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Marketing Methods

In 1977, all herd owners on the Seward Peninsula butchered and marketed their own reindeer, with the exeption of two who sold live reindeer and the buyers butchered and marketed these reindeer. An estimated 80 to 90 percent of the reindeer meat sold in the past few years from Seward Peninsula herds has been consumed within the region. The remaining reindeer meat produced in recent years has gone to Anchorage and the "lower 48 states." That portion going to Anchorage has been used in the making of sausage while the meat going to the "lower 48" has been marketed as a specialty meat.

All slaughtering of reindeer on the Seward Peninsula is done in the field. Even those reindeer carcasses that will leave northwest Alaska, and which therefore must be government inspected, are killed in the field and then brought to the Nome reindeer slaughter plant for inspection. The majority of slaughtering takes place during the winter months when herders have a mobility advantage over the reindeer. With the use of snow machines, herders can move faster than reindeer over the snow-covered ground. Two other reasons account for the slaughtering of reindeer during winter months. First, if the slaughtering can be accomplished during the first part of winter, the reindeer will be in their best condition following summer weight gains. Second, slaughtering in subfreezing temperatures quickly freezes carcasses for delivery to buyers. For these reasons, most of the reindeer slaughtering takes place from October through February. Slaughtering does occur at other times of the year on a limited basis, mainly for the owner's home consumption. The exact time when each herd butchers depends on individual preference, the location of the reindeer, weather, and availability of labor.

As has been noted before, the production from individual herds is distributed in a number of ways (Olson, 1969). At the village level, reindeer meat is distributed: 1) as wage-meat payments; 2) as sales to village residents; and 3) as sales to village stores. Owners of the larger herds also sell meat to the region's two largest population centers, Nome and Kotzebue.

The first of the village distribution channels involves wage-meat payments and herd owner home use. Many village residents receive part of their yearly meat supply by working for a herd owner at handlings or butcherings and receiving reindeer meat as payment in lieu of cash. Herd owners value reindeer meat as wages at current market price. But often herd owners will "overpay" workers by providing them with more meat than they have earned by their time

actually worked. An explanation for this behavior is herd owners acting as village *umialiks*. (See Chapter VI).

Reindeer herds on the Seward Peninsula are based at the villages of Shishmaref, Wales, Brevig Mission, Koyuk, Golovin, Teller, Deering, and Buckland, and at the towns of Nome and Kotzebue. The population of the villages is estimated to total 1,233 people. In 1976, approximately 400 reindeer carcasses were used by herd owners in these villages specifically for home consumption and labor payment. The per capita consumption from this method of distribution amounted to approximately .32 reindeer carcass (39 pounds) per village resident.

A second method of village distribution is sales directly to village residents. In one instance in the summer of 1977, this took the form of a herd owner taking orders for reindeer meat from the back of a pickup truck as he was bringing the carcasses of four or five reindeer into the village. Through August of 1977, herd owners were selling reindeer meat to village residents for 85 cents per pound.

A final type of village distribution is the sale of carcasses to village stores. These stores usually sell reindeer meat as sides or quarters and ten cents per pound is added to the price exacted by the herd owner as a handling charge. In 1976 and the first half of 1977, this produced a price at village stores of 95 cents per pound. Villages stores generally have reindeer meat only during the winter months since they have little or no cold storage facilities. It is doubtful if reindeer meat would be available in the summer even if more storage were available. There are basically two reasons for this. First, it is difficult to slaughter reindeer in the summer because of the problems in getting close to them, and second, reindeer are in the best condition for slaughter in the first part of winter.

Herd owners with less than 1,000 reindeer generally distribute all their reindeer meat in the village through either home consumption, wage-meat payments, sales to village stores, or sales to village residents. Larger herd owners, besides using these same channels, also sell reindeer meat to the two population centers of northwest Alaska: Nome and Kotzebue, and at times also make sales out of the region. In 1976, Nome stores sold approximately 100,000 pounds of reindeer meat, while stores in Kotzebue sold approximately 54,000 pounds of reindeer meat. During the winter of 1976-1977, reindeer retail cuts sold for approximately $1.70 per pound as stew meat, $1.90 per pound as shoulder cuts, and $2.00 per pound as hind cuts in Nome and Kotzebue. Prices for a competing source of protein in Nome, Alaska, were given in the March 1977 *Quarterly Food Price*

Index. They were $2.99 per pound for beef round steak, $2.04 per pound for beef chuck roast, and $1.79 per pound for beef hamburger (Thomas, 1977). As with village stores, reindeer meat is generally available only in Nome and Kotzebue stores during winter months. These stores would like to carry reindeer meat on a year-round basis; however, production is not large enough to meet this desire. Freezer facilities in the towns are sufficient to hold a large supply of reindeer meat during the summer months. These towns are also not subjected to the frequent power outages which the villages experience.

In the winter of 1976-1977, in contrast to other owners, two herd owners marketed their excess reindeer as live reindeer, thus eliminating the the problems of buthering and making marketing arrangements. These two herd owners received $70 per head for these live reindeer. If the reindeer averaged 120 pounds per carcass, these owners received 60 cents per pound for the dressed meat. However, they did not pay any costs of slaughter. This marketing option may be currently available only to these two owners as they manage their herding operations on the one area of the Seward Peninsula which has a road system. This makes it relatively easy and inexpensive for meat buyers to reach the reindeer.

Alaska Reindeer Meat Production: 1960-1977

Total production, sales, and home and herd use of reindeer slaughtered by Alaska reindeer herd owners for the years 1960-1977 are provided in Table 18. This period was characterized by generally increasing production until 1968, at which time a general decline can be noted. From 1960 through 1968, except for the years 1962 and 1967, total production increased yearly. In 1968, total production amounted to 754,000 pounds of dressed reindeer meat, 608,000 pounds of sales, and 146,000 pounds of reindeer meat used in home and herd operations. During this same period, the value of production generally increased, with the value of production estimated to be $324,000 in 1968.

From 1969 through 1977, production generally declined with 1976 being the low point when only 286,000 pounds of production occurred: 234,000 pounds of sales and 52,000 pounds of home and herd use. In 1977, production rebounded over the previous year as 312,000 pounds of production was accomplished. The value of production followed the quantity of production through 1972. However, in 1973, although production was lower than the previous year, the value of this production was $16,000 greater. Again in

Table 18. Production and Sale of Reindeer Meat by Alaskan Reindeer Herders, 1960-1977.

	Total Production		Sales		Home and Herd Use	
Year	Pounds Dr. Wt.[a]	Value ($)[b]	Pounds Dr. Wt.[a]	Value ($)[b]	Pounds Dr. Wt.[a]	Value ($)[b]
1977	312	275	256	225	56	50
1976	286	243	234	199	52	44

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1977	312	275	256	225	56	50
1976	286	243	234	199	52	44
1975	345	308	287	257	58	51
1974	300	205	220	150	80	55
1973	324	182	261	144	63	32
1972	328	166	239	121	89	45
1971	456	235	365	188	91	47
1970	615	300	479	241	136	59
1969	585	277	458	219	127	58
1968	754	324	608	260	146	64
1967	692	265	517	188	175	77
1966	701	249	546	190	155	59
1965	637	242	522	200	115	42
1964	660	254	504	195	156	59
1963	490	179	394	138	96	41
1962	482	182	372	139	110	43
1961	485	181	364	136	121	45
1960	450	180	330	132	120	48

[a] Dr. Wt. = Dress Weight (in thousands of pounds).

[b] (in thousands of dollars).

Source: Alaska Crop and Livestock Reporting Service 1973-1978.

1974, production fell but the value of the production increased over the previous year. The largest slaughter since 1971 occurred in 1975. This factor, combined with increased meet prices, raised the value of reindeer meat produced in Alaska to $308,000, a figure only exceeded by the value of the 1968 production. The 1968 slaughter was 409,000 pounds greater than the quantity of reindeer meat produced in 1975. In both 1976 and 1977, meat production was below the level of 1975 with per pound carcass meat values remaining relatively stable in these years.

As with total reindeer numbers in Alaska, the overall decline in reindeer meat production between 1960 and 1977 was caused largely by the decline of the Nunivak Island reindeer herd, instead of a general decline in reindeer numbers in all areas of Alaska. In 1960, the Nunivak herd totaled 16,000 reindeer, of which 1,625 were butchered. In 1964, this herd totaled 13,200 reindeer, and of this number 2,826 were butchered; while in 1968 the herd totaled 10,200 and 1,749 reindeer were butchered. However, in 1976, this herd had decreased to 4,000 reindeer, of which only 301 were butchered. The 1977 slaughter consisted of 187 reindeer. If these carcasses averaged 120 pounds, Nunivak accounted for 195,000 pounds of the reindeer meat slaughter in Alaska in 1960, 339,120 pounds in 1964, 209,880 pounds in 1968, 36,120 pounds in 1976, but only 22,440 pounds in 1977.

Seward Peninsula Reindeer Meat Sales: 1960-1977

Reindeer meat sales by herds on the Seward Peninsula for the years 1960-1977 are given in Table 19. This table does not include the reindeer meat used by herd owners in home and herd operations. (Except for 1976, home and herd operation information has not been available since 1971. In 1976, approximately 400 carcasses [48,000 pounds] were used for these purposes.) The quantity of meat sales by Seward Peninsula herds did not decline from beginning to end for the period 1960-1977, although a decline was seen in production by Alaska reindeer herds as a whole. This occurred because reindeer numbers have remained relatively constant on the Peninsula since 1960, varying from a high of 22,168 in 1966, to a low of 16,369 in 1968. In 1976, the estimated number of reindeer was 17,425; while in 1977, reindeer were estimated at 17,800 animals.

The value of reindeer meat sales on the Seward Peninsula showed an overall increase during this period. In 1960, the value of

Table 19. Reindeer Mea
1960-1977.

Year	Est. No. Reinde on Seward Per
1977	17,800
1976	17,425
1975	20,600
1974	n/a[b]
1973	17,397
1972	19,828
1971	n/a
1970	20,292
1969	17,009
1968	16,369
1967	18,795
1966	22,168
1965	18,944
1964	20,449
1963	18,880
1962	17,940
1961	16,405
1960	18,529

[a]Carcasses assumed tc
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[b]n/a = data not availal
Sources: U.S. Dept.
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Table 19. Reindeer Meat Sales by Seward Peninsula Reindeer Herders, 1960-1977.

Year	Est. No. Reindeer on Seward Pen.	Number Carcasses Sold	Pounds Meat Sold	Value (dollars)
1977	17,800	1,974	236,920[a]	201,380
1976	17,425	1,820	218,400[a]	185,640
1975	20,600	1,766	211,920[a]	158,940
1974	n/a[b]	1,164	139,680[a]	97,776
1973	17,397	n/a	n/a	n/a
1972	19,828	n/a	n/a	n/a
1971	n/a	2,263	271,560	141,211
1970	20,292	2,168	260,160	130,080
1969	17,009	1,792	215,040	103,219
1968	16,369	3,505	420,600	176,652
1967	18,795	2,434	292,080	105,148
1966	22,168	2,790	334,800	113,832
1965	18,944	1,527	183,240	69,631
1964	20,449	1,266	147,120	51,492
1963	18,880	1,043	125,160	46,309
1962	17,940	1,339	160,680	59,229
1961	16,405	912	109,440	40,492
1960	18,529	688	82,560	38,064

[a]Carcasses assumed to average 120 pounds, actual figures not available.

[b]n/a = data not available.

Sources: U.S. Dept. of the Interior, BIA, Annual Land Operation Reports 1960-1971, Alaska Crop and Livestock Reporting Service 1973-1978, Reindeer Herders, BLM Case Files.

reindeer meat sales to herd owners on the Seward Peninsula amounted to $38,064. In 1977, the value of reindeer meat sales was estimated at $201,380, the highest value in all the listed years.

Price Received by Herders: 1960-1977

The average price per pound received by Alaska reindeer herd owners for reindeer meat for the years 1960-1977 is provided in Table 20. From 1960 through 1968, the price per pound remained

Table 20. Price per Pound Received by Herd Owners for Reindeer Meat, 1960-1977.

Year	Price per Pound (cents)	Year	Price per Pound (cents)
1977	85[a]	1968	42
1976	85	1967	36
1975	75	1966	34
1974	70	1965	38
1973	55	1964	35
1972	51	1963	37
1971	52	1962	37
1970	50	1961	37
1969	48	1960	40

[a]January-August.

Sources: U.S. Dept. of the Interior, BIA Annual Land Operation Reports 1960-1971, Alaska Crop and Livestock Reporting Service 1973-1976, Reindeer Herders.

relatively stable, averaging 37 cents per pound. In 1969, the price rose 6 cents over the 1968 price of 42 cents. In the period 1970-1973, the price rose slowly, reaching 55 cents in 1973. The period from 1974-1977 was one of rapid changes. The 1974 price rose 15 cents. In 1975 and 1976, the price rose 5 cents and 10 cents, respectively, over the preceding year. In 1976, herd owners received 85 cents per pound for their reindeer meat. This price prevailed until the end of August, 1977.

There are a number of reasons suggested in economic theory for the increase in price received by Alaska reindeer herd owners for carcass reindeer meat (Burk, 1968). The following factors have tended to increase the consumer demand in northwest Alaska:

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Protein Contribution c

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population growth in the region, increased earned incomes of region residents, increased transfer payments such as food stamps, a perceived preference for reindeer and caribou meat, general price increases of substitutes for these meats, and the demise of the Western Arctic Caribou Herd. In 1974, the NANA Regional Corporation estimated that the region's residents consumed 14,000 caribou annually (Mauneluk Association, Inc., 1974). During the winter of 1976-1977, state-imposed hunting restrictions limited the harvest to 3,000 caribou. On the supply side, supplies of reindeer in northwest Alaska, as evidenced by numbers of animals annually slaughtered, although showing some variation up and down, have remained relatively stable since 1969, averaging an annual sale of 1,835 carcasses from Seward Peninsula reindeer herds. Increasing demand with a comparatively stable reindeer supply has put upward pressure on prices.

Protein Contribution of Reindeer

As noted earlier, the per capita consumption of reindeer meat on Seward Peninsula from wage-meats (400 carcasses) in 1976 was .32 carcasses per village resident per year (1,233 residents in the eight villages with herds) or approximately 39 pounds of reindeer meat. Sales to village residents and to village and town stores totaled approximately 1,550 animals in 1976, which, at an average of 120 pounds each, would represent some 186,000 pounds of meat. Combining the town (Nome and Kotzebue) population figures with those of the villages (6,249 people, 1975 figures) and totaling all reindeer meat consumed regardless of by what means it was obtained (approximately 234,000 pounds), yields a per capita consumption figure of 37 pounds for the Seward Peninsula. Thus, per capita consumption of reindeer meat in the towns and in the villages on Seward Peninsula from both wage-meats and purchases was about equal.

The figures for the villages reflect the payment of meat as wages to villagers. In the towns, there are few people who earn reindeer meat in this manner. Additionally, the figures for Nome and Kotzebue reflect a higher percentage of non-Natives in the population than do the figures for the villages. The non-Native buyers are probably following meat consumption patterns developed in the "lower 48," so they buy the customary meats rather than reindeer, which is a novelty to them. This implies that the per capita Native consumption of reindeer meat in the towns may actually be higher than in the villages. Part of the reason may be that people living in villages have a greater opportunity to obtain other traditional foods.

Recent studies of the impacts of Eskimo acculturation in terms of diet are reported by Draper (1977). Although direct comparisons are not possible, there exists the high probability that Seward Peninsula villages are roughly comparable to Wainwright and Point Hope, where data are available. At these villages, a study of diet in 1971 and 1972 concluded that:

> Wainwright adults obtained nearly half of their calories from native sources and about three-quarters of their protein. At Point Hope, where dietary acculturation is more extensive, less than one-quarter of the calories in the adult diet were obtained from indigenous foods, which nevertheless provided over half of dietary protein. The proportion of native foods in the diet of children, on the average, was about half that in the diet of adults. (Draper, 1977).

Since caribou were present near both of these villages in the two years studied, we assume that they made up a portion of the diet. Caribou and reindeer are virtually identical in composition and nutritive value (University of Alaska, 1973). Granted these assumptions and having already indicated that there is a high per capita consumption of reindeer on Seward Peninsula, it is suggested that reindeer represent a significant contribution to the protein intake and, consequently, the overall health of the Seward Peninsula population.

Table 21 is presented to show comparative nutritional data for reindeer and other meat products. A comparison of the figures in Table 21 shows that reindeer is a high-protein, red-meat source, low in fat and high in calories. Its lower cost relative to these other meats has been discussed. Coupled with the fact that it is a locally desired product, one can see the value of reindeer meat as a protein source for northwest Alaska.

The study by Draper (1977) contains implications for the health of the residents of this region.

> While the primitive Eskimo was beset by serious nutritional crises, these problems arose not from deficiencies in the quality of his native diet but from periodic breakdowns in his food supply as a result of natural forces. . . . He ate a balanced diet for one simple reason: there was little else to eat. The modern Eskimo has for the first time the opportunity to make significant food choices. Presented with an array of exotic new foods which he is not equipped by personal experience or education to evaluate, he tends to

Table 21. Composition of Foods, 100 Grams, Edible Portion.

Meat	Moisture (percent)	Food Energy (calories)	Protein (grams)	Fat (grams)

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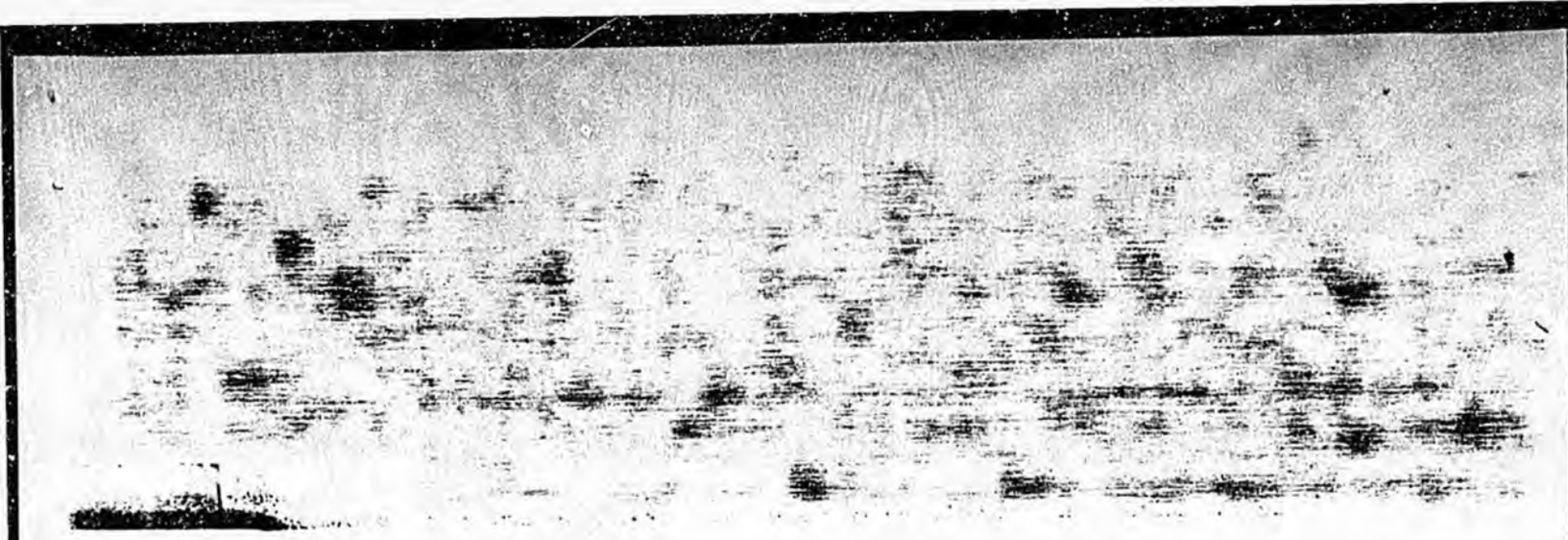
Table 21. Composition of Foods, 100 Grams, Edible Portion.

Meat	Moisture (percent)	Food Energy (calories)	Protein (grams)	Fat (grams)
Beef, Good Grade, raw, 100% lean[a]	72.1	139	21.8	5.1
Chicken, light meat without skin, raw[a]	73.7	117	23.4	1.9
Pork, fresh, carcass, raw, fat class (total edible 41% lean, 59% fat)[a]	33.4	553	9.1	57.0
Reindeer, raw flesh [b]	70.1	117	26.6	1.2

[a] Data from Watt et al., 1963:Table 1.

[b] Data from University of Alaska, 1973.



Harvesting of Reindeer Antler

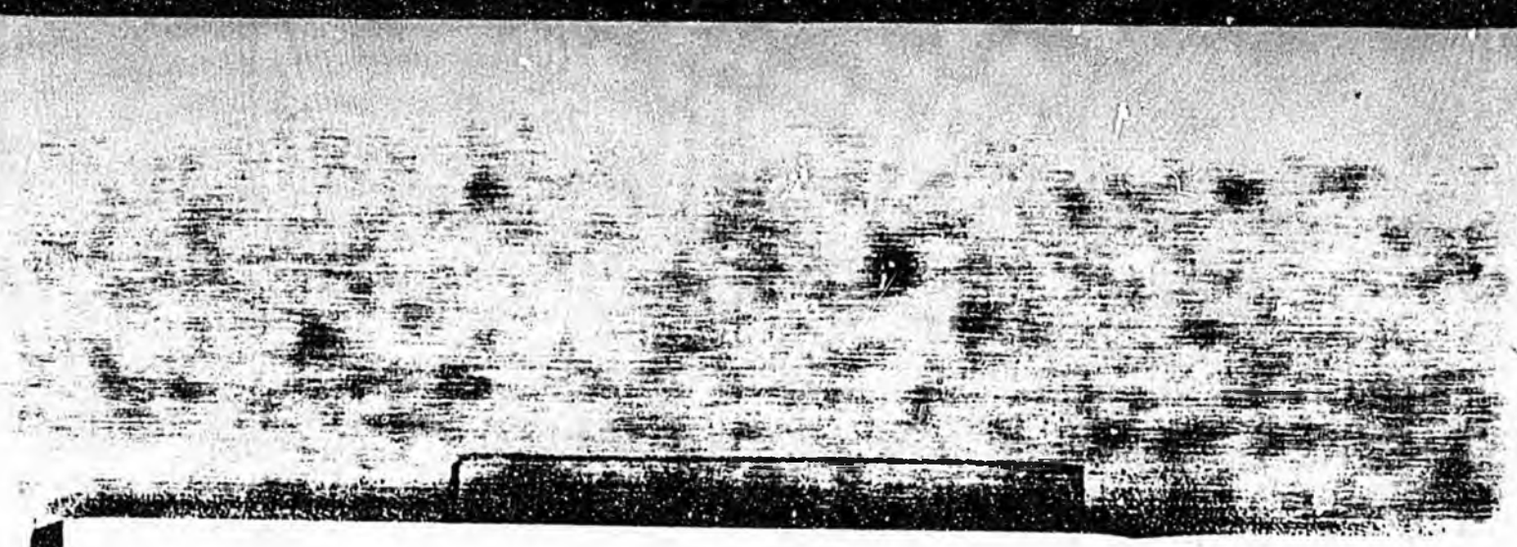
Velvet antler can be harvested only at summer handlings. In order to overcome the traditional difficulties of summer herding, the herds are now driven into the corrals for antler harvesting by a helicopter swinging back and forth behind the reindeer. This is a faster method than the herding on foot which was used until a few years ago. Once a herd is corralled, the reindeer are pushed single file through a chute at the end of the corral. As each adult reindeer moves through the chute it is held by four men and most of its antler is removed using a hand-held cutter. A rubber band is twisted around the remaining antler to prevent excessive bleeding. The smaller calf antlers are left intact.

Antler is harvested at the end of June or during the first part of July because it is during this period that the antler is most desirable: it is the largest size possible, but the inside of the antler still has a spongy texture. If the antler is allowed to continue to develop, it eventually becomes completely ossified. For this reason, antler buyers prefer not to purchase antler after the middle of July.

Price History

The price per pound received by reindeer herd owners for velvet antler has increased steadily in recent years. In 1969, herd owners received $1.00 per pound. In 1972, the price rose to $3.50 per pound; in 1975, to $4.32 per pound; and by 1976, the price had risen to $5.58 per pound. These price increases likely are a result of additional buyers attempting to purchase reindeer antlers. In 1977, two different prices were received. Except for one herd, all owners on the Seward Peninsula were under a multiyear contract and received $8.00 per pound. One herd received $23.76 per pound for its velvet antler production in 1977, the result of competitive bidding.

The sale of reindeer velvet antler has become an increasingly important source of income to Alaska reindeer herd owners. Based on information supplied by buyers and herd owners, the pounds and the value of sales for all Alaska reindeer herds for the years 1975-1977 are presented in Table 22. During these three years the quantity sold remained relatively stable. Price received, however, increased yearly, to where, in 1977, the value of sales more than doubled the 1975 level. The Seward Peninsula (Table 23) accounted for all sales



of velvet antler from Alaska for the years 1976 and 1977. In 1975, antler sales from Nunivak Island accounted for $5,310 (8 per cent) of total sales.

Table 22. Velvet Antler Sales — Alaska, 1975-1977.

Year	Pounds	Sale Value
1977	15,037	$171,673
1976	13,661	79,085
1975	15,058	65,829

Table 23. Velvet Antler Sales — Seward Peninsula, 1975-1977.

Year	Pounds	Sale Value
1977	15,037	$171,673
1976	13,661	79,085
1975	14,173	60,519

Value of Reindeer Products

In 1977, the value of sales and home use of reindeer products from all Alaska reindeer herds was estimated to total $471,000 (Alaska Crop and Livestock Reporting Service, 1978). Of this total, 95 percent ($446,673) was derived from reindeer meat and velvet antler. Five percent ($24,327) came from the production of hides, leggings (lower leg skins used for making mukluks), and meat byproducts. On the Seward Peninsula, the value of the 1977 meat and antler sales was estimated to total $373,053.

The value of all reindeer products produced in Alaska for the years 1972-1977 is presented in Table 24. This production value includes reindeer meat and meat byproducts, velvet antler, and reindeer hides and leggings. It includes meat and meat byproducts used in the home and/or for herd operations. For the years 1972-1977, with the exception of 1977, the total value of all production increased yearly. This increased value was due largely to increased prices for reindeer meat and velvet antler. Reindeer meat production from all Alaska herds actually showed a downward trend in the years 1972-1977, as was discussed previously.

The value of reindeer meat sales and velvet antler sales on the Seward Peninsula for the years 1975 through 1977 is provided in Table 25. (This table was constructed with data from interviews gathered by interviewing herd owners and antler buyers, and the examination of BLM case files.) The value of hides and meat byproducts is not available, but likely accounted for only an additional four to five

Table 24. Value of Rein

Year	Reindeer M
1977	$275,000
1976	243,000
1975	308,000
1974	205,000
1973	182,000
1972	166,000

[a]Includes sale of live rei
Source: Alaska Crop an

Table 25. Value of Rein
1975-1977.

Year	Reindeer Me
1977	$201,38
1976	185,64
1975	158,94

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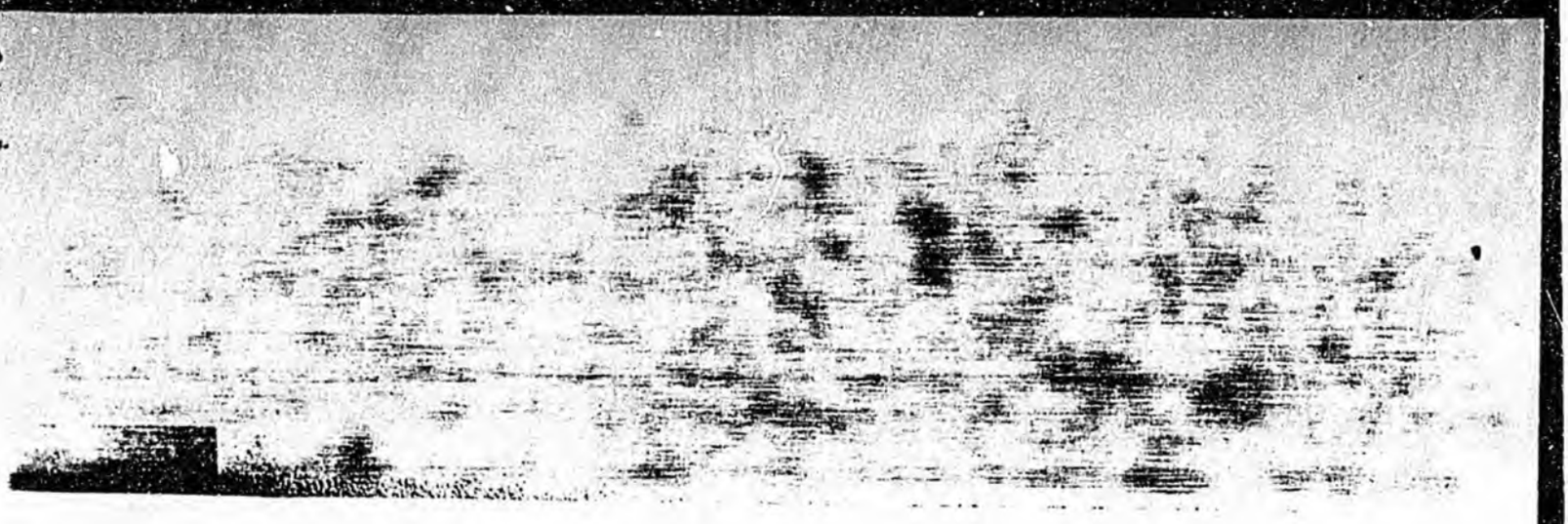

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Antler Sales –
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Sale Value
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Table 24. Value of Reindeer Production-Alaska, 1972-1977.

Year	Reindeer Meat	Antler, Hides and Meat Byproducts	Total
1977	$275,000	$196,000	$471,000
1976	243,000	258,000[a]	501,000
1975	308,000	83,500	391,500
1974	205,000	60,000	265,000
1973	182,000	34,000	216,000
1972	166,000	49,000	215,000

[a]Includes sale of live reindeer.
Source: Alaska Crop and Livestock Reporting Service 1973-1978.

Table 25. Value of Reindeer Product Sales – Seward Peninsula, 1975-1977.

Year	Reindeer Meat Sales	Antler Sales	Total
1977	$201,380	$171,673	$373,053
1976	185,640	79,100	264,740
1975	158,940	60,500	219,440

per cent of total value. Sales in 1977 were $108,313 greater than in 1976, an increase of 41 per cent. Most of the increase was due to higher antler prices between 1976 and 1977. Antler production increased by approximately ten per cent while the value of antler production rose by $92,573, a 117 per cent increase.

ALASKA'S AGRICULTURE AND FORESTRY

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CHAPTER 12

ANIMAL PRODUCTION: REINDEER

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Reindeer are the semidomestic form of the animal *Rangifer tarandus* (12). The wild animal native to North America is called caribou. Although some behavioral and morphological characteristics are identifiable between the two, there are relatively few differences, and cross-breeding does occur.

HISTORY AND LAND POLICY

Reindeer were first introduced into Alaska in 1891 by Reverend Sheldon Jackson for the avowed purpose of providing a food base for Native inhabitants (12). From 1892 through 1902, the United States government continued to import reindeer from Siberia, until there were some 1,300 deer (12). The policies on reindeer from their introduction into Alaska through 1914 were primarily determined by Jackson, who was General Agent for Education in Alaska for the Department of Interior's Bureau of Education until 1906. Reindeer ownership was largely confined to the bureau, various missions, the Eskimos, and a few Lapps who had been brought to Alaska to train Eskimos in herding (12).

A period of commercialization of reindeer by non-Native owners from 1914 up through 1939 ended following passage of the 1937 Reindeer Act, which restricts ownership of reindeer to Alaskan Eskimos, Indians, and Aleuts (12). Some statistics show that during this period, reindeer increased in Alaska to an estimated 640,000 animals in 1932 (12) and then dropped to approximately 250,000 head by 1940, but old-timers feel that a high of 640,000 animals is inflated; their count is 440,000 head (10). Numbers continued to decline through the 1950s and 1960s into the 1970s; they dropped to 18,000 in 1977 (12). The reasons for these declines are complex and interrelated. Biological factors were range deterioration, at least in some locations; disease; and predators. Economic factors were job opportunities which replaced herding and a concerted effort by national cattle interests to limit market penetration of reindeer meat. In addition, herding was not a cultural norm for the Alaskan Eskimo.

Until 1971, the only land manager on the Seward Peninsula was the Bureau of Land Management (BLM), U.S. Department of Interior. Change began with passage by the U.S. Congress of the Alaska Native Claims Settlement Act in 1971 (16). This allowed Alaska Native people to select and obtain land ownership from the Federal government. The act also directed the Federal government to study and indicate for possible retention lands with national interest. The 1980 Alaska National Interest Lands Conservation Act (ANILCA) (17) does just that. Relative to the Seward Peninsula, these two Federal statutes created new land managers: the National Park Service (NPS); Fish and Wildlife Service (FWS); the NANA Regional Corporation and the Bering Straits Regional Corporation; and numerous village corporations or groups. The State of Alaska became the fourth new land manager by virtue of its land selection rights under the 1959 Alaska Statehood Act.

These groups, along with retained BLM land management, control the range resource of the herd owners. Some of the herders are faced with the multi-agency management of their single range. There could be

benefits or losses if differential fees were charged by the various land management groups. At present, coordination in land management is apparent through cooperative arrangements made by the public agencies, BLM, NPS, FWS, and the State government. The major way that government land policy can be benign to the industry is through continued coordination (14).

RANGE

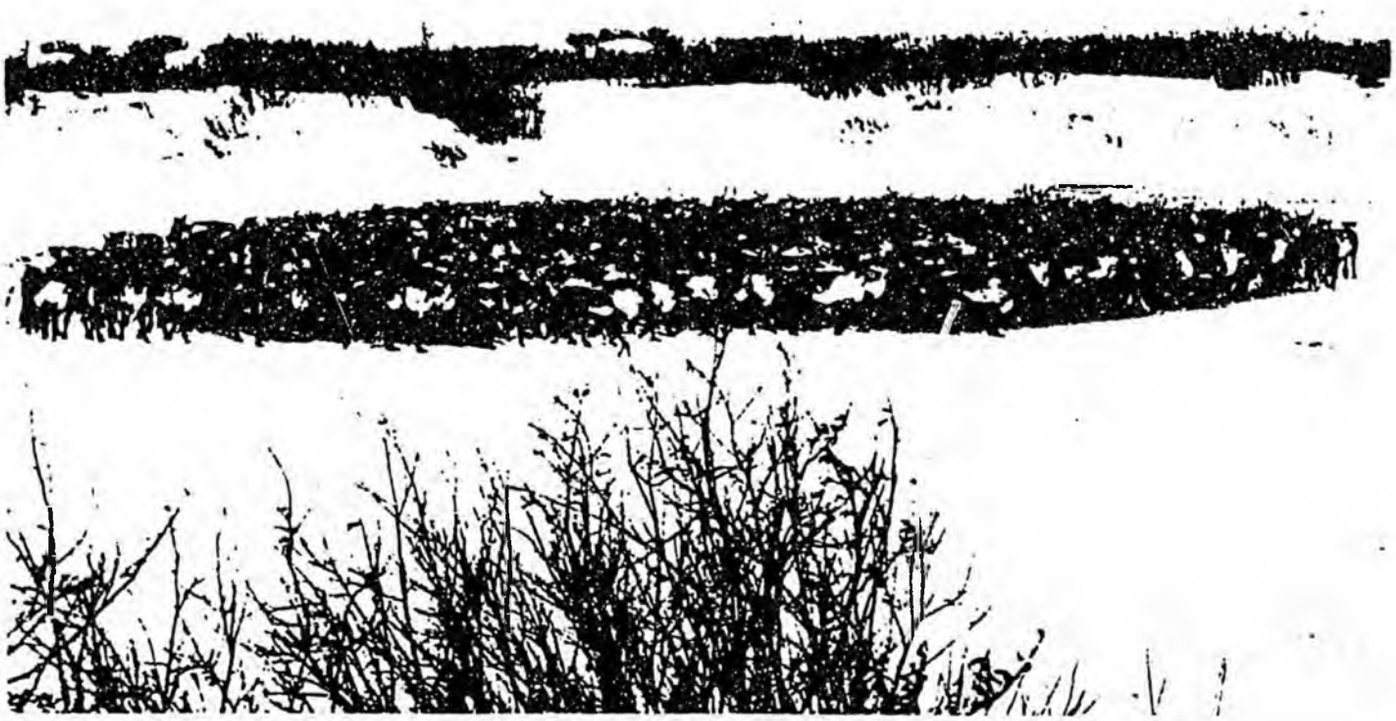
Alaska's rangelands fall into three general subcategories: (1) semidomestic livestock (reindeer, musk oxen, and bison); (2) domestic livestock (cattle, sheep, goats, horses, etc.); and (3) wildlife (moose, caribou, wild sheep, bison, muskoxen, deer, wild goats, and elk). The latter category will not be dealt with in this discussion because current practices and policies are for wild lands ranging and sport harvest of animals rather than for scientific optimization of the grazing potential of these rangelands. This societal choice of sport hunting over optimum grazing utilization and meat production impacts certain semidomestic and domestic livestock operations and has a major influence on the potential of reindeer.

Potential reindeer ranges encompass some 220 million acres (11), with about one-half usable under current management techniques. These are located along the coast from southwestern Alaska to the North Slope. Institutional constraints (17) reduce this significantly to some 13 to 14 million acres, primarily on the Seward Peninsula and on Nunivak Island. (See accompanying map.)

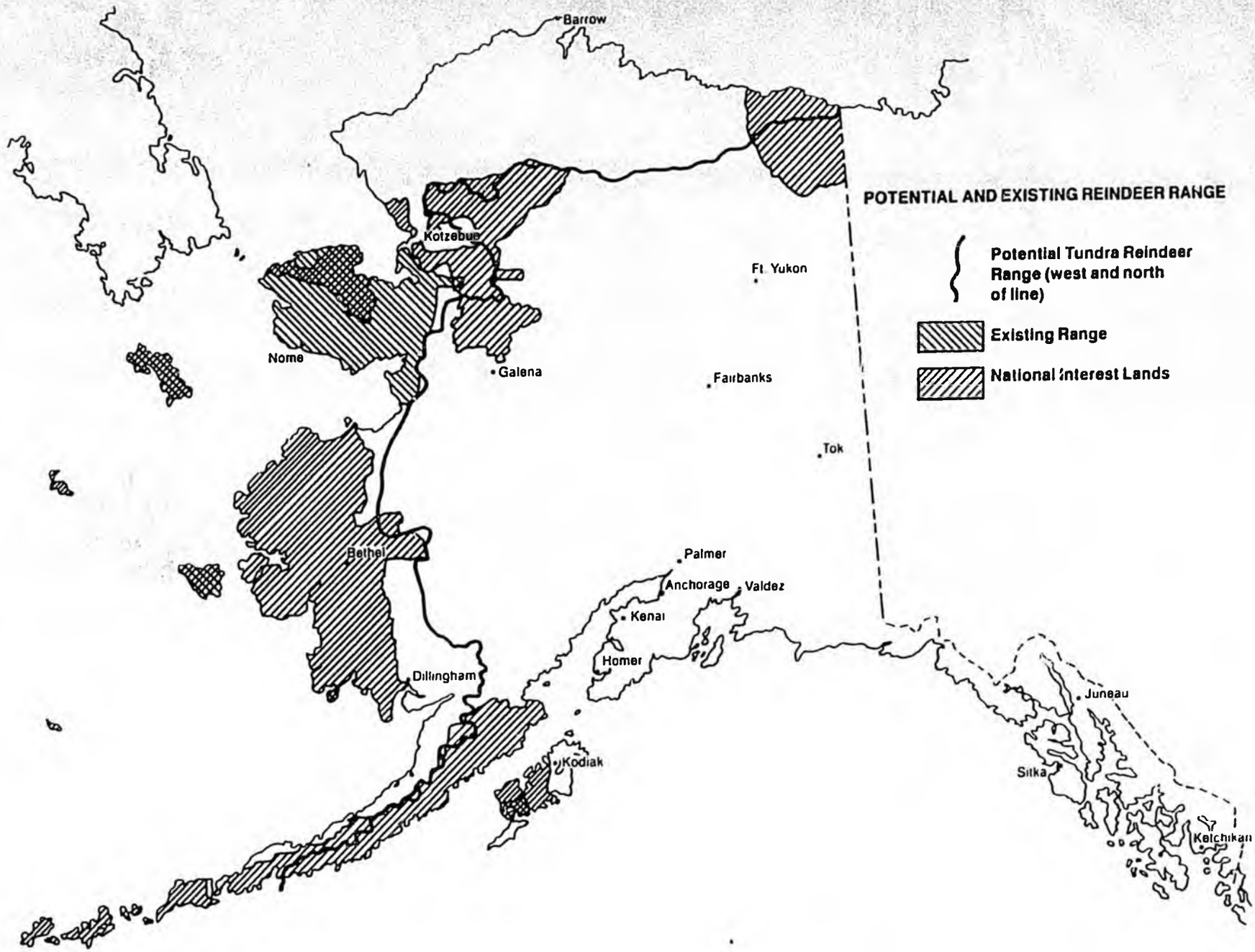
Domestic livestock ranges are estimated to encompass some 18.6 million acres statewide (11), but institutional constraints (16) reduce this figure to less than five million acres, of which maybe one million acres should be managed exclusively for range values, while the remainder has multiple agricultural values. Less than 75,000 acres (11) of this could be considered year-round range, and it is located on Alaska Native corporation lands and State lands on Kodiak Island and on the Aleutian Islands. Most of the range resources of Alaska are devoted to supporting wildlife species and encompass approximately 238 million acres (11).

Domestic livestock grazing is currently limited to operations that provide supplemental feed during most of the year. These operations are capital-intensive and require highly skilled management to be profitable. Because of the tight margin of profitability, they are found in the railbelt-highway areas where economical access to markets is available. As forage varieties and range and livestock management practices are modified and adapted to Alaska's environment, the domestic livestock industry may expand in the railbelt area.

The real potential for commercial utilization of



A portion of the reindeer herd owned by NANA Regional Corporation is pictured at Candle on the Seward Peninsula.

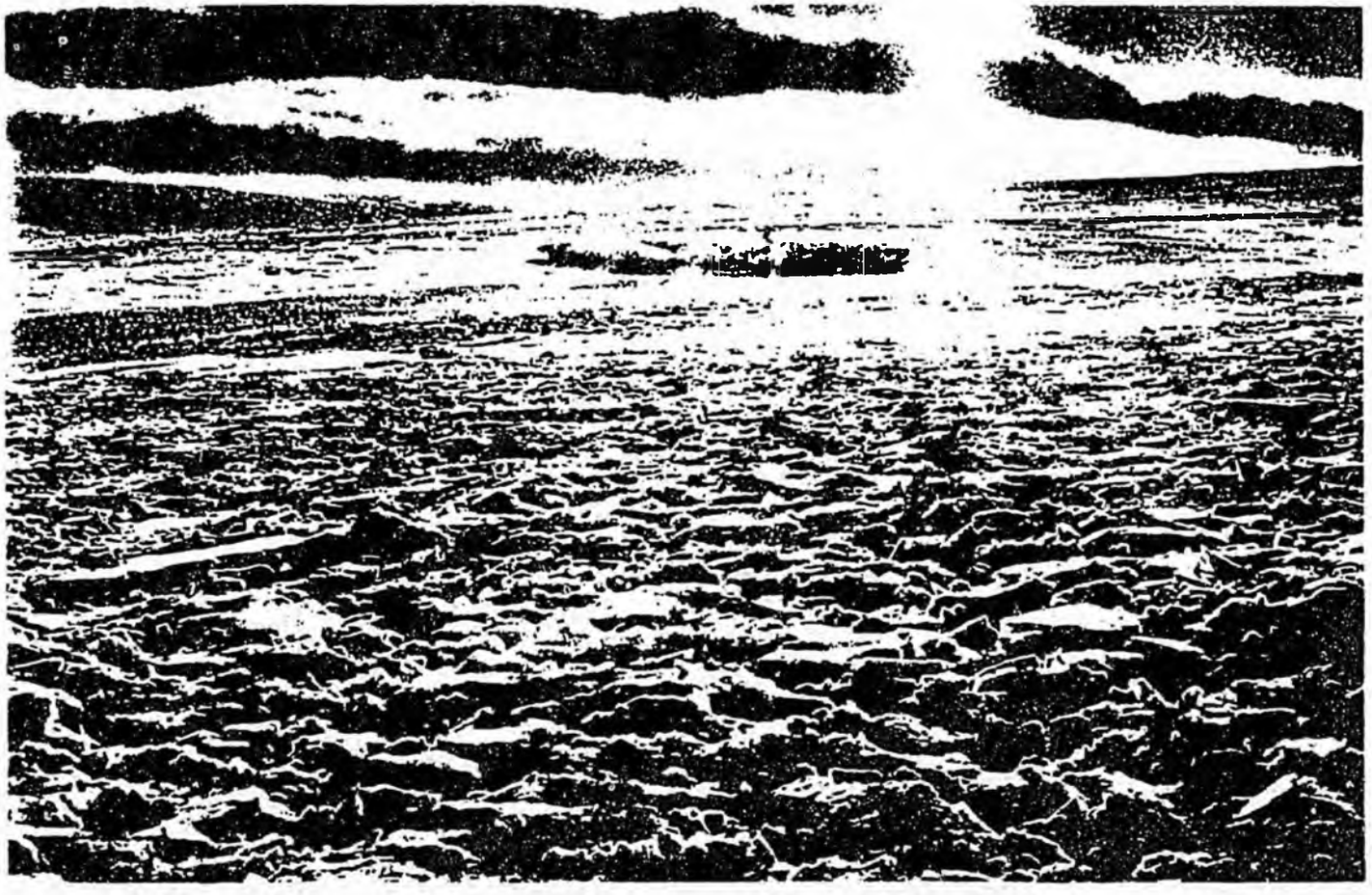

POTENTIAL AND EXISTING REINDEER RANGE
Potential Tundra Reindeer Range (west and north of line)
Existing Range
National Interest Lands
Barrow
Kotzebue
Nome
Galena
Ft. Yukon
Fairbanks
Tok
Bethel
Palmer
Anchorage
Valdez
Kenai
Homer
Dillingham
Kodiak
Juneau
Sitka
Ketchikan

rangelands in Alaska is not with common domestic livestock, but with animals that can utilize indigenous forages year-round and do not require supplemental feeding. The three major animals with these characteristics are the reindeer, the musk ox, and the bison. All three are exotic to Alaska, although they were either present in the recent past or have closely related species that are present. They are semidomesticated and require intensive herding to be commercially successful. The major limiting factors to commercial utilization of these animals tend to be more cultural than biological.

The reindeer industry has languished in neglect for the past 40 to 50 years and is just now beginning to rebound from its lowest point of some 18,000 animals in 1977 [12]. Real growth in reindeer numbers was recorded during 1982 [4], which reflects a renewed interest of herders and Alaska Native corporations. In addition, the University of Alaska has provided a significant component of technology input in the area of animal health through research and extension staffs.

With animal health problems rapidly being ameliorated, limitations to major expansion of the industry center around improving handling techniques and recognition by the public that the reindeer industry is a legitimate user of the range resource. The latter problem is of concern from a long-term perspective. The rangelands of western and northern Alaska are nonproductive to mankind without a grazing ungulate to convert cellulose into protein. Reindeer fill this need, but except for the western part of the Seward Peninsula and some offshore islands, they compete with wild caribou. The conflicts between reindeer and caribou along the eastern portion of the Seward Peninsula can be reduced by improved herding techniques and seasonal timing of range use. A continuing concern is the uncontrolled grazing of caribou on winter ranges, which decimates the range when caribou numbers become very large and is at least partially to blame for the typical cyclic growth and crash of Alaska's wild caribou populations. This limits reindeer utilization of the range in subsequent years, even after the caribou are gone.

It is estimated that the existing reindeer industry can grow three to four times in numbers of animals before utilization of their current range becomes a major limiting factor. When this occurs, society will have to decide whether utilization of these range resources is a priority for red meat production, optimizing the resource, or whether aesthetic and sport hunting uses are more important. If red meat becomes more important, the industry could increase an additional 20 to 30 times by expanding beyond the currently utilized reindeer ranges.



Reindeer can be herded to graze in areas of high quality winter range that carry some snow cover but are avoided by caribou.

REINDEER POTENTIAL VS. GAME AND NON-GAME SPECIES

Conflicts between reindeer and other wildlife have been discussed in generalities. Some of the specific conflicts that are present and will continue to influence individual as well as societal choices of range resource use are delineated as follows:

Caribou

Caribou are a continuing threat to the existing industry on the eastern Seward Peninsula. Klein (5) indicates that even under close herding, losses to migrating caribou cannot be avoided. The caribou/reindeer conflict is the maior limiting factor for expansion of the industry in western and northern Alaska. This is because of a very protective attitude toward caribou by Federal and State agencies. The BLM position is that where there is conflict between these wild (caribou) and domestic (reindeer) animals of the same species, the agency will manage for the caribou (1, 3).

There is no question that these animals fit the same ecological niche. However, with proper management, time and geography can be used to separate reindeer and caribou so that we can receive the benefits of both. In addition to the losses of reindeer to passing caribou herds, disease and pests are mutually transferable. Because caribou tend to be site-selective feeders, they deplete the forage available to reindeer. This generally impacts localized areas of winter ranges that are blown clear of snow. Reindeer can be herded to graze in areas of high quality winter range which carry some snow cover but are avoided by caribou. Reindeer will excavate feeding craters in snow to a depth of about three feet, if icing is not a problem.

NANA, particularly in the past three years, has lost several thousand head of reindeer to the Western Arctic Caribou Herd. The only way reindeer herding can be feasible is to minimize this type of loss. One answer is better surveillance of the caribou, possibly through satellite tracking, in order to move affected reindeer herds before the caribou appear in the locale. A more extreme solution is to stop herding reindeer in conflict areas. As should be expected, both solutions have decided costs and benefits. The likely outcome is reduced emphasis in range use in the affected eastern boundary areas.

Musk oxen

Musk oxen were recently reestablished in Alaska. Indigenous stocks were exterminated before the turn of the century. The reintroduced animals are calving earlier and more often than their parent stocks in Canada, causing exceptional population increases. They tend to utilize riparian ranges year-round. These ranges play an important role in reindeer summer feeding, so there may develop direct competition as musk oxen continue to increase.

Moose

Moose have been expanding their range into areas that have not, during recent times, been utilized by moose. These animals are also increasing at a rapid rate in some areas. Moose are in direct competition with reindeer for forage, especially willow, which is one of the principal summer forages for reindeer.

Other grazers

Other grazers such as arctic hares, parka squirrels, and other rodents compete with reindeer for forage, but at present this competition is less well-defined than it is for musk ox and moose.

Predators

Predators have an impact on reindeer numbers by killing and eating them or by infecting them with rabies, a lethal disease. Predators include wolves, bears, foxes, and ravens that prey on newborn calves. The environmental concern for wolves tends to favor wolves over reindeer, particularly on Federal lands.

Waterfowl and shore birds

Waterfowl and shore bird nesting areas may restrict the expansion of the reindeer industry into most of southwestern Alaska because of the U.S. Fish and Wildlife lands found there. On many of these areas, the U.S. Fish and Wildlife Service is restricted by ANILCA (17) to manage for the purpose articulated in establishing the refuges. Where reindeer are mentioned, they are usually allotted areas under lease in 1976. To expand beyond these areas, reindeer grazing would have to be determined compatible with wildlife purposes of the refuge per national standards, which seems questionable.

PROBLEMS OF HERDING

The industry, through the Alaska Reindeer Herders Association, has been working closely with the University of Alaska on disease and insect problems. Reindeer

disease control research to date has centered on the elimination of bacterial-borne brucellosis, which is a major cause of calf abortion. Parasite research has focused on warble flies and bots, which reduce animal weight and destroy meat and hide quality.

A vaccine was developed and tested on 1,000 animals for brucellosis. Initial results are promising, and researchers are optimistic that the vaccine may eventually eradicate brucellosis in reindeer.

Eighteen thousand reindeer were treated with Warbex to kill warble fly larva, and dramatic weight increases in treated animals were observed as a result. A new, lower cost parasite drug, Ivermectin, is currently under test. This drug is a broad-spectrum treatment for internal parasites, and it should solve the warble fly and bot problem and others such as lungworm or tapeworm with one treatment.

The University of Alaska's Institute of Arctic Biology is conducting research and developing techniques to reduce or eliminate animal stress during reindeer handlings. Ear tagging of calves helps to determine animal mortality rate. Radio collars that emit special signals when the animal dies help to locate these animals for inspection.

Dr. Robert Dieterich, University of Alaska–Fairbanks veterinarian, uses a voice activated communication system to describe animal health during a reindeer handling at Nome.

Field techniques are being developed to determine what effect calf nursing behavior has on milk production and fawn growth. When the results of this study are combined with liveweight calf measurements, the results will tell the herder which management techniques are giving him the highest production and the best fawn growth rates.

The institute also conducts nutrition research on the use of supplemental and/or emergency reindeer feed. Alternative feeding studies have been directed toward the use of cereal grains for winter survival and summer fattening. Additional research is determining the effects of feeding cereal grains to reindeer over a long period of time.

A major issue revolves around the transition of the northwest Alaskan Eskimo culture from a subsistence-based lifestyle toward one that is employment-based. This is a particularly acute issue for reindeer herding, because the critical times of calving, summer insect harrassment, and rut occur during peak periods of subsistence activities—whaling, fishing, berry gathering, and hunting. Those herders who make a commitment to reindeer herding are doing well, and their herds are flourishing. More herders are choosing this course, which accounts, in part, for increased numbers of animals and a view toward expanding markets.

All activities that center around the reindeer industry have economic content. These include management and marketing. The type of economic decision associated with each activity depends primarily on the value judgements of the groups most affected. This point should become more evident with the ensuing discussion.

MANAGEMENT

Reindeer are managed, in large measure, with regard to the importance placed by the herd owner on the cash economy. If subsistence activities that compete for the herd owner-manager's time are viewed as more important than time spent with the herd, then a valid economic decision has been made which, in turn, generally will reduce the performance of the herd (9). However, the increased price of antler in the world markets has led some herders to manage their animals more closely, with the likely outcome of less time for other activities (15).

Clearly, there are no right answers as to how herd management should be undertaken. However, substantial net economic benefits are possible under a more intensive management approach (6, 15). To accomplish this requires change from more traditional ways of doing things, and this change is costly. Village interaction with

reindeer herding may be reduced because of the transition to Native corporation management or aggressive individual owner management (8).

The usual management approach is ranging reindeer in country where the major barriers are natural. Fencing is generally not done on reindeer ranges, and feed comes from unimproved grazing land. More intensive management of the herds would entail closer herding and rotational grazing to evenly utilize all accessible grazing areas.

An alternative to unimproved grazing is to develop some form of improved range or pasture. While it is common in the American livestock industry, serious commercial attempts of improved grazing for reindeer are not evident in past literature. The chief reasons are the high cost of range or pasture improvement and low productivity of lands near the current reindeer industry.

A third option is to feed reindeer in cattle-type feedlots. The reindeer could be raised under range conditions and then placed in a feedlot or bred and raised in the feedlot. Barley has been found to be a good feed to over-winter reindeer, and/or to fatten reindeer in the milder months just before slaughter (2). This approach may have some applicability where range is limited for economic, social, political, or biological reasons, such as in the lower Kuskokwim area. More study is necessary to determine the economic feasibility of placing reindeer in feedlots.

MARKETING

Meat marketing has traditionally been an activity carried out by each herd owner. The animals are slaughtered, field dressed, and then distributed in several ways. At the village level, the meat is marketed as (a) wage meat payments; (b) direct sales to village residents; and (c) sales to village stores. Larger herd owners also sell directly to regional center stores, particularly in Nome and Kotzebue. In recent years, meat sales have been largely confined to the Seward Peninsula. This may be changing because of the increasing number of reindeer in herds on the peninsula; herds grew from 18,000 head in 1977 (12) to over 27,000 head in 1983 (4). The increase is due to an expanding interest in marketing a high value product, reindeer antlers.

As the quantity of reindeer meat increases, markets outside the region must be gained, or the economics of meat production will decline. It is likely, if current trends continue, that aggressive meat marketing will be a needed new program for the industry group, the Reindeer Herders Association.

Antler marketing is an export activity. Reindeer antlers and other types of deer antlers are ingredients in oriental medicine. The major markets are located in Korea, Taiwan, China, and Japan (7, 13).

This freshly harvested reindeer velvet antler will be frozen for shipment to processors in the Orient.

The price of antlers has risen dramatically since 1969, more than 3,400 percent. This has increased marketing of antlers from Alaska; about five tons per year are exported. However, the high world price has brought forth competitors, particularly from New Zealand. The antler price has weakened slightly since 1979 because of the world recession and an increased supply of antlers. Further changes are difficult to predict, but the likelihood of increasing competition appears reasonably certain. A long-term decline in antler prices would not be surprising and, if it occurs, could lead to reduced income for Alaska reindeer herd owners. The two likely reactions by reindeer herders to this scenario are: (a) increased emphasis on meat production; and/or (b) reduced interest in herd management.

SUMMARY

The reindeer industry has gone through several transition periods before arriving at today's world of export antler marketing and multi-government agency management of the reindeer range. The industry is exhibiting renewed vigor in the 1980s, but problems remain. Range conflicts are evident with caribou and other wild grazing animals. Problems of management are being addressed by applying new management techniques and through applied research carried out by the University of Alaska.

Several major economic issues are also of concern. Apparent economic advantage exists for more intensive herd management, but this conflicts with traditional subsistence activities. If the price for export antlers weakens, herds must be shifted toward greater emphasis

on meat production or there will be an overt reduction in overall herd management by individual herders.

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WARD PENINSULA REINDEER RANGE

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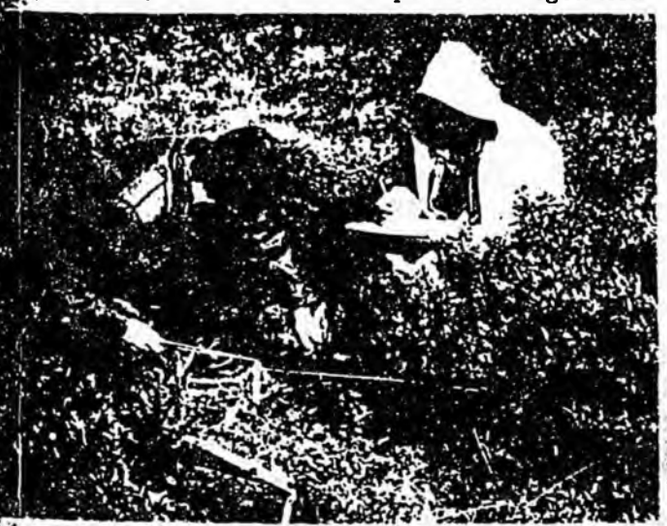
TRODUCTION

The 16 million acres of reindeer range on the Seward nsula have been mapped, and an interim Reindeer ge Management Plan has been developed for each der. Practical aspects of range management rely on agement units, which are comprised of similar gical sites, to aid land managers with land use deci- The nearly completed range-soil survey utilizes 45 gical sites (similar to vegetation habitat types) to ribe soil and vegetation relationships.

LASSIFYING PLANT COMMUNITIES

Ecological sites are based on potential native vegeta- n, and any variation of the potential vegetation characteristics may reflect a seral stage or condition class of the site. On the Seward Peninsula, ecological sites exhibit a great deal of diversity, and many factors have interacted to create a multitude of seral stages of the original plant communities. Evaluation of range fire history and past grazing records provides strong evidence to support the hypothesis that range fires have contributed the most significant impact to lichen resources. Many acres of tundra that were once rich with lichen and produced from 5,000 to 10,000 pounds/acre of total air dry lichen biomass are almost devoid of the energy rich plants. It is doubtful that these areas will ever again produce comparable lichen yields. Thus, on these ranges management must be designed for the existing vegetation, which consists primarily of cotton grass and arctic shrubs.



Range technicians Mark Kenney (left) and Calvin Steele, Soil Conservation Service, collect herbage production data on the Seward Peninsula.

GENERAL DESCRIPTION OF ECOLOGICAL SITES

In the southeastern portion of the Seward Peninsula, coniferous forests dominate many of the mountain slopes and valleys. Upland sites consist mainly of white spruce with a green alder and willow understory. Forested floodplains contain a mixture of white spruce, black spruce, cottonwood, and shrubs. In some areas, reindeer lichens grow in a thick mat and dominate the forest understory. Total production of the air dry lichen biomass is from 5,000 to 15,000 pounds/acre.

Shrublands occur throughout the peninsula, but are more extensive in the southern half. They are mainly comprised of green alder, a variety of willows, dwarf birch, resin birch, and other boreal tundra shrubs. The herbaceous understory of these sites consists of grass and grasslike plants, forbs, and lichens. The lichen-rich

shrub type also occurs on the southern half of the peninsula. Green alder and willow dominated sites occur on the sides of mountain slopes, in drainage ways, and along alluvial floodplains. These sites yield from 2,000 to 6,000 pounds/acre of annual air dry herbage production. As a group, the brush sites exhibit the highest annual productivity of any on the Seward Peninsula and provide important winter browse for moose.

Grasslands constitute a very small portion of the Seward Peninsula. Bluejoint grasslands occur primarily in recently breached lake beds where exposed, mineral rich soil provides a favorable environment for luxuriant grass production. Many of these dry lake beds appear as seas of grass where four-foot tall bluejoint is capable of yields of 3,000 to 5,000 pounds/acre annual air dry herbage production. As moisture increases and water accumulates, bluejoint is replaced by sedges and rushes, and annual air dry production decreases. Beach wildrye grows in specialized communities with spear grass and xerophytic forbs (adapted for growth under dry conditions) along beach zones. Sparse and scattered stands of bluejoint occur in various areas throughout the tundra landscape. They are remnants of formerly dominant plant communities that were introduced following range fires and now are being replaced by more competitive climax vegetation.

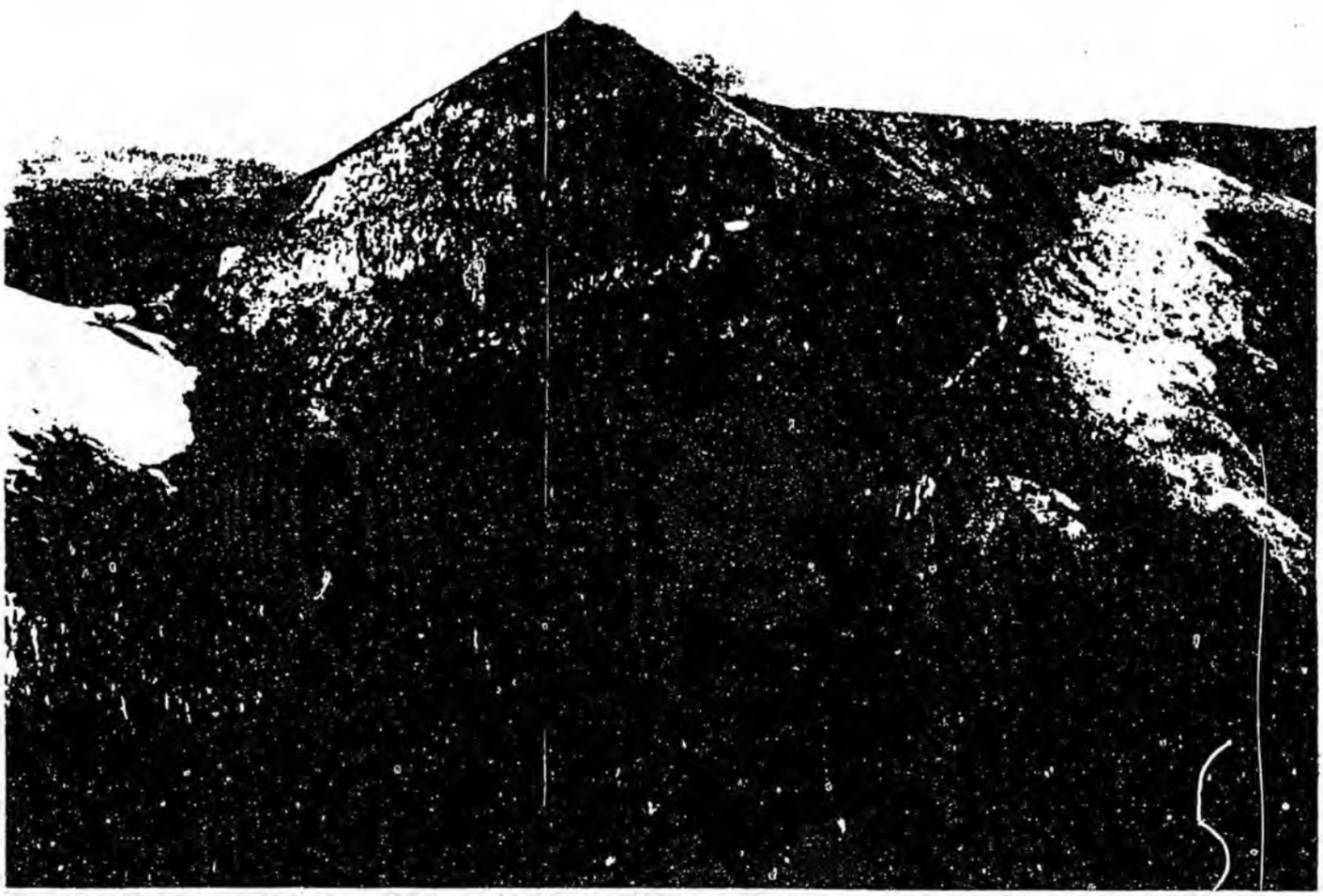
Three basic tundra zones are used to differentiate Seward Peninsula tundra range. They are (1) low to high elevation sites; (2) low to mid elevation sites; and (3) high elevation, sub-alpine sites. These zones are described as follows:

Low to high elevation sites

Low positioned, wet sites support a mixture of sedges and rushes with hydrophyllic forbs that are growing in standing and flowing water. These sites yield approximately 500 to 1,000 pounds/acre of annual air dry herbage production with very little lichen biomass.

Low to mid elevation sites

These are mid positioned sites that are free from standing and flowing water and are underlain by continuous permafrost. They represent a typical and vast tundra zone. It is presumed that abundant quantities of



Forested areas such as this one near Elim dominate many of the mountain slopes and valleys in the southeastern portion of the Seward Peninsula.

lichens once occurred where they are now absent on many of these sites. Typically, these sites are comprised of rushes, cotton grass, cloudberry, Labrador tea, dwarf birch, blueberry, lingonberry, dwarf willows, and lichens that grow in or on sphagnum moss. The composition of grasses, forbs, shrubs, and lichens varies significantly relative to the condition. This zone typically produces the highest annual yield of the three tundra zones (an air dry herbage production of 1,200 to 1,500 pounds/acre). In addition, on sites were lichen occurs, from 1,000 to 5,000 pounds/acre of total lichen biomass may be present. These sites produce high quality, high value winter forage for reindeer and require careful management for sustained harvest of lichen resources.

High elevation, sub-alpine sites

These sites are sparsely vegetated with a great variety of plants, such as threadleaf sedge, bluegrass, bigelow sedge, mountain heather, two flower Cassiope, willows, and various lichens. Air dry annual herbage production is from 50 to 300 pounds/acre with approximately 100 to 500 pounds/acre of total lichen biomass.

USE OF RANGE DATA

Data developed from the range survey have been used primarily for reindeer interpretations, although multiple interpretations can be made for musk ox, moose, and horses. Reindeer range management plans that have been developed are defined either as *extensive* or *intensive*. Extensive management plans identify and utilize summer and winter range separately with free roaming herds. Herding is minimal, and consequently, the initial stocking rates are correspondingly low. Herders who employ this management technique utilize subsistence stocking rates of 500 to 1,000 acres/reindeer/winter.

Intensive range management plans involve the identification and use of from four to eight seasonal ranges, intensive herding, and rotational use of spring, fall, and winter ranges. Herding during winter months makes more efficient use of forage resources, and ideally, reindeer are moved around the winter management unit in a systematic pattern. However, weather, predators, and snow conditions add variability to the basic plan. Initial stocking rates range from 80 to 150 acres/reindeer/winter.

Reindeer are shown grazing in the Grand Central Canyon-Salmon Lake area of the Seward Peninsula.

CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
TO ASSURE LEGIBILITY

lichens once occurred where they are now absent on many of these sites. Typically, these sites are comprised of rushes, cotton grass, cloudberry, Labrador tea, dwarf birch, blueberry, lingonberry, dwarf willows, and lichens that grow in or on sphagnum moss. The composition of grasses, forbs, shrubs, and lichens varies significantly relative to the condition. This zone typically produces the highest annual yield of the three tundra zones (an air dry herbage production of 1,200 to 1,500 pounds/acre). In addition, on sites were lichen occurs, from 1,000 to 5,000 pounds/acre of total lichen biomass may be present. These sites produce high quality, high value winter forage for reindeer and require careful management for sustained harvest of lichen resources.

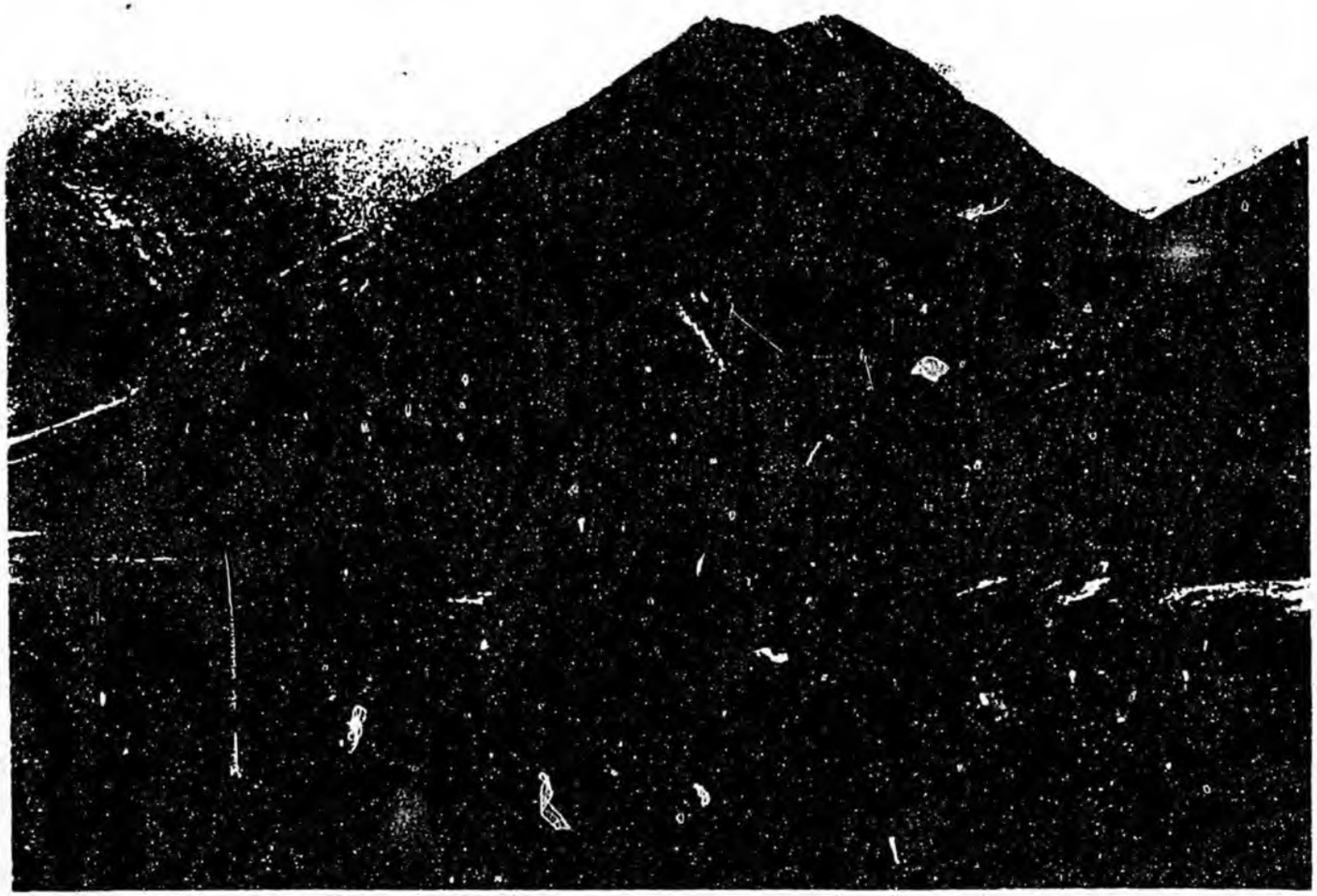
High elevation, sub-alpine sites

These sites are sparsely vegetated with a great variety of plants, such as threadleaf sedge, bluegrass, bigelow sedge, mountain heather, two flower Cassiope, willows, and various lichens. Air dry annual herbage production is from 50 to 300 pounds/acre with approximately 100 to 500 pounds/acre of total lichen biomass.

USE OF RANGE DATA

Data developed from the range survey have been used primarily for reindeer interpretations, although multiple interpretations can be made for musk ox, moose, and horses. Reindeer range management plans that have been developed are defined either as *extensive* or *intensive*. Extensive management plans identify and utilize summer and winter range separately with free roaming herds. Herding is minimal, and consequently, the initial stocking rates are correspondingly low. Herders who employ this management technique utilize subsistence stocking rates of 500 to 1,000 acres/reindeer/winter.

Intensive range management plans involve the identification and use of from four to eight seasonal ranges, intensive herding, and rotational use of spring, fall, and winter ranges. Herding during winter months makes more efficient use of forage resources, and ideally, reindeer are moved around the winter management unit in a systematic pattern. However, weather, predators, and snow conditions add variability to the basic plan. Initial stocking rates range from 80 to 150 acres/reindeer/winter.



Reindeer are shown grazing in the Grand Central Canyon-Salmon Lake area of the Seward Peninsula.

Forage resources on the Seward Peninsula are abundant and are capable of sustaining a greater number of reindeer than are currently stocked. It is imperative that the winter ranges receive proper management and protection for sustained use. Overgrazing and fire present the greatest immediate threat to lichen winter ranges. Fire suppression on the winter range must be employed if grazing management is to be practiced. The herd expansion planned by the Reindeer Herders Association will result in a need for more intensive range management practices. Roads and facilities such as cabins; trails; corrals; bridges; and, in some areas, fences will have to be constructed. Raw materials for such facilities can be obtained from forest resources of the peninsula. As needs for roads and facilities are met, meat processing and marketing infrastructure must be developed.

Before intensive management planning and herd expansion can occur, it will be necessary to prevent caribou from the Western Arctic Herd from mingling with reindeer of the eastern part of the Seward Peninsula. This land use priority commitment must be made by all governing agencies that administer land and wildlife resources on the Seward Peninsula.

Danny Karmun, reindeer agent for the University of Alaska Cooperative Extension Service, evaluates range utilization by caribou in the Selawik Hills of the Seward Peninsula.

REINDEER RANGELAND IN OTHER AREAS OF ALASKA

Vast areas throughout Alaska have summer and winter forage that is suitable for reindeer. Coastal areas from Barrow to Bethel that were grazed by reindeer from 1900 through the 1930s and many areas in the interior theoretically could support a sizeable number of reindeer, if the conflict with caribou herds can be eliminated.

The Aleutian Islands and the Alaska Peninsula also provide suitable forage and habitat for reindeer. Reindeer forage on Umnak, St. George, and other islands is comprised of bluejoint; hairgrass; willow leaves; willow roots; and a variety of forbs, including wild celery leaves, stalks, and roots. In addition, there are mosses and club moss, which obviously constitute part of the reindeer's diet. Observations of reindeer on the islands indicates that even though lichens are essentially lacking in the original potential plant community or have been grazed out, suitable forage is available. The reindeer in these areas are generally much larger than those of the Seward Peninsula.

Many areas throughout Alaska could provide forage for semidomestic and domestic moose, bison, horses, and musk ox. More limited areas, primarily the Alaska Peninsula and Aleutian Islands, have grassy valleys and mountains dominated by bluejoint, fescues, hairgrass, bluegrasses, and forbs, which yield from 2,000 to 4,000 pounds/acre of annual air dry herbage production. Range forage and kelp from the sea provide forage throughout the winter months in some snow free areas along the coastal zones.

The development and utilization of Alaska's ranges must be approached cautiously. Winter feed supplies are critically important to any year-round livestock operation in Alaska. Animals differ widely in their abilities to cope with snow of varying hardness and depth. Primary consideration should be given to contingency plans for winter feed. Delicate balances between existing wildlife populations and the range ecosystem need to be considered when establishing or introducing domestic or semidomestic animals into a functioning ecosystem. The trade-offs must be considered and fully evaluated before commitments are made to finance and implement such activities.

HOUSE COMMITTEE REPORT

File

(11)
Date Referred: April 13, 1990 FURTHER REFERRALS:

Date of Committee Action: 5/2/90

The FINANCE Committee considered: CSSB 364(FINANCE)

CS SB NO. 364 (Finance) INSPECTION OF SLAUGHTERED REINDEER

"An Act relating to inspection of slaughtered reindeer; and providing for an effective date."

RECOMMENDATIONS:
[✓] be replaced with CSSB 364 (FIN) [✓] the same title [ ] a new title
[ ] have attached amendment(s)
[✓] do pass
[ ] do not pass
[ ] no recommendation
[ ] individual recommendations
[ ] additional referral to the _____ Committee

* ADOPTS: Finance letter of intent

ATTACHES NEW FISCAL NOTE(s): (Dept)
[ ] fiscal impact _____
[✓] zero fiscal note HFC
[ ] zero with analysis _____

APPROVES PREVIOUS: (Date/Dept)
[ ] fiscal note(s) _____
[ ] zero fiscal note(s) _____
[ ] zero fn/analysis _____

SIGNING DO PASS:

Larson
Swaekhammer
Brown
Kodonen
Ulmer
Phillips

SIGNING: (Check approp. column)

	Do Not Pass	No Rec	Amend
Rieger		✓	

Co-Chairman's Signature
Larson

STATE OF ALASKA
1990 LEGISLATIVE SESSION

BILL VERSION: CSSB 364 (Fin)
PUBLISH DATE: _____

FISCAL NOTE

REQUEST:

Revision Date: _____
Title: An Act relating to inspection of slaughtered reindeer
Sponsor: Senator Kerttula
Requestor: House Finance Committee

Agency Affected: Environmental Conservation
BRU: Environmental Health
Components: Animal Health/Dairy

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	-0-	-0-	-0-	-0-	-0-	-0-
CAPITAL	-0-	-0-	-0-	-0-	-0-	-0-
REVENUE	-0-	-0-	-0-	-0-	-0-	-0-

FUNDING: (Thousands of Dollars)

GENERAL FUND	-0-	-0-	-0-	-0-	-0-	-0-
FEDERAL FUNDS						
OTHER						
TOTAL	-0-	-0-	-0-	-0-	-0-	-0-

POSITIONS:

FULL-TIME	-0-	-0-	-0-	-0-	-0-	-0-
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

Prepared by: House Finance Committee
Division: Co-Chairman Ron Larson
Phone: 465-3727
Date: 5/2/90

Approved by Commissioner: Co-Chairman Lyman Hoffman
Agency: _____
Date: 5/2/90

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

Adopted by SFC 3/24/90

Alaska State Legislature

SENATE

Committee on Finance

Official Business

P.O. Box V
State Capitol
Juneau, Alaska 99811

Senate Bill 364 (FInance)

Letter of Intent

It is the intent of the Senate that this bill not restrict the efforts of Alaskan reindeer herders in their marketing of fresh reindeer meat to other Alaskan communities and businesses.

Senate adopted 3/24

Offered: 3/21/90
Referred: Rules

6-1575D

Original sponsor(s): SEN. KERTTULA, Sturgulewski, Szymanski, Adams, Fahrenkamp

IN THE SENATE BY THE FINANCE COMMITTEE

CS FOR SENATE BILL NO. 364 (Finance)

IN THE LEGISLATURE OF THE STATE OF ALASKA

SIXTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to inspection of slaughtered reindeer; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 03.05.020(a) is amended to read:

(a) The commissioner shall

(1) require routine inspection of food animals, fish, poultry, and derivative food products, to protect the public against fraud, disease, and spoilage, and in this connection adopt uniform regulations establishing standards of identity and composition of these food products and minimum standards of sanitation and handling methods as to all phases of slaughtering, processing, storing, transporting, displaying, and selling of these food products;

(2) issue orders or cause the orders to be issued by an authorized veterinarian prohibiting transportation and sale of food products intended for human consumption that [WHICH] do not meet the minimum requirements established under (1) of this subsection, and limiting their use and disposal in conformity with protection of the public;

(3) adopt a schedule of fees or charges, and credit provisions, for services rendered by state veterinarians to farmers and others at their request in caring for livestock and poultry, and all the fees shall be transmitted to the commissioner for deposit in the state treasury;

Alaska State Legislature

SENATE

Official Business

P.O. Box V
State Capitol
Juneau, Alaska 99811

M E M O R A N D U M

TO: Representative Ron Larson, Co-Chairman
House Finance Committee

Representative Lyman Hoffman, Co-Chairman
House Finance Committee

FROM: Senator Jay Kerttula

SUBJ: Senate Bill 364
State Inspection of Slaughtered Reindeer

DATE: April 11, 1990

I would appreciate your scheduling Senate Bill 364, relating to state inspection of slaughtered reindeer at your earliest convenience.

Senate Bill 364 would allow the state to inspect reindeer meat for use in meat products like sausage. This inspection is mandated by the federal government, but the federal government provides no funding for the inspection. Senate Bill 364 would provide the reindeer herders with greater economic opportunity and the Alaska meat-processing industry with national and international markets.

With the passage of this legislation, the reindeer industry is put in a position of potential for phenomenal growth, through meat, blood, hide and horn sales. While there are current markets for reindeer products, these markets are in their infancy. Meat inspection is the key to further developing these markets.

Senate Bill 364 is supported both by the administration and the reindeer herders. I have attached a letter of support from Representative Foster. I appreciate your consideration of my request.

JK:kh

Attachment

REPRESENTATIVE
RICHARD FOSTER
BOX 1028
NOME, ALASKA 99762

PO BOX V
JUNEAU, AK 99811

(907) 465-3789

Alaska State Legislature

House of Representatives

11 March, 1990

Ms. Rose Atuk - Fosdick
Executive Director
Northwest Reindeer Herder's Association
POB 948
Nome, AK. 99762

RE: Pending Legislation and Budgetary Issues Relating to the Reindeer Industry.

Greetings Rose and Association Board Members:

Please accept my best wishes to you all and I trust your annual meeting is productive and enjoyable. I regret not being able to attend but it just is not possible. Nonetheless, allow me to update you all on the issues relating to your industry before us here in Juneau.

Beginning last year, staff in my office have been working with your members and officials within the Department of Environmental Conservation (DEC), in conjunction with officials of the US Department of Agriculture, to establish the basic requirements for an inspected meat policy so as to allow reindeer meat to be included in USDA inspected products. Over the summer, a consensus was agreed upon which we are monitoring now in the legislature. The consensus revolves around the establishment of an additional veterinarian position within the DEC for reindeer slaughter and packing inspections that will comply with the USDA requirements. In addition, Senator Kerttula has introduced legislation that enables and instructs the Commissioner of DEC to undertake this responsibility, as well as mandating that this program will be borne by the state. Please keep this point in mind: the inspection program is voluntary in nature, only required if a herder wishes to supply product to a packing plant that wishes to include the meat in a USDA inspected product. In other words, if a herder only sells his product across the counter as reindeer meat,

there is no inspection required. If another herder wishes to sell front quarters to be used in reindeer sausage, along with beef and pork, his product, from the time of slaughter until packing, must comply with inspection guidelines.

Regarding inspection guidelines, it is the consensus of the department that it would be best if guidelines are drawn up after the new veterinarian is hired. At that point, he/she would meet with the industry members and discuss, draft, listen for public comment, and finally adopt regulations that would be in compliance with USDA requirements. It is my hope that your group be fully involved in this process and insure that final regulations are such that you are not negatively impacted and in fact have agreed upon.

So far, both Senator Kerttula's bill, CSSB 364 (Resources), and the budget increment request, have had favorable hearings. I will keep you advised as the process continues. In the event there are further concerns, please feel free to call the office.

That's all I have now, again, best regards and if there is anything I can do, please let me know

Sincerely,

Richard Foster

Encl: 3

cc: Sen. Kerttula
Mr. Doug Donegan, DEC

Alaska State Legislature
Senate

Official Business

P.O. BOX V
State Capitol
Juneau, Alaska 99811

SPONSOR STATEMENT

SENATE BILL 364

STATE INSPECTION OF SLAUGHTERED REINDEER

Senate Bill 364 would allow the state to inspect reindeer meat for use in meat products like sausage. This inspection is mandated by the federal government, but the federal government provides no funding for the inspection. Senate Bill 364 would provide the reindeer herders with greater economic opportunity and the Alaska meat-processing industry with national and international markets.

With the passage of this legislation, the reindeer industry is put in a position of potential for phenomenal growth, through meat, blood, hide and horn sales. While there are current markets for reindeer products, these markets are in their infancy. Meat inspection is the key to further developing these markets.

I urge passage of Senate Bill 364.

Senator Jay Kerttula

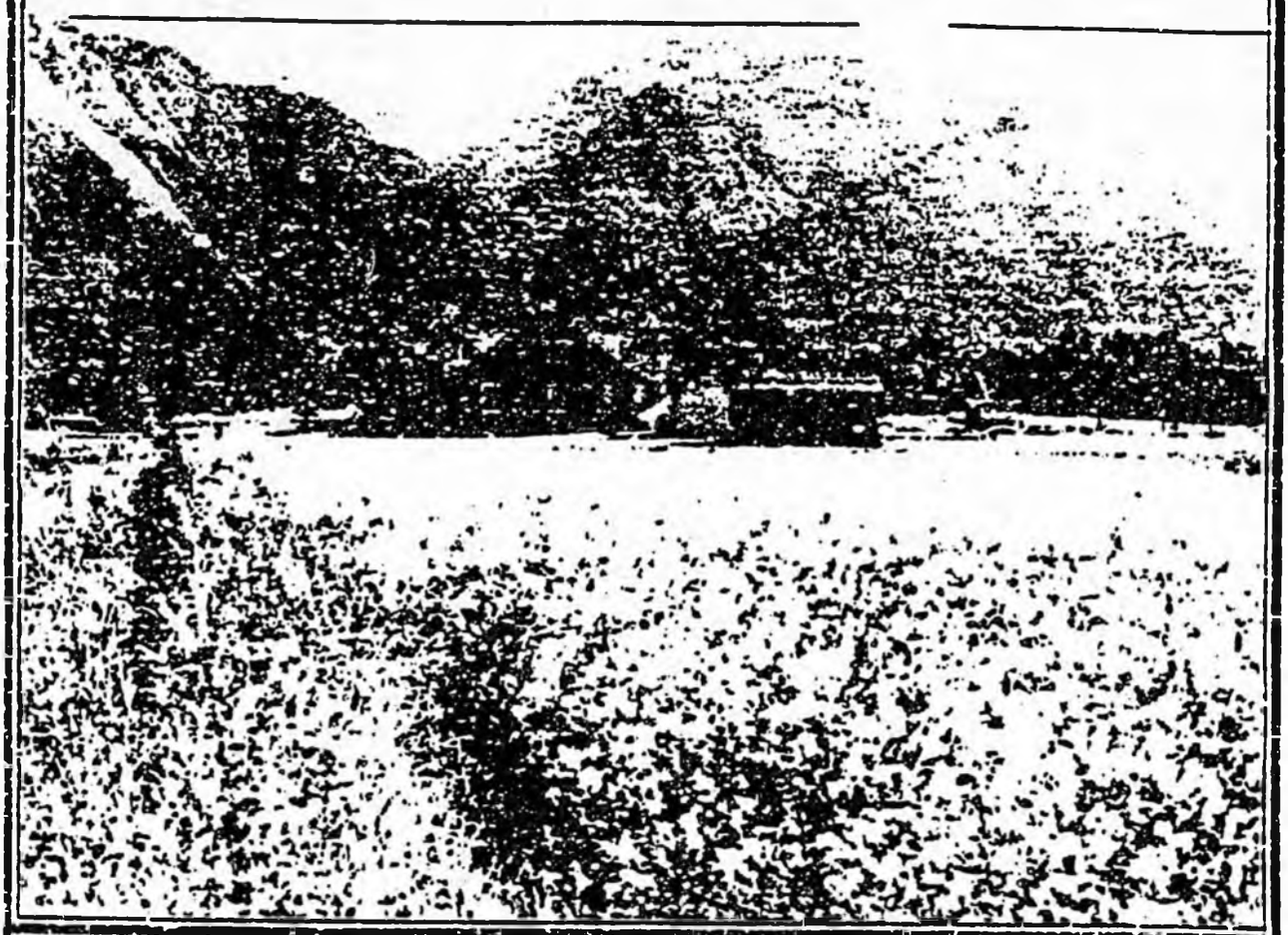
THE FOLLOWING DOCUMENT HAS

NOT BEEN FILMED BUT IS

AVAILABLE IN THE ORIGINAL

FILE

An Economic Assessment of Alaskan Agriculture



Department of Commerce
and Economic Development
Division of Finance and Economics
for
The Alaska Agricultural Action Council

December 1983

Potential For a Reindeer Industry in Alaska

by Edward L. Arobio*

Summary

The reindeer industry in Alaska is generally confined on or adjacent to the Seward Peninsula. Current estimates of the reindeer population on the Peninsula are between 20,000 and 27,000 head.

Reindeer graze on lands managed by the State of Alaska, the Bureau of Land Management, and the National Park Service. Annual permits are required from these agencies to graze reindeer.

Reindeer herding in Alaska is for most herders a part-time activity. Herds are extensively managed, graze over a wide area, and during much of the year, are left untended.

Products from reindeer herds include meat and antlers. Most meat is marketed in the local towns and villages of northwest Alaska. Antlers are harvested for foreign markets with the major markets in Korea, Taiwan, China, and Japan.

Range suitable for reindeer grazing in Alaska has been estimated at about 110 million acres. This area is along the coast from southwestern Alaska to the North Slope. However, institutional constraints probably limit reindeer herding in Alaska under extensive grazing operations to the Seward Peninsula and some coastal islands.

The Seward Peninsula can support additional numbers of reindeer when considering the availability of forage. Potentially, 50,000 to 75,000 head could graze the areas now under permit. Output from herds can increase through either additional herd numbers, more intensive management of herds, or both. Potential meat production resulting from increased numbers of animals and more intensive management have been estimated at between 475,000 and 800,000 pounds annually.

Markets exist in Alaska for additional outputs of meat. Markets for increased output of antlers may not exist without a decrease in prices received by herders for this product.

*Agricultural Economist, Alaska Agricultural Action Council/ Department of Commerce and Economic Development

Introduction

The reindeer industry in Alaska is generally confined on or adjacent to the Seward Peninsula. Current estimates of the reindeer population on the Peninsula are between 20,000 and 27,000 head. 8/3/ Grazing permits in this area are held by one Native regional corporation, one Native village corporation, and twelve individuals.*/ Additional herds in Alaska are located at the villages of Stebbins and Shaktolick, and on Nunivak, St. Lawrence, Hagemeister and Umnak Islands.

Herd Management

For the most part, reindeer graze on lands managed by the State of Alaska, the Bureau of Land Management, and the National Park Service. Annual permits are required from these agencies to graze reindeer. Only limited grazing now takes place on Native owned land. However, as the ownership of more lands is transferred to Native village corporations and Native regional corporations as a result of ANCSA, agreements will be needed between herders and these corporations if current grazing operations are to remain unchanged.

Reindeer herding in Alaska is for most herders a part-time activity. They view the herding of reindeer as only one of many annual activities. Herds are extensively managed, graze over wide areas, and during much of the year are left untended.

Products from reindeer herds include meat and antlers. Production figures for meat have not been available since 1977. During the period 1968-1977, data are available for eight of ten years.5/ Average production during this period was 246,000 pounds of carcass meat per year with an average value at $150,000. In recent years, annual production has probably maintained at least this level and may have expanded somewhat, due primarily to development of the NANA Corporation herd. This herd is the largest and most intensively managed herd on the Peninsula.

Currently, the more valuable reindeer product on a per pound basis is velvet (wet) antlers. These antlers are removed during handlings that take place from the middle of June to the middle of July. Again, data on the quantity of production has not been available since 1977. At that time approximately 15,000 pounds were harvested.5/ In that year, herders received between $8 and $23 per pound for wet antlers. In more recent years, herders have been received from $30 to $40 per pound. Based on 15,000 pounds of annual production, the value of the antlers would range between $450,000 and $600,000.

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*/The herding or reindeer in Alaska is limited to Native peoples of the State.

Information on the returns to reindeer herd operations are limited. However, a recently published article estimated costs and returns for three herd sizes[6/] (Table 1). These were based on herds that were managed on a part-time basis.

Table 1. Annual Cost of Production and Returns for Extensively Managed Alaskan Reindeer Herds, 1977.

Item	Size of Operation		
	1,000	2,000	3,000
Investment	$105,000	$205,000	$305,000
Cash Revenues	24,300	48,640	70,700
Cash Expenses	20,900	31,600	41,600
Depreciation	500	500	500
Interest on Capital at 6%	6,300	10,300	18,300
Return to Owner Labor and Management	<$3,400>	$4,240	$12,560

Source: Thomas, W.C., E.L. Arobio, L.L. Naylor, and R.O. Stern. 1983. An Alternative Management System for Alaska Reindeer Herds. Agricultural Systems 11: 1-6.

Marketing

Because of the limited production of meat from Alaskan herds, most meat is marketed in the local towns and villages of northwest Alaska. Meat marketing has traditionally been done by the individual herd owner. The reindeer are normally slaughtered in the field and field dressed. The meat then moves to the villages and can be distributed as wage-meat payments, direct sales to village residents, or sales to village stores. Larger herd owners also make sales to stores in Nome and Kotzebue. Small quantities occasionally do move to Anchorage or Fairbanks and at times have gone to the "Lower 48".

Antlers are harvested for foreign markets. The normal procedure is for herders to sell the harvested antler on a wet basis to buyers just after harvesting. The buyers will then dry and process the antlers and export the product for use in oriental medicines. Contrary to popular belief, deer antlers, including reindeer antlers, are not used as aphrodisiacs but as medicines. The major markets for antlers are located in Korea, Taiwan, China, and Japan.

While it is likely that meat production can be expanded without the price to the producer suffering, the situation is different for antlers. Reindeer antler is only one of several types of deer antlers that are used in Oriental medicines. Reindeer antlers, because their use only began in the early 1960s, have a limited history and are not considered by buyers to be the best antler. In addition, reindeer antlers suffer from intense competition from other countries.

The leading antler exporting country in the world is New Zealand. Most of the antler coming from New Zealand is harvested from Red Deer. The antler from Red Deer is considered superior to reindeer antler. Deer in New Zealand are raised in a controlled situation and instead of grazing freely on an open range, they graze in fenced pastures, free from predators. By the mid 1980s, deer herds in New Zealand may total 500,000 head.[4/]

It has been estimated that Alaska has less than one percent of the possible worldwide production of deer antlers.[4/] For this reason and because reindeer antler is considered inferior to other types, the price for reindeer antlers received by Alaskan herders may suffer a long-term decline if antler production from Alaskan herds is expanded significantly.[7/] Long-term growth in output from Alaskan herds will have to be based on meat production.

References

1. Arobio, E.L., W.C. Thomas and W.G. Workman (1980). Mathematical programming for considering management options in Alaska reindeer herding. In: Proceedings of the 2nd International Reindeer/Caribou Symposium. (Reimers, E., E. Gaare and S.Skejenneberg (Eds)), 690-9.

2. Collins, W. Assistant Professor of Range Management. Agricultural Experiment Station, University of Alaska. Personal Communication.

3. Epps, A.C. and W. C. Thomas, Reindeer (1983). In: Alaska's Agriculture and Forestry Potential. In press.

4. Luick, J. R. (1980). Velvet antler: placebo, panacea, or passing fancy? In: Proceedings of the 2nd International Reindeer/Caribou Symposium. (Reimers, E., E. Gaare and S. Skejenneberg (eds)), 798-799.

5. Stern, R.O., E.L. Arobio, L.L. Naylor and W.C. Thomas (1980). Eskimos, Reindeer and Land. Agricultural Experiment Staton, University of Alaska, Fairbanks. Bulletin 59.

6. Thomas, W.C., E.L. Arobio, L.L. Naylor and R.O. Stern (1983). An Alternative Management System for Alaska Reindeer Herds. Agricultural Systems 11:1-6.

7. Thomas, W.C., E.L. Arobio (1980). Reindeer antler marketing: a preliminary analysis of the processing and marketing aspects of the Alaska reindeer antler industry. contract No. CC08-9179. Report prepared for the Alaska Department of Commmerce and Economic Development.

8. Thomas, W.C. and E.L. Arobio (1983). Public policy and the future of Alaska's reindeer industry. Agroborealis. 15:61-65.

THE FOLLOWING DOCUMENT HAS

NOT BEEN FILMED BUT IS

AVAILABLE IN THE ORIGINAL

FILE

ESKIMOS, REINDEER AND LAND

by
Richard O. Stern, Edward L. Arobio, Larry L. Naylor
and Wayne C. Thomas

Agricultural Experiment Station
School of Agriculture and Land Resources Management
University of Alaska

James V. Drew, Director

Bulletin 59

December, 1980

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CHAPTER VII

MARKETING OF REINDEER PRODUCTS

This chapter is concerned with the marketing of reindeer products. Topics to be discussed include the marketing of reindeer meat, the marketing of velvet antler, and the combined value of all reindeer products sold or used in the home by herd owners. In our discussion of reindeer meat marketing, we will consider the time of year and methods by which reindeer are slaughtered and meat distributed, the quantity and value of the reindeer meat produced in Alaska and the Seward Peninsula from 1960 to 1977, the prices received by herd owners for carcass reindeer meat, and the protein contribution of reindeer meat to residents of northwest Alaska. The analysis of velvet-antler marketing will focus on antler-harvesting procedures, a summary of prices received by herd owners for this product over the last several years, and the quantity and value of velvet-antler production in Alaska for the years 1975-1977. The last major topic, value of reindeer products, describes the quantity and value of all reindeer products produced from all Alaska reindeer herds between 1972 and 1977 and gives the quantity and value of reindeer product sales from the Seward Peninsula for 1975-1977.

Marketing of Reindeer Meat

Through 1977, the main product from Alaska reindeer herds in terms of quantity and value of production was carcass reindeer meat. In 1977, Alaska reindeer herd owners produced 312,000 pounds of dressed reindeer meat and sold 256,000 pounds (Alaska Crop and Livestock Reporting Service, 1978). The remaining 56,000 pounds were used by herd owners in the home and as payment for labor used during normal herd operations. The main source of carcass reindeer meat is steers, although some bulls, cows, and calves are included in any year's total production. The bulk of the slaughtering activity occurs in October through February. A variable number of reindeer can be slaughtered throughout the year, however. Although a reindeer carcass can weight 150 pounds and more, the total recent production figures for Alaska indicate an average of approximately 120 pounds per carcass. (This average weight is based on field observation, individual herd records, and the U.S. Department of the Interior, BIA, Annual Land Operation Reports 1960-1971.)

Marketing Methods

In 1977, all herd owners on the Seward Peninsuala butchered and marketed their own reindeer, with the exeption of two who sold live reindeer and the buyers butchered and marketed these reindeer. An estimated 80 to 90 percent of the reindeer meat sold in the past few years from Seward Peninsula herds has been consumed within the region. The remaining reindeer meat produced in recent years has gone to Anchorage and the "lower 48 states." That portion going to Anchorage has been used in the making of sausage while the meat going to the "lower 48" has been marketed as a specialty meat.

All slaughtering of reindeer on the Seward Peninsula is done in the field. Even those reindeer carcasses that will leave northwest Alaska, and which therefore must be government inspected, are killed in the field and then brought to the Nome reindeer slaughter plant for inspection. The majority of slaughtering takes place during the winter months when herders have a mobility advantage over the reindeer. With the use of snow machines, herders can move faster than reindeer over the snow-covered ground. Two other reasons account for the slaughtering of reindeer during winter months. First, if the slaughtering can be accomplished during the first part of winter, the reindeer will be in their best condition following summer weight gains. Second, slaughtering in subfreezing temperatures quickly freezes carcasses for delivery to buyers. For these reasons, most of the reindeer slaughtering takes place from October through February. Slaughtering does occur at other times of the year on a limited basis, mainly for the owner's home consumption. The exact time when each herd butchers depends on individual preference, the location of the reindeer, weather, and availability of labor.

As has been noted before, the production from individual herds is distributed in a number of ways (Olson, 1969). At the village level, reindeer meat is distributed: 1) as wage-meat payments; 2) as sales to village residents; and 3) as sales to village stores. Owners of the larger herds also sell meat to the region's two largest population centers, Nome and Kotzebue.

The first of the village distribution channels involves wage-meat payments and herd owner home use. Many village residents receive part of their yearly meat supply by working for a herd owner at handlings or butcherings and receiving reindeer meat as payment in lieu of cash. Herd owners value reindeer meat as wages at current market price. But often herd owners will "overpay" workers by providing them with more meat than they have earned by their time

actually worked. An explanation for this behavior is herd owners acting as village *umialiks*. (See Chapter VI).

Reindeer herds on the Seward Peninsula are based at the villages of Shishmaref, Wales, Brevig Mission, Koyuk, Golovin, Teller, Deering, and Buckland, and at the towns of Nome and Kotzebue. The population of the villages is estimated to total 1,233 people. In 1976, approximately 400 reindeer carcasses were used by herd owners in these villages specifically for home consumption and labor payment. The per capita consumption from this method of distribution amounted to approximately .32 reindeer carcass (39 pounds) per village resident.

A second method of village distribution is sales directly to village residents. In one instance in the summer of 1977, this took the form of a herd owner taking orders for reindeer meat from the back of a pickup truck as he was bringing the carcasses of four or five reindeer into the village. Through August of 1977, herd owners were selling reindeer meat to village residents for 85 cents per pound.

A final type of village distribution is the sale of carcasses to village stores. These stores usually sell reindeer meat as sides or quarters and ten cents per pound is added to the price exacted by the herd owner as a handling charge. In 1976 and the first half of 1977, this produced a price at village stores of 95 cents per pound. Villages stores generally have reindeer meat only during the winter months since they have little or no cold storage facilities. It is doubtful if reindeer meat would be available in the summer even if more storage were available. There are basically two reasons for this. First, it is difficult to slaughter reindeer in the summer because of the problems in getting close to them, and second, reindeer are in the best condition for slaughter in the first part of winter.

Herd owners with less than 1,000 reindeer generally distribute all their reindeer meat in the village through either home consumption, wage-meat payments, sales to village stores, or sales to village residents. Larger herd owners, besides using these same channels, also sell reindeer meat to the two population centers of northwest Alaska: Nome and Kotzebue, and at times also make sales out of the region. In 1976, Nome stores sold approximately 100,000 pounds of reindeer meat, while stores in Kotzebue sold approximately 54,000 pounds of reindeer meat. During the winter of 1976-1977, reindeer retail cuts sold for approximately $1.70 per pound as stew meat, $1.90 per pound as shoulder cuts, and $2.00 per pound as hind cuts in Nome and Kotzebue. Prices for a competing source of protein in Nome, Alaska, were given in the March 1977 *Quarterly Food Price*

Index. They were $2.99 per pound for beef round steak, $2.04 per pound for beef chuck roast, and $1.79 per pound for beef hamburger (Thomas, 1977). As with village stores, reindeer meat is generally available only in Nome and Kotzebue stores during winter months. These stores would like to carry reindeer meat on a year-round basis; however, production is not large enough to meet this desire. Freezer facilities in the towns are sufficient to hold a large supply of reindeer meat during the summer months. These towns are also not subjected to the frequent power outages which the villages experience.

In the winter of 1976-1977, in contrast to other owners, two herd owners marketed their excess reindeer as live reindeer, thus eliminating the the problems of buthering and making marketing arrangements. These two herd owners received $70 per head for these live reindeer. If the reindeer averaged 120 pounds per carcass, these owners received 60 cents per pound for the dressed meat. However, they did not pay any costs of slaughter. This marketing option may be currently available only to these two owners as they manage their herding operations on the one area of the Seward Peninsula which has a road system. This makes it relatively easy and inexpensive for meat buyers to reach the reindeer.

Alaska Reindeer Meat Production: 1960-1977

Total production, sales, and home and herd use of reindeer slaughtered by Alaska reindeer herd owners for the years 1960-1977 are provided in Table 18. This period was characterized by generally increasing production until 1968, at which time a general decline can be noted. From 1960 through 1968, except for the years 1962 and 1967, total production increased yearly. In 1968, total production amounted to 754,000 pounds of dressed reindeer meat, 608,000 pounds of sales, and 146,000 pounds of reindeer meat used in home and herd operations. During this same period, the value of production generally increased, with the value of production estimated to be $324,000 in 1968.

From 1969 through 1977, production generally declined with 1976 being the low point when only 286,000 pounds of production occurred: 234,000 pounds of sales and 52,000 pounds of home and herd use. In 1977, production rebounded over the previous year as 312,000 pounds of production was accomplished. The value of production followed the quantity of production through 1972. However, in 1973, although production was lower than the previous year, the value of this production was $16,000 greater. Again in

Table 18. Production and Sale of Reindeer Meat by Alaskan Reindeer Herders, 1960-1977.

	Total Production		Sales		Home and Herd Use	
Year	Pounds Dr. Wt.[a]	Value ($)[b]	Pounds Dr. Wt.[a]	Value ($)[b]	Pounds Dr. Wt.[a]	Value ($)[b]
1977	312	275	256	225	56	50
1976	286	243	234	199	52	44

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Table 18. Production and Sale of Reindeer Meat by Alaskan Reindeer Herders, 1960-1977.

	Total Production		Sales		Home and Herd Use	
Year	Pounds Dr. Wt.[a]	Value ($)[b]	Pounds Dr. Wt.[a]	Value ($)[b]	Pounds Dr. Wt.[a]	Value ($)[b]
1977	312	275	256	225	56	50
1976	286	243	234	199	52	44
1975	345	308	287	257	58	51
1974	300	205	220	150	80	55
1973	324	182	261	144	63	32
1972	328	166	239	121	89	45
1971	456	235	365	188	91	47
1970	615	300	479	241	136	59
1969	585	277	458	219	127	58
1968	754	324	608	260	146	64
1967	692	265	517	188	175	77
1966	701	249	546	190	155	59
1965	637	242	522	200	115	42
1964	660	254	504	195	156	59
1963	490	179	394	138	96	41
1962	482	182	372	139	110	43
1961	485	181	364	136	121	45
1960	450	180	330	132	120	48

[a] Dr. Wt. = Dress Weight (in thousands of pounds).

[b] (in thousands of dollars).

Source: Alaska Crop and Livestock Reporting Service 1973-1978.

1974, production fell but the value of the production increased over the previous year. The largest slaughter since 1971 occurred in 1975. This factor, combined with increased meet prices, raised the value of reindeer meat produced in Alaska to $308,000, a figure only exceeded by the value of the 1968 production. The 1968 slaughter was 409,000 pounds greater than the quantity of reindeer meat produced in 1975. In both 1976 and 1977, meat production was below the level of 1975 with per pound carcass meat values remaining relatively stable in these years.

As with total reindeer numbers in Alaska, the overall decline in reindeer meat production between 1960 and 1977 was caused largely by the decline of the Nunivak Island reindeer herd, instead of a general decline in reindeer numbers in all areas of Alaska. In 1960, the Nunivak herd totaled 16,000 reindeer, of which 1,625 were butchered. In 1964, this herd totaled 13,200 reindeer, and of this number 2,826 were butchered; while in 1968 the herd totaled 10,200 and 1,749 reindeer were butchered. However, in 1976, this herd had decreased to 4,000 reindeer, of which only 301 were butchered. The 1977 slaughter consisted of 187 reindeer. If these carcasses averaged 120 pounds, Nunivak accounted for 195,000 pounds of the reindeer meat slaughter in Alaska in 1960, 339,120 pounds in 1964, 209,880 pounds in 1968, 36,120 pounds in 1976, but only 22,440 pounds in 1977.

Seward Peninsula Reindeer Meat Sales: 1960-1977

Reindeer meat sales by herds on the Seward Peninsula for the years 1960-1977 are given in Table 19. This table does not include the reindeer meat used by herd owners in home and herd operations. (Except for 1976, home and herd operation information has not been available since 1971. In 1976, approximately 400 carcasses [48,000 pounds] were used for these purposes.) The quantity of meat sales by Seward Peninsula herds did not decline from beginning to end for the period 1960-1977, although a decline was seen in production by Alaska reindeer herds as a whole. This occurred because reindeer numbers have remained relatively constant on the Peninsula since 1960, varying from a high of 22,168 in 1966, to a low of 16,369 in 1968. In 1976, the estimated number of reindeer was 17,425; while in 1977, reindeer were estimated at 17,800 animals.

The value of reindeer meat sales on the Seward Peninsula showed an overall increase during this period. In 1960, the value of

Table 19. Reindeer Me
1960-1977.

Year	Est. No. Reinc on Seward Pe
1977	17,800
1976	17,425
1975	20,600
1974	n/a[b]
1973	17,397
1972	19,828
1971	n/a
1970	20,292
1969	17,009
1968	16,369
1967	18,795
1966	22,168
1965	18,944
1964	20,449
1963	18,880
1962	17,940
1961	16,405
1960	18,529

[a]Carcasses assumed t
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[b]n/a = data not availal

Sources: U.S. Dept.
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Table 19. Reindeer Meat Sales by Seward Peninsula Reindeer Herders, 1960-1977.

Year	Est. No. Reindeer on Seward Pen.	Number Carcasses Sold	Pounds Meat Sold	Value (dollars)
1977	17,800	1,974	236,920[a]	201,380
1976	17,425	1,820	218,400[a]	185,640
1975	20,600	1,766	211,920[a]	158,940
1974	n/a[b]	1,164	139,680[a]	97,776
1973	17,397	n/a	n/a	n/a
1972	19,828	n/a	n/a	n/a
1971	n/a	2,263	271,560	141,211
1970	20,292	2,168	260,160	130,080
1969	17,009	1,792	215,040	103,219
1968	16,369	3,505	420,600	176,652
1967	18,795	2,434	292,080	105,148
1966	22,168	2,790	334,800	113,832
1965	18,944	1,527	183,240	69,631
1964	20,449	1,266	147,120	51,492
1963	18,880	1,043	125,160	46,309
1962	17,940	1,339	160,680	59,229
1961	16,405	912	109,440	40,492
1960	18,529	688	82,560	38,064

[a]Carcasses assumed to average 120 pounds, actual figures not available.

[b]n/a = data not available.

Sources: U.S. Dept. of the Interior, BIA, Annual Land Operation Reports 1960-1971, Alaska Crop and Livestock Reporting Service 1973-1978, Reindeer Herders, BLM Case Files.

reindeer meat sales to herd owners on the Seward Peninsula amounted to $38,064. In 1977, the value of reindeer meat sales was estimated at $201,380, the highest value in all the listed years.

Price Received by Herders: 1960-1977

The average price per pound received by Alaska reindeer herd owners for reindeer meat for the years 1960-1977 is provided in Table 20. From 1960 through 1968, the price per pound remained

Table 20. Price per Pound Received by Herd Owners for Reindeer Meat, 1960-1977.

Year	Price per Pound (cents)	Year	Price per Pound (cents)
1977	85[a]	1968	42
1976	85	1967	36
1975	75	1966	34
1974	70	1965	38
1973	55	1964	35
1972	51	1963	37
1971	52	1962	37
1970	50	1961	37
1969	48	1960	40

[a]January-August.

Sources: U.S. Dept. of the Interior, BIA Annual Land Operation Reports 1960-1971, Alaska Crop and Livestock Reporting Service 1973-1976, Reindeer Herders.

relatively stable, averaging 37 cents per pound. In 1969, the price rose 6 cents over the 1968 price of 42 cents. In the period 1970-1973, the price rose slowly, reaching 55 cents in 1973. The period from 1974-1977 was one of rapid changes. The 1974 price rose 15 cents. In 1975 and 1976, the price rose 5 cents and 10 cents, respectively, over the preceding year. In 1976, herd owners received 85 cents per pound for their reindeer meat. This price prevailed until the end of August, 1977.

There are a number of reasons suggested in economic theory for the increase in price received by Alaska reindeer herd owners for carcass reindeer meat (Burk, 1968). The following factors have tended to increase the consumer demand in northwest Alaska:

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Protein Contribution

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population growth in the region, increased earned incomes of region residents, increased transfer payments such as food stamps, a perceived preference for reindeer and caribou meat, general price increases of substitutes for these meats, and the demise of the Western Arctic Caribou Herd. In 1974, the NANA Regional Corporation estimated that the region's residents consumed 14,000 caribou annually (Mauneluk Association, Inc., 1974). During the winter of 1976-1977, state-imposed hunting restrictions limited the harvest to 3,000 caribou. On the supply side, supplies of reindeer in northwest Alaska, as evidenced by numbers of animals annually slaughtered, although showing some variation up and down, have remained relatively stable since 1969, averaging an annual sale of 1,835 carcasses from Seward Peninsula reindeer herds. Increasing demand with a comparatively stable reindeer supply has put upward pressure on prices.

Protein Contribution of Reindeer

As noted earlier, the per capita consumption of reindeer meat on Seward Peninsula from wage-meats (400 carcasses) in 1976 was .32 carcasses per village resident per year (1,233 residents in the eight villages with herds) or approximately 39 pounds of reindeer meat. Sales to village residents and to village and town stores totaled approximately 1,550 animals in 1976, which, at an average of 120 pounds each, would represent some 186,000 pounds of meat. Combining the town (Nome and Kotzebue) population figures with those of the villages (6,249 people, 1975 figures) and totaling all reindeer meat consumed regardless of by what means it was obtained (approximately 234,000 pounds), yields a per capita consumption figure of 37 pounds for the Seward Peninsula. Thus, per capita consumption of reindeer meat in the towns and in the villages on Seward Peninsula from both wage-meats and purchases was about equal.

The figures for the villages reflect the payment of meat as wages to villagers. In the towns, there are few people who earn reindeer meat in this manner. Additionally, the figures for Nome and Kotzebue reflect a higher percentage of non-Natives in the population than do the figures for the villages. The non-Native buyers are probably following meat consumption patterns developed in the "lower 48," so they buy the customary meats rather than reindeer, which is a novelty to them. This implies that the per capita Native consumption of reindeer meat in the towns may actually be higher than in the villages. Part of the reason may be that people living in villages have a greater opportunity to obtain other traditional foods.

Recent studies of the impacts of Eskimo acculturation in terms of diet are reported by Draper (1977). Although direct comparisons are not possible, there exists the high probability that Seward Peninsula villages are roughly comparable to Wainwright and Point Hope, where data are available. At these villages, a study of diet in 1971 and 1972 concluded that:

> • Wainwright adults obtained nearly half of their calories from native sources and about three-quarters of their protein. At Point Hope, where dietary acculturation is more extensive, less than one-quarter of the calories in the adult diet were obtained from indigenous foods, which nevertheless provided over half of dietary protein. The proportion of native foods in the diet of children, on the average, was about half that in the diet of adults. (Draper, 1977).

Since caribou were present near both of these villages in the two years studied, we assume that they made up a portion of the diet. Caribou and reindeer are virtually identical in composition and nutritive value (University of Alaska, 1973). Granted these assumptions and having already indicated that there is a high per capita consumption of reindeer on Seward Peninsula, it is suggested that reindeer represent a significant contribution to the protein intake and, consequently, the overall health of the Seward Peninsula population.

Table 21 is presented to show comparative nutritional data for reindeer and other meat products. A comparison of the figures in Table 21 shows that reindeer is a high-protein, red-meat source, low in fat and high in calories. Its lower cost relative to these other meats has been discussed. Coupled with the fact that it is a locally desired product, one can see the value of reindeer meat as a protein source for northwest Alaska.

The study by Draper (1977) contains implications for the health of the residents of this region.

> While the primitive Eskimo was beset by serious nutritional crises, these problems arose not from deficiencies in the quality of his native diet but from periodic breakdowns in his food supply as a result of natural forces. . . . He ate a balanced diet for one simple reason: there was little else to eat. The modern Eskimo has for the first time the opportunity to make significant food choices. Presented with an array of exotic new foods which he is not equipped by personal experience or education to evaluate, he tends to

Table 21. Composition of Foods, 100 Grams, Edible Portion.

Meat	Moisture (percent)	Food Energy (calories)	Protein (grams)	Fat (grams)

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Table 21. Composition of Foods, 100 Grams, Edible Portion.

Meat	Moisture (percent)	Food Energy (calories)	Protein (grams)	Fat (grams)
Beef, Good Grade, raw, 100% lean[a]	72.1	139	21.8	5.1
Chicken, light meat without skin, raw[a]	73.7	117	23.4	1.9
Pork, fresh, carcass, raw, fat class (total edible 41% lean, 59% fat)[a]	33.4	553	9.1	57.0
Reindeer, raw flesh [b]	70.1	117	26.6	1.2

[a] Data from Watt et al., 1963:Table 1.

[b] Data from University of Alaska, 1973.

Harvesting of Reindeer Antler

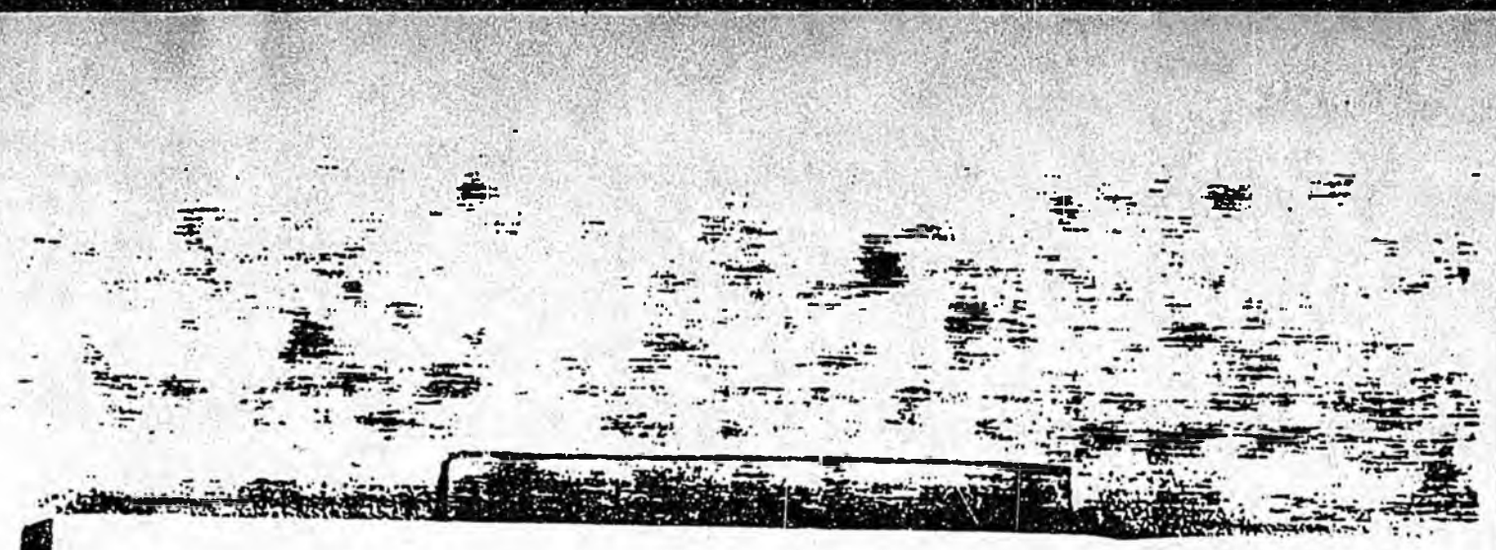
Velvet antler can be harvested only at summer handlings. In order to overcome the traditional difficulties of summer herding, the herds are now driven into the corrals for antler harvesting by a helicopter swinging back and forth behind the reindeer. This is a faster method than the herding on foot which was used until a few years ago. Once a herd is corralled, the reindeer are pushed single file through a chute at the end of the corral. As each adult reindeer moves through the chute it is held by four men and most of its antler is removed using a hand-held cutter. A rubber band is twisted around the remaining antler to prevent excessive bleeding. The smaller calf antlers are left intact.

Antler is harvested at the end of June or during the first part of July because it is during this period that the antler is most desirable: it is the largest size possible, but the inside of the antler still has a spongy texture. If the antler is allowed to continue to develop, it eventually becomes completely ossified. For this reason, antler buyers prefer not to purchase antler after the middle of July.

Price History

The price per pound received by reindeer herd owners for velvet antler has increased steadily in recent years. In 1969, herd owners received $1.00 per pound. In 1972, the price rose to $3.50 per pound; in 1975, to $4.32 per pound; and by 1976, the price had risen to $5.58 per pound. These price increases likely are a result of additional buyers attempting to purchase reindeer antlers. In 1977, two different prices were received. Except for one herd, all owners on the Seward Peninsula were under a multiyear contract and received $8.00 per pound. One herd received $23.76 per pound for its velvet antler production in 1977, the result of competitive bidding.

The sale of reindeer velvet antler has become an increasingly important source of income to Alaska reindeer herd owners. Based on information supplied by buyers and herd owners, the pounds and the value of sales for all Alaska reindeer herds for the years 1975-1977 are presented in Table 22. During these three years the quantity sold remained relatively stable. Price received, however, increased yearly, to where, in 1977, the value of sales more than doubled the 1975 level. The Seward Peninsula (Table 23) accounted for all sales



of velvet antler from Alaska for the years 1976 and 1977. In 1975, antler sales from Nunivak Island accounted for $5,310 (8 per cent) of total sales.

Table 22. Velvet Antler Sales – Alaska, 1975-1977.

Year	Pounds	Sale Value
1977	15,037	$171,673
1976	13,661	79,085
1975	15,058	65,829

Table 23. Velvet Antler Sales – Seward Peninsula, 1975-1977.

Year	Pounds	Sale Value
1977	15,037	$171,673
1976	13,661	79,085
1975	14,173	60,519

Value of Reindeer Products

In 1977, the value of sales and home use of reindeer products from all Alaska reindeer herds was estimated to total $471,000 (Alaska Crop and Livestock Reporting Service, 1978). Of this total, 95 percent ($446,673) was derived from reindeer meat and velvet antler. Five percent ($24,327) came from the production of hides, leggings (lower leg skins used for making mukluks), and meat byproducts. On the Seward Peninsula, the value of the 1977 meat and antler sales was estimated to total $373,053.

The value of all reindeer products produced in Alaska for the years 1972-1977 is presented in Table 24. This production value includes reindeer meat and meat byproducts, velvet antler, and reindeer hides and leggings. It includes meat and meat byproducts used in the home and/or for herd operations. For the years 1972-1977, with the exception of 1977, the total value of all production increased yearly. This increased value was due largely to increased prices for reindeer meat and velvet antler. Reindeer meat production from all Alaska herds actually showed a downward trend in the years 1972-1977, as was discussed previously.

The value of reindeer meat sales and velvet antler sales on the Seward Peninsula for the years 1975 through 1977 is provided in Table 25. (This table was constructed with data from interviews gathered by interviewing herd owners and antler buyers, and the examination of BLM case files.) The value of hides and meat byproducts is not available, but likely accounted for only an additional four to five

Table 24. Value of Re

Year	Reindeer !
1977	$275,00(
1976	243,00(
1975	308,00(
1974	205,00(
1973	182,00(
1972	166,00(

[a]Includes sale of live re
Source: Alaska Crop a

Table 25. Value of Rei
1975-1977.

Year	Reindeer M
1977	$201,3
1976	185,6
1975	158,9

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Antler Sales –
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Table 24. Value of Reindeer Production-Alaska, 1972-1977.

Year	Reindeer Meat	Antler, Hides and Meat Byproducts	Total
1977	$275,000	$196,000	$471,000
1976	243,000	258,000[a]	501,000
1975	308,000	83,500	391,500
1974	205,000	60,000	265,000
1973	182,000	34,000	216,000
1972	166,000	49,000	215,000

[a]Includes sale of live reindeer.
Source: Alaska Crop and Livestock Reporting Service 1973-1978.

Table 25. Value of Reindeer Product Sales – Seward Peninsula, 1975-1977.

Year	Reindeer Meat Sales	Antler Sales	Total
1977	$201,380	$171,673	$373,053
1976	185,640	79,100	264,740
1975	158,940	60,500	219,440

per cent of total value. Sales in 1977 were $108,313 greater than in 1976, an increase of 41 per cent. Most of the increase was due to higher antler prices between 1976 and 1977. Antler production increased by approximately ten per cent while the value of antler production rose by $92,573, a 117 per cent increase.

ALASKA'S AGRICULTURE AND FORESTRY

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CHAPTER 12

ANIMAL PRODUCTION: REINDEER

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Reindeer are the semidomestic form of the animal *Rangifer tarandus* (12). The wild animal native to North America is called caribou. Although some behavioral and morphological characteristics are identifiable between the two, there are relatively few differences, and cross-breeding does occur.

HISTORY AND LAND POLICY

Reindeer were first introduced into Alaska in 1891 by Reverend Sheldon Jackson for the avowed purpose of providing a food base for Native inhabitants (12). From 1892 through 1902, the United States government continued to import reindeer from Siberia, until there were some 1,300 deer (12). The policies on reindeer from their introduction into Alaska through 1914 were primarily determined by Jackson, who was General Agent for Education in Alaska for the Department of Interior's Bureau of Education until 1906. Reindeer ownership was largely confined to the bureau, various missions, the Eskimos, and a few Lapps who had been brought to Alaska to train Eskimos in herding (12).

A period of commercialization of reindeer by non-Native owners from 1914 up through 1939 ended following passage of the 1937 Reindeer Act, which restricts ownership of reindeer to Alaskan Eskimos, Indians, and Aleuts (12). Some statistics show that during this period, reindeer increased in Alaska to an estimated 640,000 animals in 1932 (12) and then dropped to approximately 250,000 head by 1940, but old-timers feel that a high of 640,000 animals is inflated; their count is 440,000 head (10). Numbers continued to decline through the 1950s and 1960s into the 1970s; they dropped to 18,000 in 1977 (12). The reasons for these declines are complex and interrelated. Biological factors were range deterioration, at least in some locations; disease; and predators. Economic factors were job opportunities which replaced herding and a concerted effort by national cattle interests to limit market penetration of reindeer meat. In addition, herding was not a cultural norm for the Alaskan Eskimo.

Until 1971, the only land manager on the Seward Peninsula was the Bureau of Land Management (BLM), U.S. Department of Interior. Change began with passage by the U.S. Congress of the Alaska Native Claims Settlement Act in 1971 (16). This allowed Alaska Native people to select and obtain land ownership from the Federal government. The act also directed the Federal government to study and indicate for possible retention lands with national interest. The 1980 Alaska National Interest Lands Conservation Act (ANILCA) (17) does just that. Relative to the Seward Peninsula, these two Federal statutes created new land managers: the National Park Service (NPS); Fish and Wildlife Service (FWS); the NANA Regional Corporation and the Bering Straits Regional Corporation; and numerous village corporations or groups. The State of Alaska became the fourth new land manager by virtue of its land selection rights under the 1959 Alaska Statehood Act.

These groups, along with retained BLM land management, control the range resource of the herd owners. Some of the herders are faced with the multi-agency management of their single range. There could be

benefits or losses if differential fees were charged by the various land management groups. At present, coordination in land management is apparent through cooperative arrangements made by the public agencies, BLM, NPS, FWS, and the State government. The major way that government land policy can be benign to the industry is through continued coordination [14].

RANGE

Alaska's rangelands fall into three general subcategories: [1] semidomestic livestock (reindeer, musk oxen, and bison); [2] domestic livestock (cattle, sheep, goats, horses, etc.); and [3] wildlife (moose, caribou, wild sheep, bison, muskoxen, deer, wild goats, and elk). The latter category will not be dealt with in this discussion because current practices and policies are for wild lands ranging and sport harvest of animals rather than for scientific optimization of the grazing potential of these rangelands. This societal choice of sport hunting over optimum grazing utilization and meat production impacts certain semidomestic and domestic livestock operations and has a major influence on the potential of reindeer.

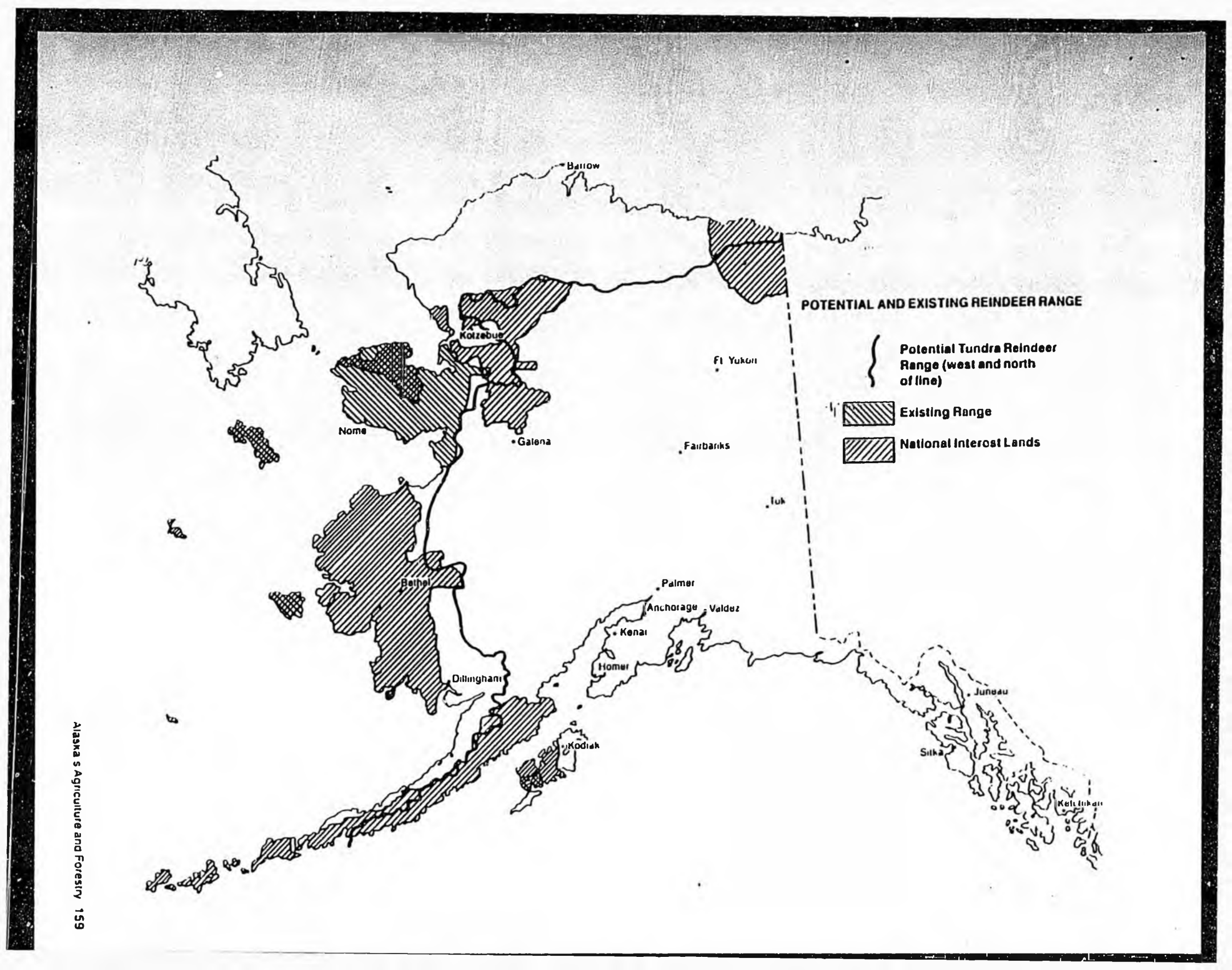
Potential reindeer ranges encompass some 220 million acres [11], with about one-half usable under current management techniques. These are located along the coast from southwestern Alaska to the North Slope. Institutional constraints [17] reduce this significantly to some 13 to 14 million acres, primarily on the Seward Peninsula and on Nunivak Island. [See accompanying map.]

Domestic livestock ranges are estimated to encompass some 18.6 million acres statewide [11], but institutional constraints [16] reduce this figure to less than five million acres, of which maybe one million acres should be managed exclusively for range values, while the remainder has multiple agricultural values. Less than 75,000 acres [11] of this could be considered year-round range, and it is located on Alaska Native corporation lands and State lands on Kodiak Island and on the Aleutian Islands. Most of the range resources of Alaska are devoted to supporting wildlife species and encompass approximately 238 million acres [11].

Domestic livestock grazing is currently limited to operations that provide supplemental feed during most of the year. These operations are capital-intensive and require highly skilled management to be profitable. Because of the tight margin of profitability, they are found in the railbelt-highway areas where economical access to markets is available. As forage varieties and range and livestock management practices are modified and adapted to Alaska's environment, the domestic livestock industry may expand in the railbelt area.

The real potential for commercial utilization of

A portion of the reindeer herd owned by NANA Regional Corporation is pictured at Candle on the Seward Peninsula.

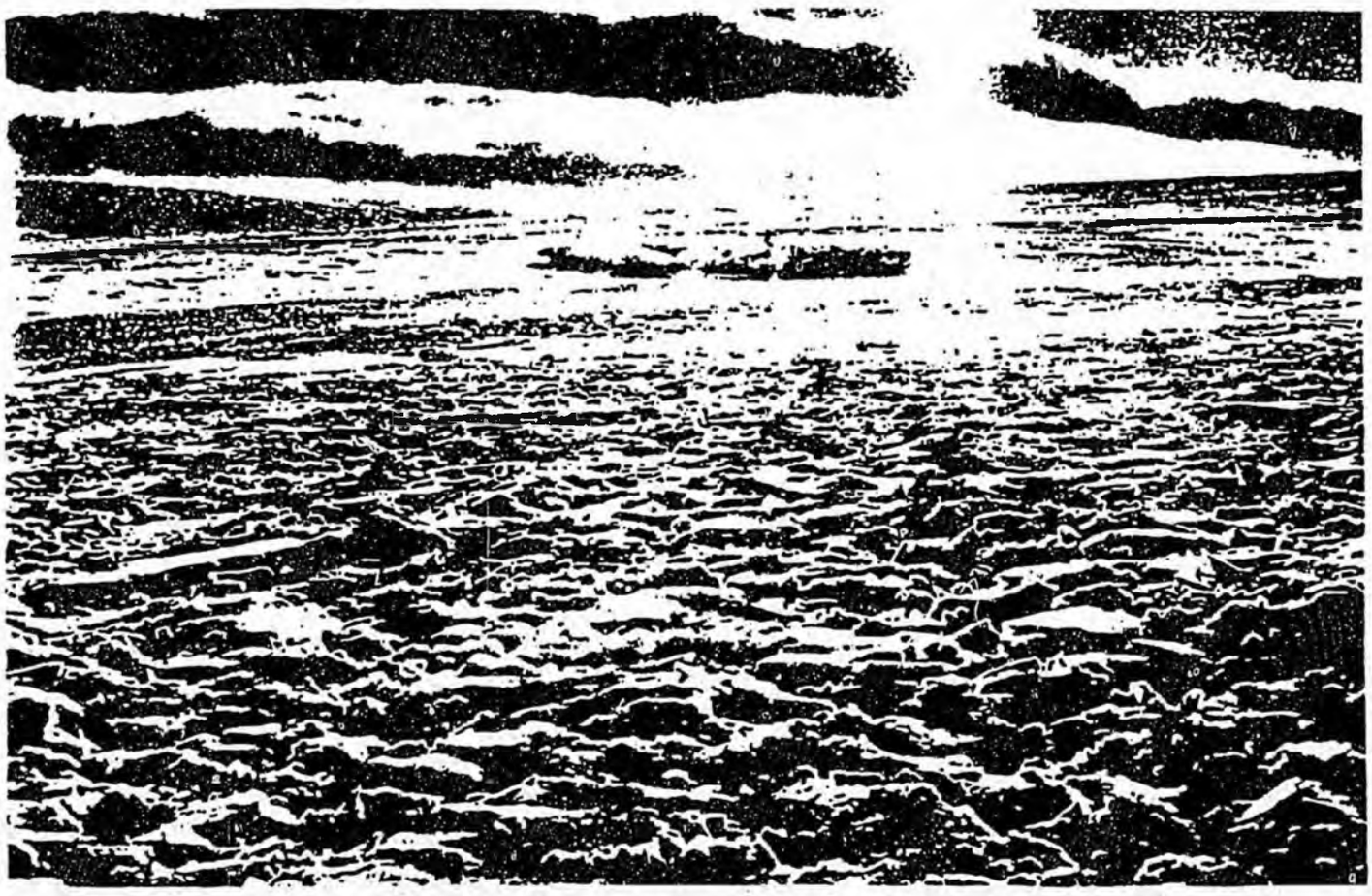

POTENTIAL AND EXISTING REINDEER RANGE
Potential Tundra Reindeer Range (west and north of line)
Existing Range
National Interest Lands
Barrow
Kotzebue
Ft Yukon
Nome
Galena
Fairbanks
Tok
Bethel
Palmer
Anchorage
Valdez
Kenai
Homer
Dillingham
Juneau
Kodiak
Sitka

rangelands in Alaska is not with common domestic livestock, but with animals that can utilize indigenous forages year-round and do not require supplemental feeding. The three major animals with these characteristics are the reindeer, the musk ox, and the bison. All three are exotic to Alaska, although they were either present in the recent past or have closely related species that are present. They are semidomesticated and require intensive herding to be commercially successful. The major limiting factors to commercial utilization of these animals tend to be more cultural than biological.

The reindeer industry has languished in neglect for the past 40 to 50 years and is just now beginning to rebound from its lowest point of some 18,000 animals in 1977 [12]. Real growth in reindeer numbers was recorded during 1982 [4], which reflects a renewed interest of herders and Alaska Native corporations. In addition, the University of Alaska has provided a significant component of technology input in the area of animal health through research and extension staffs.

With animal health problems rapidly being ameliorated, limitations to major expansion of the industry center around improving handling techniques and recognition by the public that the reindeer industry is a legitimate user of the range resource. The latter problem is of concern from a long-term perspective. The rangelands of western and northern Alaska are nonproductive to mankind without a grazing ungulate to convert cellulose into protein. Reindeer fill this need, but except for the western part of the Seward Peninsula and some offshore islands, they compete with wild caribou. The conflicts between reindeer and caribou along the eastern portion of the Seward Peninsula can be reduced by improved herding techniques and seasonal timing of range use. A continuing concern is the uncontrolled grazing of caribou on winter ranges, which decimates the range when caribou numbers become very large and is at least partially to blame for the typical cyclic growth and crash of Alaska's wild caribou populations. This limits reindeer utilization of the range in subsequent years, even after the caribou are gone.

It is estimated that the existing reindeer industry can grow three to four times in numbers of animals before utilization of their current range becomes a major limiting factor. When this occurs, society will have to decide whether utilization of these range resources is a priority for red meat production, optimizing the resource, or whether aesthetic and sport hunting uses are more important. If red meat becomes more important, the industry could increase an additional 20 to 30 times by expanding beyond the currently utilized reindeer ranges.



Reindeer can be herded to graze in areas of high quality winter range that carry some snow cover but are avoided by caribou.

REINDEER POTENTIAL VS. GAME AND NON-GAME SPECIES

Conflicts between reindeer and other wildlife have been discussed in generalities. Some of the specific conflicts that are present and will continue to influence individual as well as societal choices of range resource use are delineated as follows:

Caribou

Caribou are a continuing threat to the existing industry on the eastern Seward Peninsula. Klein [5] indicates that even under close herding, losses to migrating caribou cannot be avoided. The caribou/reindeer conflict is the major limiting factor for expansion of the industry in western and northern Alaska. This is because of a very protective attitude toward caribou by Federal and State agencies. The BLM position is that where there is conflict between these wild (caribou) and domestic (reindeer) animals of the same species, the agency will manage for the caribou [1, 3].

There is no question that these animals fit the same ecological niche. However, with proper management, time and geography can be used to separate reindeer and caribou so that we can receive the benefits of both. In addition to the losses of reindeer to passing caribou herds, disease and pests are mutually transferable. Because caribou tend to be site-selective feeders, they deplete the forage available to reindeer. This generally impacts localized areas of winter ranges that are blown clear of snow. Reindeer can be herded to graze in areas of high quality winter range which carry some snow cover but are avoided by caribou. Reindeer will excavate feeding craters in snow to a depth of about three feet, if icing is not a problem.

NANA, particularly in the past three years, has lost several thousand head of reindeer to the Western Arctic Caribou Herd. The only way reindeer herding can be feasible is to minimize this type of loss. One answer is better surveillance of the caribou, possibly through satellite tracking, in order to move affected reindeer herds before the caribou appear in the locale. A more extreme solution is to stop herding reindeer in conflict areas. As should be expected, both solutions have decided costs and benefits. The likely outcome is reduced emphasis in range use in the affected eastern boundary areas.

Musk oxen

Musk oxen were recently reestablished in Alaska. Indigenous stocks were exterminated before the turn of the century. The reintroduced animals are calving earlier and more often than their parent stocks in Canada, causing exceptional population increases. They tend to utilize riparian ranges year-round. These ranges play an important role in reindeer summer feeding, so there may develop direct competition as musk oxen continue to increase.

Moose

Moose have been expanding their range into areas that have not, during recent times, been utilized by moose. These animals are also increasing at a rapid rate in some areas. Moose are in direct competition with reindeer for forage, especially willow, which is one of the principal summer forages for reindeer.

Other grazers

Other grazers such as arctic hares, parka squirrels, and other rodents compete with reindeer for forage, but at present this competition is less well-defined than it is for musk ox and moose.

Predators

Predators have an impact on reindeer numbers by killing and eating them or by infecting them with rabies, a lethal disease. Predators include wolves, bears, foxes, and ravens that prey on newborn calves. The environmental concern for wolves tends to favor wolves over reindeer, particularly on Federal lands.

Waterfowl and shore birds

Waterfowl and shore bird nesting areas may restrict the expansion of the reindeer industry into most of southwestern Alaska because of the U.S. Fish and Wildlife lands found there. On many of these areas, the U.S. Fish and Wildlife Service is restricted by ANILCA [17] to manage for the purpose articulated in establishing the refuges. Where reindeer are mentioned, they are usually allotted areas under lease in 1976. To expand beyond these areas, reindeer grazing would have to be determined compatible with wildlife purposes of the refuge per national standards, which seems questionable.

PROBLEMS OF HERDING

The industry, through the Alaska Reindeer Herders Association, has been working closely with the University of Alaska on disease and insect problems. Reindeer

disease control research to date has centered on the elimination of bacterial-borne brucellosis, which is a major cause of calf abortion. Parasite research has focused on warble flies and bots, which reduce animal weight and destroy meat and hide quality.

A vaccine was developed and tested on 1,000 animals for brucellosis. Initial results are promising, and researchers are optimistic that the vaccine may eventually eradicate brucellosis in reindeer.

Eighteen thousand reindeer were treated with Warbex to kill warble fly larva, and dramatic weight increases in treated animals were observed as a result. A new, lower cost parasite drug, Ivermectin, is currently under test. This drug is a broad-spectrum treatment for internal parasites, and it should solve the warble fly and bot problem and others such as lungworm or tapeworm with one treatment.

The University of Alaska's Institute of Arctic Biology is conducting research and developing techniques to reduce or eliminate animal stress during reindeer handlings. Ear tagging of calves helps to determine animal mortality rate. Radio collars that emit special signals when the animal dies help to locate these animals for inspection.

Dr. Robert Dieterich, University of Alaska–Fairbanks veterinarian, uses a voice activated communication system to describe animal health during a reindeer handling at Nome.

Field techniques are being developed to determine what effect calf nursing behavior has on milk production and fawn growth. When the results of this study are combined with liveweight calf measurements, the results will tell the herder which management techniques are giving him the highest production and the best fawn growth rates.

The institute also conducts nutrition research on the use of supplemental and/or emergency reindeer feed. Alternative feeding studies have been directed toward the use of cereal grains for winter survival and summer fattening. Additional research is determining the effects of feeding cereal grains to reindeer over a long period of time.

A major issue revolves around the transition of the northwest Alaskan Eskimo culture from a subsistence-based lifestyle toward one that is employment-based. This is a particularly acute issue for reindeer herding, because the critical times of calving, summer insect harrassment, and rut occur during peak periods of subsistence activities—whaling, fishing, berry gathering, and hunting. Those herders who make a commitment to reindeer herding are doing well, and their herds are flourishing. More herders are choosing this course, which accounts, in part, for increased numbers of animals and a view toward expanding markets.

All activities that center around the reindeer industry have economic content. These include management and marketing. The type of economic decision associated with each activity depends primarily on the value judgements of the groups most affected. This point should become more evident with the ensuing discussion.

MANAGEMENT

Reindeer are managed, in large measure, with regard to the importance placed by the herd owner on the cash economy. If subsistence activities that compete for the herd owner-manager's time are viewed as more important than time spent with the herd, then a valid economic decision has been made which, in turn, generally will reduce the performance of the herd [9]. However, the increased price of antler in the world markets has led some herders to manage their animals more closely, with the likely outcome of less time for other activities [15].

Clearly, there are no right answers as to how herd management should be undertaken. However, substantial net economic benefits are possible under a more intensive management approach [6, 15]. To accomplish this requires change from more traditional ways of doing things, and this change is costly. Village interaction with

reindeer herding may be reduced because of the transition to Native corporation management or aggressive individual owner management (8).

The usual management approach is ranging reindeer in country where the major barriers are natural. Fencing is generally not done on reindeer ranges, and feed comes from unimproved grazing land. More intensive management of the herds would entail closer herding and rotational grazing to evenly utilize all accessible grazing areas.

An alternative to unimproved grazing is to develop some form of improved range or pasture. While it is common in the American livestock industry, serious commercial attempts of improved grazing for reindeer are not evident in past literature. The chief reasons are the high cost of range or pasture improvement and low productivity of lands near the current reindeer industry.

A third option is to feed reindeer in cattle-type feedlots. The reindeer could be raised under range conditions and then placed in a feedlot or bred and raised in the feedlot. Barley has been found to be a good feed to over-winter reindeer, and/or to fatten reindeer in the milder months just before slaughter (2). This approach may have some applicability where range is limited for economic, social, political, or biological reasons, such as in the lower Kuskokwim area. More study is necessary to determine the economic feasibility of placing reindeer in feedlots.

MARKETING

Meat marketing has traditionally been an activity carried out by each herd owner. The animals are slaughtered, field dressed, and then distributed in several ways. At the village level, the meat is marketed as (a) wage meat payments; (b) direct sales to village residents; and (c) sales to village stores. Larger herd owners also sell directly to regional center stores, particularly in Nome and Kotzebue. In recent years, meat sales have been largely confined to the Seward Peninsula. This may be changing because of the increasing number of reindeer in herds on the peninsula; herds grew from 18,000 head in 1977 (12) to over 27,000 head in 1983 (4). The increase is due to an expanding interest in marketing a high value product, reindeer antlers.

As the quantity of reindeer meat increases, markets outside the region must be gained, or the economics of meat production will decline. It is likely, if current trends continue, that aggressive meat marketing will be a needed new program for the industry group, the Reindeer Herders Association.

Antler marketing is an export activity. Reindeer antlers and other types of deer antlers are ingredients in

This freshly harvested reindeer velvet antler will be frozen for shipment t processors in the Orient.

oriental medicine. The major markets are located i Korea, Taiwan, China, and Japan (7, 13).

The price of antlers has risen dramatically sinc 1969, more than 3,400 percent. This has increase marketing of antlers from Alaska; about five tons pe year are exported. However, the high world price ha brought forth competitors, particularly from Nev Zealand. The antler price has weakened slightly sinc 1979 because of the world recession and an increase supply of antlers. Further changes are difficult to predict but the likelihood of increasing competition appear reasonably certain. A long-term decline in antler price would not be surprising and, if it occurs, could lead t reduced income for Alaska reindeer herd owners. Th two likely reactions by reindeer herders to this scenaric are: (a) increased emphasis on meat production; and/o (b) reduced interest in herd management.

SUMMARY

The reindeer industry has gone through several transition periods before arriving at today's world of export antler marketing and multi-government agency management of the reindeer range. The industry is exhibiting renewed vigor in the 1980s, but problems remain. Range conflicts are evident with caribou and other wild grazing animals. Problems of management are being addressed by applying new management techniques and through applied research carried out by the University of Alaska.

Several major economic issues are also of concern. Apparent economic advantage exists for more intensive herd management, but this conflicts with traditional subsistence activities. If the price for export antlers weakens, herds must be shifted toward greater emphasis

on meat production or there will be an overt reduction in overall herd management by individual herders.

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WARD PENINSULA REINDEER RANGE

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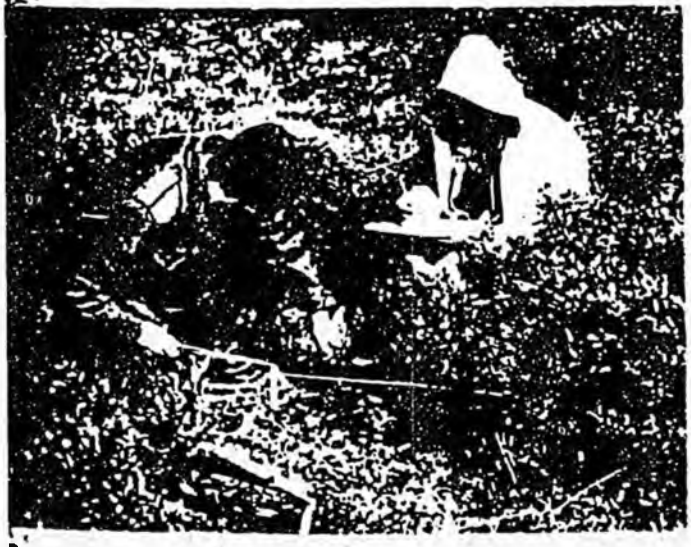
State Range Conservationist
Soil Conservation Service
U.S. Department of Agriculture

TRODUCTION

The 16 million acres of reindeer range on the Seward nsula have been mapped, and an interim Reindeer ge Management Plan has been developed for each der. Practical aspects of range management rely on nagement units, which are comprised of similar logical sites, to aid land managers with land use deci- The nearly completed range-soil survey utilizes 45 logical sites (similar to vegetation habitat types) to ribe soil and vegetation relationships.

LASSIFYING PLANT COMMUNITIES

Ecological sites are based on potential native vegeta- n, and any variation of the potential vegetation characteristics may reflect a seral stage or condition class of the site. On the Seward Peninsula, ecological sites exhibit a great deal of diversity, and many factors have interacted to create a multitude of seral stages of the original plant communities. Evaluation of range fire history and past grazing records provides strong evidence to support the hypothesis that range fires have contributed the most significant impact to lichen resources. Many acres of tundra that were once rich with lichen and produced from 5,000 to 10,000 pounds/acre of total air dry lichen biomass are almost devoid of the energy rich plants. It is doubtful that these areas will ever again produce comparable lichen yields. Thus, on these ranges management must be designed for the existing vegetation, which consists primarily of cotton grass and arctic shrubs.



Range technicians Mark Kenney (left) and Calvin Steele, Soil Conservation Service, collect herbage production data on the Seward Peninsula.

GENERAL DESCRIPTION OF ECOLOGICAL SITES

In the southeastern portion of the Seward Peninsula, coniferous forests dominate many of the mountain slopes and valleys. Upland sites consist mainly of white spruce with a green alder and willow understory. Forested floodplains contain a mixture of white spruce, black spruce, cottonwood, and shrubs. In some areas, reindeer lichens grow in a thick mat and dominate the forest understory. Total production of the air dry lichen biomass is from 5,000 to 15,000 pounds/acre.

Shrublands occur throughout the peninsula, but are more extensive in the southern half. They are mainly comprised of green alder, a variety of willows, dwarf birch, resin birch, and other boreal tundra shrubs. The herbaceous understory of these sites consists of grass and grasslike plants, forbs, and lichens. The lichen-rich

shrub type also occurs on the southern half of the peninsula. Green alder and willow dominated sites occur on the sides of mountain slopes, in drainage ways, and along alluvial floodplains. These sites yield from 2,000 to 6,000 pounds/acre of annual air dry herbage production. As a group, the brush sites exhibit the highest annual productivity of any on the Seward Peninsula and provide important winter browse for moose.

Grasslands constitute a very small portion of the Seward Penmsula. Bluejoint grasslands occur primarily in recently breached lake beds where exposed, mineral rich soil provides a favorable environment for luxuriant grass production. Many of these dry lake beds appear as seas of grass where four-foot tall bluejoint is capable of yields of 3,000 to 5,000 pounds/acre annual air dry herbage production. As moisture increases and water accumulates, bluejoint is replaced by sedges and rushes, and annual air dry production decreases. Beach wildrye grows in specialized communities with spear grass and xerophytic forbs (adapted for growth under dry conditions) along beach zones. Sparse and scattered stands of bluejoint occur in various areas throughout the tundra landscape. They are remnants of formerly dominant plant communities that were introduced following range fires and now are being replaced by more competitive climax vegetation.

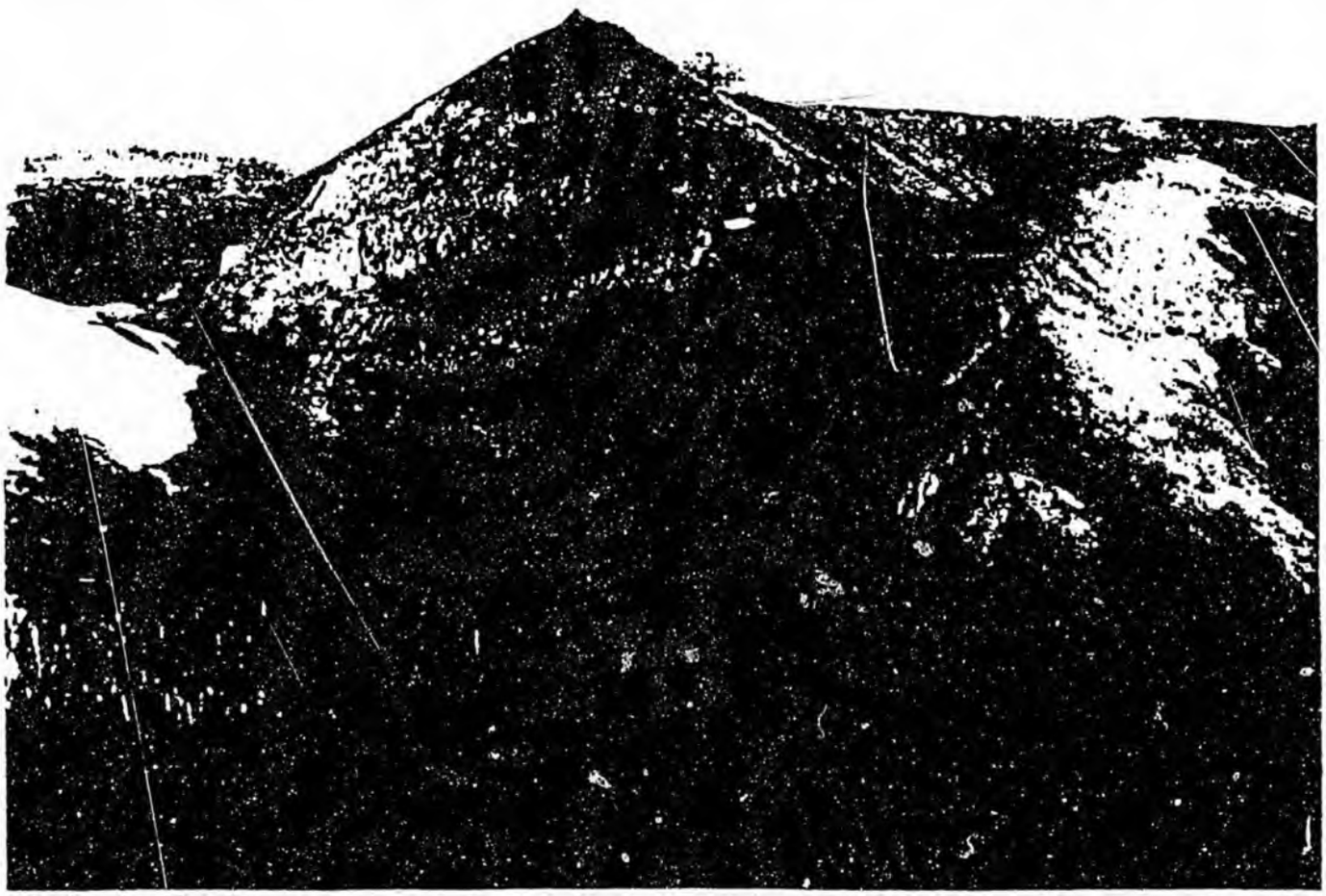
Three basic tundra zones are used to differentiate Seward Peninsula tundra range. They are (1) low to high elevation sites; (2) low to mid elevation sites; and (3) high elevation, sub-alpine sites. These zones are described as follows:

Low to high elevation sites

Low positioned, wet sites support a mixture of sedges and rushes with hydrophyllic forbs that are growing in standing and flowing water. These sites yield approximately 500 to 1,000 pounds/acre of annual air dry herbage production with very little lichen biomass.

Low to mid elevation sites

These are mid positioned sites that are free from standing and flowing water and are underlain by continuous permafrost. They represent a typical and vast tundra zone. It is presumed that abundant quantities of



Forested areas such as this one near Elim dominate many of the mountain slopes and valleys in the southeastern portion of the Seward Peninsula.

lichens once occurred where they are now absent on many of these sites. Typically, these sites are comprised of rushes, cotton grass, cloudberry, Labrador tea, dwarf birch, blueberry, lingonberry, dwarf willows, and lichens that grow in or on sphagnum moss. The composition of grasses, forbs, shrubs, and lichens varies significantly relative to the condition. This zone typically produces the highest annual yield of the three tundra zones (an air dry herbage production of 1,200 to 1,500 pounds/acre). In addition, on sites were lichen occurs, from 1,000 to 5,000 pounds/acre of total lichen biomass may be present. These sites produce high quality, high value winter forage for reindeer and require careful management for sustained harvest of lichen resources.

High elevation, sub-alpine sites

These sites are sparsely vegetated with a great variety of plants, such as threadleaf sedge, bluegrass, bigelow sedge, mountain heather, two flower Cassiope, willows, and various lichens. Air dry annual herbage production is from 50 to 300 pounds/acre with approximately 100 to 500 pounds/acre of total lichen biomass.

USE OF RANGE DATA

Data developed from the range survey have been used primarily for reindeer interpretations, although multiple interpretations can be made for musk ox, moose, and horses. Reindeer range management plans that have been developed are defined either as *extensive* or *intensive*. Extensive management plans identify and utilize summer and winter range separately with free roaming herds. Herding is minimal, and consequently the initial stocking rates are correspondingly low. Herders who employ this management technique utilize subsistence stocking rates of 500 to 1,000 acres/reindeer/winter.

Intensive range management plans involve the identification and use of from four to eight seasonal ranges, intensive herding, and rotational use of spring, fall, and winter ranges. Herding during winter months makes more efficient use of forage resources, and ideally reindeer are moved around the winter management units in a systematic pattern. However, weather, predators, and snow conditions add variability to the basic plan. Initial stocking rates range from 80 to 150 acres/reindeer/winter.

Reindeer are shown grazing in the Grand Central Canyon-Salmon Lake area of the Seward Peninsula.

Forage resources on the Seward Peninsula are abundant and are capable of sustaining a greater number of reindeer than are currently stocked. It is imperative that the winter ranges receive proper management and protection for sustained use. Overgrazing and fire present the greatest immediate threat to lichen winter ranges. Fire suppression on the winter range must be employed if grazing management is to be practiced. The herd expansion planned by the Reindeer Herders Association will result in a need for more intensive range management practices. Roads and facilities such as cabins; trails; corrals; bridges; and, in some areas, fences will have to be constructed. Raw materials for such facilities can be obtained from forest resources of the peninsula. As needs for roads and facilities are met, meat processing and marketing infrastructure must be developed.

Before intensive management planning and herd expansion can occur, it will be necessary to prevent caribou from the Western Arctic Herd from mingling with reindeer of the eastern part of the Seward Peninsula. This land use priority commitment must be made by all governing agencies that administer land and wildlife resources on the Seward Peninsula.

Danny Karmun, reindeer agent for the University of Alaska Cooperative Extension Service, evaluates range utilization by caribou in the Selawik Hills of the Seward Peninsula.

REINDEER RANGELAND IN OTHER AREAS OF ALASKA

Vast areas throughout Alaska have summer ar winter forage that is suitable for reindeer. Coastal are from Barrow to Bethel that were grazed by reindeer fro 1900 through the 1930s and many areas in the interi theoretically could support a sizeable number reindeer, if the conflict with caribou herds can b eliminated.

The Aleutian Islands and the Alaska Peninsula als provide suitable forage and habitat for reindeer. Reinde forage on Umnak, St. George, and other islands is com prised of blueioint; hairgrass; willow leaves; willo roots; and a variety of forbs, including wild celery leave stalks, and roots. In addition, there are mosses and clu moss, which obviously constitute part of the reindeer' diet. Observations of reindeer on the islands indicate that even though lichens are essentially lacking in th original potential plant community or have been graze out, suitable forage is available. The reindeer in thes areas are generally much larger than those of the Sewar Peninsula.

Many areas throughout Alaska could provide forag for semidomestic and domestic moose, bison, horses and musk ox. More limited areas, primarily the Alaska Peninsula and Aleutian Islands, have grassy valleys and mountains dominated by blueioint, fescues, hairgrass, bluegrasses, and forbs, which yield from 2,000 to 4,000 pounds/acre of annual air dry herbage production. Range forage and kelp from the sea provide forage throughout the winter months in some snow free areas along the coastal zones.

The development and utilization of Alaska's ranges must be approached cautiously. Winter feed supplies are critically important to any year-round livestock operation in Alaska. Animals differ widely in their abilities to cope with snow of varying hardness and depth. Primary consideration should be given to contingency plans for winter feed. Delicate balances between existing wildlife populations and the range ecosystem need to be considered when establishing or introducing domestic or semidomestic animals into a functioning ecosystem. The trade-offs must be considered and fully evaluated before commitments are made to finance and implement such activities.

STATE OF ALASKA
1990 LEGISLATIVE SESSION

BILL VERSION: CSSB 364 (Finance)
PUBLISH DATE: 3/28/90

FISCAL NOTE

REQUEST:

Revision Date: _____
Title: Act relating to inspection of slaughtered reindeer
Sponsor: Senator Kerttula
Requestor: Senate Finance

Agency Affected: Environmental Conservation
BRU: Environmental Health
Components: Animal Health/Dairy

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES	63.3	63.3	63.3	63.3	63.3	63.3
TRAVEL	15.0	15.0	15.0	15.0	15.0	15.0
CONTRACTUAL	20.0	20.0	20.0	20.0	20.0	20.0
SUPPLIES	8.0	8.0	8.0	8.0	8.0	8.0
EQUIPMENT	3.0	3.0	3.0	3.0	3.0	3.0
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	109.3	109.3	109.3	109.3	109.3	109.3
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	109.3	109.3	109.3	109.3	109.3	109.3
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME	1	1	1	1	1	1
PART-TIME						
TEMPORARY						

ANALYSIS : (Attach a separate page if necessary)

See attachment

This fiscal note is adopted by the Rules Comm. 3/27/90

Prepared by: _____
Division: Senator Johnne Binkley, Co-chairman
Senate Finance Committee

Phone: 465-4985
Date: March 27, 1990

Approved by Commissioner: _____ Date: _____
Agency: _____

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

ATTACHMENT

ANALYSIS:

The funding necessary to implement this legislation is contained in an Increment Request in the Environmental Health BRU, Animal Health/Dairy Industry Component.

Without the resources identified in this increment, it will be impossible to implement a field-kill inspection program that satisfies federal requirements, and allow the use of reindeer in state and federally inspected meat products.

POSITION PAPER
CSSB 364

Title

An Act relating to inspection of slaughtered reindeer.

Effect of the Bill

This bill requires the Department to establish a field-kill inspection program for reindeer. The inspection program will be voluntary and meet the requirements of the United States Department of Agriculture (USDA) so that inspected reindeer qualifies for use in USDA meat products.

Department Position

The Department supports the passage of CSSB 364. The USDA requires that reindeer meet certain federal inspection requirements for use in other meat products such as reindeer sausage. The inspection of reindeer is a state responsibility. Because of the lack of an acceptable field-kill inspection program, Alaskan herders have been frustrated in their attempts to supply these existing markets and expand the sales of their product. Lack of inspection is a bottleneck to the development of an industry which may have great potential for rural Alaskans. We have attached a memorandum from the state veterinarian on the bill.

We have attached a memorandum from the State Veterinarian on the bill.

Fiscal Effect

The Governor's FY 90 operating budget request contains an increment that would fully fund the program in this legislation. A copy of the increment has been attached to the fiscal note submitted by the Department on this bill.

SB

366

SENATE FINANCE COMMITTEE REPORT

DATE: 2/12/90 FURTHER:

DATE TURNED INTO OFFICE: 3/20/90

The Finance Committee considered SB 366

"An Act relating to the Dalton Highway."

and recommended:

[✓] replace with ______ CS SB 366 (FIN) [ ] same title
[ ] or adopt ______ CS ______ [ ] new title
[ ] technical title change (HB only)

[ ] attached amendment(s)
[ ] ______ letter of intent adopted

[ ] do pass

[ ] do not pass

[✓] no recommendation

[ ] individual recommendations

[ ] further referral to ______

ATTACHES NEW FISCAL NOTE(S):

Dept/Date:

[✓] fiscal note(s) DOT 30.0 opr 92.0 cap. 3/20/90
DPS 272.9 opr. 20.0 cap. 3/20/90
DF&G 14.9 1/31/90

[✓] zero fiscal note(s)
DOA -0- 3/20/90

[ ] appropriation-no fiscal note

APPROVES PREVIOUS:

Dept/Date:

[ ] fiscal note(s) ______

[ ] zero fiscal note(s) ______

SIGNING ~~DO PASS~~:

[signatures]

OTHER RECOMMENDATIONS:

[signature] - No Rec
[signature] No Rec
[signature] No Rec
[signature, struck through]

1. [signature] DO NOT PASS 2. [signature] (DO PASS)

Co-Chairs: Signatures and Recommendations

STATE OF ALASKA
1990 LEGISLATIVE SESSION

BILL VERSION: CSSB 366 (Finance)
PUBLISH DATE: _____

FISCAL NOTE

REQUEST:

Revision Date: _____
Title: Dalton Highway maintenance and access
Sponsor: Senator Frank
Requestor: Senate Finance

Agency Affected: Public Safety
BRU: Alaska State Troopers and Fish and Wildlife Protection
Components: Detachments (AST) and Enforcement (FWP)

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES	141.93	141.93	141.93	141.93	141.93	141.93
TRAVEL	3.00	3.00	3.00	3.00	3.00	3.00
CONTRACTUAL	71.88	71.88	71.88	71.88	71.88	71.88
SUPPLIES	4.50	4.50	4.50	4.50	4.50	4.50
EQUIPMENT	51.60	0	0	0	0	0
LAND & STRUCTURES	0	0	0	0	0	0
GRANTS, CLAIMS	0	0	0	0	0	0
MISCELLANEOUS	0	0	0	0	0	0
TOTAL OPERATING	272.91	221.31	221.31	221.31	221.31	221.31
CAPITAL	70.0	0	0	0	0	0
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	342.91	221.31	221.31	221.31	221.31	221.31
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	342.91	221.31	221.31	221.31	221.31	221.31

POSITIONS:

FULL-TIME						
PART-TIME	3	3	3	3	3	3
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

Prepared by: Senator Rick Uehling, Co-chairman
Division: Senate Finance Committee
Phone: 465-4821
Date: 3/20/90

Approved by Commissioner: _____ Date: _____
Agency: _____

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

SB 366 - FISCAL NOTE BACKUP
DEPARTMENT OF PUBLIC SAFETY - CAPITAL

CAPITAL:

2 X Mobile Homes	$40.0
Site Preparation	10.0
Transportation & Installation	20.0
	$70.0

The Mobile Homes would be utilized to house the Alaska State Trooper and Fish & Wildlife Protection Officer to be stationed at Coldfoot. It is intended that the Department of Public Safety locate the trailers in the Department of Transportation & Public Facilities compound at Coldfoot including hooking the units into the DOT/PF utility system.

STATE OF ALASKA
1990 LEGISLATIVE SESSION

BILL VERSION: CSSB 366 (Finance)
PUBLISH DATE: _____

FISCAL NOTE

REQUEST:

Revision Date: _____
Title: Act relating to the Dalton Highway
Sponsor: Senator Frank
Requestor: Senate Finance

Agency Affected: Administration
BRU: Information Services
Components: Telecommunications

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND	0	0	0	0	0	0
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

ANALYSIS: (Attach a separate page if necessary)

Prepared by: Senator Rick Uehling, Co-chairman
Division: Senate Finance Committee
Phone: 465-4821
Date: 3/20/90

Approved by Commissioner: _____
Agency: _____
Date: _____

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

STATE OF ALASKA
1990 LEGISLATIVE SESSION

BILL VERSION: CSSB 366 (Finance)
PUBLISH DATE: _____

FISCAL NOTE

REQUEST: _____

Revision Date: _____
Title: Act relating to the Dalton Highway
Sponsor: Senator Frank
Requestor: Senate Finance

Agency Affected: DOTPF
BRU: Northern Region
Interior Maintenance and Operation
Components: _____

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES	0	0	0	0	0	0
TRAVEL	0	0	0	0	0	0
CONTRACTUAL	20.0	20.0	20.0	20.0	0	0
SUPPLIES	0	0	0	0	0	0
EQUIPMENT	0	0	0	0	0	0
LAND & STRUCTURES	0	0	0	0	0	0
GRANTS, CLAIMS	0	0	0	0	0	0
MISCELLANEOUS	0	0	0	0	0	0
TOTAL OPERATING	20.0	20.0	20.0	20.0	0	0
CAPITAL	92.0	0	0	0	0	0
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	112.0	20.0	20.0	20.0	0	0
FEDERAL FUNDS	0	0	0	0	0	0
OTHER	0	0	0	0	0	0
TOTAL	92.0	20.0	20.0	20.0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

Prepared by: Senator Rick Uehling, Co-chairman
Division: Senate Finance Committee
Phone: 465-4821
Date: 3/20/90

Approved by Commissioner: _____ Date: _____
Agency: _____

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

STATE OF ALASKA
1990 LEGISLATIVE SESSION

BILL VERSION: CSSB 366 (SA)
PUBLISH DATE: 2/13/90 (d)

FISCAL NOTE

REQUEST:

Revision Date:
Title: An Act Relating to the Dalton Highway
Sponsor: Frank
Requestor: Senate State Affairs

Agency Affected: Fish and Game
BRU: Wildlife Conservation

Components: Widlife Conservation

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY91	FY 92	FY 93	FY 94	FY 95	FY 96
PERSONAL SERVICES	9.9	10.4	10.9	11.4	11.9	12.4
TRAVEL	2.0	2.0	2.2	2.2	2.4	2.4
CONTRACTUAL						
SUPPLIES	3.0	3.0	3.0	3.0	3.0	3.0
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	14.9	15.4	16.1	16.6	17.3	17.8
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND	14.9	15.4	16.1	16.6	17.3	17.8
FEDERAL FUNDS						
OTHER						
TOTAL	14.9	15.4	16.1	16.6	17.3	17.8

POSITIONS:

FULL-TIME						
PART-TIME	1	1	1	1	1	1
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

A Fish and Wildlife Technician III will be hired for 3 months to monitor hunting activities & assist with enforcement of regulations, especially relating to off-road vehicle use. No FY 90 costs.

Prepared by: W Bruce Dinneford
Phone: 465-4190
Division: Wildlife Conservation
Date: 1-29-90

Approved by Commissioner:
Date: Jan 31, 1990
Agency: ADF&G

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

Changes in CSSB 366 (Fin) have no fiscal impact. This fiscal note is appropriate. 3/20/90

6-0586J ✓
Chenoweth
3/21/90

Original sponsor(s): SEN. FRANK, Coghill, Fahrenkamp, Pourchot

IN THE SENATE

CS FOR SENATE BILL NO. 366 (Finance)

IN THE LEGISLATURE OF THE STATE OF ALASKA

SIXTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to the Dalton Highway; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. FINDINGS, PURPOSE, AND INTENT. (a) The legislature finds

(1) the northern portion of the Dalton Highway possesses unique scenic and recreational resources of high public value;

(2) significant wildlife and fishery resources are present along the Dalton Highway and represent important resources to highway users for viewing and to local residents for subsistence;

(3) current levels of public law enforcement services along the Dalton Highway are not sufficient to cope with increased use of the highway to ensure the safety of users of the highway, or to protect fish and wildlife resources;

(4) future facilities, both private and public, along the highway should be permitted and constructed only in accordance with land use plans in order to prevent adverse effects on the scenic, recreational, or fish and wildlife values of the highway corridor.

(b) It is the purpose of this Act to

(1) permit public use of a publicly owned and maintained highway; and

(2) increase and enhance tourism along the Dalton Highway.

(c) It is the intent of the legislature that

(1) the opening of the Dalton Highway not adversely affect local fish and wildlife resources;

(2) rigorous monitoring, enforcement, and regulations be implemented to protect fish and wildlife resources along the highway corridor;

(3) future developments in the highway corridor be restricted to nodes of development of facilities and services along the highway;

(4) if land along the highway corridor is transferred to the state, such land should not be disposed of, or subject to lease, by the state except as provided by a land use plan prepared by the state.

* Sec. 2. AS 19.40.110 is amended to read:

Sec. 19.40.110. PUBLIC USE OF [A PORTION OF] THE HIGHWAY. The department shall maintain the [SECTION OF THE] highway [BETWEEN THE YUKON RIVER AND DIETRICH CAMP] and shall keep [THAT SECTION OF] the highway open to use by the public [BETWEEN JUNE 1 AND SEPTEMBER 1 EACH YEAR].

* Sec. 3. AS 19.40.290(2) is amended to read:

(2) "highway" means the secondary highway from the Yukon River to <u>a terminus near</u> the Arctic Ocean.

* Sec. 4. This Act takes effect ~~June~~ July 1, 1990.

STEVE FRANK
DISTRICT K
SEAT A

119 N. Cushman, Rm. 213
Fairbanks, Alaska 99701

While in Juneau
P.O. Box V
Juneau, Alaska 99811
(907) 465-3709

Capitol Rm. 514

Alaska State Legislature

Senate

MEMBER
Finance Committee
Resources Committee
Legislative Council
Special Committee on Banking & Economic Development

VICE-CHAIR
Community & Regional Affairs Committee

MEMORANDUM

TO: Senator Rick Uehling, Co Chairman
Senator Johne Binkley, Co Chairman
Senate Finance Committee

FROM: Senator Steve Frank

RE: Request for a hearing on SB 366 "An act relating to the Dalton Highway"

DATE: March 15, 1990

I am writing to request that you schedule SB 366 for a hearing before the Senate Finance Committee at your earliest convenience.

The legislation would open the James Dalton Highway (North Slope Haul Road) for public travel all the way to Prudhoe Bay.

The Dalton Highway is maintained by the Department of Transportation & Public Facilities (DOT/PF) with state general fund dollars. However, access past Disaster Creek is limited to those with a "commercial purpose." The Dalton is the only public road in Alaska closed to public travel.

In addition to the public's right to travel a public road are the benefits that will come from increased tourism activity. This summer I participated in a DOT/PF sponsored trip up the Dalton and I was impressed by the unique beauty of the land. I think that this area has a tremendous potential for both in and out of state tourism.

This issue is not new. Since I first introduced the legislation in 1987 and again this year, we have had over 10 committee and subcommittee meetings, during which we have taken extensive public testimony. I think that it is time that we open this public road to the public.

Thank you for your consideration.