STATUS OF MOOSE POPULATIONS IN INTERIOR ALASKA

Moose are Alaskan residents of long standing, having immigrated to the state over 175,000 years ago. Interior Alaska was largely a treeless grassland or tundra at that time and moose probably existed in very low numbers during their early colonizing years. A series of climatic warming trends subsequently resulted in a vegetation complex of trees, shrubs and grasslands similiar to that in interior Alaska today. This change of habitat was favorable for moose and they increased in numbers and became firmly established.

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However, historical records and comments by early hunters and trappers suggest that moose existed in at least low to moderate numbers throughout most of interior Alaska, although there were some unexplained voids in their range. In the late 1940's, 1950's and early 1960's moose gradually increased in abundance, reaching maximum numbers around 1965 (Figure 1). Since that time moose populations have generally declined to the present low levels. The purpose of this report is to describe the recent history of moose in interior Alaska, and to speculate on the future of this species.

Population Growth

The increase of moose populations during the 1940's and 1950's was due to a combination of events. The most important factor was probably a large increase in moose habitat caused by a high number of natural and man-caused fires, and developments such as homesteading, mining and construction. Regrowth of shrubs in these disturbed areas greatly expanded the available food supply. Moose on a high quality diet frequently have high reproductive success, and during the years between 1956 and 1964, for example, the ratio of calves per 100 cows during fall in Game Management Unit 20A (See map, page 4) was high, ranging from 42 to 55.

Two other factors contributed to the growth in moose populations from late 1940 to early 1960. First, extensive predator control by the Federal government reduced wolf populations and minimized predation upon moose. Poisons were used until early 1960, and aerial hunting and bounties on wolves continued throughout the period. Second, relatively mild winters during this interval contributed to high overwinter survival of calves and adults during most years.

Although moose populations throughout most of interior Alaska continued to increase during the late 1940's and 1950's, these increases probably slowed and the populations eventually stabilized during the early 1960's. Moose were then extremely abundant and an estimated 10,000 to 12,000 animals existed in Unit 20A alone. It appears that moose numbers had approached, and perhaps exceeded, a critical balance with the available food supply during the 1960's. An inadequate food supply often leads to reduced reproductive success, and the observed ratio of calves per 100 cows in Unit 20A during fall 1965 was one-half that occurring during several previous years.

Population Decline

The winter of 1965-1966 was probably the turning point for moose populations throughout much of interior Alaska. There were too many moose for the available food supply, and this problem was aggravated by two successive severe winters (Figure 1). Three feet of snow had accumulated by December 1965 in moose winter habitats, and snow depths continued to increase throughout the winter. Snow accumulation was also greater than usual during the winter

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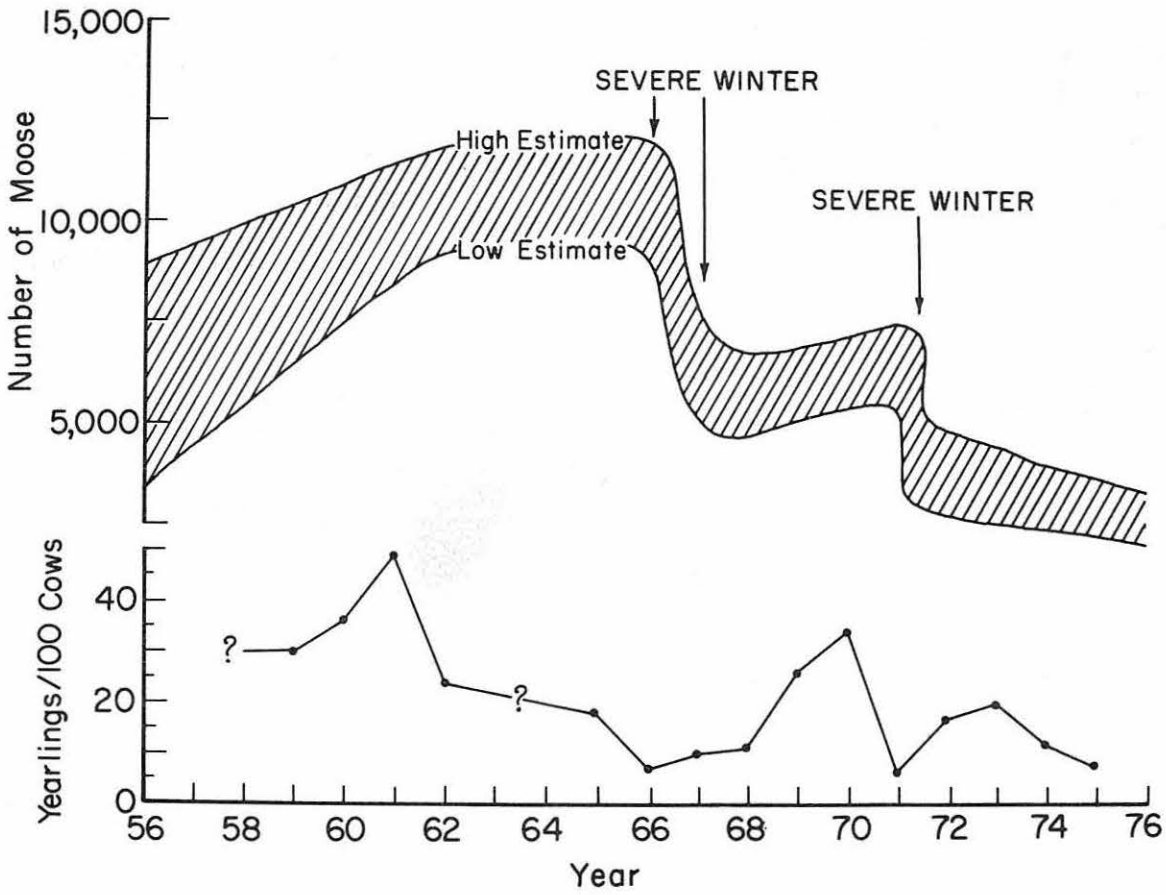

Figure 1. "Estimated moose abundance and yearlings per 100 cows in Unit 20A moose populations. Severe winters caused sharp declines in moose populations. Note that periods of population growth are characterized by relatively high yearling survival, while periods of population decline correspond to low yearling survival."

of 1966-67. Overwinter calf survival during these years was very poor, and only 7 yearlings per 100 cows were found by spring 1966 and 10 yearlings per 100 cows by spring 1967 in Unit 20A (Figure 1). Furthermore, adult mortality during these winters was also apparently high. Perhaps 50 percent of the moose population in Unit 20A and in other areas of interior Alaska died during the winter of 1965-66 alone.

While long legs usually allow moose easy movement in deep snow, even they can be inadequate during severe winters. Snow depths in excess of two and one-half to three feet force moose to "plow" or "bound" through the snow. When the energy required to move in this manner is considerably greater than the energy moose can obtain from their food, malnutrition and eventual death may occur. Calves are even more affected by deep snow than adults because of their shorter legs and lower fat reserves.

Winters were relatively mild between 1967 and 1970, and the moose populations in Unit 20A and adjacent areas began to slowly increase. Calf survival through summer to fall sharply increased during this period and yearling overwinter survival more than tripled between 1967 and 1970.

Disaster struck the moose populations in interior Alaska again during the winter of 1970-71 (Figure 1). Snow conditions were as severe as those during the 1965-66 winter, and again the winter mortality of moose apparently approached 50 percent. In the spring of 1971 a record low of six yearlings per 100 cows was seen in Unit 20A, indicating that most calves had died during the winter. This time the moose populations in Unit 20A and adjacent areas did not begin to increase, but instead they continued to decline.

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The reasons for the steady decline of moose populations since 1971 are clear: a continuous and unavoidable mortality among adults and a low recruitment of new animals, or yearlings, into the breeding adult population. However, the ultimate factors behind these declines are less clear. Hunting is one obvious source of adult mortality in many areas of interior Alaska. For example, reported hunter harvest in Unit 20A prior to 1970, when moose were relatively abundant, ranged between 145 and 258 animals per year (Figure 2). This reported harvest increased from 298 in 1970 to 710 in 1973, but in 1974 and 1975 the hunting season was sharply reduced, and the harvests were 341 and approximately 40, respectively. Thus, hunting during 1970 through 1974 was certainly a mortality factor which contributed to the eventual decrease in total moose numbers in Unit 20A.

Although hunting may have been a significant cause of mortality in certain heavily hunted areas, it was probably not a major factor contributing to the widespread and generally synchronized decline of moose throughout

interior Alaska. Moose populations in lightly hunted and even unhunted regions have experienced similar population declines. While large areas of the Chena River and Beaver Creek drainages are very lightly hunted, they too have low numbers of calves and yearlings, and have experienced sharp population declines in recent years. Furthermore, in spite of an extremely low hunter harvest in Unit 20A during 1975, the moose population has continued to decline in that area. Moose in unhunted populations in Mount McKinley National Park are also experiencing similar declines. Several individuals familiar with Park wildlife have reported a continuous reduction in moose abundance during the past several years. An aerial survey conducted by Park personnel during fall 1974 revealed low calf and yearling ratios comparable to those seen in Unit 20A.

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Poor range conditions have probably not been a major factor contributing to moose declines in recent years in interior Alaska. Although quantity and quality of moose range is probably lower today than during the 1950's and 1960's, it appears capable of supporting considerably more moose than it is at present. A two-year study of Unit 20A moose habitat and browse use conducted by the Alaska Department of Fish and Game concluded that neither food nor habitat were limiting moose numbers. Further, rate of growth and maximum body size of moose in Unit 20A are among the highest in the state, both of which are characteristic of animals on a high quality diet.

The influence of disease on moose mortality has not been closely examined. However, observations from Alaska and western Canada suggest that disease is probably not a significant mortality factor among either calves or adults in these areas.

With the exception of severe winters, predation may well have been the most significant and widespread cause of moose mortality during the past several years. Predator control during the 1950's probably facilitated the large increase in moose numbers during that period. With a decrease in the intensity of predator control beginning about 1959, wolves probably responded to the abundant moose populations by increasing in abundance. Even as moose populations began to decline in 1966, there were still adequate numbers of prey to support high predator populations. Further, wolves may have compensated for declining moose populations by heavily utilizing snowshoe hares, which reached the peak of their cycle during the late 60's and early 70's. When hares declined in 1972 or 1973, abundant wolf populations were again forced to rely primarily on declining moose populations for food.

Therefore, throughout much of interior Alaska at this time, we are faced with high wolf populations. Fish and Game biologists estimated from aerial surveys in 1975 that approximately 200 wolves and 3,000 moose are present in Unit 20A during most of the year. This ratio of approximately 1 wolf to 15 moose represents considerably higher wolf numbers than the moose populations can support, and probably reflects the cause of declining moose populations in recent years. In spite of relatively mild winters since 1971, overwinter calf survival in Unit 20A declined to a ratio of eight yearlings per 100 cows in spring 1975. Observations of biologists, hunters and trappers, as well as results of extensive moose radio- and visual-collaring studies conducted by the Department of Fish and Game in Unit 20A, suggest that a large number of calves are killed by wolves during their first year of life. Further, of 40 adult moose radio-collared during 1973 and 1974, approximately 25 percent were proven or are strongly suspected of having been killed by wolves. Therefore, in Unit 20A wolves appear to be responsible for a very high mortality among both calf and adult moose. An imbalance between wolves and moose also may be causing low calf survival and declining moose populations observed in many other areas of interior Alaska as well.

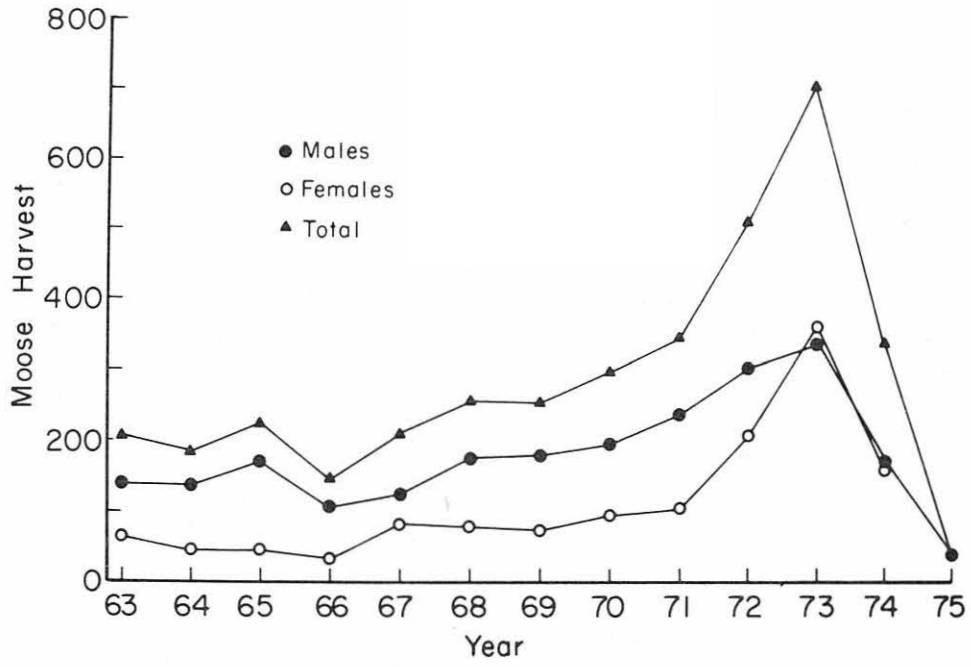

Figure 2. "Unit 20A moose harvest from '63 to 1975. Note the abrupt increase in harvest in the early 70's and rapid decline (to about 40 bulls)in 1975."

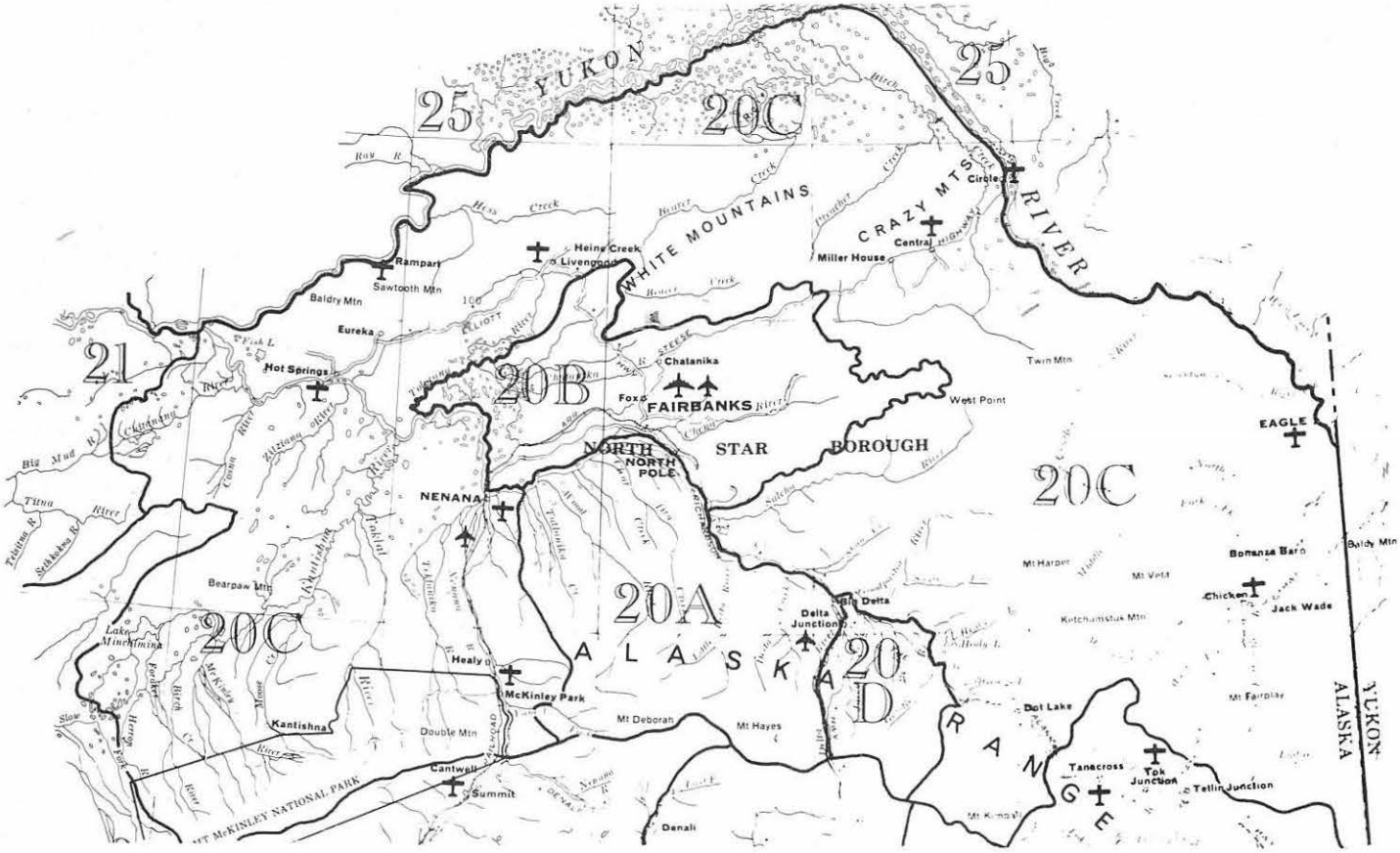

Figure 3. Interior Alaska Game Management Units

Future

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The eventual recovery of moose populations in interior Alaska is assured. However, the prospects for a significant increase in moose abundance and improved hunting in the near future are not good. Although wolf populations in Unit 20A may be declining, they will continue to further depress moose populations until a normal balance between predator and prey is restored, and moose can begin to increase. This process could no doubt take several years, depending upon the rate of wolf population declines, severity of winters, etc. If wolf numbers are reduced by control programs in selected areas, the recovery rate of moose populations will be increased. However, this recovery will still require several years. Meanwhile moose hunting must be sharply restricted and limited only to males to assure that it does not further depress populations.

Moose population fluctuations will continue to occur in response to ecological and management changes. Certain factors influencing moose abundance, such as winter weather, cannot be controlled. However, other factors can be influenced, and an awareness of these factors can help us avoid the extreme population fluctuations that have occurred during the past 10 years. As management of land in Alaska becomes more intense, it is unlikely that fires or development will create vast areas of new moose habitat resulting in extensive population growth as occurred during the late 1940's and 1950's. Also, extensive predator control will not be practiced as it was in the 1940's and 1950's. Therefore, as moose populations increase in response to local habitat improvement or development, a suitable balance between prey and predator will be maintained. Moose populations will be more intensively managed by liberalizing or restricting seasons and bag limits in response to population trends and publicly accepted management goals.

We believe an awareness of and an ability to control most factors influencing moose abundance will assure the health of moose populations and the opportunity to hunt and view this species in the future.

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