic benefit at nearly any level of census accuracy. For example, the cost of capturing and instrumenting a muskox in April 1984 was $585 (excluding staff salaries). If one assumes that mean transmitter life is 4 years, the annual cost of maintaining a radio-tagged animal in the population is $146. Thus the annual cost of the 7 radio-tagged muskoxen (4% of the population) available for the 1983 census was $1,023. If radiotelemetry had not been used, the cost savings at current state leased aircraft operating rates and staff salaries would have allowed 5.6 additional hours of flying time. Although the 1983 census probably underestimated the actual population size by 10-15 animals (Smith et al. 1985), 5.6 additional hours of aerial survey time without use of radiotelemetry would not have provided comparable accuracy. The 1985 photocensus required 5.1 hours of flying time with a State-leased Cessna 185 and 2 staff members.

Sixteen radio collars were used (Table 1) for a total cost of $3,203. If the census had been done solely with a visual aerial survey using the same aircraft and observers, I estimate that comparable accuracy would have required at least 30 hours (cost of aircraft operation and staff salaries = $5,400) of flying. The survey probably could not have been achieved even with that level of coverage without the information on muskox distribution gained by routine tracking of radio-collared animals throughout the year. Radiotelemetry provides a means to obtain a variety of information important for sound management which further increases the benefit:cost ratio.

Mortalities

Three radio-collared muskoxen (Appendix A) and 1 unmarked adult male are known to have died during this reporting period. The death of animal No. 48 was noteworthy because it was radio-collared as a lone bull on the Kougarok River, a remote location by criteria defined in Smith et al. (1985). This muskox moved 82 km (51 mi) from the capture location to an area 6 km (4 mi) from Teller and 3 km (2 mi) from Brevig Mission, within the range normally occupied by wintering concentrations of muskoxen. The animal acquired a harem at least 1 month prior to its death. An attempt was made to recover the carcass for necropsy, but only the head and collar could be freed from the ice where the animal had died. Although the cause of death could not be determined, an injury sustained in a rutting battle, as reported elsewhere by Wilkinson and Shank (1976), or shooting, are potential causes. The animal's age was estimated on the basis of horn structure to be 8-9 years at the time of death (see Smith [1976] for a discussion of the technique).

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Table 1. Active radio collars, estimated population size, and percent radio-collared animals at time of April census, 1983-85.

Year	Active radios	Population census	% Radio-collared animals
1983	7	175[a]	4
1984	14	225	6
1985	16	271	6

[a] Corrected for animals missed. See Smith (1986) for discussion.

Appendix A. Identification and status of marked and radio-collared animals on the Seward Peninsula, 1981-85.[a]

Animal/ visual collar number	Sex	Date collared	Location	Approximate age at collaring	Plastic ear tag nos. & color		Metal ear tag nos.[b]		Horn streamer colors		Radio status, November 1985
					Left	Right	Left	Right	Left	Right	
1/45	F	3/24/81	Pt. Clarence	4+	--	--	334[b]		--	--	Functional ?
2/--	M	10/18/83	Pinguk R.	6 mos.	R20	R20	--	--	--	--	Not collared
3/46	F	3/25/81	Pt. Clarence	2+	--	--	369[b]		--	--	Animal dead, fall 82
6/47	F	3/24/81	Pt. Clarence	3+	--	--	13[b]		--	--	Animal dead, fall 82
8/48	F	3/24/81	Pt. Clarence	3+	--	--	29[b]		--	--	Functional
11/--	M	10/18/83	Nuluk R.	6-7	R2	R2	--	--	Or	Or	Functional ?
12/43	F	6/23/82	California R.	13	R66	R66	10035	10036	--	--	Animal dead, 4/09/84
13/--	F	10/18/83	Upper Nuluk	5-6	R3	R3	--	--	Wh	Wh	Functional
14/--	M	4/12/84	Pinguk R.	6+	R4	R4	17224	17225	Red	Wh	Animal dead 7/17/85
15/--	M	10/18/83	Pinguk R.	6-7	R5	R5	--	--	Red	Red	Functional ?
16/64	F	6/23/82	Pinguk R.	3	R64	R64	17207	17208	--	--	Not located since 1/25/84

Appendix A. Continued.

Animal/ visual collar number	Sex	Date collared	Location	Approximate age at collaring	Plastic ear tag nos. & color		Metal ear tag nos.		Horn streamer colors		Radio status, November 1985
					Left	Right	Left	Right	Left	Right	
18/61	F	6/23/82	Nuluk R.	3	R68	R68	17204	17203	--	--	Functional
19/--	M	4/12/84	Nuluk R.	8-10	R7	R7	17236	17236	Blk	Red	Functional
20/63	F	6/23/82	Cooper Cr.	--	R63	R63	17205	17026	--	--	Functional
21/--	F	10/18/83	Pinguk R.	15	R8	R8	10032	10031	--	--	Functional
22/65	M	6/23/82	Pinguk R.	4	R65	R65	--	--	--	--	Functional ?
23/--	M	4/13/84	Black Mt.	10+	R9	R9	--	17234	Red	Yel	Animal dead, 6/10/84
24/62	F	6/23/82	Nuluk R.	6	R62	R62	17201	17202	--	--	Functional
34/--	M	10/27/83	Don R.	12+	R11	R11	17211	17212	Blk	Yel	Functional
37/--	F	10/18/83	Pinguk R.	5-6	R14	R14	--	--	Yel	Blk	Functional
39/--	F	4/12/84	Nuluk R.	10+	R15	R15	17238	17237	Red	--	Animal dead, 7/17/85
41/--	M	4/12/84	Nuluk R.	4	R16	R16	17234	17233	Blk	Red	Functional
44/--	M	8/29/83	Solomon	2+	R1	R1	--	--	Red	Red	Functional
45/--	M	4/13/84	Black Mt.	7+	R17	R17	--	17240	--	--	Not located since 5/03/84

Appendix A. Continued.

Animal/ visual collar number	Sex	Date collared	Location	Approximate age at collaring	Plastic ear tag nos. & color		Metal ear tag nos.		Horn streamer colors		Radio status, November 1985
					Left	Right	Left	Right	Left	Right	
48/--	M	6/06/84	Kougarok R.	8-9	R19	R19	--	17241	Yel	Yel	Animal dead; 11/01/84
50/--	M	8/05/85	Nome	7-8	--	--	--	--	--	--	Functional

[a] Does not include 4 muskoxen radio-collared in April 1984 that died within 3 weeks of handling.

[b] Not clear from transplant reports whether same tag number applied to both left and right ear tags.