PAST, PRESENT, AND FUTURE MOOSE MANAGEMENT AND RESEARCH IN ALASKA

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ABSTRACT: Human coexistence with moose (*Alces alces gigas*) in Alaska has always been one of exploitation. Primitive people relied on the moose as a source of food, shelter, and clothing. Interior Indians utilized moose whenever available. With the advent of white exploration and gold mining, moose were killed in large numbers for food. Market hunting was common and over-harvest in some areas resulted. Modern conservation and game management came into practice in the later half of the 20th century. With it came regulations preventing over-harvest. Moose seasons were adjusted to accommodate increased demand. Any-sex seasons were largely eliminated or restricted and selective harvest of bulls became the norm. New laws, primarily the Alaska Native Claims Settlement Act changed the paradigm of equal availability of game to all citizens. The law dictated a priority for harvest by rural citizens and instituted the era of subsistence management. Subsistence regulations redistributed harvest among users. It also shifted responsibility of management toward the federal government and away from the state. Today, major interest groups are still battling to ensure their right to a share of the harvest. New to the scene are the "non-consumptive" users. This group views moose as a part of the natural environment to be enjoyed, but not killed. The focus of moose management in the 21st century will likely continue along these battle lines. Coupled with this will be the ever present threat of habitat loss. Research efforts in the next century will likely focus on increasing our understanding of how predators, habitat quality, and hunting influence the population dynamics of moose.

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Moose have long been and continue today to be of great importance to Alaska. Historically, they were a source of food, clothing, and implements for Alaskan Natives and an important food source for early trappers and explorers (Reeves and McCabe 1997). Today, moose continue to provide large amounts of nutritious and healthy food to many Alaskans. They also provide outstanding recreational opportunities for about 33,000 hunters each fall. Over 1 million tourists visit Alaska each year and viewing of wildlife is the number one reason given for visiting the state. Moose are one of the favored animals to see.

Moose have a significant effect on the economy of the state. The annual value of meat harvested amounts to about $9 million (based on cost of $3/pound). Nonresident hunters spend $1.3 million on licenses and tags each year, while residents spend about $300,000. These 33,000 hunters generate about $9 million into the economy through purchases of equipment, food, motels, and aircraft charters. In addition, about 1,000 nonresident hunters use the services of professional guides. This generates another $22 million into Alaska's economy and provides a livelihood to about 550 guides, assistant guides, and their families.

Obviously, moose enhance Alaska's economy, but they are also a great source of pride and joy for Alaskans. Most people genuinely like moose and insist they be managed properly to maintain viable, sus-

tainable populations for both hunters and wildlife viewers.

DISTRIBUTION AND DENSITY

Moose have been associated with Alaska since Pleistocene times. LeResche *et al.* 1974:146 noted that ".....moose survived in Alaska during Wisconsin and pre-Wisconsin glaciation on limited and marginal habitat. During the last few thousand years, development of extensive shrub and forest communities favored increased moose densities throughout much of Alaska." Archeological records indicate moose occurred throughout most of interior and south-central Alaska during the 18th and 19th centuries (Lutz 1960). Moose were rare in the Colville River drainage and the Yukon-Kuskoquim Delta until the mid-20th century. Moose occur only in a few river valleys in southeastern Alaska.

Moose densities in Alaska vary greatly, primarily associated with the occurrence of wildfire, but high densities also occur along some river valleys associated with extensive stands of willow. Densities are lowest in the interior boreal forests which have not burned in recent years. Densities vary from 0.3 to 2.5 moose per square mile over most of their range, but seasonal densities can be higher in some areas.

HISTORY OF MOOSE MANAGEMENT IN ALASKA

For centuries Native Alaskans used moose wherever they occurred. Their population was small and the country vast, so human harvest had little impact on moose populations. Natives had traditions or rules about when and which type of moose could be taken.

The first Europeans came to Alaska about 1740, but for many years their activities were restricted to Kodiak Island and the coastal areas of southeastern Alaska where there was little contact with moose. Russians and a few Americans moved onto the Kenai Peninsula about 1780 and began to explore and settle into interior Alaska by 1840 (Tikhmenev 1888). These settlers were primarily trappers and explorers and likely used moose for food and clothing, but had little effect on the moose population. Throughout the 1800's the white population slowly increased but reached only 4,300 by 1890 (Sherwood 1981) while the Native population greatly declined due to introduced diseases.

Alaska was purchased by the United States from Russia in 1867. Following purchase there were few people in Alaska and they received little attention from the federal government. In essence, there was no government for the first 17 years after purchase. In 1884, Alaska became a district governed by the laws of Oregon (Sherwood 1981). Oregon laws meant little to the to the Alaskans and basically no game regulations existed.

Gold was discovered in the Klondike in 1896 and Alaska's population boomed, because access to the Canadian gold fields was primarily through Skagway in southeastern Alaska. Gold discoveries were subsequently made near Fairbanks and by 1900 Alaska's population was 63,500 (Rollins 1978). About this time, protection of wildlife became a popular issue in the United States due to excess market hunting and depletion of many species of wildlife. Several states began to pass game regulations at this time.

Market hunting of moose and other wildlife was common near Fairbanks and Skagway. Concern over depletion of Alaska's wildlife prompted Congress to pass the Alaska Game Law in 1902 (Sherwood 1981). This was the first attempt to regulate game in Alaska. The law prohibited export of illegally harvested game and set up seasons and bag limits on moose and other species. However, the law was largely ignored be-

cause it was not enforced, but it did create the first confrontation between local and federal control of game management. Many Alaskan residents believed the Alaska Game Law discriminated against residents favoring "outside" hunters. They were vocal in expressing their viewpoint but were ignored (Sherwood 1981).

Alaska became a territory of the United States in 1912. A territorial legislature was created and Alaska had its first representative government, even though the Territorial Governor was appointed by the President. Alaska's moose population was managed under his authority from 1912 to 1925. Game regulations were established to set seasons and bag limits, but these laws were not enforced.

In 1925, the Alaska Game Commission was established by the Congress. The concept of a commission was promoted by the Bureau of Biological Survey. Professionals in that agency wanted to unify management of fur and game animals under one agency and to hire expert managers. The concept was well-founded, but its implementation was slow and difficult. Alaska still had few people and many felt hostility toward the federal government as well as toward predators like wolves and bears (Sherwood 1981).

In 1940, Alaska's population was 59,278, a decline of about 4,000 since the gold rush boom days (Rollins 1978). The United States entered World War II in 1942. Japan invaded and occupied 2 islands in the Aleutian archipelago. Suddenly, Alaska became of great strategic importance to the United States. In 1942 and 1943 the Alaskan Highway was built and a military buildup in Alaska began. By 1946, the population reached 103,000 (Rollins 1978). Alaska was changing rapidly and so was wildlife management. The larger human population and increasing use of airplanes by hunters were impacting the moose populations. Laws were still being promulgated from Washington, DC. Harvest was limited by regulations, but a primary wildlife management tool was widespread predator control.

Following World War II, Alaska's human population grew rapidly due to the continued military buildup and expansion of the fishing industry. Residents of the state began to demand statehood so they could have control and voice in their government. A primary issue in the statehood debate was the management of fish and wildlife. Alaskans did not like management decisions being made in Washington, DC by people that had never seen Alaska.

With the discovery of oil on the Kenai Peninsula in 1957, Alaska was able to pay for state government and the demand for statehood increased. In 1959, Alaska became the 49th state. The first state legislature established the Department of Fish and Game (ADF&G). The department was and still is led by a commissioner who is appointed by the governor. There are 6 divisions within the department, including the Division of Wildlife Conservation (formerly the Game Division) that has responsibility for management of all resident wildlife resources, except fish and marine mammals. Today, the Division of Wildlife Conservation has 195 employees in 23 locations.

The first legislature also created the Board of Fish and Game as a mechanism for making regulations to allocate harvest of fish and wildlife resources. This board was later divided into the Board of Fish and the Board of Game. The 7 members on the Board of Game are citizen volunteers appointed by the governor. They have authority over allocation of game resources, including: setting seasons, bag limits, methods and means of hunting, and establishment of areas closed to hunting. They do not have authority over expenditure of funds or personnel in the department.

To assure local public involvement in

game management decisions, the legislature created a system of local fish and game advisory committees. Today, there are 87 advisory committees that meet before each Board of Fish or Board of Game meeting to make recommendations on proposals under consideration. The chairperson of each committee may attend the board meetings at state expense to present the views of the local advisory committee.

In addition to the formal local fish and game advisory committee system, the public has several other ways to be involved in game management in Alaska. Any member of the public can submit a proposed regulation dealing with game management. These proposals are published and widely distribute for review by the public. All proposals submitted by the public must be considered by the Board of Game. Also any member of the public can testify before the board on any proposal under consideration. We have a system of management that promotes public involvement.

MOOSE RESEARCH IN ALASKA

The first few years following statehood, the ADF&G developed into a professional organization with a strong management and research program. Significant emphasis was placed on moose research because of the importance of moose to Alaskans and the need for better management techniques.

Early research efforts quantified moose distribution and movement patterns in important hunting areas. In the 1960's, under the supervision of Robert A. Rausch (ADF&G) and Will Troyer (Manager of the Kenai National Moose Range) construction began on the Moose Research Center (MRC) on the Kenai Peninsula. The facility was operational by 1968 under its first director, Robert LeResche and assisted by James Davis. Their early work focused on moose census techniques and habitat relationships. In 1972, Al Franzmann replaced LeResche and directed the MRC until his retirement in 1987. His work focused on techniques development, especially immobilizing drugs. He also worked on applying the indicator animal concept to assess moose condition and status using physiological and morphometric parameters. He was ably assisted by Paul Arneson and David Johnson.

During the 1970's and through the early 1980's the U.S. Fish and Wildlife Service, through the Denver Wildlife Research Center, was an active partner at the MRC. John Oldemeyer was the first cooperator focusing on moose/habitat relationships.

In 1977, Charles Schwartz and Wayne Regelin joined the MRC research staff as partners on moose nutrition and physiology using captive moose. Al Franzmann began working on moose/predator relationships and was also involved in nutritional studies. Work was done on methods to improve moose habitat and to define carrying capacity of various habitats.

In 1987, Charles Schwartz became director of the MRC. He was joined by Kris Hundertmark and later Tom Stephenson. The research effort continued on moose nutrition, but studies of moose genetics and reproductive physiology were started. Much of the emphasis today involves understanding the relationship between nutritional condition and reproductive performance.

The MRC has long been a leader in moose research. Scientists working at the MRC have published over 150 scientific articles, 21 books or book chapters, and have received numerous awards for their contributions.

Not all moose research efforts in Alaska occurred at the MRC. In interior Alaska, Bill Gasaway developed a moose census technique that was accurate and precise. Today, it is used throughout the world to census moose populations. He also made numerous highly significant contributions to our understanding of moose/wolf and moose/

bear relationships. This work continues today in the capable hands of Rodney Boertje. Warren Ballard made similar contributions to our understanding of moose/predator relationships in south-central and northwestern Alaska. Today, Ward Testa is working to understand the factors affecting moose population dynamics in south-central Alaska.

Biologists in other agencies also made significant contributions to our understanding of moose through their research efforts. This includes graduate students from various academic institutions. Notable work was done by Vic Van Ballenberghe, with the U.S. Forest Service, and his associates on moose behavior and habitat relationships in Denali National Park and the Copper River Delta. Layne Adams' contributions from Denali National Park are also recognized. Many other agency personnel have contributed and ideas were annually exchanged at the Interagency Moose Meetings held in Alaska.

MOOSE MANAGEMENT TODAY

The research efforts outlined above contributed to making moose management in Alaska highly successful. There are between 150,000 to 175,000 moose in Alaska in fall before hunting seasons begin and the annual harvest level is 8,000 to 10,000. The state is subdivided into 26 game management units (GMUs) and management biologists are assigned responsibility for one or more GMUs. Using aircraft, these biologists routinely census moose to obtain population estimates. Annual estimates of productivity are monitored by surveying calving areas. Mortality from predation is assessed through fall and spring composition counts. Harvest rates are monitored by a harvest ticket system where both successful and unsuccessful hunters report. Mandatory check stations are set up in some locations.

Harvest levels are managed primarily through timing of the opening of hunting season and setting bag limits. The seasons begin August 20 or September 1 and are about 30 days in length with an allowable harvest of one moose. Winter hunts are allowed in some areas. Harvest of females is allowed in some areas where predation levels are not high and the population is healthy and growing. Calves are not harvested. Antler restrictions are used in many areas to limit harvest while providing increased opportunities to see more moose and thereby increase hunting opportunities. A regulation allowing only the harvest if bull moose with a spike antler, a forked antler, or at least a 50-inch (125 centimeter) antler spread is used in much of the road-accessible parts of Alaska. This regulation protects about half of the bull population. It has allowed seasons to be lengthened in several areas, improved the bull:cow ratios, increased total harvest, and provided increased hunting opportunities. The Division of Wildlife Conservation also has the authority to close any season by emergency order on 24-hour notice if overharvest occurs.

Under state law, subsistence hunters are provided a priority use of wildlife. All state residents are considered subsistence hunters. If population levels do not allow all subsistence hunters to participate in a hunt, priority is given to individuals that have the greatest dependence upon that specific game resource.

Alaska enjoyed excellent wildlife management until about 1990. We still maintain our outstanding system that blends current and accurate biological information with input from the public on how they want their wildlife managed. However, other forces and factors are threatening our ability to manage wildlife in Alaska.

POLITICAL AND LEGAL PROBLEMS

In 1980, Congress passed the Alaska National Interest lands Conservation Act (ANILCA) that classified more than 130 million acres of federal lands into conservation units such as national parks, national wildlife refuges, and other federal land designations. ANILCA recognized Alaska's uniqueness and need for continued access to lands placed in these conservation units. Special provisions in ANILCA provided for continuation of traditional activities such as hunting, trapping, and motorized access on these lands. Despite ANILCA's guarantees to protect the Alaska lifestyle, federal agencies have neglected to accommodate these provisions.

The range of management tools that the state uses includes a variety of hunting regulations, but the ability of the state to use those tools is impacted by federal agencies tending to limit access for hunters. The Division of Wildlife Conservation actively monitors federal agency land management decisions to ensure hunting and other traditional activities can continue and the state's ability to manage wildlife on these lands is not further diminished.

A more significant problem facing Alaska's wildlife managers is due to another section of ANILCA. This section requires a priority for subsistence on federal lands based on rural residency. The law mandates the federal courts assume responsibility for allocation of fish and wildlife resources on federal lands if state laws do not provide for this subsistence priority based on rural residency. Alaska's Constitution does not allow for priority use of commonly-owned fish and wildlife resources based on where a person lives. The federal courts broadly transferred authority to federal agencies to allocate wildlife harvest for subsistence on federal lands. The federal agencies created a separate board to make allocation decisions and a separate public advisory system to provide public input to the process. In 1990, the federal government adopted the state's subsistence seasons, bag limits, and methods and means. However, since 1991 the federal regulations have diverged extensively from the state regulations.

The state continues to regulate wildlife populations on all lands, other than National Park lands established prior to 1980, and allocates harvests for subsistence uses on state and private lands and for nonsubsistence uses on federal lands. This dual system of management is very expensive, divisive to the people of Alaska, confusing to hunters, and results in inefficient wildlife management.

Another major issue facing state wildlife managers in Alaska results from a recent federal appeals court decision. This decision opened the door to potentially give Indian Country status to 40 million acres of lands given to the various Native regional and village corporations in 1972 to settle all Native land claims. Indian Country status would potentially allow each Native entity (210 in Alaska) to govern themselves, make and enforce their own laws, manage fish and game on tribal lands, and not be subject to state law. This court decision has been appealed by the state to the U.S. Supreme Court.

OTHER MANAGEMENT CONCERNS

Wildlife management in Alaska is profoundly influenced by the animal rights movement, primarily because of wolf management (Franzmann 1993). Alaska has a healthy wolf population and a responsibility to manage wolves as a usable wildlife resource. Many people, led by animal rights activists, do not accept wolf management when their harvest is involved. This has led to placing wildlife management issues on

the election ballot that tends to reduce complex issues to simple yes or no questions. When successful these ballot measures override the high degree of public involvement in the management process. There presently is a lawsuit challenging the use of ballot box initiatives for wildlife management based on the common-use clause in Alaska's Constitution.

Another trend in wildlife management is the new focus on ecosystem management and the de-emphasis on single-species in some areas. Moose management and research are not counter to ecosystem management or conservation biology, but provides a cornerstone for it. Attempting to manage entire ecosystems with our present base of knowledge is presumptive and misleading to the public.

Funding for wildlife management is also a great concern in Alaska. Most funds used to manage wildlife are provided by hunters and some hunters want these funds to be used to promote intensive game management. Others want the Division of Wildlife Conservation to fund programs oriented toward viewing and management of species that are not hunted. This has become a legislative issue in Alaska. The Teaming with Wildlife initiative is a proposed federal law to provide funds for wildlife education and management of species not hunted and wildlife viewing programs. An excise tax would be placed on bird seed, field guides, and selected outdoor recreational equipment. These funds would be provided to states to pay for management programs. This would benefit up to 1,800 wildlife species for which no reliably funded conservation program exists. It would solve the concern that only hunters are paying for management of species that are not hunted.

THE FUTURE

Alaska needs a more effective and better funded education program to inform the public about the benefits of sound wildlife management. An important fact is that people like moose and will support sound management programs.

The political and legal problems of dual management of subsistence harvest and authorities that may be granted under the Indian Country decision may hinder our ability to manage moose and other wildlife. Alaska must have a more stable and reasonable political climate to properly manage wildlife resources. We need to dedicate more management and research effort toward the legal and social side of wildlife management as we increase our knowledge of moose biology.

Three areas should receive the attention of moose biologists in the future. The first is to increase our understanding of the relationships between habitat quality, moose condition, and reproductive performance. The second area is to better understand the impacts of human harvest on population dynamics and genetic diversity of moose. We have not placed adequate emphasis on how different harvest strategies can improve the health of the moose population while increasing the opportunity to participate in moose hunting. The final general area that needs continued research is understanding of moose/predator relationships, especially in areas where there is more than one predator. A more specific list of needs was presented by Crichton *et al.* (1997).

REFERENCES

CRICHTON, V.F.J., W.L. REGELIN, A.W. FRANZMANN, and C.C. SCHWARTZ. 1997. The future of moose management and research. Pages 655-663 *in* A. W. Franzmann and C.C. Schwartz (eds.) Ecology and management of the North American moose. Smithsonian Inst. Press, Washington, DC.

FRANZMANN, A.W. 1993. Biopolitics of

wolf management in Alaska. Alces 29:9-26.

LERESCHE, R.E., R.H. BISHOP, and J.W. COADY. 1974. Distribution and habitats of moose in Alaska. Naturaliste can. 101:143-176.

LUTZ, H.J. 1960. Early occurrence of moose on the Kenai Peninsula and in other sections of Alaska. Alaska Forest Research Center, Misc. Publ. Number 1, Juneau, AK. 25 pp.

REEVES, H.M. and R.E. MCCABE. 1997. Of moose and men. Pages 1-75 *in* A.W. Franzmann and C.C. Schwartz (eds.) Ecology and management of the North American moose. Smithsonian Inst. Press, Washington, DC.

ROLLINS, A.M. 1978. Census Alaska: Number of inhabitants, 1792-1970. Univ. Alaska, Anchorage. 210 pp.

SHERWOOD, M.B. 1981. Big game in Alaska: a history of wildlife and people. Yale Univ. Press, New Haven, CT. 200 pp.

TIKHMENEV, P.A. 1888. A history of the Russian-American Company. Translated by R.A. Pierce and A.S. Donnelly from Russian to English for the 1978 edition. Univ. Washington Press, Seattle. 522 pp.