NUNIVAK
NATIONAL WILDLIFE REFUGE

Annual Report
1965

NUNIVAK NATIONAL WILDLIFE REFUGE

Narrative Report

January 1, 1965 to December 31, 1965

STAFF

Calvin J. Lensink	Refuge Manager
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Department of the Interior
Bureau of Sport Fisheries and Wildlife
Fish and Wildlife Service
Bethel, Alaska

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NARRATIVE REPORT

January 1, 1965 to December 31, 1965

I GENERAL

Refuge personnel visited Nunivak Island twice during the year. Assistant Manager Hout spent the period from June 30 to August 6 on a fisheries survey. Refuge Manager Lensink and Supervisor of Alaska Wildlife Refuges, Spencer conducted the annual musk ox census between July 22 and 25.

A. Weather Conditions. A heavy winter snowfall was reported by the residents of Nunivak. This was evident by the presence of snowdrifts along the beaches as late as mid-July. A somewhat shorter summer than usual resulted from a late spring breakup and an early fall freeze-up.

Losses of reindeer were relatively low despite the heavy snow. However, the loss of a herd of seven musk ox which was attributed to some unknown weather or snow condition, was the first recorded instance of group mortality of this type.

B. Habitat Conditions. Food and Cover: Eelgrass, Zostera marina, was found growing in the bays of Ingrimiut, Kewigimiut, Ikongimiut and Duchikthluk on the east and south sides of the island. Abundance of this important brant food in the various bays was difficult to determine as vegetative growth had not reached its peak at the time of survey.

Berries utilized by ptarmigan, emperor and Canada geese appeared to be abundant again this year.

II WILDLIFE

A. Migratory Birds. The majority of bird observations were made during the course of the fishery survey and as a result were confined primarily to the coastal area.

Waterfowl: Ducks and geese were present in limited numbers in all of the bays visited during the fishery survey. The most common species observed along the coast in order of their abundance were: common eider (283), old squaw (59), emperor goose (48), harlequin (37), pintail (23), white-fronted goose (22), scaup (19), merganser (14), green-winged teal (12), and lesser Canada goose (10).

During the aerial survey of musk ox, 300 Canada geese (probably lessers) were counted on Lukluksukwik Lake and 110 on Karon Lake. The geese on these interior lakes were believed to be moulting birds.

Only one brant was observed this summer. This bird was seen near the mouth of Duchikthluk Bay. In September, brant were reported in good numbers in several of the bays around the island, and informants believed that the numbers of brant stopping at Nunivak this fall was the largest in recent years.

Waterfowl broods observed during the fishery survey are listed in Table 1.

TABLE I

BROOD COUNTS OF WATERFOWL ON NUNIVAK ISLAND, 1965

Species	Total Broods	Average Brood Size
Green-winged teal	1	8.0
Pintail	1	1.0
Greater scaup	1	4.0
Common eider	6	7.6
Old squaw *	7	4.1
Emperor goose	8	3.8
White-fronted goose	1	3.0
Whistling swan	1	4.0

* One group of seven adults with 29 young

Other Migratory Birds. A total of 38 lesser sandhill cranes were counted during the fishery and musk ox surveys. No special effort was made to record these birds so this figure represents a minimum count. Many of the cranes observed were paired and frequently displayed decoying tactics common to birds with young. However, no nests or young were observed.

The major sea cliff rookeries were viewed from a small boat during the course of the fishery survey. These rookeries were inhabited by countless numbers of black-legged kittywakes, murres, pigeon guillemot, auklets, horned and tufted puffins. Kittywakes are the most numerous of the colony nesting birds with the murres a close second. The horned puffins are more numerous than the tufted.

Sufficient ornithological work has not been done on the island to determine the present status of many species. However, a checklist including tentative estimates of status based on records in the literature and observations from the summer of 1965 is included in the appendix of this report.

B. Upland Game Birds. Willow ptarmigan, Lagopus lagopus, were seen on all but the western side of the island where the lack of willows may account for the birds absence.

Nesting success appeared to be good this summer. A total of 19 broods were recorded with an average brood size of 7.05 (Table 2).

TABLE 2

PTARMIGAN BROOD COUNTS ON NUNIVAK ISLAND, 1965

Brood Size	Frequency	Total
2	1	2
3	1	3
4	2	8
5	1	5
6	2	12
7	3	21
8	3	24
9	2	18
10	3	30
11	1	11
Total	19	134

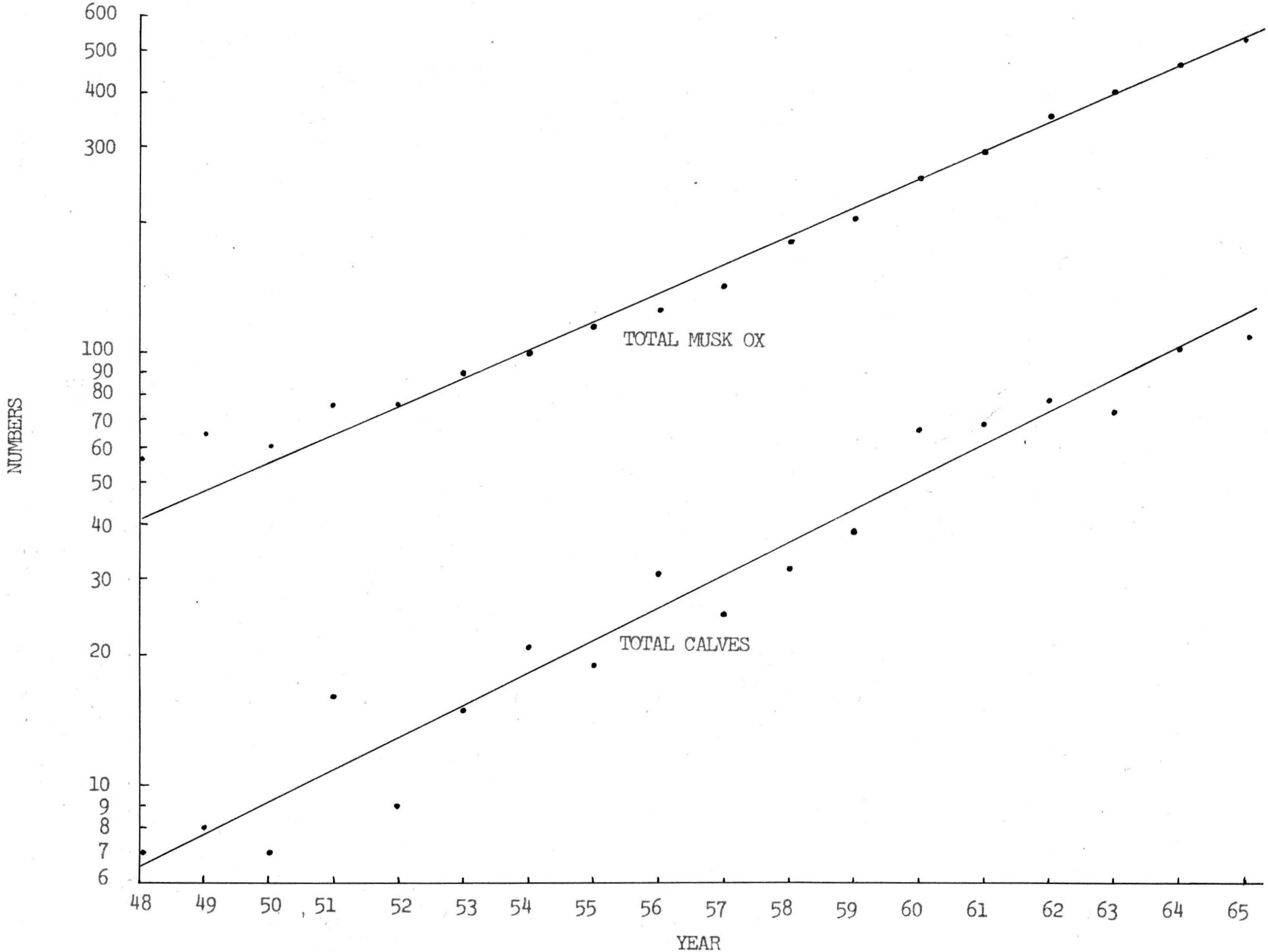
Rock ptarmigan, Lagopus mutus, have been recorded on the island by Swarth (1934), but were not observed in 1965.

C. Big Game Animals.

Musk ox: The July 22 to 25 musk ox census resulted in a count of 514 animals of which 109 were calves. This is an increase of 47 animals or 9.14% over the count of 467 in 1964. However, adjusting for the 23 animals removed for experimental domestication by the University of Alaska in August 1964 results in a true increase of 70 musk ox or 13.6%. The count of 467 in 1964 plus the 109 calves counted this year totals 576, or 62 more animals than revealed by the 1965 census. The missing animals may be accounted for as follows:

Removal of calves by the University of Alaska	23
Mortality during capture of above	2
Shot by U. S. Coast Guard	3
Shot by resident of Mekoryuk	1
Observed dead - cause of death unknown	12
Unaccountable	21

The number of missing animals which could not be accounted for is 3.6% of the expected total. This is somewhat below the average of 5.7% unaccountable animals in censuses conducted since 1947. As most deaths on the island are recorded, the excess mortality probably occurs during the winter when musk ox may wander onto the sea ice and are cut off or carried away from the island.



GROWTH OF THE NUNIVAK MUSK OX HERD

This year a total of 12 dead musk ox were examined during the musk ox census and fishery study. A group of seven winter killed musk ox were found in the Duchikthluk Bay area. These animals were identified as 1 adult cow, 3 calves of the year, 1 yearling, and 2 unclassified, but probably sub-adults. The 1965 loss is the highest known mortality of any year. The previous highest known loss was 7 in 1963. Two adult musk ox skulls were obtained from dead animals this summer. One of these skulls was given to the University of Alaska and the other was added to the refuge collection.

An inexcusable incident occurred on July 19 when three musk ox were shot by personnel of the U. S. Coast Vessel Balsam. The Commander of the vessel stated that two bulls left a herd and approached to within 50 yards of a shore party enroute to service the navigation light at Cape Mohican. As the animals did not stop and appeared mangy looking (a natural condition in the summer when they are shedding their wool), they were shot. While three animals, 1 bull and 2 cows (with calves), were killed, the Coast Guard admitted to shooting only two.

We have reason to believe that musk ox have been killed in the past by persons servicing the Cape Mohican light. A yearling was found dead and reported shot less than 300 yards from this light in 1964. A report by C. H. Rouse (1948) mentions that seamen from the light tender servicing the Cape Mohican light had boasted of killing musk ox.

Letters of reprimand were sent to the Coast Guard by the Bureau and by the Alaska Department of Fish and Game. Every effort will be made to prevent this situation in the future.

Mr. John Teal of the University of Alaska spent the early part of October on the island and succeeded in capturing 10 female musk ox calves. This completes his permit for the capture of 33 musk ox calves. These animals are being utilized for domestication experiments at the University of Alaska.

Reindeer: As in the past an attempt was made to count reindeer concurrent with the musk ox census. A count of 6300 to 9,000 was made, but because one or more large herds were believed missed, this count was not accurate. Last year's count of 15,500 made from aerial photos is considered reasonably accurate. As no extensive winter-kills occurred on the island, the 1965 population prior to butchering was probably about that of 1964. The Bureau of Indian Affairs, who manages the herd, reported a total of 2,267 deer slaughtered in 1965. This total does not include animals taken by residents of the island for local consumption.

While making the reindeer counts this year a remarkable consistant percent of white deer was noted in each of the herds. An average of 1.27% with a range of 1.00 to 2.00% white deer was observed in seven herds ranging in size from 150 to 1,300 animals.

It appears that white deer are randomly distributed throughout the population. As counts of white deer are probably much more accurate than estimates of herd size, such counts may provide a reliable estimate of population size.

Caribou: During the fishery survey, bones reported to be from caribou were found in some of the middens. One resident related that his grandfather had killed one of the last caribou on the island. A search of the literature to corroborate the presence of caribou on Nunivak resulted in locating the following statement in Nelson (1887): Referring to caribou - "They were very abundant on Nunivak Island in 1877 and 1878, but are nearly exterminated there now." "Eskimos from over a hundred miles along the coast in each direction went to Nunivak in the summer, and, in company with the natives resident on the island, took thousands of adult skins for several seasons, until they suddenly found that "Reindeer" were not left in sufficient numbers to pay for hunting."

D. Fur Animals. Mink, weasel, red and arctic fox are the only resident fur animals on the island. Currently, knowledge of the abundance of fur animals on Nunivak is not adequate for determining population trends. This summer very few fur bearers were noted during the period that refuge personnel were on the island. Reports from residents indicate that the population of red and arctic fox is still low. Some of the people feel that this is due to overhunting by snowplanes. This type of vehicle is very efficient in running a fox down so it can be shot. In discussion with some of the village leaders a willingness was expressed to voluntarily discontinue the practice of fox hunting with snowplanes. The people stated that they would not like to have regulations prohibiting the use of these machines as they rely on their use for gathering wood, seal hunting, etc.

E. Hawks, Eagles, Owls, Crows, Ravens, and Magpies. One fledgling short-eared owl was found in the Duchikthluk Bay area. This is a breeding and distribution record for the island.

F. Other Birds. See check list in appendix.

G. Fish. A five week fishery survey was made this summer. Results of this survey are discussed in Section V.

H. Disease. A number of red fox carcasses found along the beach this summer indicated an outbreak of rabies. This conclusion was further substantiated by a residents report that three "crazy" red foxes had been shot in the village of Mekoryuk last winter.

III REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development. We are in need of a cabin which can be utilized both in winter and summer, and also a warehouse in which barrels of aviation gasoline, outboard motors, and camping equipment can be stored. Traditionally, the Bureau of Indian Affairs operated Nunivak Development Corporation housing and mess facilities have been used by refuge personnel during the annual musk ox survey. With the expanding refuge program on the island and increased use by Bureau of Indian Affairs personnel, these facilities are no longer adequate.

B. Refuge Development. The nature of wildlife problems on Nunivak does not require physical development of the refuge, which is being retained to the greatest extent possible as a wilderness area.

IV RESOURCE MANAGEMENT

The harvest of game species, fur bearers and fish is controlled through regulations of the State of Alaska.

Reindeer are managed by the Bureau of Indian Affairs and musk ox by the Bureau of Sport Fisheries and Wildlife. Management consists primarily of controlling the size of the population of these animals.

The Bureau of Indian Affairs operated Nunivak Development Corporation has harvested better than 2,000 deer annually the last three years. In an effort to control the size of the herd, both sexes are harvested and in some years male calves are castrated. The meat is marketed by the Bureau of Indian Affairs with 60% going to the Alaska markets. In addition to meat other salable by-products include reindeer skins, tendons, and antlers. The latter are ground and marketed in Korea as an aphrodisiac.

The musk ox population on the island has now reached a size where herd reduction can be contemplated. In keeping with an agreement with the State of Alaska governing a policy of disposal of excess animals, a small number of musk ox have been removed in the past for public display and domestication experiments. Now with a population of 514 animals and an annual recruitment of about 16% it is necessary to consider more effective means for controlling numbers.

A musk ox transplant is planned by the State of Alaska with the project tentatively scheduled for the spring of 1966 or 1967. Nelson Island has been selected as the site to receive the musk ox. This island is approximately forty miles from Nunivak and lies between the north and south sections of the Clarence Rhode Range. Habitat on Nelson Island is similar to Nunivak and, like Nunivak, the island has no large predators. The selection of Nelson Island is particularly advantageous from our point of view as it will permit us to periodically check the status of the animals.

V FIELD INVESTIGATIONS

A survey of the fishery resources of Nunivak Island was conducted this summer. This survey was made to determine what management is necessary, if any, to protect this resource, which is so important to the 250 Eskimos living on the Nunivak National Wildlife Refuge.

Assistant Refuge Manager Hout, with the aid of an Eskimo guide and boat operator, spent the period from June 30 to August 6 visiting all the major fish camps, counting the numbers of fish caught and collecting size, age, and sex data from the catch. Stream surveys were made on the known major salmon spawning streams to obtain physical description of the streams and to count the numbers of spawning fish.

The following results of this study have been summarized from the progress report:

1. Fish (salmon, halibut, tom cod, charrs, flounders, herring and smelt) are important in the economy of the Nunivak Island Eskimos.

2. Normally about forty out of the forty eight families on the Island participate in the chum salmon, Oncorhynchus keta, fishery, which takes place between the middle of June and the middle of July. In 1965 only twelve families fished with the others remaining in the village to work on construction of a new school.

3. Beach seines, approximately 50 feet long, are the most common type of gear used to capture chum salmon. A few chums are also taken with spears and fyke traps. Gill nets are used in the small silver salmon fishery.

4. Chum salmon is the most important fish in the subsistence economy. In 1965 around 4,200 chums were caught. The average catch per family was 354 for the twelve families. Had all forty families fished, the estimated chum salmon catch would have been about 14,160 (i.e., 40 x 354).

5. Analysis of chum salmon scales taken from the catch indicates that four year fish are the dominant age class (88% four's, 10% three's, 2% two's). Average weight of chums was 6.18 pounds. The sex ratio was nearly equal with the males slightly more abundant (53.5%). Figures based on a sample of 242 fish.

6. Other species of fish present on the island include silver salmon, Oncorhynchus kisutch, pink salmon, O. gorbuscha, red salmon, O. nerka, king salmon, O. tschwytscha, Dolly Varden, Salvelinus malma, arctic charr, Salvelinus alpinus, halibut, herring, smelt, flounder, tom cod, blackfish, Dallia pectoralis. King crab, clams and mussels are also present.

7. Eighteen streams, including the known major chum salmon spawning areas, were surveyed and cataloged. Each stream was described and a count of spawning salmon made.

8. A total of 2,345 chums, 5 pinks, and 1 silver salmon were counted or estimated in the streams surveyed. This count was considered minimal because only a small portion of each stream was surveyed and because the peak of spawning had passed when the surveys were made.

Other Investigations. Three investigations by graduate students of the University of Alaska were conducted on the Island this summer. These students were under the supervision of the Alaska Wildlife Cooperative Unit.

The following summary of activities and results of these studies was abstracted from the Alaska Cooperative Wildlife Research Unit Quarterly Progress Report - July to September 1965.

Project: The caribou warble fly: Parasite-host interrelationships
Investigator: Darwin Seim
Objective: Investigate some aspects of the relationships of the caribou warble fly, Oedemagena tarandi, to its host species as influenced by ecological factors of the environment.
Activities and results. Approximately 150 animals were examined during the reindeer harvest. Each animal was weighed, measured and jaw bone removed. Warble fly scars were counted on the fleshed hide of each animal examined.

General condition of the reindeer was very good. Fat disposition ranged between 2 and 4 centimeters. A total of 74 males were examined, of these 37 were bulls and 37 steers. Average weight on the hoof was 251 pounds for bulls and 240 pounds for steers. The average weight for 76 females was 198 pounds.

Warble fly scars ranged from 5 to 417 per animal. Averages for bulls were 114, steers 64, and females 63.

Project: Musk ox reconnaissance study
Investigator: Gregory Bos
Objectives: Determine the basic population dynamics and range interrelationships of the Nunivak Island musk ox herd.
Activities and results. The investigator spent the months of July and August on the Island. Activities during this period included air and ground herd composition counts, participation as an observer on the annual musk ox census, vegetation studies, and the placement of 14 vegetation utilization cages in areas of known musk ox use.

Project: Development and appraisal of reindeer range evaluation techniques. Sponsored by the U. S. Bureau of Land Management.
Investigator: Robert Pegau
Objectives: 1. Initial range inventory surveys to classify range areas as to suitability for reindeer, potential stocking levels (carrying capacity), and desired rotation.

2. Evaluation of condition and trend of range vegetation on stocked ranges.

Activities and results. On Nunivak Mr. Pegau located three of the six exclosure plots established by L. J. Palmer in the 1920's. Two of these plots had been disturbed and were of no value for vegetation analysis. New quadrats were established and will be compared with Palmer's.

VI PUBLIC RELATIONS

Refuge Visitors. On the following page is a list of persons known to visited Nunivak Island during the summer of 1965.

LIST OF REFUGE VISITORS

Name	Title and Organization	Purpose
Mr. & Mrs. Lee Ellis	Project Manager, B.I.A., Kotzebue	Reindeer harvest
Gregory Bos	Graduate Student, University of Alaska	Musk ox study
Howard Bowman	Wildlife Services, BSF&W, Kotzebue	Reindeer harvest
Edward L. Nygard	Area Land Officer, B.I.A., Juneau	Reindeer harvest
Dr. Honsinger	State Veterinarian, Juneau	Reindeer inspection
E. W. Barret	Agri. Extension Officer, Wash., D. C.	Reindeer harvest
M. D. Abbott	B.I.A., Bethel	Reindeer harvest
Dave Scott	Range Manager, B.I.A., Nome	Range study
Robert Pegau	Graduate Student, University of Alaska	Range study
Darwin Seim	Graduate Student, University of Alaska	Warble fly study
Hans Roth	Student Assistant, University of Alaska	Range study
David L. Spencer	Supervisor, Alaska Wildlife Refuges BSF&W, Kenai	Musk ox census
John Teal and party	University of Alaska	Musk ox capture

BIRDS OF THE NUNIVAK NATIONAL WILDLIFE REFUGE

Index

Seasons

s - March-May
s - June-August
f - September-November
w - December-February

Status

a - abundant
c - common
u - uncommon
o - occasional
r - rare
x - recorded, status unknown

	s	s	f	w
Common Loon		c		
Yellow-billed Loon		x		
Arctic Loon		c		
Red-throated Loon		c	x	
Red-necked Grebe		x		
Slender-billed Shearwater			x	
Fork-tailed Petrel			x	
Pelagic Cormorant		c		
*Whistling Swan		c		
Lesser Canada Goose		x	x	
Cackling Canada Goose		x	x	
Black Brant		x	x	
*Emperor Goose		c	c	
*White-fronted Goose		x	x	
Lesser Snow Goose			c	
*Pintail		c	c	
*Green-winged Teal		c		
*Greater Scaup		x		
*Old Squaw		c	x	
Harlequin		c		
*Common Eider		c	c	
Steller's Eider		c	c	
King Eider		x	x	
White-winged Scoter		x	x	
Common Scoter			x	
*Red-breasted Merganser		x	x	
Sharp-shinned Hawk	x			
Gyrfalcon			x	
*Willow Ptarmigan	c	c	c	c
Rock Ptarmigan		x		
*Lesser Sanhill Crane		c		
Semipalmated Plover		x		
Mongolian Plover		x	x	
*American Golden Plover		c	c	
Black-bellied Plover		x		
Ruddy Turnstone		x	x	
Black Turnstone		x		
Common Snipe		o		
Bristle-thighed Curlew		x		
Spotted Sandpiper		x		
Wandering Tattler		x	x	
Knot		x		

BIRDS OF THE NUNIVAK NATIONAL WILDLIFE REFUGE (CONT)

	s	s	f	w
*Aleutian Rock Sandpiper		c	c	
*Northern Rock Sandpiper		c	c	
Sharp-tailed Sandpiper		x	x	
Baird's Sandpiper		x	x	
*Dunlin		a	a	
Long-billed Dowitcher		x		
*Western Sandpiper		a	a	
Bar-tailed Godwit		x	x	
*Sanderling		x	x	
Red Phalarope		a	x	
*Northern Phalarope		c		
Pomarine Jaeger		x		
Parasitic Jaeger		c	x	
*Long-tailed Jaeger		c		
Glaucous Gull		c	x	
Glaucous-winged Gull		x	x	
Slaty-backed Gull		x		
*Black-legged Kittiwake		a	a	
Sabine's Gull		a	x	
Arctic Tern		c		
Aleutian Tern		x		
*Common Murre		a		
*Black Guillemot		x		
*Pigeon Guillemot		a		
Parakeet Auklet		c		
Crested Auklet		x		
*Horned Puffin		a		
Tufted Puffin		a		
Snowy Owl			x	
*Short-eared Owl		x		
Hummingbird (Rufous?)		x		
Yellow-shafted Flicker			x	
Horned Lark		x		
Tree Swallow		x		
Black-capped Chickadee			x	
Gray-cheeked Thrush		x	x	
Mountain Bluebird				
Wheatear		r	r	
Kennicot Willow Warbler			x	
Middendorff's Grasshopper Warbler			r	
Mountain Accentor			r	
Yellow Wagtail		u	u	
*Western Water Pipit		x	x	
Japanese Water Pipit			r	
Orange-crowned Warbler		c		
Yellow Warbler			o	
Grinnel's Northern Waterthrush		r		
Wilson's Pileolated Warbler		x	x	
Cassin's Bullfinch			r	

BIRDS OF THE NUNIVAK NATIONAL WILDLIFE REFUGE (CONT)

	s	s	f	w
*Pribilof Gray-crowned Rosy Finch		x	x	
*Common Redpoll		x	x	
*Savannah Sparrow		c		
Slate-colored Junco		x	x	
Western Tree Sparrow			o	
Gambel's White-crowned Sparrow		x	x	
Fox Sparrow		u		
*Alaska Longspur		c	c	
*Snow Bunting		c	c	c
*McKay's Bunting		c	c	

* Nesting species

Submitted by: _____
Assistant Refuge Manager

_____
Date

Approved by: _____
Calvin J. Lensink, Refuge Manager

Approved by: _____
David L. Spencer, Associate Refuge Supervisor

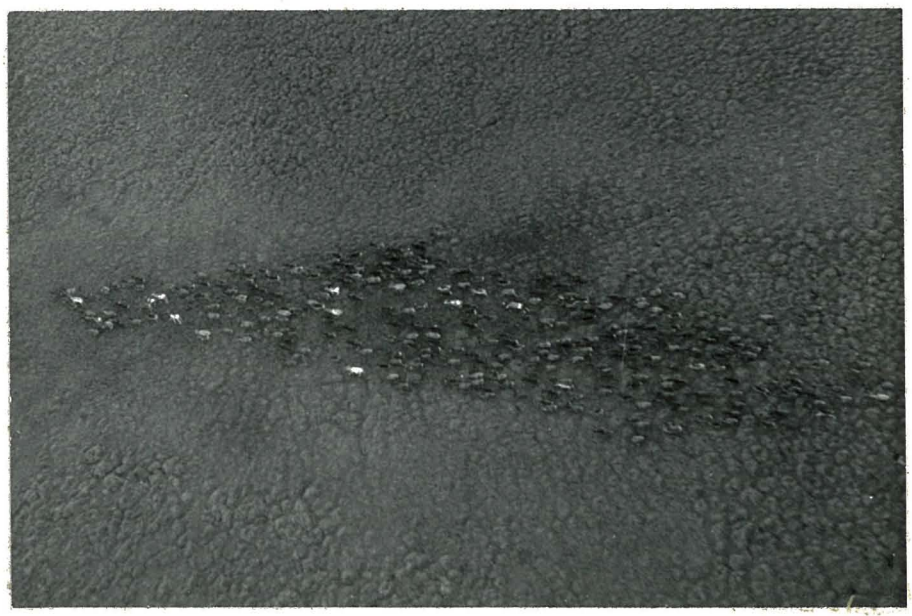
Submitted by: Leroy L Hunt
Assistant Refuge Manager

January 31, 1966
Date

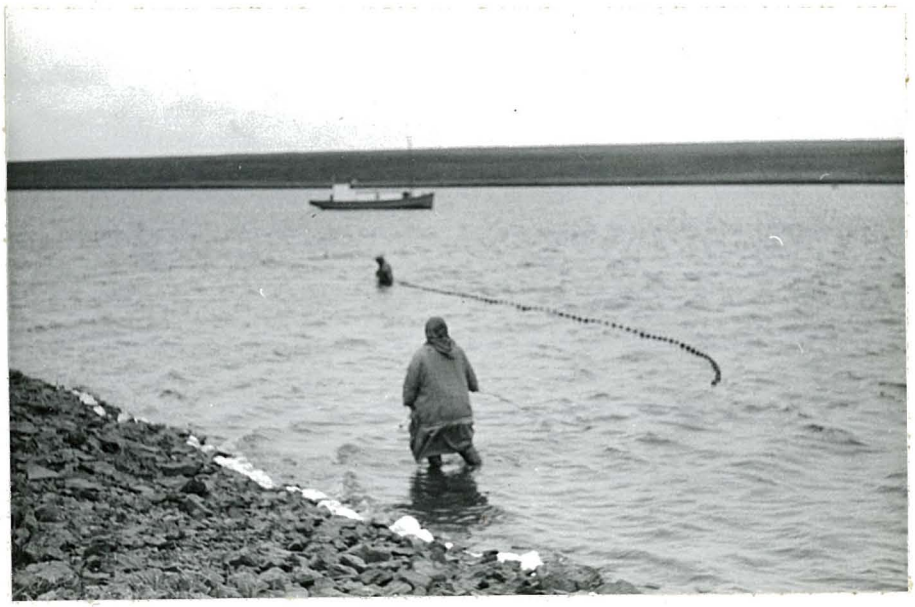
Approved by: Calvin J Lensink
Calvin J. Lensink, Refuge Manager

Approved by: _____
David L. Spencer, Associate Refuge Supervisor

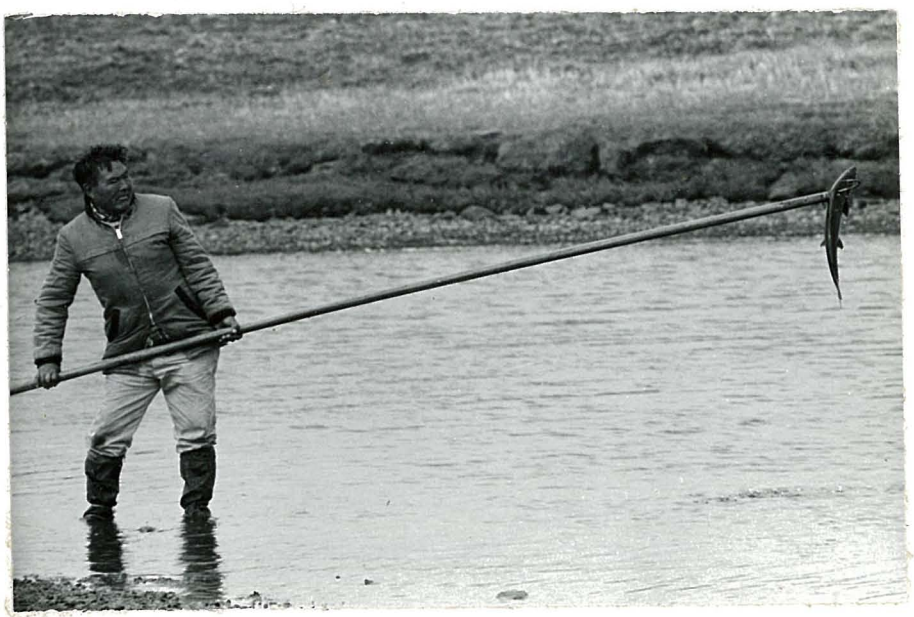
We can not believe this is a typical herd of muskox. There seems to be 2 bulls, 1 cow, 5 yearlings, and twin calves. Twin calves are rare, triplets, let alone quints, are unknown. The photo may be our first evidence of instability of muskox herd.
Photo by J. L. Hout, 7-31-65.



Herd of reindeer photographed in 1964. Counts of white animals in the herd in 1965 and from herds photographed in 1964 averaged 1.27% with a range of 1.00 to 2.00%.
Photo by J. L. Hout, 8-31-64.



Beach seining in the mouth of Duchikimiut River. This is the most common type of gear used in the chum salmon fishery. Photo by J. L. Hout, 7-5-65.



Guide, Kay Hendrickson demonstrating how salmon are gaffed from the spawning streams. Photo by J. L. Hout, 7-9-65.

Chum salmon being split in preparation for drying.

The women split and dress the fish in short order with their "ulus" or woman's knife. Photos by J. L. Hout, 7-5-65.

Turning the split chum salmon on the drying rack. These fish are turned every 3-4 days and will be sufficiently dry to bundle in approximately 2 weeks, weather permitting. Drying racks are made from driftwood as there is no timber on the Island. Photo by J. L. Hout, 7-2-65.