AN ASSESSMENT OF THE REINDEER GRAZING ISSUE IN ALASKA,

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Introduction

Reindeer, a domestic relative of the caribou, were brought to Alaska in 1892 from Siberia. The objective of this introduction was to provide an alternative food source for Native people during times of wildlife shortages. By 1930 there were some 650,000 reindeer in western and northern Alaska. Overgrazing of ranges, straying with caribou, predation, and economic, social and political factors led to a sharp decline in reindeer populations during the 1930's (Fig. 1). The Reindeer Act of 1937 established Natives as sole owners of Alaskan reindeer and assigned support responsibilities to the Secretary of the Interior. Inspite of this action, reindeer numbers have remained at a relatively low level.

Today, there are approximately 30 thousand reindeer in Alaska (Map A). A majority of the herds occur on the Seward Peninsula while smaller numbers of reindeer persist on Nunivak, St. Lawrence, Hagemeister, Kodiak, Umnak, Atka and St. Paul Islands. Reindeer herding on the Seward Peninsula and Nunivak Island continue to provide red meat at a relatively low cost to local people. A recent upsurge of interest in reindeer grazing is the result of highly increasing prices paid for antlers ($30. to $50./lb.). Reindeer antler is used for medical and aphrodisiac purposes in the Orient.

Organizations such as the Reindeer Herder's Association, NANA Regional Corporation, University of Alaska, and various State and Federal agriculture agencies are promoting expansion of the reindeer industry. Thus far the NANA Regional Corporation has taken the lead towards re-establishing an economically viable reindeer operation in Alaska. Other regional and village corporations elsewhere in the State are expected to enter the reindeer business if NANA proves successful. Areas where expansion of the reindeer industry is most likely to occur are: (see Map B)

A.	Seward and Baldwin Peninsulas	Intensify existing operations
B.	Nunivak Island	Intensify existing operations
C.	St. Lawrence Island	Intensify existing operations
D.	Aleutian Islands	New operation
E.	Yukon-Kuskokwim Delta	New operation
F.	Bristol Bay - Togiak	New operation
G.	Arctic Slope	New operation

Biological Problems

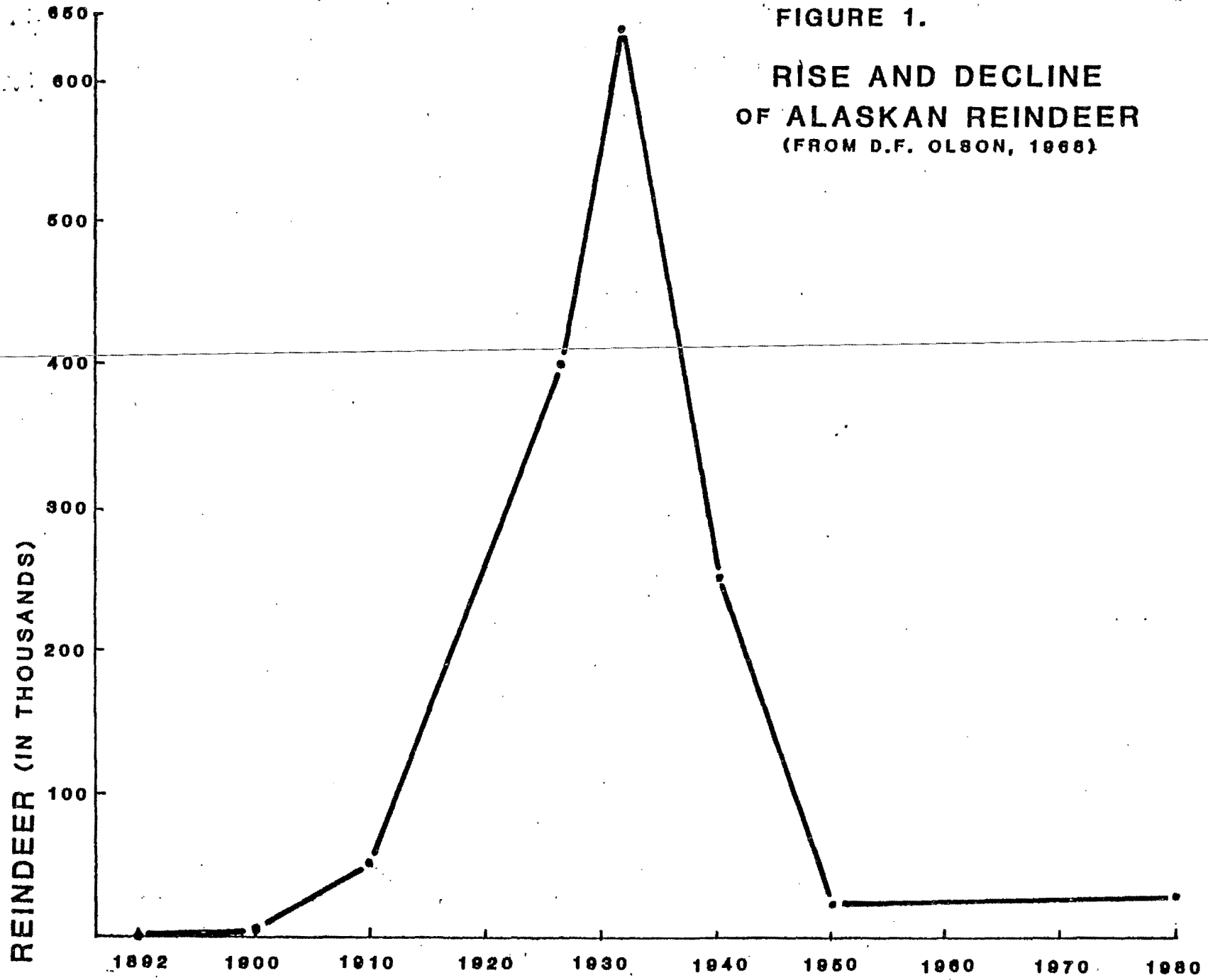
A. Reindeer - Bird Interactions

While little data on reindeer - bird interactions is available from the early days when reindeer were extremely numerous in Alaska, a number of observers have pointed out possible problems. Snow goose colonies on

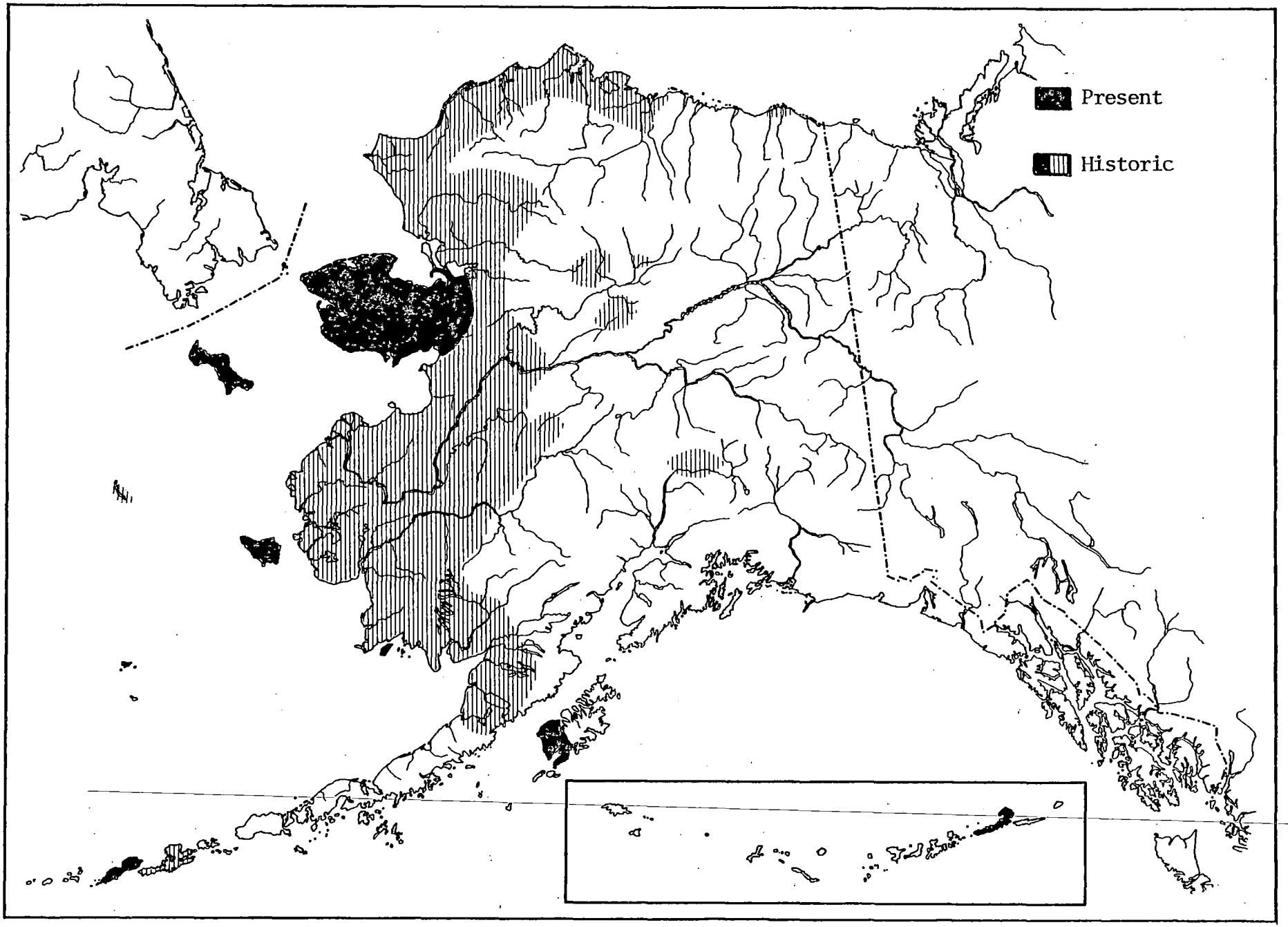
FIGURE 1.

RISE AND DECLINE OF ALASKAN REINDEER

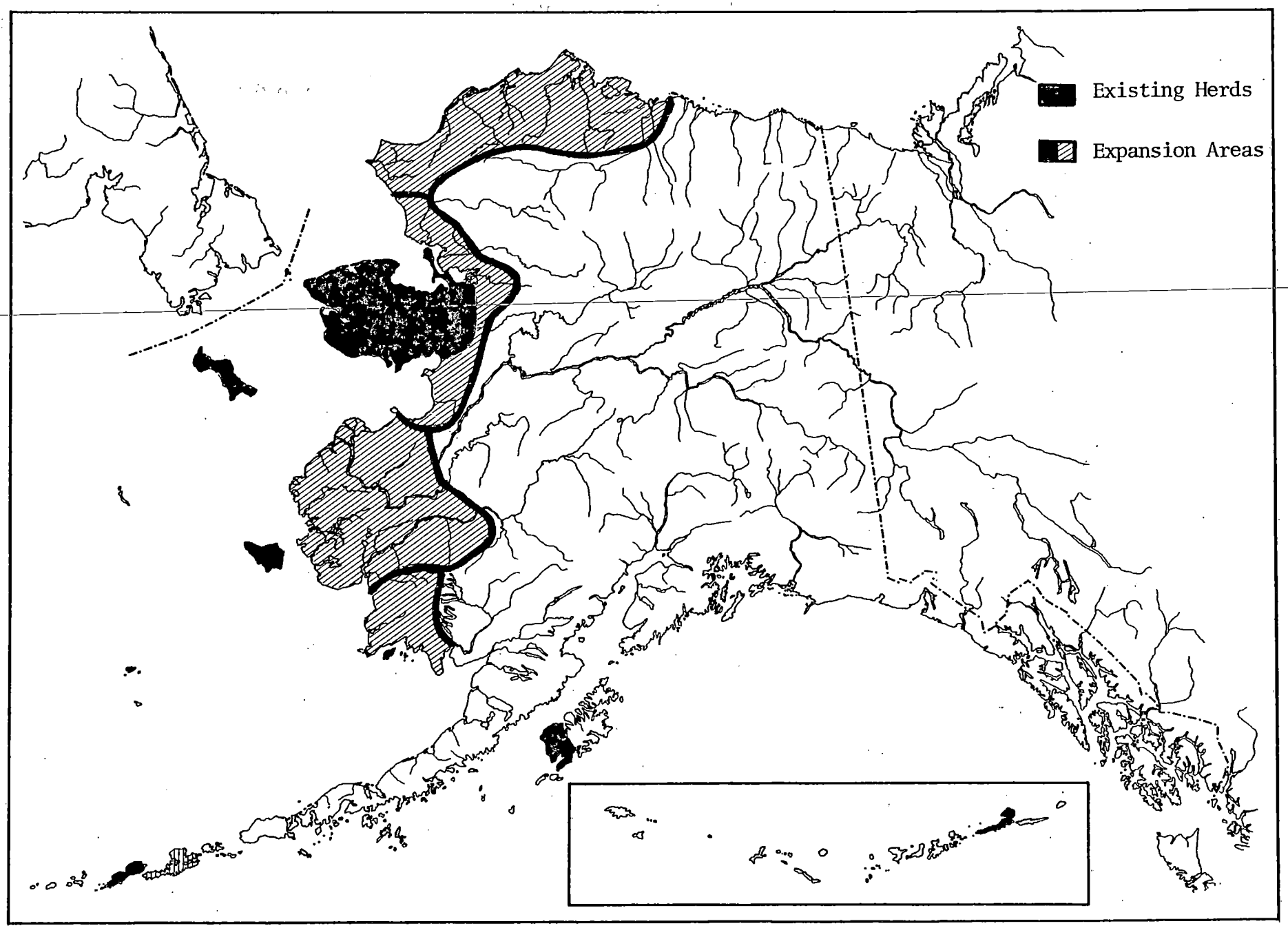
(FROM D.F. OLSON, 1968)



MAP A. PRESENT AND HISTORIC DISTRIBUTIONS OF ALASKA REINDEER
(from Reindeer Herders Assoc. 1979; Palmer 1926, Manville and Young, 1965)



MAP B. EXISTING REINDEER HERDS AND POTENTIAL EXPANSION AREAS



the Arctic Slope east of Barrow vanished at the time of reindeer grazing in that area. (King, 1970) Declines of cackling Canada goose populations nesting in the Kotzebue Sound area are suggested by Hanson and Nelson (1959) to be related to the impacts of reindeer grazing activities. Because there were no comprehensive bird nesting data for most parts of Alaska prior to the establishment of the reindeer industry, the complete impact to bird populations will remain unknown.

The nature of some impacts to birds by reindeer have been identified. The eating of eggs, young birds and bird nests by reindeer and caribou has been reported by a number of authors (Palmer 1934, Porsild 1942, Shephard 1955, Kelsall 1968, and Abraham et. al. 1977). Trampling of bird nests and eggs by reindeer was observed by Shepherd in 1955 in the Selawik area and recently by Tracy in 1978 at Cape Espenberg. Shepherd indicated that reindeer trampling of waterfowl nests may have been the major cause for lower brood counts on tidal flats near Selawik in 1955. Wright (1978) identified several potential conflicts between reindeer and birds. He found a high correlation between the use of low-medium willow habitat by reindeer and nesting birds such as pintail, willow ptarmigan, savannah sparrow, tree sparrow and white-crowned sparrow during June and July. Wright also found that when harassed by insects (June-July on the Seward Peninsula) reindeer gather into dense groups and congregate in the coastal wetlands where prevailing winds provide relief. In years when there is an early emergence of harassing insects, a serious conflict exists with late nesting waterbirds, especially spectacled eiders, emperor geese and loons. (Wright, 1978).

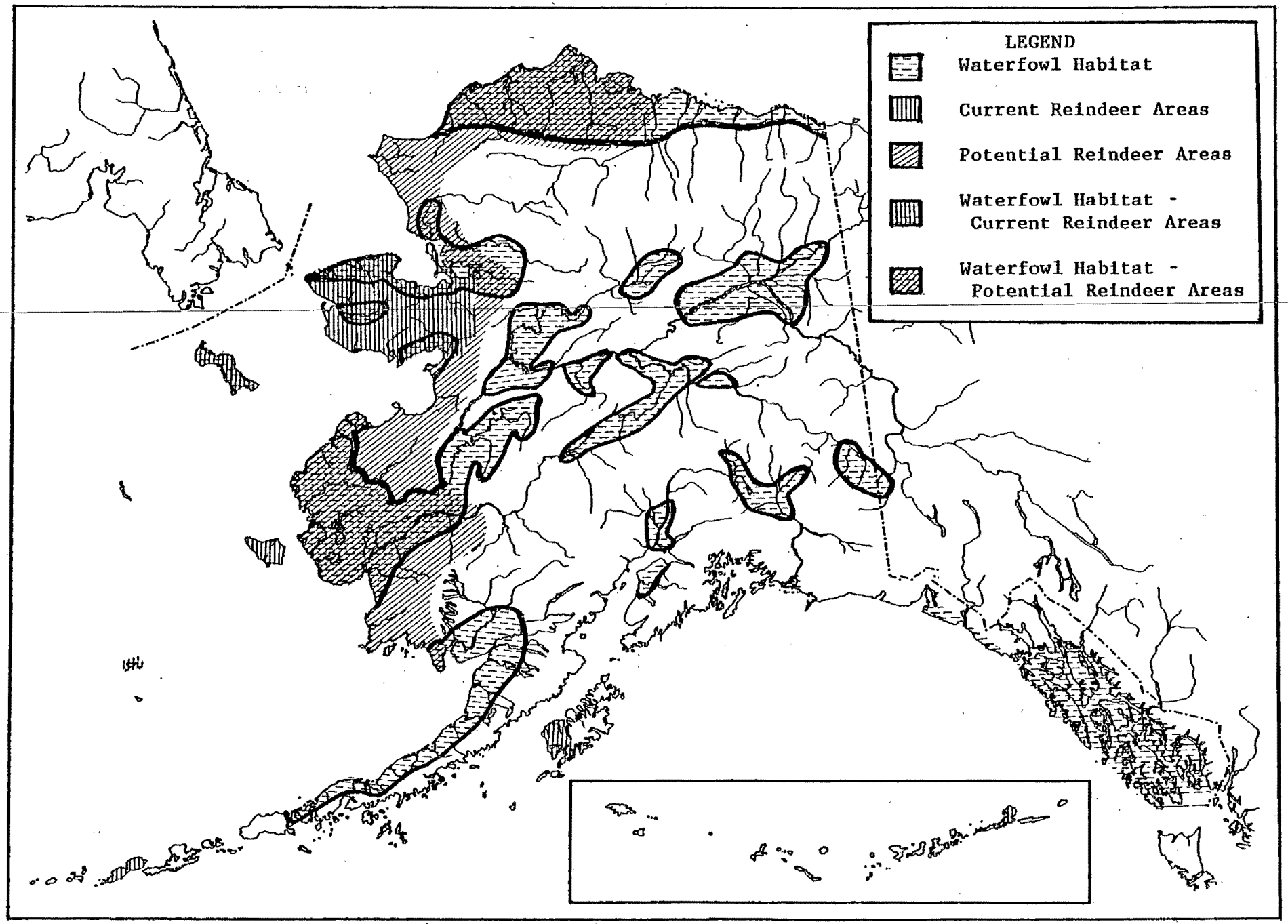
While the impacts of current reindeer activities are not thought to have serious consequences for bird populations due to the relatively low densities of reindeer, there is reason for concern as reindeer operations begin to expand and intensify. The areas where reindeer grazing is expected to increase coincide with the major waterfowl and shorebird habitats of western and northern Alaska. (Map C). Of all the potential threats to these internationally important bird resources (including such things as petroleum development, mining and roads) none compares with reindeer grazing in terms of the size of area that may be affected.

B. Reindeer - Caribou Conflicts

Ever since man domesticated the reindeer there have been problems when caribou and reindeer come in conflict. Since both animals are of the same species (Rangifer tarandus) they compete for forage, interbreed, transfer diseases and parasites, attract the same predators and readily intermingle on open ranges. A thorough examination of the literature on reindeer-caribou interaction is presented by Klein (1980).

From the reindeer herder's point of view the most serious problem is the loss of reindeer that wander off with migratory caribou. In order to guard against such losses, reindeer herders have resorted to "close" herding practices. Efforts are sometimes made to drive the free-roaming caribou away from reindeer ranges. In Scandanavia and the Soviet Union

MAP C, MAJOR WATERFOWL HABITATS IN ALASKA IN RELATION TO CURRENT AND POTENTIAL REINDEER AREAS
(from Bartonek, 1969)



wild reindeer (caribou) have been displaced from vast areas of prime forage as a result of close herding activities over a long time period. (Klein, 1980) In Alaska, reindeer have replaced caribou on the Seward Peninsula for over eighty years. When reindeer are "loosely herded" the result is often the opposite, with caribou taking over the reindeer range. This has occurred throughout much of northwest Alaska where "loosely herded" reindeer were lost to the expanding Western Arctic caribou herd during 1940's - 1960's.

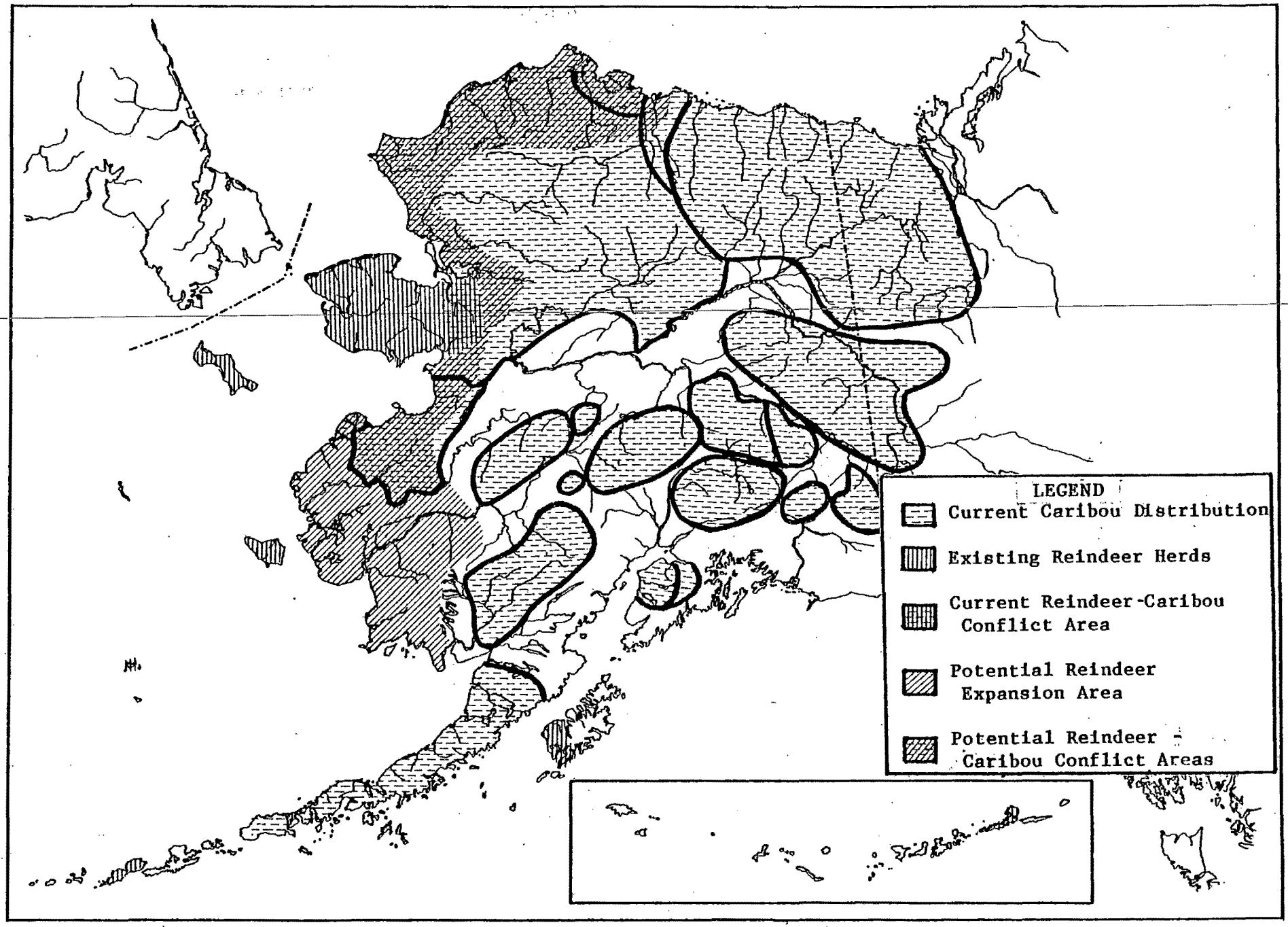
The current distribution of caribou and reindeer in Alaska as well as existing and potential conflict areas are shown on Map D. Today the main area of reindeer-caribou interaction occurs along the base of the Seward Peninsula. The situation is not a major problem at this time because relatively low numbers of reindeer are involved and herders are taking considerable precautions to keep the reindeer away from caribou. There may be serious problems in the future, if reindeer increase to projected numbers (33,000) and are grazed on traditionally used caribou winter range. (NANA Corporation, 1978) Close herding of large numbers of reindeer will result in direct competition for critical winter forage of the caribou. Forage competition coupled with concerted efforts to drive away migratory caribou to inferior winter ranges where predation is greater will most likely result in a lowering of the caribou population. If reindeer herding enterprises begin on the Arctic Slope of Alaska, there will be direct competition for summer as well as winter range areas and will further impact the caribou herd.

C. Reindeer and Predators

It has been long established that predator control is mandatory for successful reindeer operations. In Scandanavia and portions of the Soviet Union, predator control activities associated with the reindeer industry are responsible for nearly complete elimination of the wolf and for greatly reduced bear populations. In Alaska, reindeer oriented predator control programs have kept the Seward Peninsula relatively free of wolves and until recently - suppressed the grizzly bear population. Until as recently as 1972 the U. S. Fish and Wildlife Service through its Predator and Rodent Control Branch conducted aerial wolf control programs on reindeer ranges in northwestern Alaska. Depending on weather conditions, at least 25 wolves per year were taken by this government sponsored effort. Today, reindeer herders take on the responsibility of predator control themselves. The use of aircraft for wolf hunting is authorized by State regulations over most of the existing reindeer ranges. Permits for aerial wolf hunting on reindeer ranges are authorized by the Alaska Department of Fish and Game on a case by case basis. Recently lengthened brown bear hunting seasons (at reindeer herder's request) has resulted in at least a three-fold increase in harvest.

As reindeer herding intensifies on the Seward Peninsula, the pressure for further predator control will increase. As reindeer herding expands to new areas (as identified on Map B) similar reductions of predator populations can be expected. Complicating the issue is a rising national concern for predators and a basic unacceptance by the general public of predator control programs.

MAP D. REINDEER AND CARIBOU RANGES AND AREAS OF CURRENT AND POTENTIAL CONFLICT
(from Davis, 1977 and MAP B.



D. Reindeer - Effect on Vegetation

The manner in which reindeer herding affects the vegetation resources of a given land area is highly variable depending on many conditions such as: the number of animals involved, type of herding techniques used, initial vegetation resources available, climatic and topographic features of the range, and many others. There are however some general considerations which have become well known. In most situations available forage during the winter is critical to the well being of both caribou and reindeer. The most preferred plant resource during winter is lichens which provide the main source of carbohydrates. Often, snow and ice conditions greatly limit the amount of forage available, inspite of the apparent large quantities of lichens on some ranges. Lichens grow extremely slow, are fragile and susceptible to trampling if reindeer herds frequent winter range during the summer. (Pegau 1968) There has been a sad history of overgrazing by reindeer in western Alaska during the first half of this century. (Palmer and Rouse, 1945) In some areas, the lichens have not recovered yet. (Reardon, 1974) In cases where reindeer have been introduced on islands, where predators were not present to keep the reindeer population in check, classic examples of boom and bust have occurred with severe destruction of the vegetation (Klein, 1959) (Scheffer, 1951). Several islands where reindeer persist, such as Nunivak, Atka, and Umnak, are essentially devoid of lichens. In these cases, reduced herds are barely surviving on non-lichen forage during winter.

Although there are many similarities between caribou and reindeer, perhaps some of the most marked differences between the animals is in their effects upon vegetation. Caribou range over huge areas, the summer and winter ranges being separated by vast distances. Caribou often shift their use of winter ranges from year to year. Reindeer are always kept on smaller more compact ranges, with relatively short distance from summer to winter range.

In some cases where reindeer are not closely herded, they may wander on or through the winter range during summer, causing damage by trampling of the dry, sensitive lichens. (Pegau, 1968) This does not occur with caribou because of the seasonal and spacial separation. It has been concluded that caribou tend to use 3-4% of the food supply of a given winter range each year. Closely herded reindeer on the other hand may use up to 35-40% of available winter forage. (Andrev, 1975) Loosely herded reindeer may more closely simulate wild caribou with regard to the percentage of winter range utilized.

Various management techniques have been developed which enable improved utilization of plant resources by reindeer. The almost constant contact with human herders under close herding practices results in tame reindeer which are easily managed. This allows for elaborate grazing management plans which optimize seasonal and spacial opportunities of a specific range area. Some reindeer areas in the Soviet Union and Scandanavia are being managed under this approach. With close herding,

the grazing of winter ranges can be rotated from year to year, achieving a controlled level of utilization and allow for recovery of the lichens before the range is used again. In order to be successful, such rotational grazing schemes require manageable reindeer, and strategically placed facilities such as cabins, corrals and sometimes fences.

At present there is little or no close herding techniques being practiced in Alaska. Nearly all herds are free-roaming, semi-wild in nature. Only a minimum of human contact and herding facilities are used. The NANA Corporation is working towards establishment of a close herding approach to its herds. Individual range plans being developed by other herders through assistance by the Soil Conservation Service are based on rotational grazing concepts which require a close herding approach (controlable animals). It remains to be seen if current efforts to convert from loose herding to close herding practices can be accomplished in Alaska, there are both advantages and disadvantages from a resource perspective. Theoretically, close herding will assure that reindeer grazing can be properly regulated to prevent overgrazing through implementation of good range conservation plans. On the other hand, close herding practices will result in the reindeer industry becoming an intensified agricultural activity. The experience with reindeer operations in this context, in Scandinavia and the Soviet Union has resulted in the removal of caribou, wolves and bears from large areas of their former range.

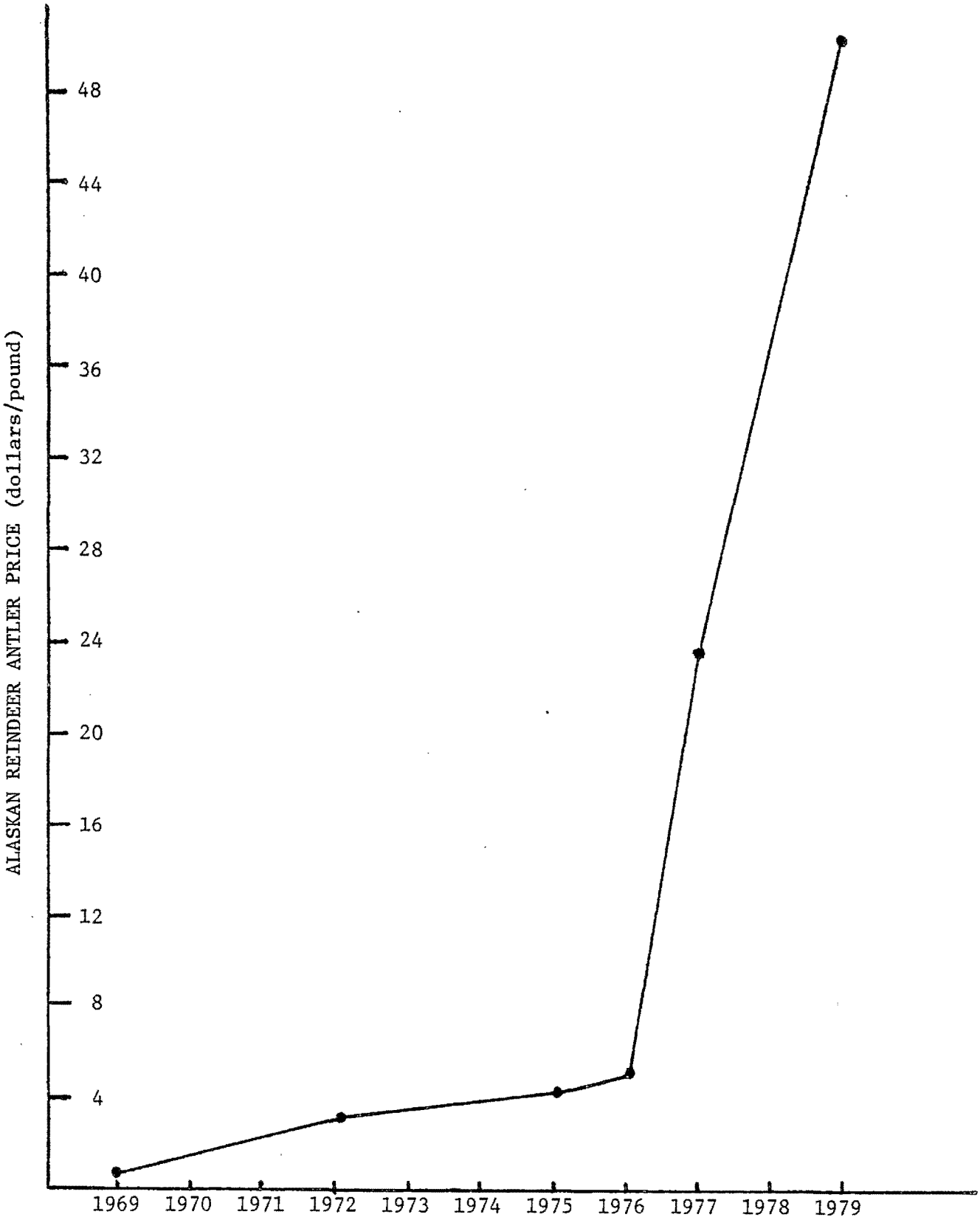
Economic Factors and Recent Developments

Following the great decline of Alaskan reindeer and subsequent passage of the Reindeer Act of 1937, the economy of the reindeer industry has for the most part been one of general decline and stagnation. Over this period the total numbers of reindeer have remained relatively constant (25 -30,000) and the industry was mainly one of meat production for local consumption. Major sales of reindeer antlers to oriental buyers began in the mid 1960's. Recent marketing efforts of the NANA Corporation has resulted in a dramatic increase in price/pound paid for reindeer antlers. (Fig 2) The current high prices paid for antlers has injected new life into the reindeer economy and has stimulated a flurry of renewed interest throughout many of the former reindeer areas.

As a result of the new "antler economy", a number of substantial changes are occurring on the Alaskan reindeer scene. Perhaps the most significant is a shift of operations (managed within the context of the herder's participation in other subsistence activities), towards a strictly cash producing enterprise.

Under management goals for optimum reindeer meat production the incentive is to harvest a maximum number of young-of-the-year in the fall and maintain only a breeding population over the critical winter period. The new antler economy dictates that each animal's annual antler regrowth is valuable and should be treated as a renewable resource. For example, the real dollar value of antler production

FIGURE 2
RECENT INCREASE IN PRICES PAID
FOR ALASKAN REINDEER ANTLERS



(assuming $50/lb. of antler) for the life of a male reindeer has been calculated to be $6,850 while its meat value is about $100. (Luick, 1978) This concept results in an economic incentive to maintain large numbers of reindeer over the winter and have larger herds over-all. The implications of this new approach may lead to over-grazing of existing ranges and establishment of new herds on areas that are not currently used by reindeer. Land management agencies can plan on receiving requests and being pressured for permits allowing more reindeer on existing ranges and for establishment of new herds.

This sequence has already begun in one portion of the Seward Peninsula. The NANA Regional Corporation has recently entered into an agreement with an independent herder (Paul Hadley) and has requested grazing privileges in the Buckland River drainage to be increased from the allotted 2,000 animals to 33,000 (NANA Regional Corp. 1978). The later figure was derived from carrying capacity calculations of the Soil Conservation Service following a standard soil and range survey conducted by that agency. Reindeer range scientists at the University of Alaska believe that the SCS estimated carrying capacity for the Buckland area is overly optimistic due to the fact that no data on snow conditions had been gathered prior to the estimate (Klein, per. comm. 1979). Compounding the situation is the fact that the eastern Buckland drainage is a prime wintering grounds for caribou. The Bureau of Land Management (the principle land agency involved) is currently conducting its own analysis of the Buckland range. Meanwhile, NANA has been granted additional grazing privleges in the Koyuk drainage for its planned herd buildup until the Buckland conflict can be properly addressed.

Further expansion of the new antler economics is occurring on the south side of the Seward Peninsula where the NANA Corporation has entered into management agreements for the Kakaruk herd (near Imuruk Basin) and the Ankognak herd (near Golovin). Such arrangements provide the capital and management resources of the corporation which are necessary for the small independent herders to engage in the expansion and intensification of operations which is necessary to maximize profits on the antler scene.

Interest in reindeer herding is growing in several other areas of Alaska. The BIA, on behalf of Nunivak reindeer herders, has recently requested the Soil Conservation Service to conduct range inventories and assist in plans for herd expansion on Nunivak NWR. The 1980 Alaska Legislature has earmarked funds ($400,000) to the University of Alaska for a feasibility study of reindeer herding in the lower Kuskokwim area. Officals of the Aleut Corporation are making inquiries about reindeer grazing on their lands in the Aleutian Islands NWR and villagers of Atka have requested the Fish and Wildlife Service to allow introduction of reindeer on Amlia Island. Renewed interest in reindeer has been expressed by Native leaders in the Togiak area regarding the existing herd on Hagemeister Island (Ak. Marine Resources NWR) and introductions within the Togiak NWR. To the north, the North Slope Borough has repeatedly expressed concern for reindeer developments in

the future. Thus, it can be safe to state that as the antler economics continues to heat up, and Native corporations obtain conveyance of their lands, that an increasing number of reindeer enterprises will be initiated. To prepare for expansion of the reindeer industry, the Reindeer Herder's Association has improved its organization, developed a set of goals and objectives, and a plan of action. Response from the government sector has also taken place, with a host of agriculture oriented agencies pledging support through funding and new programs aimed at development of the reindeer industry in Alaska. Appendix A provides a listing of government agencies and their activities in the reindeer issue.

Administrative Considerations

A. Reindeer on Refuge Lands

Reindeer were introduced on certain Alaska refuges during the early 1900's with the intention of providing a more reliable food source for local Natives. The executive orders for Nunivak and Aleutian Island refuges mention reindeer among the purposes for establishment. Since the early days of refuges and reindeer in Alaska a better understanding of ecological principles has developed and become incorporated in the laws and policies pertaining to the management of National Wildlife Refuges. Now a proposed economic activity such as reindeer grazing must be found to be compatible and of benefit to wildlife before it can be allowed on a refuge. Because of inherent biological conflicts between reindeer and native plant and wildlife species (described in Section III of this paper) reindeer are usually not considered a compatible use. The only refuges in Alaska where reindeer herding is currently recognized are Nunivak and Aleutian Island NWR's where the executive orders provide a legal basis for the activity and on the recently created Selawik and Alaska Marine Resources NWR's where reindeer herding occurred prior to establishment. The Alaska Lands Legislation currently before the Congress would allow the Selawik reindeer operations to continue on the existing permit area and provide for future reindeer operations on areas the Yukon Delta refuge where such activity is determined to be compatible with the other purposes of the refuge.

As a result of the rising interest in reindeer enterprises, several areas on Alaska refuges have been suggested as sites for reindeer expansion. Undoubtedly more requests will surface in the future. In spite of the rather clear policy and legal requirements for dealing with new reindeer proposals on refuges, the problem for refuge managers may be more difficult. As Native corporations obtain conveyance to their lands either within or adjacent to a wildlife refuge some may elect to begin reindeer operations on their lands. The current "state of the art" of reindeer herding would have no guarantee that the animals would remain off refuge lands. Thus the Service may either be faced with trespass situations or with requiring the neighboring land owners to fence in their reindeer. Needless to say there is potential for legal action over such issues in the future. Cooperative agreements between the Service and adjacent land owners may be a solution to some of these problems. Effective environmental education programs explaining the

biological problems associated with the reindeer introductions on refuges may be the best long term solution to these problems.

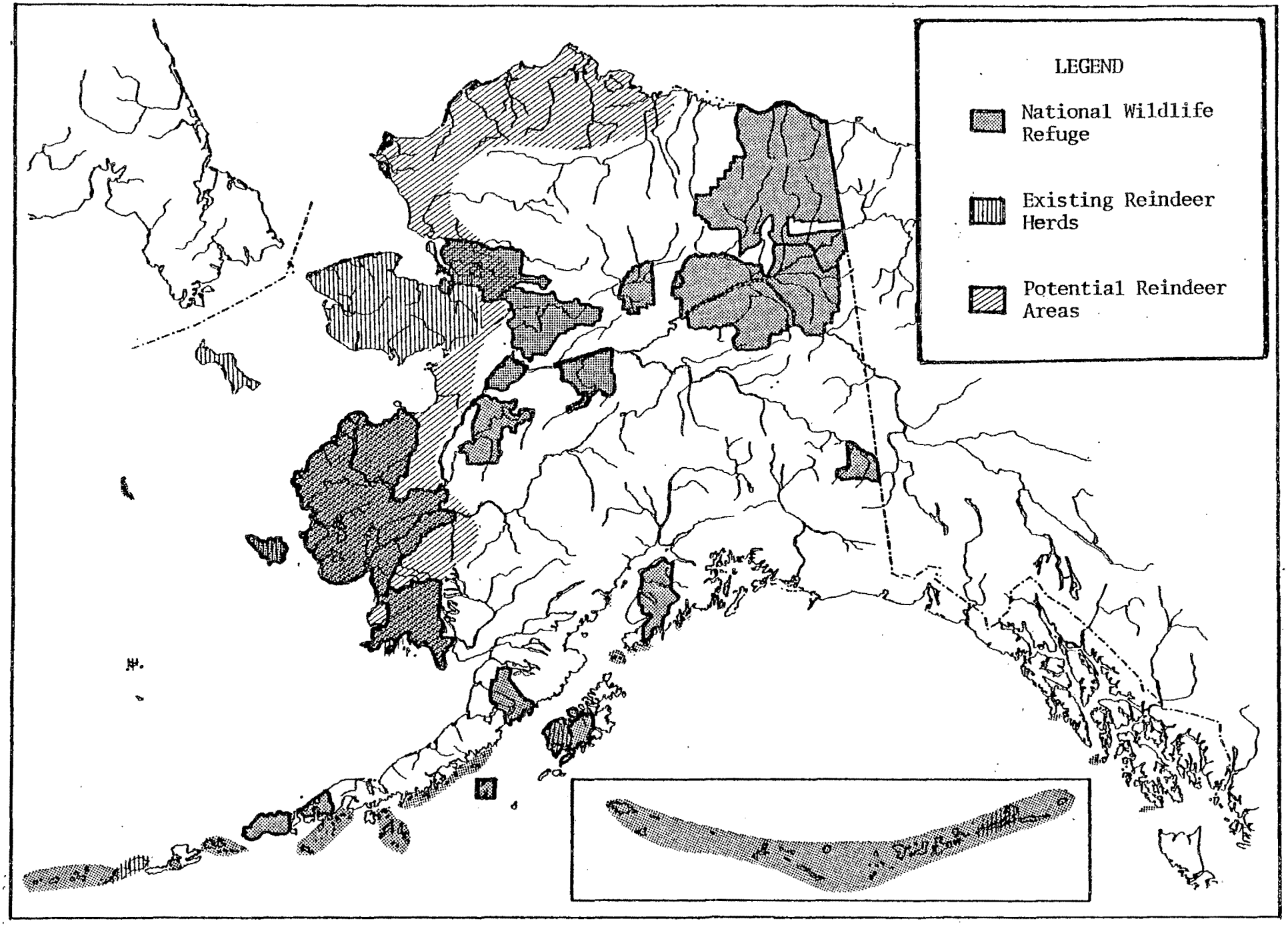
Map E. depicts existing and potential reindeer areas in relation to lands currently under Fish and Wildlife Service jurisdiction. The following is a brief description of the reindeer situation on each refuge area involved.

Nunivak NWR:

Following the extirpation of native caribou from the island in the mid-19th century, reindeer were introduced on Nunivak in 1920. The refuge was established in 1929 for the purposes of preserving native birds and wildlife, reestablishment of musk ox in Alaska and for "conducting experiments in the crossing and propagation of reindeer and native caribou..." (Executive order No. 5075, 1929). By 1938 the reindeer on Nunivak numbered about 12,000 and increased to 30,000 in 1944 (USFWS, 1975). Severe deterioration of the range was reported by Palmer and Rouse (1945), and earlier estimates of the island's carrying capacity for reindeer were reduced. In the mid-1940's the reindeer herd crashed and was estimated at 7-10,000 in 1948 (Rouse, 1948). In retrospect, it is apparent that adequate consideration was not given to the variable snow and ice conditions that would affect forage availability (USFWS, 1975). Since the late 1940's to the present time, reindeer on Nunivak Island have experienced another boom and bust cycle with additional damage to the previously depleted range. Currently there are approximately 4,000 reindeer on the island. Concern for range competition between reindeer and musk ox was first expressed by Palmer (1938). Recent musk ox reports and investigations continue to echo Palmer's concern (USFWS, 1975) and (White per. comm., 1980). In spite of repeated expression of concern, very little data has been gathered to adequately define the problem.

The Service's role in reindeer management on the Nunivak refuge has been essentialy non-existant. The most meaningful reindeer range studies on the island were conducted by Lawrence Palmer of the Bureau of Biological Survey in the 1930's. There has been no consistant program of monitoring the range or further studies since Palmer's work. The Service has occasionally assisted reindeer herders by counting reindeer in conjunction with aerial musk ox surveys. Some observations and data have also been gathered on winter range conditions as a part of related musk ox work, but such information gathering has been sporadic. In spite of requests by Nunivak herders for the Service's assistance in reindeer management (Bering Sea Reindeer Products 1972), a comprehensive range inventory and management plan has never been done. Annual work plans over the past years (FY 77-80) have not adequately addressed the needs for reindeer management on the refuge and little has been actually accomplished. In an effort to better address the Service's responsibilities on Nunivak, manager Frickie was instrumental in assigning an assistant at Mekoryuk in 1978 who had previous field experience in musk ox work on Nunivak. This position has been recently consolidated back to the Bethel office. Current annual work plans (FY-81) call for exclosure construction, some remote sensing analysis of

MAP E. NATIONAL WILDLIFE REFUGES IN ALASKA IN RELATION TO EXISTING REINDEER HERDS AND POTENTIAL EXPANSION AREAS.



range, snow surveys, and assistance to herders. While these annual work plans address some aspects of the reindeer situation on Nunivak, they are a continuation of a fragmentary approach to the problem.

In a search for comprehensive range inventories and range management plans, the Nunivak herders have turned to BIA for help. In turn, the BIA (Bethel office) has requested the Soil Conservation Service to conduct a soils and range inventory on Nunivak refuge and to assist the local herders in management plans for herd expansion. The work was requested to begin in FY-81.

Range inventories done by SCS elsewhere in the State have lacked adequate ground truthing of aerial photographs and satellite data and have neglected the aspect of snow and ice as a limiting factor in determining reindeer range carrying capacities. As a result, SCS estimates of stocking rates, carrying capacities and range management plans in general have been overly optimistic as to the number of reindeer that can be accomodated on a particular range. Reindeer herders on the Seward Peninsula have endorsed the favorable figures generated by SCS as justification for the BLM to relax its current permit limitations. Because of technical inadequacies on the SCS data and subsequent analysis, the BLM is currently conducting its own range studies on controversial reindeer areas.

In summary we find that the reindeer situation on Nunivak NWR has been neglected by the Service for many years. There has been repeated cycles of overgrazing and range destruction. Competition for range between musk ox and reindeer remains poorly understood. Data on the range has been gathered in a piecemeal fashion and the development of a comprehensive range management plan for the refuge has yet to be accomplished. Meanwhile, as interest in the new antler economy grows, the Nunivak reindeer herders have requested the SCS to assist them in plans for herd expansion. The record shows that unrealistically optimistic forecasts for reindeer possibilities (which will be embraced by the herders) may be forthcoming if SCS gets involved. The Service may find itself hard pressed to accomodate the herder's wishes and not have adequate data to make a sound resource decision. Complicating the situation is that Nunivak can no longer be viewed as "out of sight - out of mind". The general public (especially certain segments which have shown keen interest in how the Service manages the NWR system) will not allow another era of overgrazing on Nunivak NWR to pass by unheeded.

Aleutian Islands NWR

Reindeer were introduced on Unalaska and Umnak Islands in 1913, the same year that the refuge was established (Spencer, 1979). The executive order for the refuge lists "propagation of reindeer" as a reason for establishment. In 1914 reindeer were brought to Atka Island (USFWS, 1973). Very little information can be found regarding how these reindeer populations increased over the years. Reports of reindeer introductions on other Alaskan islands indicates charateristic boom and bust cycles occurred with resultant destruction of vegetation. (Scheffer, 1951) (Klein, 1959) It is known that the Unalaska reindeer

did not survive.

Presently there are about 2,000 reindeer on Atka (Jones, per. comm., 1980). The current status of the Umnak reindeer is unknown. The Atka reindeer are free-roaming and range mostly on the western portion of the island. Residents of Atka, military personnel and commercial fishermen occasionally hunt the Atka reindeer. (USFWS, 1973). There have been no reindeer range investigations or studies conducted in the Aleutians. It is reported, however, that the lichen vegetation on Atka has been essentially eliminated as a result of reindeer grazing (Jones per. comm., 1980). Bald Eagles have been found to prey on reindeer calves at Atka and are often shot by the villagers for that reason. (Jones, per. comm., 1980).

Although annual work plans for FY-80 identified assistance to Atka residents and the development of a reindeer management plan as steps to take, no progress has been made to date. The refuge manager has been approached by the villagers of Atka for permission to introduce reindeer on nearby Amlia Island. A meeting to discuss this proposal is scheduled for mid-September, 1980. Possible issues which may arise if reindeer are brought to Amlia include the following:

1.) Impacts will occur to the vegetation, especially the lichen communities. The extent of impact will be dependent upon whether or not effective management practices can be applied.

2.) There may be adverse impacts to bald eagles on Amlia as a result of predator control efforts initiated by the reindeer herders.

3.) It is believed that Amlia was formerly inhabited by the endangered Aleutian Canada goose. Impacts on vegetation, and the disturbances associated with reindeer herding, especially summer roundups for antler-cutting may influence possibilities for the geese re-establishing themselves on Amlia.

4.) The extreme western portion of Amlia Island, about seven sections of land, has been selected by the Village of Atka. When conveyed, these lands will become private lands subject to Section 22(g) of ANCSA. Any regulations the Service develops regarding 22(g) for Amlia may have to address reindeer grazing.

5.) Current legislation before Congress (Tsongas - Jackson Substitute and the House-passed version of HR-39 will designate the remaining federal lands on Amlia as wilderness. While wilderness designation does not preclude grazing per se, it may restrict the placement of cabins, corrals and other structures related to reindeer herding within the wilderness area.

Critical to the entire reindeer issue in the Aleutian is the classification status of reindeer. Native leaders have requested assistance from BIA in getting the status of reindeer on Atka, Umnak and

Kodiak Islands reclassified from "feral" to "domestic". The BIA has also been requested to transfer the ownership of those herds to Natives once the re-classification is completed. The Interior Department's Regional Solicitor's office is currently working on the legal aspects of reclassification and it is expected that any final decision will rest with the Secretary. Preliminary indications are that the Alaska Dept. of Fish and Game is not opposed to the change.

The interest in antler sales has reached the Aleutians, and in the summer of 1980 a helicopter was brought to Atka to aid in rounding up the reindeer for antler cutting. (Martin, per. comm., 1980). It is expected that there will be increasing requests for reindeer grazing privileges on the refuge. Like the situation described for Nunivak, the Service has not adequately addressed the reindeer responsibilities in the Aleutians, and is currently in a poor position to deal with anticipated problems. Again, there is a definite need for management oriented studies and the development of appropriate reindeer management plans.

Selawik NWR

The Kotzebue Sound area has a lengthy history of reindeer grazing activities. A herd was established at the village of Kotzebue in 1901 and Selawik in 1909 (Stern, 1977). The activity of herding reindeer continued at Selawik village until the mid-1960's when the expanding Western Arctic Caribou herd absorbed the loosely herded reindeer (Stern, 1977).

A new reindeer operation sponsored by the NANA Regional Corporation began in 1974 when some 900 animals from BIA's "Model Herd" were brought to the Baldwin Peninsula from Nome. (BLM, 1976). Over the past six years this herd has been increased to about 9,000 through natural increases, purchase of animals from other herds, and merger agreements with other herders. Current intentions of the corporation are to expand its herd to 33,000 through the establishment of 11 sub herds by 1986. This plan for expansion is based upon carrying capacity recommendations made by the Soil Conservation Service following their range inventory in 1976. The main area planned for this build up is the Buckland river drainage. The BLM is presently conducting range inventories and wildlife studies (caribou) in the Buckland area in an attempt to seek solutions to the obvious conflict with wintering caribou.

Because of the real threat of losing the reindeer herd to migrating caribou, in the fall NANA moves its animals away from the Baldwin Peninsula to the Candle area on the Seward Peninsula. When caribou move north, away from their traditional wintering area in the Selawik Hills and Buckland drainage, the NANA herd is moved back into the Baldwin Peninsula summer range.

The basal portion of the Baldwin Peninsula as well as lands at the mouth of the Buckland River and along the north slope of the Selawik Hills are currently within the Selawik NWR and under a previously existing BLM grazing permit. The Interior Dept. policy which has been expressed to

NANA is that this permit would be honored as a valid existing use (subject to appropriate resource regulations). This position is also evidenced in both the House and Senate versions of the Alaska Lands Legislation.

The House boundary would include NANA operations on the Baldwin Peninsula and northwest of Buckland. The Senate version excludes these areas from the refuge except for about six townships of land southeast of Selawik Lake which are currently under a reindeer permit to NANA. If either bill is passed, the Service must develop regulations, grant permits, monitor and enforce stipulations. To meet these responsibilities especially as they relate to other resources and uses, an effective reindeer management plan based on sound range information must be developed.

Yukon Delta - Clarence Rhode NWR's

Archeological evidence indicates there was human use of caribou on the Yukon Delta region at least 1200 to 1300 years ago. (Shaw, per. comm. 1980) It is believed that such use dates back much earlier, however, varifying evidence remains to be discovered. Historical mention is made of caribou being present throughout the region up until the 1870-1880's (Skoog, 1968). Today, small herds of caribou are still found in the uplands to the north (Andreafsky Hills) and east (Kilbuk Mtns.).

Reindeer were first brought to the Delta region in 1901 when 176 animals were released in the Bethel area. (Reardon, 1974) By 1936 some 176,000 reindeer were reported for the Yukon-Kuskokwim Delta region. (Reardon, 1974) A sharp decline in the early 1940's resulted in a complete breakdown of reindeer herding on the delta. There are no longer any active reindeer operations in the region, except for a small herd at Stebbins (near the northern most part fo the refuge). The status of the Stebbins herd is unknown at the writing of this paper.

From time to time interest has been expressed for ressurecting the reindeer industry on the Yukon-Kuskokwim delta. Most interest has been focused on the upland areas along the eastern portion of the refuge and in the Andreafsky Hills. Hypotheses have been made that past reindeer operations on the western delta region where an intense pattern of water bodies interlace with low flat wetlands, failed because of the general unsuitability of these lands to reindeer herding (Dau, per. comm., 1979). Introductions of reindeer in this portion of the refuge could result in severe impacts to nesting waterfowl (Map C). Annual work plans for the Clarence Rhode NWR during the period of 1977-1979 have called for an inventory of waterfowl habitats which may conflict with reindeer. While some progress has been made, much remains to be completed on this project.

The 1980 Alaska State Legislature approved the funding ($400,000) for a University of Alaska study of the feasibility of reindeer herding on the lower Kuskokwim. It is anticipated that at least a portion of this study will involve lands within the Yukon Delta NWR. Both versions of the Alaska Lands Legislation allow for reindeer herding on the Yukon

Delta refuge in areas where it would be compatible with the other purposes of the refuge. Sound comprehensive resource information for the entire refuge will be necessary to make compatibility determinations and provide recommendations to the University of Alaska study. Although there is presently no reindeer herding on the Yukon-Kuskokwim delta, this area is one of the most likely places expansion will occur and has substantial potential for serious impacts to wildlife resources.

Kodiak NWR

Reindeer were first introduced on the island in the 1930's. There is no record of caribou ever being present on Kodiak. Herders from the village of Akhiok herded the Kodiak reindeer for several years and it is believed that the herd reached several thousand in number. At Statehood in 1958, the Kodiak reindeer were declared feral and have remained in a unherded status. Today it is estimated that only 150-200 animals remain (Reardon, per. comm., 1980). Essentially no young animals have been observed in the herd for the last two years. (Reardon, per. comm., 1980).

Recent inquiries regarding possible herding of the Kodiak reindeer has been voiced by villagers at Old Harbor and Akhiok. In addition, the BIA is currently requesting legal analysis for possible re-classification of the Kodiak reindeer from feral to domestic. In the event that the status of the Kodiak reindeer is changed, it will become necessary for the owners to obtain grazing permits from the FWS. The decision to grant such permits; and if granted, under what stipulations and regulations; should be determined only after a thorough analysis of the resources involved. To date, annual work plans for Kodiak NWR have provided only monitoring of the reindeer herd. Essentially no range data has been collected upon which to base reindeer management plans.

Alaska Marine Resources NWR

There are two island areas within this refuge where reindeer currently occur. A herd of about 750 reindeer (under a previous BLM grazing permit) are on Hagemeister Island. Some 2,000 feral reindeer are also on Umnak Island. According to BLM files, there is a history of overgrazing on both islands. (Merrick, per. comm., 1980) The reindeer of Umnak are subject to current re-classification considerations being initiated by BIA.

Like all other refuge areas where reindeer grazing occurs, there is a need to get on top of the situation on these islands. Again, there is a need for a comprehensive analysis of these islands with good range studies and management plans developed.

B. Reindeer on Non-Refuge Lands

A number of possible issues regarding reindeer herding off refuge lands has been identified. In many cases there are basic similarities to issues relating to refuge lands and there is considerable interrelation between both categories. Because of the often close relationship between reindeer issues both on and off refuge lands, a clear Service

policy must be established.

The reindeer issue that is most related to refuges is where herding occurs on private lands within or immediately adjacent to wildlife refuges. Problems with trespass animals, predator control, and fencing are just a few examples that must be dealt with. In cases where other land agencies manage reindeer herding which also occurs on a refuge will necessitate coordination of permits, permit conditions, etc. It is hoped that through cooperative agreements and possibly in some cases, land exchanges that such problems can be handled to the best benefit of wildlife resources. Such involvement will definitely require substantial allocations of manpower and funds on the part of the Service to meet these requirements. As the nation's steward of migratory bird resources, the Service will have concern about reindeer activities off refuges that occur in major bird habitats. In these cases it will become necessary for the Service to identify possible conflict areas (Map C) and address them in comprehensive habitat protection plans. In some cases it may become necessary to try to acquire key areas for protection from such impacts. In other cases, impacts of reindeer herding may be prevented through Service participation in regional land use planning efforts. In all cases, such involvement will require personnel and funds to accomplish these needs. It is expected that the new Wildlife Operations branch of the Area Office will be directed to work on these issues.

APPENDIX A

Throughout the history of reindeer in Alaska, a variety of government agencies have been deeply involved. The very idea of bringing reindeer to the territory was formulated by government officials. Today, the government agency involvement with reindeer is more complex than ever. The following is a list of the principle agencies in the reindeer arena and a short summary of their roles, activities etc.

FEDERAL AGENCIES

Dept. of Interior

Bureau of Indian Affairs (BIA)

The BIA is chiefly responsible for carrying out the Secretary of Interior's responsibilities for support of Native reindeer herders according to the Reindeer Act of 1937. Currently the BIA helps fund the activities of the Reindeer Herders Association, soil and range inventories conducted by the Soil Conservation Service and certain reindeer research projects with the University of Alaska. Mr. Frank Madison (Juneau) is the BIA reindeer representative.

Bureau of Land Management (BLM)

For many years, the BLM was the sole land managing agency for reindeer ranges. The boundaries of the existing reindeer range allotments were established by the Bureau. With passage of Alaska Native Claims Settlement Act (ANCSA), there are now several land agencies and owners involved in addition to BLM. The Bureau is currently conducting its own range studies on the Buckland and Unalakleet areas where conflicts exist with caribou. BLM is also preparing to develop a land use plan for lands under its jurisdiction on the Seward Peninsula. Key personnel involved with the reindeer issue for BLM are: Sal DeLeonardis and LaRalle Smith (State Office, Anchorage), Roger Bolstad and Matt Robus (Fairbanks District Office), Dave Scott (Nome) and Keith Woodworth (Kotzebue).

National Park Service (NPS)

A relative newcomer to the reindeer scene, the NPS is now responsible for management of the Bering Land Bridge National Monument which has several ongoing reindeer operations. The NPS has recently funded socio-economic studies of reindeer herding and preliminary investigations of all-terrain vehicle (ATV) use related to reindeer herding on the Monument. Mr. Charles Budge (Anchorage) is the acting reindeer representative for NPS.

Fish and Wildlife Service (FWS)

The FWS has been involved with reindeer herding since the establishment of the Aleutian Islands National Wildlife Refuge in 1913. Until 1972, the Service conducted predator control activities on reindeer ranges in northwestern Alaska. A study of reindeer - wildlife interactions conducted by the Alaska

Cooperative Wildlife Research Unit, University of Alaska was recently funded by FWS. Fran Mauer, Charles Strickland, and John Martin are the reindeer contacts for the agency.

U.S. Department of Agriculture (USDA)

Office of the Secretary's Representative

Mr. James Fischer has shown considerable interest in Alaska's reindeer industry and works to coordinate support from USDA agencies in Alaska.

Soil Conservation Service (SCS)

The SCS became involved in the reindeer issue in the mid-70's when requested by the NANA Regional Corporation to conduct soil and range inventories on the Seward and Baldwin Peninsula. Thus far about 2/3's of the Seward Peninsula has been surveyed by SCS. From these surveys, SCS is assisting reindeer herders in developing individual range management plans which include stocking schemes, rotational grazing, and carrying capacities. The SCS is beginning to conduct snow cover investigations on reindeer ranges but has little data thus far. The Reindeer Subcommittee of the Alaska Cooperative Land Manager's Task Force is hosted by SCS. Ted Freeman and Dave Swanson (Anchorage) are the chief reindeer contacts for SCS.

Animal and Plant Health Inspection Service

Mr. Daniel Jones, the USDA veterinarian for Alaska has taken an active interest and is working to obtain support for the reindeer industry.

STATE AGENCIES

Alaska Department of Commerce and Economic Development (DCED)

This state agency indicates it will provide marketing expertise for the reindeer industry and intends to plan for marketing research in the future. Mr. Joe Ferguson (Juneau) handles reindeer matters for DCED in Juneau.

Alaska Department of Natural Resources (DNR)

Due to imminent conveyance of federal lands on the Seward Peninsula to the State of Alaska, the DNR is preparing to deal with the reindeer issue from a standpoint of land management. The Department is in the process of drafting new grazing regulations for all state lands. It is also embarking as a regional land use planning effort. Both activities will address reindeer policy on state lands. Jim Wicks and Richard Stern (Anchorage) are reindeer contacts for DNR.

Alaska Department of Fish and Game (ADF&G)

The Nome reginal office handles most reindeer issues for ADF&G, especially as it pertains to predator control on reindeer ranges. Wildlife disease specialists for the Department based

in Fairbanks handle disease studies of reindeer and caribou. Mr. Robert Pegau (Nome), Jim Davis and Ken Neiland (Fairbanks) work on reindeer affairs for ADF&G.

UNIVERSITY OF ALASKA

Cooperative Extension Service (CES)

The Cooperative Extension Service has been active in assisting the Reindeer Herder's Association in the development of training workshops for herders and in the transfer of information to herders and other interested parties. Personnel of CES have actively briefed the reindeer herders on the Alaska Lands Legislation. Key contacts at CES are Alan Epps (Fairbanks) and Virgil Severns (Nome).

Agricultural Experiment Station (AES)

This agency has provided support through research of reindeer economics and has been involved in animal husbandry work. Reindeer personnel include: Ed Arobio (Fairbanks) and Sig Restad (Palmer).

Institute of Arctic Biology (IAB)

The Institute has long been a leader in scientific research of reindeer. Through the work of Dr. Jack Luick, a multitude of physiological and nutritional research projects have been conducted with reindeer. Current projects under Dr. Luick include such topies as general reindeer nutrition and physiology, the physiological and behaviorial effects of antler cutting, development of supplemental feeds for reindeer, and translation of pertinent foreign literature on reindeer. Dr. Robert Dieterich (staff veterinarian) is conducting studies and tests to develop a vaccine for Brucellosis in Alaskan reindeer. Dr. Dieterich also is involved in study of other reindeer diseases and parasites. Dr. Robert White, also a reindeer physiologist with the Institute, is currently leading a State-funded feasibility study of establishing reindeer herding in the lower Kuskokwim area.

Alaska Cooperative Wildlife Research Unit

The Coop Unit has conducted several reindeer related studies over the past 20 years. Unit leader, Dr. David Klein is a recognized authority on caribou and reindeer. The most recent reindeer work performed by the unit was a study of reindeer - wildlife interactions which was funded by the U.S. Fish and Wildlife Service.

Arctic Environmental Information and Data Center (AEIDC)

Recent involvement in the reindeer issue by AEIDC was the coordination of a reindeer conference in December 1979. Director Dave Hickock has long maintained an interest in the reindeer industry.

ALASKA STATE LEGISLATURE

The Special Committee on Agriculture (House of Representatives) has recently taken an active interest in supporting expansion of the reindeer industry. In November, 1979 this committee held public meetings regarding the reindeer issue. Representatives Pappy Moss (Delta), Leo Schaeffer, Jr. (Kotzebue) and Jack Fuller (Nome) have been most active in the House for reindeer issues. Ms. Kelly Fike is the key staff person for the Ag committee for the reindeer issue. In the State Senate, Frank Ferguson (Kotzebue) and George Holman (Bethel) have been the main reindeer industry advocates.

PRIVATE ORGANIZATIONS

Reindeer Herder's Association (RHA)

The RHA is made up of 17 member reindeer herders with an elected president (Clifford Weyiouanna) and has an executive director (Dan Karmun). BIA funds most of the RHA's activities. The association functions as the main advocacy group for the reindeer herders and the industry. It coordinates information to the reindeer herders and provides data to government and university groups that deal with the herders. RHA works to stimulate funding for industry related projects, studies and programs as well as developing public awareness to the reindeer industry.

Kawerak Incorporated

Kawerak Inc. is the non-profit native corporation for the Bering Straits region. Kawerak provides office space for the RHA and helps to fund some industry - oriented programs. Mr. Charlie Johnson is the Kawerak contact on reindeer issues.

Alaska Federal of Natives (AFN)

The AFN has long supported the reindeer industry and is involved in working to obtain funds for industry programs. Ann Vick handles reindeer affairs for AFN.

Alaska Humanities Forum (AHF)

The Alaska Humanities Forum is currently developing an Alaska Native Cultural Institute which will provide information on alternative designs for adult and secondary education. The intention will be to include reindeer training education in this program. The forum also provides technical assistance to Native Regional and Village Corporations. Gary Holthaus is the reindeer contact at AHF.

NANA Regional Corporation (NANA)

NANA is recognized as the current leader in the reindeer industry. Starting in 1974 with about 900 reindeer from the "BIA Model Herd" from Nome, NANA has expanded its involvement to include the former Clark, and Hadley ranges and a portion of

the Gray range (4 million acres) and has entered into agreements for management of the reindeer on the Aukongak and Kakaruk ranges (1.8 million acres). The corporation is currently managing about 12,000 reindeer. NANA is experimenting with the use of dogs, horses, air cushion vehicles, radio-tracking collars, and aircraft (fixed wing and helicopter) to supplement the more traditional use of snow machines and ATV's for reindeer herding. Through aggressive marketing of velvet antlers by NANA officials, the price paid to Seward Peninsula herders for these products has increased by over 300% in the past three years. The corporation has gone on record of requesting reindeer grazing privileges on key winter range areas of the Western Arctic caribou herd. President John Schaeffer and his chief herder, Doug Sheldon are in charge of the NANA reindeer operations.

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