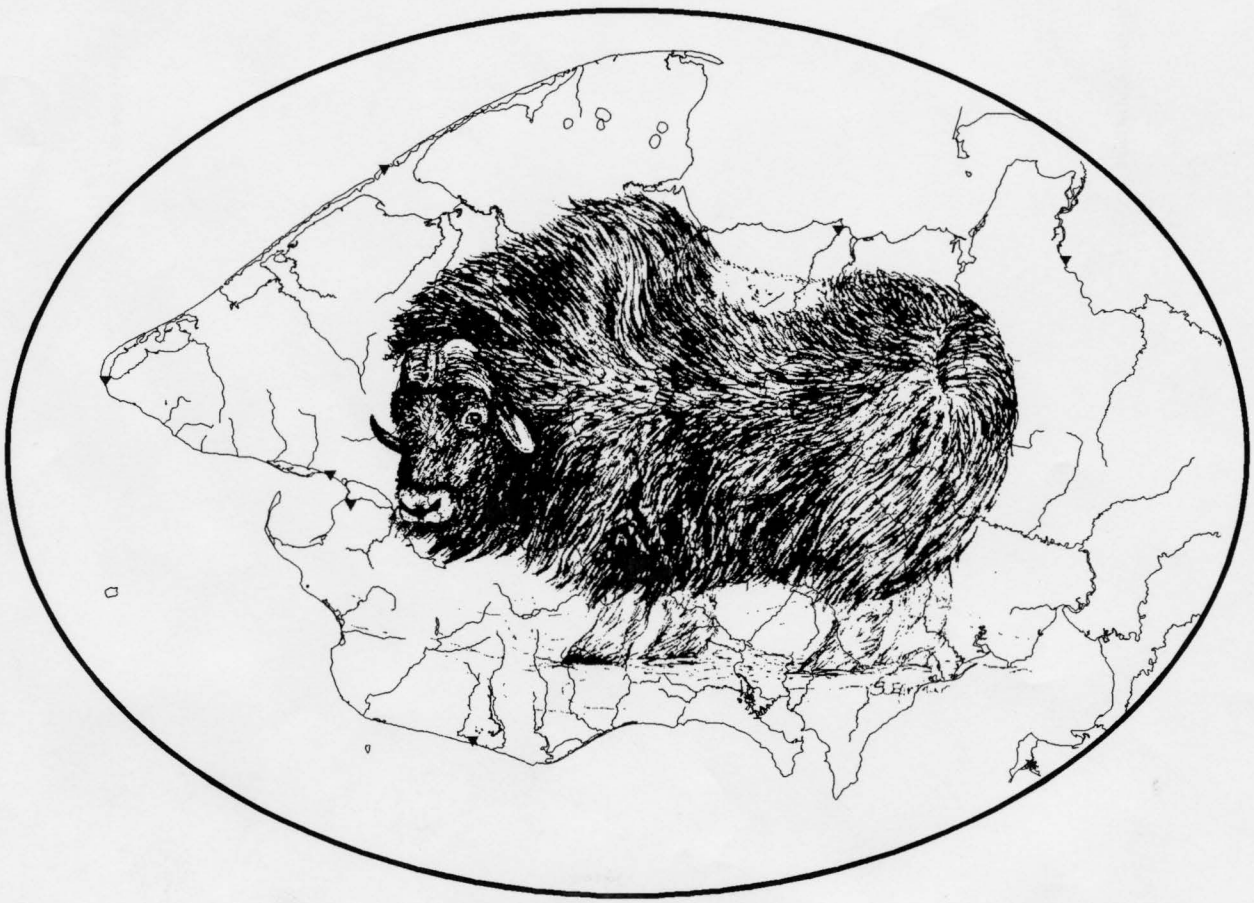
SEWARD PENINSULA

COOPERATIVE

MUSKOX MANAGEMENT PLAN



Seward Peninsula Cooperative Muskox Management Plan

Attention:

All known print and electronic copies lack the figures mentioned in the report. At least four figures are mentioned, which seem to be illustrations and maps.

Appendix 1 appears twice. The second appearance of appendix 1 has the same information, but is formatted differently.

INTRODUCTION

Purpose

The Seward Peninsula Muskox Management Plan herein noted as the "Plan" will form the basis for future muskox management in Game Management Unit 22, and southern Game Management Unit 23 (Figure 1). This plan was drafted by the Alaska Department of Fish and Game (ADF&G) in cooperation with the National Park Service (NPS), the U.S. Bureau of Land Management (BLM), the Reindeer Herders Association (RHA), the Soil Conservation Service (SCS), the Alaska Department of Natural Resources (ADNR) and the Bering Straits Native Corporation (BSNC). It is not the intention of this plan to detract from management of reindeer or wildlife species. The plan is not permanent and will be subject to revision during the coming years. It will also require continued input from resource users and other interested parties during implementation.

Some components of this plan will be carried out immediately, others will take years to accomplish. Suggested hunting issues are dependent on muskox population size, growth, and distribution. They must comply with limitations imposed by State and Federal laws and regulations, and ultimately must be approved by the Alaska Board of Game and the Federal Subsistence Board.

Copies of this plan are available from:

ALASKA DEPARTMENT OF FISH & GAME
POUCH 1148
NOME, ALASKA 99762

The following Agencies, Associations, and Landowners have given their approval to this Cooperative Muskox Management Plan:

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Management History

Muskoxen on the Seward Peninsula have been managed with goals and objectives set by ADFG's Alaska Muskox Management Policy (Appendix 1). This policy was initially approved in 1973, updated in 1980, and again in 1990. Public input into the decision-making process was minimal. However, interest in muskox management is increasing and now includes local, statewide, and national interests. Numerous individuals throughout Alaska have expressed a desire to view and hunt Seward Peninsula muskoxen.

The Seward Peninsula is one of the few areas in our nation where wild muskoxen can be viewed from state maintained road systems; therefore, the viewing and wildlife education potential is extensive. Potential conflicts between consumptive (i.e. hunting) and nonconsumptive (i.e. viewing and educational) uses necessitate that extensive public input be gathered for a Seward Peninsula muskox management plan.

During recent years, the Seward Peninsula muskox population status has been evaluated by aerial surveys, censuses, composition counts, and periodic monitoring of radio-collared animals. A comprehensive research program was also conducted from 1983 through 1987 (Smith 1987). Portions of this study were in cooperation with the NPS and BLM.

Several models have been used in past years to provide insight on herd growth. Because of their simplicity and inability to incorporate key factors such as natural mortality and emigration, a conservative approach has been taken in interpreting those data. Figure 2 compares herd growth, as calculated by one of the models with actual counts obtained from surveys and censuses conducted between 1980 and 1994.

Current Status

Although most muskoxen are distributed in the western half of the Seward Peninsula (Subunits 22D and 22E), animals are also found in southern Unit 23 and in Subunits 22B and 22C (Figure 1). Muskoxen occur on lands managed by the State, NPS, and BLM; and, on private lands managed or owned by BSNC, NANA, various village corporations, and others.

An extensive population survey conducted in April 1992 throughout the western portion of the Seward Peninsula (Figure 3) revealed 52 individual groups containing a minimum of 706 muskoxen. The total number of animals located in the different Subunits and Units were: Subunit 22E, 180; Subunit 22D, 340; Subunit 22C, 49; Subunit 22B, 3; and Unit 23, 134. A survey of the same area conducted in April 1994 found 75 individual groups containing a minimum of 925 muskoxen (Figure 4). The total number of animals located in the different Subunits and Units were: Subunit 22E, 184; Subunit 22D, 405; Subunit 22C, 79; Subunit 22B, 11; and Unit 23, 246. The expansion observed in recent years demonstrates that muskoxen are emigrating from the core area. The rate and the composition of those animals emigrating remains unknown at this time.

Post-calving data obtained from larger groups located in Subunit 22D during late spring 1992 showed a ratio of 64 calves per 100 adult cows, and 33 adult bulls per 100 adult cows. We question the accuracy of the bulls per 100 adult cows estimate because it is common for many bulls to split off from the major herds and small bull groups of 1 to 3 animals are easily missed.

Additional information pertinent to Seward Peninsula muskoxen are available in Appendix 2.

GOALS AND MANAGEMENT OBJECTIVES

The following 6 management goals form the basis of a management program for Seward Peninsula muskoxen. These goals follow the guidelines of the Alaska Muskox Management Policy (Appendix 1). The foremost priority for management of muskox populations on the Seward Peninsula is to allow for continued dispersal and herd expansion. Viewing, photography, hunting, and other non-consumptive uses are also considered high priority. Domestication and commercial harvest are currently lowest in priority.

For the purposes of this plan, the "muskox population" includes all animals resident of Game Management Subunits 22B, 22C, 22D, 22E, and that portion of GMU 23 west of the Kiwalik River (Figure 1).

The established goals for Seward Peninsula muskoxen are listed below. The management objectives described are to be used to meet these management goals.

GOAL 1: Allow for continued natural increase in the size and distribution of the Seward Peninsula muskox population.

Management Objectives:

A) Efforts shall be made by the cooperators to conduct periodic censuses, composition surveys, and radiotelemetry studies of the muskox population to track herd growth, productivity, and range expansion.

- Censuses and surveys throughout all or portions of the Seward Peninsula should be conducted at two year intervals, and a suitable number of animals should be radio-collared to achieve this objective.

GOAL 2: Provide for limited hunting of muskoxen in a manner consistent with existing State and Federal laws and regulations, and the other goals and management objectives of this plan.

Management Objectives:

A) Harvests, when allowed, will be managed to allow continued herd growth and range expansion. For the purposes of determining harvest, population size will be evaluated by post-hunt, pre-calving censuses conducted during late winter.

B) Suggested harvests shall initially be restricted to male muskoxen (bulls) in Subunits 22E and 22D (Figure 1). This aspect of the plan will be revised if numbers change sufficiently to affect sustained yield and dispersal. No harvest will occur in these Subunits when there are fewer than 200 muskoxen in Subunit 22E, 350 muskoxen in Subunit 22D; or, data indicate the Seward Peninsula population as previously described contains less than 950 animals*.

C) The suggested annual harvest should initially not exceed 5 bulls in GMU 22E and 10 bulls in GMU 22D**. This aspect of the plan will be revised if muskox numbers change sufficiently to affect sustained yield and dispersal.

D) A harvest of cows should only be considered if necessitated by a significant change in the sex-age structure or size of the muskox population in specific areas. The sex-age structure and population size will be managed to provide for the goals of population growth, dispersal, and harvest.

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* A simplistic model (Figure 2) was used as a guide for projecting herd growth. This model at present does not factor in extremely important variables such as natural mortality and emigration as reliable data are unavailable. Because of this, a conservative approach was taken when suggesting minimum population and suggested harvest figures.

E) Harvest will be by permit only. Hunting regulations and the distribution of permits must be consistent with existing state and federal laws and regulations. The public will have the opportunity to participate in developing and modifying muskox hunting regulations through fish and game advisory committees and federal regional councils and in testimony to the Alaska Board of Game and the Federal Subsistence Board. Appendix 3 discusses options available for a Seward Peninsula muskox hunt under current (1994) law.

GOAL 3: Manage muskoxen in Subunits 22B and 22C primarily for viewing, education, and other non-consumptive uses.

Management Objectives:

A) The foremost priority for muskox management in Subunits 22B and 22C will initially be viewing, education, and other non-consumptive uses. The cooperators will work with the local tourism industry, the Alaska Department of Transportation, and other Public Facilities to develop highway turn-outs and roadside displays at locations where muskoxen may commonly be observed.

GOAL 4: Work with local reindeer herding interests to identify and minimize conflicts between reindeer and muskoxen which may occur.

Management Objectives:

A) The cooperators will work with reindeer herding interests to determine whether significant competition occurs among muskoxen and reindeer use of range and habitat, particularly during the winter months. If it is determined that significant competition does occur, the cooperators and the herding interests will work to resolve, to the maximum extent possible, these conflicts.

GOAL 5: Protect and maintain the habitat and other components of the ecosystem upon which muskoxen depend.

Management Objectives:

A) Identify ecosystem components (snow depth, weather variations, habitat types, and etc.) which are critical for muskoxen. This information will help evaluate the potential for expansion of muskoxen onto suitable habitats beyond the Seward Peninsula.

B) Some cooperators will attempt to determine year-round habitat use and inventory muskox habitat types to estimate carrying capacity based on the most valid scientific data.

C) The cooperators will work with development interests and private landowners to minimize adverse impacts development projects may have upon muskox populations and habitat.

GOAL 6: Encourage cooperation and information sharing among agencies and resource users in developing and carrying out management and research programs.

Management Objectives:

A) The cooperators shall, at a minimum, meet bi-annually to discuss:

* Reindeer/muskoxen interactions.

* Results of research and management studies, and plans for future cooperative studies.

* Proposed management actions.

* Regulatory proposals to the Alaska Board of Game and the Federal Subsistence Board.

* Any other business related to management of Seward Peninsula muskoxen.

B) This plan will be revised when necessitated by changes in muskox population status, regulations, needs of resource users, and expectations of the public. Therefore, the cooperators shall also formulate a schedule for later revision of this Plan

C) Cooperators will communicate information to resource users concerning population dynamics, proposed management actions, and other pertinent information.

D) Cooperators shall encourage an exchange of information between users and managers and solicit from resource users information concerning local muskox populations, suggestions for management, and any other pertinent input.

E) Cooperators will also incorporate, to the maximum extent possible, information concerning muskox ecology and management into information/education and school programs.

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Appendix 1. Alaska statewide muskox management policy as amended in 1990.

Species Background

Muskoxen were once widely distributed in Alaska but were extirpated by the middle or late 1800's. The survival of remaining muskox populations in Canada and Greenland was in doubt by the early 1900's. In 1929, with the support of the Alaska Territorial Legislature, the U. S. Congress initiated a program to reintroduce muskoxen in Alaska: 1) to aid in conserving a species threatened with extinction; 2) for contemplated experiments in re-establishing the muskox as a native animal in Alaska; and 3) for experimentation leading to their eventual domestication and utilization.

Nunivak Island was designated a National Wildlife Refuge in 1929 to provide a site for establishing a muskox population which would produce animals for transplants to mainland Alaska. In 1935 and 1936, 31 muskoxen captured in East Greenland and their progeny born into captivity were released on Nunivak Island. Muskoxen adapted readily to Nunivak Island and increased to more than 700 animals by 1968. In 1964 and 1965, 33 muskoxen were captured on Nunivak Island for a muskox domestication project in Fairbanks. From 1967 to 1981, 228 muskoxen were translocated from Nunivak Island to establish free-ranging populations elsewhere in Alaska. Muskoxen were introduced to Nelson Island, the Arctic National Wildlife Refuge, Cape Thompson north of Kotzebue, and onto the Seward Peninsula. With the exception of the Cape Thompson population (status unknown), all of the introductions were successful, resulting in at least 2,200 free-ranging muskoxen in Alaska in 1988. The recent history of muskoxen in the State is an excellent example of the benefits of scientific wildlife management, it is likely that muskox numbers and beneficial uses of the species will continue to increase for many years.

As muskox populations have grown, subsequent research has corrected several erroneous assumptions about muskox biology and ecological relationships:

1. Muskoxen can be highly productive. Several introduced muskox populations in Alaska have displayed annual rates of increase exceeding 20%. In areas of good habitat many females calve annually, usually beginning at 3 years of age. The belief that muskox populations have low intrinsic productivity was based on previous studies of Canadian high arctic populations which have lower rates of annual increase and longer calving intervals.

2. Muskoxen can adapt to a wide variety of habitats. The last surviving muskox populations were found in high arctic ecosystems. These populations should be characterized as relict rather than typical, surviving in areas where hunters were scarce or non-existent. Muskox habitat in Alaska is widespread, with upland tundra areas being preferred. However, muskoxen have also occupied wet lowland tundra on the Yukon-Kuskokwim Delta and forested areas south of the Brooks Range and on the eastern Seward Peninsula. Although animals rarely forage through more than a foot of hard-packed snow, they do not necessarily require extensive areas with shallow snow cover. Muskoxen can locate microhabitats with suitable foraging conditions within regions where the average snow cover would ordinarily preclude feeding. Muskoxen are much more adaptable and able to utilize a wider range of habitats than previously thought.

3. Muskoxen may migrate or disperse widely. Soon after muskoxen were established on the mainland, individuals were sighted at great distances from release sites. These animals were initially believed to be lost from the population. Observations of radio-collared animals on the Seward Peninsula and the Arctic National Wildlife Refuge confirmed that muskoxen can be very mobile and occupy relatively large home ranges. Muskoxen making long movements were frequently able to locate other animals or return to their area of origin.

Public hunting of muskoxen in Alaska was initiated on Nunivak Island in 1975, on Nelson Island in 1981, and in the Arctic

National Wildlife Refuge in 1983. Muskox hunts on Nunivak Island have provided substantial benefit to the public. Guiding and transporting muskox hunters is a major component of the economy of Mekoryuk, the only village on Nunivak Island. More than 25,000 pounds of meat is obtained annually in the hunt, most of which remains in Mekoryuk. Revenues collected by the state from sale of tags and fees for drawing permits alone during 1975-1985 for the Nunivak Island muskox hunt have exceeded the costs of managing the population.

Species and Habitat Management Policies

1. The Alaska Department of Fish and Game (Department) will strive to re-establish muskoxen throughout suitable range in Alaska, and to provide for their use and enjoyment by the public. Dispersal from previously translocated herds will be the primary method by which range expansion occurs. A gradual and natural process of population growth and range expansion will help provide necessary time for acceptance of muskox conservation principles by local residents before animals reappear or become established in new areas.

2. The Department recognizes that responsible muskox management must be based on scientific knowledge. A Department program will be maintained to increase knowledge of population status, and biological and ecological requirements of muskoxen. The Department will cooperate with other agencies or individuals whose investigations may provide useful information for managing muskoxen.

3. Preservation of winter habitat and protection from harassment, particularly prior to and during calving, rutting, and late winter, are essential for optimum survival and reproductive success. Muskoxen are dependent on areas that accumulate less than 30 cm. of snow cover for at least a portion of the winter. Hard packed snow hinders foraging more than the same depth of soft snow. Muskoxen may reduce their activity and movements during winter as an energy conservation strategy. Therefore, disturbance on late winter range could be very detrimental if suitable habitat is limited or if animals are forced to move.

4. Muskox populations will be maintained at levels commensurate with available habitat and other native fauna. Either sex harvests will be used as necessary to alter sex and age composition and growth rates of populations.

5. Translocating muskoxen to vacant habitat may be a beneficial management action. However, transplants must be consistent with Department transplant policy and consider: 1) management objectives of the program; 2) future public access to animals in the region of the transplant; 3) probability of successfully establishing a viable population; 4) effects of transplanted muskoxen on the status or utilization of resident species; 5) public understanding of the relocation; 6) extent to which the public is meaningfully involved in management planning for the translocated herd; 7) anticipated costs of the program compared to expected benefits to the muskox resource and the public; and 8) priority of the program to the state compared with other Department programs.

6. The Department recognizes that successful muskox management requires public support and cooperation in both rural and urban areas. All Alaskan residents must have an opportunity to understand muskox management programs, to participate in muskox management planning, and to develop a sense of responsibility for conserving the species.

Species Use Management Policies

The Constitution of Alaska requires that muskoxen be managed on the sustained yield principle for the benefit of the resource and the people of the State. There are several beneficial uses of muskoxen, and all will be considered.

1. Viewing, hunting, and esthetic enjoyment are important uses of muskoxen. The knowledge that historic muskox range in Alaska is being repopulated, even though animals may never be observed by some individuals, is an also an important component of these uses.

2. Because most muskoxen occur in remote areas of the State, opportunity for viewing the species is limited. Therefore, appreciation of muskoxen will be encouraged through public information and education programs. In areas where muskoxen are or will become relatively accessible, such as along roads on the Seward Peninsula, viewing opportunities will be publicized. An emphasis on viewing may require limiting or excluding other uses if they diminish chances of viewing animals.

3. Muskoxen may provide significant benefits as a food resource in some areas. Where people use or potentially will use muskoxen primarily for food, the Department will manage populations to provide meat as well as for other uses.

4. In selected areas with intensive hunter use, muskoxen will be managed for high sustained yield. Management techniques may include, but are not limited to, either sex harvests by registration and/or drawing permit, long seasons that coincide with preferred times for hunting, and minimum restrictions on means of transportation and access.

5. Certain areas of the state will be managed to provide muskox hunting opportunities of high aesthetic quality. These areas will provide a large proportion of trophy animals, the opportunity to view numerous muskoxen, and uncrowded hunting conditions. Management techniques may include, but are not limited to, regulating access and means of transportation, controlling number and distribution of hunters, and regulating sex and age of animals taken.

6. Public viewing, education, and scientific study are acceptable uses for limited numbers of captive muskoxen. However, such uses will be authorized only if a surplus of muskoxen exists in a wild herd, adequate holding facilities and expertise are available, and substantial public benefit can be demonstrated.

7. Private ownership of muskoxen for domestication or commercial harvests is the lowest priority use of the species. Private ownership will be considered only if it would be consistent with Alaska Statute 16.40.010.

8. The Department will work with land managers and owners to maintain or develop public access to muskox populations. This may include, but is not limited to, cooperative management planning and developing or renewing cooperative agreements. If public access to any population is restricted, dispersing muskoxen which occupy adjacent lands accessible to the public will be protected and enhanced.

Management Problems

1. Illegal harvests of muskoxen appear to be increasing in some areas. Because recent generations of Alaskans have had limited exposure to muskoxen, unauthorized hunting has not become widespread. An opportunity exists to prevent illegal harvests from increasing further by working closely with hunters and local leaders to obtain support for muskox conservation principles. This will require close working relationships to develop understanding and credibility between residents and Department staff, and a meaningful involvement by the public and other resource management agencies in cooperative management planning and conservation.

2. Muskoxen have been absent from mainland Alaska for most of this century, and some local residents do not view reintroductions favorably. Some people believe that: 1) muskoxen compete with or impact caribou, reindeer, and waterfowl; 2) trample vegetation and berries otherwise available to local residents; and 3) frighten people. Acceptance of muskoxen by local residents in some areas may never occur, while in other areas it will require many years. The nature of interactions between muskoxen and other species needs to be studied more fully. The Department must better inform the public about ecological relationships and behavior of muskoxen, and become better informed on the beliefs and concerns of the public.

3. Public demand for muskox hunting opportunity greatly exceeds allowable harvests and will likely remain so for several years. Alaska Statute 16.05.346 specifies that only hunters who have received a permit may take muskoxen, and further specifies the conditions under which either drawing or registration permits will be issued. Intense competition for the limited number of permits has caused conflicts and provoked criticism of both the Board of Game and the Department. A method of allocating permits must be developed which will reduce interpersonal tensions and will be viewed as equitable by the majority of hunters.

APPENDIX 2. Background information.

Historical information indicate muskoxen most likely disappeared from Alaska during the late 1800s. At that time, remnant populations occurred only in portions of Canada and Greenland. Some authors believe that historic muskox distribution in Alaska was restricted to the North Slope (Spencer and Lensink 1970). However, Russell (1898 in Alien 1912) believed that muskoxen were once abundant from the Mackenzie Delta to Bering Strait. In an effort to preserve the species from extinction and to eventually effect their reintroduction into historic Alaska range, a herd of 31 muskoxen from Greenland was introduced to Nunivak Island during 1935 and 1936. The introduced population grew rapidly, and has served as the source of animals for transplants to 4 other sites in Alaska.

The extent that muskoxen inhabited the Seward Peninsula is unknown. Smith (1987) provides reference to skeletal material collected by the Beechey Expedition (1825-28) at Elephant Point on Escholtz Bay, Northern Seward Peninsula. It was emphatically stated that the muskox bones collected were of recent origin. The Beechey Expedition also reportedly interviewed a man from the Buckland River area who appeared familiar with the species suggesting that muskoxen still survived or had only recently been exterminated.

During spring 1970, 36 muskoxen (19 males, 17 females) were transplanted from Nunivak Island to the Seward Peninsula near the Feather River (Figure 4). By 1980, the population increased in size to approximately 104 muskoxen (Grauvogel 1981). During spring 1981, an additional 35* muskoxen (10 males, 25 females) were transplanted from Nunivak Island to a site on the Seward Peninsula near the village of Brevig Mission (Figure 4). From 1983 to 1988, the Seward Peninsula muskox population grew dramatically as animals dispersed throughout much of the northern and western portion of the Seward Peninsula (Smith 1987). In spring 1992, the population was found to contain a minimum of 706 muskoxen.

Since the early 1980s, radio collars have been placed on both sexes of muskoxen to assess herd distribution and movements, habitat use, and to assist in conducting population censuses. Data gathered from the locations of radio-collared animals and

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* The original number of animals transplanted was 37 A 4+ female died shortly after the transplant, and a yearling female was transported to Fairbanks, AK because of capture myopathy.

the 1992 census indicates that most of the muskoxen on the Seward Peninsula are located in GMU 22D and GMU 22E. Smaller numbers occur in the southern portion of GMU 23, in GMU 22B, and GMU 22C (Figures 1 & 3). Wandering bulls apparently play an extremely important role in pioneering movements into new areas (Smith 1989).

We believe that mortality rates among Seward Peninsula muskoxen are low. Wolves are relatively uncommon on the Peninsula, particularly in the western half, where most of the muskoxen occur. Reports of grizzly bears killing muskoxen have not been documented. Analyses of blood samples taken from muskoxen immobilized for radio-collaring indicate that Seward Peninsula muskoxen are apparently free of disease (Smith 1987). The lack of any evidence of exposure to brucellosis is particularly noteworthy because some muskoxen do come in contact with infected reindeer herds.

Very little range use information is available for Seward Peninsula muskoxen. Some authors have indicated that muskox populations are characterized by low intrinsic productivity, and are specially adapted for use of only arctic and high arctic ranges characterized by low precipitation rates (Tener 1965 in Smith 1987). Spencer and Lensink (1970) maintained that muskoxen are poorly adapted for use of ranges south of the Bering Strait which may experience heavy snows and severe freeze-thaw and icing conditions. The impressive population growth of herds located in coastal, subarctic environments (Nunivak and Nelson Islands, and Seward Peninsula) indicates that muskoxen are much more productive, and may be capable of using a wider variety of habitats than previously believed.

The carrying capacity of Seward Peninsula muskox ranges has not been determined. Efforts to predict the carrying capacity of various muskox ranges in other parts of Alaska and Canada have not proven entirely successful. Estimates provided by different authors of the range carrying capacity of Nunivak Island have varied from 300 to over 5,000 (Smith 1987). Occasional harsh winters characterized by heavy snow and severe icing conditions may limit our ability to establish meaningful estimates of carrying capacity. The high productivity exhibited by the Seward Peninsula population suggests that herd size is probably smaller than the carrying capacity of the habitat.

Very little quantitative information documenting whether reindeer or caribou and muskox significantly compete for range on the Seward Peninsula is available. Although muskox and reindeer have co-existed on Nunivak Island for more than 50 years, significant overlap of range use has not been demonstrated (Smith 1987, Spencer and Lensink 1970). Other authors have suggested that Nunivak Island muskoxen and reindeer eat some of the same forage species although widespread competition for habitat use has not been observed (Patten 1986). Nunivak island range is considered critically overgrazed (Swanson et al. 1986), and conclusions from studies there may not be applicable to other parts of Alaska. Additional studies to determine whether significant overlap of range use occurs among muskoxen, reindeer, and caribou on the Seward Peninsula are warranted.

Appendix 3. Options for Muskox Hunting on the Seward Peninsula.

A number of the public comments on the draft Seward Peninsula Muskox Management Plan requested that if hunting is allowed, then hunting should be limited to local residents of Seward Peninsula communities. The plan itself was not specific about how muskox hunting on the Seward Peninsula might be regulated because this falls under the authority of the Alaska Board of Game and the Federal Subsistence Board. Nonetheless, given current (1994) federal and state subsistence law and regulation, there are significant limitations on how a muskox hunt might occur. Given these limitations, it is unlikely that hunting would be limited to residents of the Seward Peninsula. This appendix discusses possible scenarios for a Seward Peninsula muskox hunt under existing state and federal law.

State Muskox Hunt

The Alaska Board of Game may authorize a general hunt, a subsistence hunt, or both for Seward Peninsula muskoxen. The differences between a general and subsistence hunt are described below.

1. General Hunt

A general hunt would be open to all Alaska residents and possibly non-residents. To authorize a general hunt, the Alaska Board of Game does not need to find that muskoxen have customarily and traditionally been used for subsistence. A general hunt, however, carries no subsistence priority or preference. All lands (federal, state, and private) would be open to a general hunt, although private land owners may restrict access to or travel across their lands.

If a general hunt were opened, it would probably be a drawing hunt (lottery) or registration hunt (first-come, first-served) because of the small number of animals available for harvest. In a registration hunt, the timing of the open season, and the method, location, and time selected for issuing permits may have some effect on who gets the permits.

2. Subsistence Hunt

Since the Alaska Supreme Court decision in the McDowell case in 1989, all Alaskans have been eligible for state subsistence hunts. Under current law, the state is not able to provide a priority for rural residents. (This diverges from the subsistence protection provided by Title VIII of ANILCA.)

To authorize a subsistence hunt, the Alaska Board of Game must first determine that muskoxen have been used customarily and traditionally for subsistence. The Board will review staff reports, public testimony, and any other available information to determine this, using the following eight criteria:

1. Length and consistency of use,
2. Seasonality of harvest and use,
3. Efficient and economical means and methods of harvest,
4. Geographic area of use,
5. Methods and means of handling, preserving, storing, and preparing,
6. Intergenerational transmission of knowledge, skills, values, and lore,
7. Distribution and exchange of resources, and
8. Reliance upon a diversity of resources in the area.

At this point, no determinations have been made regarding customary and traditional use of muskoxen for areas or communities on the Seward Peninsula. All lands (federal, state, and private) would be open to a state subsistence hunt, although private land owners may restrict access to or travel across their lands.

A state subsistence hunt could either be Tier I or Tier II, both open to all Alaska residents. A Tier I hunt would probably be a drawing hunt (lottery) or registration hunt (first-come, first-served) because of the small number of animals available for harvest. Unlike a general hunt, a Tier I hunt carries a subsistence priority or preference. In a subsistence registration hunt, the timing of the open season, and the method, location, and time selected for issuing permits may have some effect on who gets the permits. For example, by scheduling a hunt for mid-winter and issuing permits in Shishmaref two weeks before the season opens, non-local hunters might be less likely to participate. But even if permits were distributed in Shishmaref for a mid-winter hunt, non-local hunters would be free to travel to Shishmaref and apply.

The Alaska Board of Game might authorize a Tier II hunt if it finds that the harvestable portion of the Seward Peninsula muskox population is not sufficient to provide a reasonable opportunity for subsistence uses. Through an application process, a Tier II hunt distributes a limited number of permits to hunters using the following criteria:

1. the customary and direct dependence on the game population by the subsistence user for human consumption,
2. the proximity of the residence of the subsistence user to the game population, and
3. the ability of the subsistence user to obtain food if subsistence use is restricted or eliminated.

Federal Muskox Hunt

The Federal Subsistence Board may authorize a subsistence muskox hunt, regardless of the state's actions. This hunt, however, would apply only on federal lands, in this case principally the Bering Land Bridge National Preserve. To authorize a subsistence hunt, the Federal Subsistence Board must first determine which communities or areas have customarily and traditionally used muskoxen for subsistence, using factors similar to the state's eight criteria. The Board may then authorize a federal subsistence hunt limited to specific communities or areas with customary and traditional uses. If the state also authorizes a muskox hunt, both the state and federal hunts could occur concurrently on federal lands unless the harvestable surplus was insufficient to support both. In that case, the state hunt on federal lands would be closed. The state hunt, however, may continue on state-managed lands, provided that the harvestable surplus is not likely to be taken entirely on federal lands.

Appendix 1. Alaska statewide muskox management policy as amended in 1990.

Species Background

Muskoxen were once widely distributed in Alaska but were extirpated by the middle or late 1800's. The survival of remaining muskox populations in Canada and Greenland was in doubt by the early 1900's. In 1929, with the support of the Alaska Territorial Legislature, the U. S. Congress initiated a program to reintroduce muskoxen in Alaska: 1) to aid in conserving a species threatened with extinction; 2) for contemplated experiments in re-establishing the muskox as a native animal in Alaska; and 3) for experimentation leading to their eventual domestication and utilization.

Nunivak Island was designated a National Wildlife Refuge in 1929 to provide a site for establishing a muskox population which would produce animals for transplants to mainland Alaska. In 1935 and 1936, 31 muskoxen captured in East Greenland and their progeny born into captivity were released on Nunivak Island. Muskoxen adapted readily to Nunivak Island and increased to more than 700 animals by 1968. In 1964 and 1965, 33 muskoxen were captured on Nunivak Island for a muskox domestication project in Fairbanks. From 1967 to 1981, 228 muskoxen were translocated from Nunivak Island to establish free-ranging populations elsewhere in Alaska. Muskoxen were introduced to Nelson Island, the Arctic National Wildlife Refuge, Cape Thompson north of Kotzebue, and onto the Seward Peninsula. With the exception of the Cape Thompson population (status unknown), all of the introductions were successful, resulting in at least 2,200 free-ranging muskoxen in Alaska in 1988. The recent history of muskoxen in the State is an excellent example of the benefits of scientific wildlife management. It is likely that muskox numbers and beneficial uses of the species will continue to increase for many years.

As muskox populations have grown, subsequent research has corrected several erroneous assumptions about muskox biology and ecological relationships:

1. Muskoxen can be highly productive. Several introduced muskox populations in Alaska have displayed annual rates of increase exceeding 20%. In areas of good habitat many females calve annually, usually beginning at 3 years of age. The belief that muskox populations have low intrinsic productivity was based on previous studies of Canadian high arctic populations which have lower rates of annual increase and longer calving intervals.

2. Muskoxen can adapt to a wide variety of habitats. The last surviving muskox populations were found in high arctic ecosystems. These populations should be characterized as relict rather than typical, surviving in areas where hunters were scarce or non-existent. Muskox habitat in Alaska is widespread, with upland tundra areas being preferred. However, muskoxen have also occupied wet lowland tundra on the Yukon-Kuskokwim Delta and forested areas south of the Brooks Range and on the eastern Seward Peninsula. Although animals rarely forage

through more than a foot of hard-packed snow, they do not necessarily require extensive areas with shallow snow cover. Muskoxen can locate microhabitats with suitable foraging conditions within regions where the average snow cover would ordinarily preclude feeding. Muskoxen are much more adaptable and able to utilize a wider range of habitats than previously thought.

3. Muskoxen may migrate or disperse widely. Soon after muskoxen were established on the mainland, individuals were sighted at great distances from release sites. These animals were initially believed to be lost from the population. Observations of radio-collared animals on the Seward Peninsula and the Arctic National Wildlife Refuge confirmed that muskoxen can be very mobile and occupy relatively large home ranges. Muskoxen making long movements were frequently able to locate other animals or return to their area of origin.

Public hunting of muskoxen in Alaska was initiated on Nunivak Island in 1975, on Nelson Island in 1981 and in the Arctic National Wildlife Refuge in 1983. Muskox hunts on Nunivak Island have provided substantial benefit to the public. Guiding and transporting muskox hunters is a major component of the economy of Mekoryuk, the only village on Nunivak Island. More than 25,000 pounds of meat is obtained annually in the hunt, most of which remains in Mekoryuk. Revenues collected by the state from sale of tags and fees for drawing permits alone during 1975-1985 for the Nunivak Island muskox hunt have exceeded the costs of managing the population.

Species and Habitat Management Policies

1. The Alaska Department of Fish and Game (Department) will strive to re-establish muskoxen throughout suitable range in Alaska, and to provide for their use and enjoyment by the public. Dispersal from previously translocated herds will be the primary method by which range expansion occurs. A gradual and natural process of population growth and range expansion will help provide necessary time for acceptance of muskox conservation principles by local residents before animals reappear or become established in new areas.

2. The Department recognizes that responsible muskox management must be based on scientific knowledge. A Department program will be maintained to increase knowledge of population status, and biological and ecological requirements of muskoxen. The Department will cooperate with other agencies or individuals whose investigations may provide useful information for managing muskoxen.

3. Preservation of winter habitat and protection from harassment, particularly prior to and during calving, rutting, and late winter, are essential for optimum survival and reproductive success. Muskoxen are dependent on areas that accumulate less than 30 cm of snow cover for at least a portion of the winter. Hard-packed snow hinders foraging more than the same depth of soft snow. Muskoxen may reduce their activity and movements during winter as an energy conservation strategy. Therefore,

disturbance on late winter range could be very detrimental if suitable habitat is limited or if animals are forced to move.

4. Muskox populations will be maintained at levels commensurate with available habitat and other native fauna. Either sex harvests will be used as necessary to alter sex and age composition and growth rates of populations.

5. Translocating muskoxen to vacant habitat may be a beneficial management action. However, transplants must be consistent with Department transplant policy and consider: 1) management objectives of the program; 2) future public access to animals in the region of the transplant; 3) probability of successfully establishing a viable population; 4) effects of transplanted muskoxen on the status or utilization of resident species; 5) public understanding of the relocation; 6) extent to which the public is meaningfully involved in management planning for the translocated herd; 7) anticipated costs of the program compared to expected benefits to the muskox resource and the public; and 8) priority of the program to the state compared with other Department programs.

6. The Department recognizes that successful muskox management requires public support and cooperation in both rural and urban areas. All Alaskan residents must have an opportunity to understand muskox management programs, to participate in muskox management planning, and to develop a sense of responsibility for conserving the species.

Species Use Management Policies

The Constitution of Alaska requires that muskoxen be managed on the sustained yield principle for the benefit of the resource and the people of the State. There are several beneficial uses of muskoxen, and all will be considered.

1. Viewing, hunting and esthetic enjoyment are important uses of muskoxen. The knowledge that historic muskox range in Alaska is being repopulated, even though animals may never be observed by some individuals, is an also an important component of these uses.

2. Because most muskoxen occur in remote areas of the State, opportunity for viewing the species is limited. Therefore, appreciation of muskoxen will be encouraged through public information and education programs. In areas where muskoxen are or will become relatively accessible, such as along roads on the Seward Peninsula, viewing opportunities will be publicized. An emphasis on viewing may require limiting or excluding other uses if they diminish chances of viewing animals.

3. Muskoxen may provide significant benefits as a food resource in some areas. Where people use or potentially will use muskoxen primarily for food, the Department will manage populations to provide meat as well as for other uses.

4. In selected areas with intensive hunter use, muskoxen will be managed for high sustained yield. Management techniques may include, but are not limited to, either sex harvests by registration and/or drawing permit, long seasons that coincide with preferred times for hunting, and minimum restrictions on means of transportation and access.

5. Certain areas of the state will be managed to provide muskox hunting opportunities of high aesthetic quality. These areas will provide a large proportion of trophy animals, the opportunity to view numerous muskoxen, and uncrowded hunting conditions. Management techniques may include, but are not limited to, regulating access and means of transportation, controlling number and distribution of hunters, and regulating sex and age of animals taken.

6. Public viewing, education, and scientific study are acceptable uses for limited numbers of captive muskoxen. However, such uses will be authorized only if a surplus of muskoxen exists in a wild herd, adequate holding facilities and expertise are available, and substantial public benefit can be demonstrated.

7. Private ownership of muskoxen for domestication or commercial harvests is the lowest priority use of the species. Private ownership will be considered only if it would be consistent with Alaska Statute 16.40.010.

8. The Department will work with land managers and owners to maintain or develop public access to muskox populations. This may include, but is not limited to, cooperative management planning and developing or renewing cooperative agreements. If public access to any population is restricted, dispersing muskoxen which occupy adjacent lands accessible to the public will be protected and enhanced.

Management Problems

1. Illegal harvests of muskoxen appear to be increasing in some areas. Because recent generations of Alaskans have had limited exposure to muskoxen, unauthorized hunting has not become widespread. An opportunity exists to prevent illegal harvests from increasing further by working closely with hunters and local leaders to obtain support for muskox conservation principles. This will require close working relationships to develop understanding and credibility between residents and Department staff, and a meaningful involvement by the public and other resource management agencies in cooperative management planning and conservation.

2. Muskoxen have been absent from mainland Alaska for most of this century, and some local residents do not view reintroductions favorably. Some people believe that: 1) muskoxen compete with or impact caribou, reindeer, and waterfowl; 2) trample vegetation and berries otherwise available to local residents; and 3) frighten people. Acceptance of muskoxen by local residents in some areas may never occur, while in other areas it will require many years. The nature of interactions between muskoxen and other species needs to be studied more fully. The Department must better inform the public about ecological relationships

and behavior of muskoxen, and become better informed on the beliefs and concerns of the public.

3. Public demand for muskox hunting opportunity greatly exceeds allowable harvests and will likely remain so for several years. Alaska Statute 16.05.346 specifies that only hunters who have received a permit may take muskoxen, and further specifies the conditions under which either drawing or registration permits will be issued. Intense competition for the limited number of permits has caused conflicts and provoked criticism of both the Board of Game and the Department. A method of allocating permits must be developed which will reduce interpersonal tensions and will be viewed as equitable by the majority of hunters.