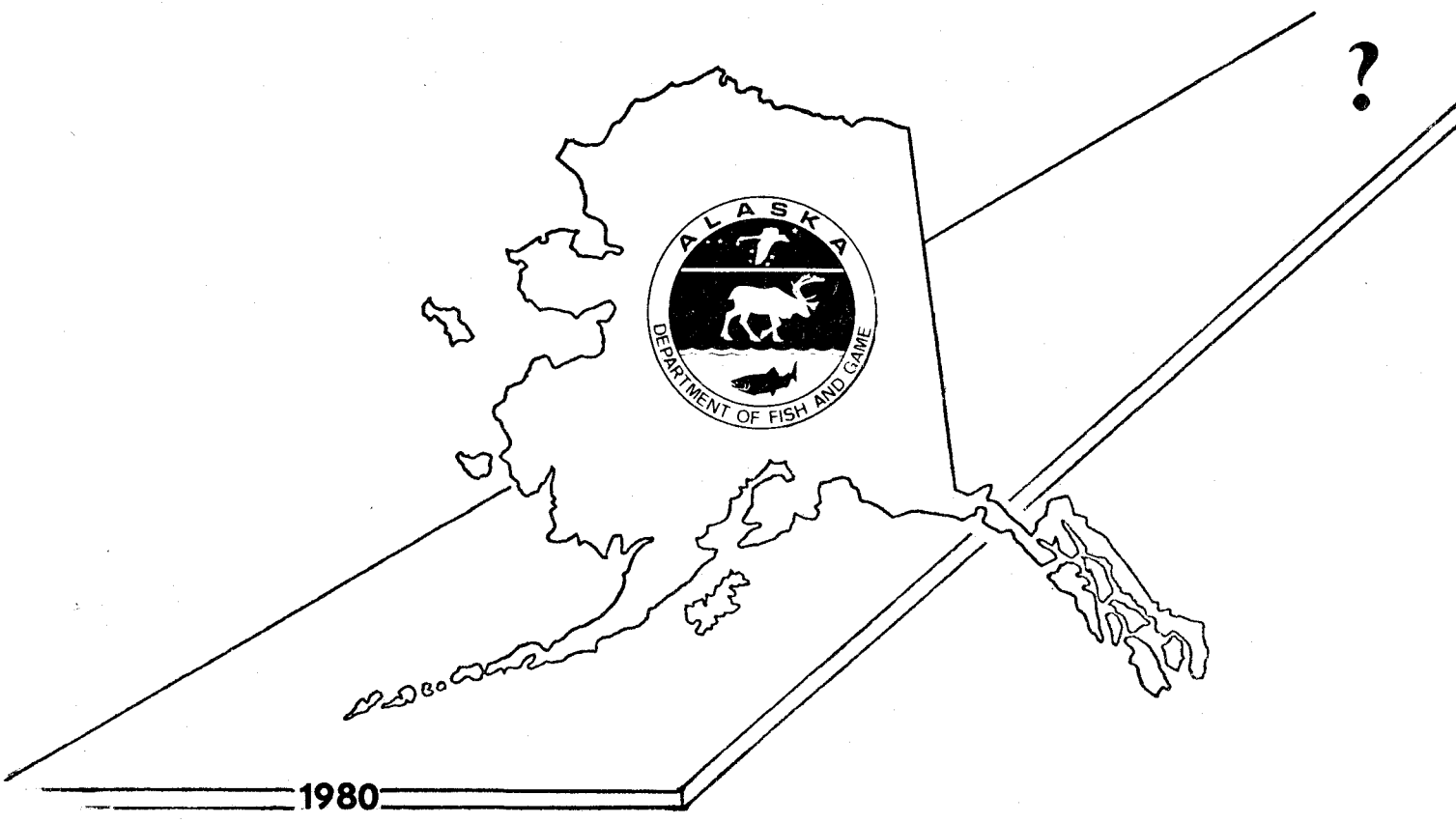
ALASKA WILDLIFE MANAGEMENT PLANS

SPECIES MANAGEMENT POLICIES



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SPECIES MANAGEMENT POLICIES

STATE OF ALASKA

Jay S. Hammond, Governor

DEPARTMENT OF FISH AND GAME
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FOREWORD

These Species Management Policies are the principal policy base upon which the Game Division's Wildlife Management Plans are developed. Originally published in 1973 as the Alaska Game Management Policies, and subsequently revised and expanded by the addition of species background narratives, these policies were reviewed and endorsed by the Alaska Board of Game in 1980.

These policies reflect current Department and Alaska Board of Game philosophy on the management of Alaska's wildlife. They are not intended to replace or constrain the authorities or prerogatives of the Board and the Department in promulgating regulations or taking administrative actions to safeguard the resource or beneficial public uses of wildlife. Rather, they should provide guidance and a basis against which decisions and actions by the Board and Department can be considered.

It is hoped that publication and distribution of these species policies will help the general public, organizations, and other agencies interested in the welfare or use of Alaska's wildlife and other resources to understand the Department's wildlife management philosophy.

These policies will require periodic updating and revision as new information becomes available and as human needs and legal mandates change.

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BLACK BEAR MANAGEMENT POLICIES

Species Background

Black bears (Ursus americanus) are widely distributed in Alaska, with the highest densities occurring in southeastern Alaska, Prince William Sound, and coastal mountains and lowlands in southcentral Alaska. Black bears are absent from the islands north of Frederick Sound, the Alaska Peninsula and the north slope of the Brooks Range. Interior and western areas have low to moderate densities of bears.

Distribution of black bears in Alaska coincides closely with that of forests, but seasonal variations in habitat use are apparent within this vegetative zone. Black bears prefer open forests rather than dense stands of timber, and the highest densities of black bears generally occur in areas having interspersed vegetation types. Semi-open forested areas with understories composed of fruitbearing shrubs and herbs, lush grasses and succulent forbs are particularly attractive to black bears. Extensive, open areas are generally avoided.

In spring, black bears are frequently found in moist, lowland areas or coastal beaches and alder slides where early-growing, green vegetation is available. In July and August, coastal black bears congregate along streams to feed on spawning salmon, although abundant berry crops may attract bears away from salmon streams. In interior areas some use of spawning salmon occurs, but opportunities for such use are limited. Berries are an important food item in late summer and fall, and bears move into alpine and subalpine areas where berries are plentiful.

Most black bears have relatively small annual home ranges, especially in coastal areas where seasonal movements are altitudinal in nature. However, black bears are capable of traveling long distances and have shown a remarkable ability to return to their home ranges when transplanted to other locations.

Little information is available regarding natural controls on black bear populations and the degree of population fluctuations. Deep, long-lasting snows are thought to cause mortality of adults and cubs by slowing emergence of hibernating bears from dens and delaying availability of new green vegetation after emergence. Such mortality may cause significant annual fluctuations in bear numbers. Some bears are killed by other bears and occasionally by wolves, but the importance of such losses is unknown. Parasites and diseases do not cause significant mortality. One parasite of concern to man, Trichina, is present in some bears and is transmissible to man when raw or partially cooked bear meat is eaten. Available information indicates little cub

mortality through the first eight months of life. Cubs are precocious; instances are known in which orphans as young as five months of age have survived without maternal care.

Most human use of black bears in Southeastern, Southcentral and Interior Alaska is recreational hunting for skins and meat. In addition, some bush residents in these regions utilize black bears to meet subsistence needs whenever bears are available. Despite traditionally liberal hunting seasons and bag limits, the harvest of bears remains relatively small except near some coastal communities where large increases in hunting pressure have occurred. In western Alaska, subsistence use is the primary use although the relative scarcity of bears in much of the area makes such use opportunistic.

Black bears have long been considered nuisance animals by some Alaskans, particularly during years in which populations have been high and bear-human encounters more frequent. Increased interest in black bears as game animals has been evident in recent years, particularly as opportunities to hunt other species have become more limited.

Black bear hunting is popular in spring when bears are one of the few species of big game that can be taken legally. Hunters seek bears shortly after the bears emerge from winter dens, when the hides are less likely to be rubbed. Hide quality deteriorates as the winter hair is shed and rubbed spots appear, and therefore most sport hunting ceases by mid-June. The harvest of males is greatest in spring because they leave the den before females and because females accompanied by cubs are protected by regulation.

Recreational hunting of bears resumes in September when hides have improved in quality and continues until bears den for the winter. Black bears provide considerable use at this time, but many of the bears harvested are taken incidental to hunts for other species. The proportion of females in the fall harvest is greater in comparison to the spring harvest due in part to a greater availability of sows that have become separated from grown cubs.

extent as to endanger the bear population in question. The Department will discourage undue competition with bears resulting from human activities including animal husbandry. It is the owner's responsibility to protect his property from damage by black bears. Reasonable efforts must be made to protect life and property by means other than the destruction of bears. When control by removal of bears is necessary, humane methods will be used and the meat, hides and skulls will be salvaged. Whenever appropriate, control of bears will be accomplished by recreational hunting. Poison bait will not be used for control. Problem bears usually will not be relocated because individuals frequently return to their original home range or cause problems for humans in their new locations.

6. When the use of prey by black bears and by humans exceeds the capabilities of the prey population to sustain those uses, the black bear and prey populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. The various subsistence, recreational, and aesthetic values of both bears and their prey will be considered in the final management decisions.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage black bears on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of black bears. Present use priorities may not be the priorities of the future, and black bear management must continue to consider all uses.

2. Throughout the state, recreation is the most important use of black bears. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing bears in natural interactions with their environment. These uses are held to be generally compatible. Management of black bears will seek to provide maximum opportunities for all these recreational uses.

3. Many Alaskans utilize black bears for food. In areas where people are primarily dependent on wildlife for food the Department will manage bears to meet their needs, within the limitation of maximum sustained yield.

4. In areas with intensive hunter use, black bears will be managed for an optimum sustained yield of animals. Management techniques may include, but are not limited to, harvest of bears of both sexes, liberal seasons and bag limits, and access improvement.

5. Certain areas of the state will be managed to provide black bear hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, and population manipulation.

6. Recreational observation and photography of black bears will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of bears, certain areas exceptionally suited to viewing black bears may be zoned in time or space to restrict other uses in favor of observation of bears.

7. The commercial harvesting of black bears for the sale of animal products will be opposed. The domestication of black bears is not considered a wise use of the resource and will be discouraged.

8. Permits may be issued for capturing, holding, importing and exporting black bears for stocking, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

9. The Department will plan for access to improve opportunities for use of black bears. In areas where black bears are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, off-road vehicle trails, hiking or horse trails, canoe routes, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* In Alaska, maulings and fatalities associated with "unprovoked" black bears attacks occur nearly every year. Usually such attacks are associated with bears which have become habituated to humans, or which, because of the wilderness nature of their habitat, have no fear of humans. Black bears rapidly become accustomed to the presence of humans and the ready source of food that human habitations and activities provide. Open garbage dumps and the excesses or indulgences of humans at recreation sites and campgrounds quickly make nuisances of bears which become dependent on such sources of food. Many nuisance bears become a threat to human safety and property and must then be destroyed. Proper garbage disposal and refraining from feeding "tame" bears are necessary to avoid eventual confrontations that endanger human life and lead to destruction of the bears. State law prohibiting the feeding of bears or other wildlife should help reduce the number of confrontations. Backcountry travelers, tourists and new residents of the state should be made aware of the fact that black bears are dangerous and should be advised of the precautions necessary to handle potentially dangerous associations with bears.

* Some coastal populations of black bears are vulnerable to overharvest and face increasing spring hunting pressure. Bears foraging on snow-free beach areas after emerging from dens are visible and readily accessible to hunters hunting from boats. A growing human population and increasingly limited opportunities for hunting other species will continue to cause increased hunting pressure on bears. Management of vulnerable bear populations requires adjustment of hunting pressure to avoid overharvests.

BROWN/GRIZZLY BEAR MANAGEMENT POLICIES

Species Background

Brown/grizzly bears were once considered as a large number of species and subspecies, but the brown/grizzly bears of North America and Europe are now considered members of one species by most taxonomists. Bears over the greater part of North America fall under one subspecies, Ursus arctos horribilis. Brown bears on Kodiak-Afognak Islands, however, are considered a reproductively isolated population with distinctive cranial features and are classified as U. a. middendorffi. Most laymen and scientists refer to bears found near coastal areas as brown bears, especially in the southern half of Alaska, while those found inland and in the northern half of Alaska and the remainder of North America are commonly called grizzly bears.

Brown/grizzly bears occur throughout Alaska except on some islands in southeastern Alaska and Prince William Sound, the islands west of Unimak in the Aleutian Chain, and the Yukon-Kuskokwim Delta. Over most of the state brown bears are probably as abundant now as they have ever been. Some localized reductions in brown bear populations have occurred in areas surrounding human population centers, and grizzly bears in Arctic Alaska may not be as abundant now as they were in the early 1960's. Bear densities are greatest in southeastern Alaska, on the Kodiak Archipelago and the Alaska Peninsula. They are lowest in Arctic Alaska, and vary by location elsewhere.

All habitat types are utilized by brown/grizzly bears, but alpine areas, grass communities and alluvial valley bottoms, particularly those with salmon spawning streams, are the most important feeding areas. Where bears occur in forested areas, they require substantial meadows, muskegs, sedge flats, or other grassy areas.

The brown/grizzly bear's diet includes a wide range of animal and plant foods and is highly variable between areas and during different seasons. In spring, grass and other early-growing herbaceous plants make up the bulk of the diet. During summer and fall, berries may constitute the major food item along with salmon in those areas supporting runs of spawning fish. Bear predation on moose and caribou may be significant in some areas. Carrion is eaten when it is available. The quantity and quality of protein foods, especially salmon, and the longer period of the year in which food is available to bears in coastal areas are believed to be the major factors responsible for differences in size of bears and population densities between coastal and interior brown/grizzly bears.

Little information is available regarding natural controls on brown/ grizzly bear populations or the causes and extent of population fluctuations. Except for dental and skeletal disorders, remarkably few diseases or anomalies are reported for this species. Bears apparently possess an unusual ability to withstand infections and to recover from fractures, many of which are caused by fighting. Cannibalism and other intraspecific strife may cause significant mortality. Trichinella spiralis is the best known parasite infecting bears because it is transmissible to man in raw or partially cooked bear meat; however, it appears to be of minor significance to infected bears.

In accessible, inhabited areas, human activities are doubtless the most significant source of mortality. Sport hunting is presently the most important mortality factor, but there is also a high mortality of nuisance bears near human habitations. Bears are killed when they are attracted to food sources associated with humans and when they endanger human safety. Losses of free-ranging livestock sometimes necessitate removal of specific bears.

Recreational uses of brown/grizzly bears predominate throughout Alaska although domestic utilization continues to some extent in certain areas. Recreational hunting is the primary consumptive use. Admiralty, Baranof and Chichagof islands in southeastern Alaska, Kodiak Island, the Alaska Peninsula, the Alaska Range and the Brooks Range are the most important hunting areas. Observation and photography of bears are also important in these same areas.

As hunting pressure has increased, regulations affecting the number of hunters, season lengths and methods of transport have become more restrictive so allowable harvest levels will not be exceeded. Management has intensified to maintain productive bear populations. Timing of spring and fall bear hunting seasons is used to influence the proportion of male bears in the harvest, which allows manipulation of sex ratios to optimize productivity. In the spring, more males are taken because males emerge from dens before females and because females with cubs are protected. In the fall, more females are legally available for harvest because of natural separation of sows from grown cubs.

Nonconsumptive use of brown/grizzly bears occurs on an opportunistic basis wherever bears are available for observation. Several areas with unusual seasonal concentrations of bears are reserved for observation and photography and experience heavy visitor use. Growing national interest in brown/grizzly bears is certain to increase the demand for nonconsumptive use opportunities.

Species and Habitat Management Policies

1. The Department recognizes that responsible brown/grizzly bear management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of brown/grizzly bears. When others conduct research on bears within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on brown/grizzly bears. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in brown/grizzly bear management. Important habitats such as salmon spawning areas, coastal sedge flats, and denning areas must be designated and protected. Because brown/grizzly bears occasionally kill or injure people or damage human property, some people believe that bear populations should not be maintained near human settlements. However, maintenance of healthy brown/grizzly bear populations cannot depend solely on the creation of vast tracts of unspoiled "wilderness," as shown by conflicts occuring in large national parks. Bears are not constant threats and the major problems with bears in settled areas usually have resulted from improper land planning and classification, marginal economic pursuits, and basic misunderstanding of bears and their behavior. In areas where humans and brown/grizzly bears may interact, proper handling and storage of food and disposal of garbage are of singular importance in avoiding confrontations.

3. Transplanting brown/grizzly bears for restocking former ranges or stocking vacant habitat usually is not feasible, but under certain conditions may be a useful management tool. Transplanting of bears will be generally opposed, but may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of brown/grizzly bears as determined by comprehensive study; 2) prior study must establish that the introduction of brown/grizzly bears will not adversely affect the numbers, health, or utilization of resident species or create conflicts with humans; 3) protection of the proposed transplant population from incompatible land

uses must be assured; and 4) future public use of the resource must be guaranteed.

4. Management for secure, productive bear populations must consider their coexistence with man, including reasonable provisions for public safety. Situations may arise requiring control of brown/ grizzly bears. Controls will be implemented only after an investigation by Department personnel has determined a valid need exists, but shall never be carried out to such an extent as to endanger the bear population in question. The Department will discourage undue competition with brown/grizzly bears resulting from human activities including animal husbandry. It is the owner's responsibility to protect his property from damage by bears. Reasonable efforts must be made to protect life and property by means other than the destruction of bears. When control by removal of bears is necessary, humane methods will be used and meat or hides and skulls will be salvaged. Whenever appropriate, control of brown/grizzly bears will be accomplished by recreational hunting. Poison bait will not be used for control. Because of the relative scarcity of brown/ grizzly bears, problem bears may be relocated when warranted by the circumstances as determined on a case-by-case basis.

5. When the use of prey by brown bears and by humans exceeds the capabilities of the prey population to sustain those uses, the brown bear and prey populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. The various subsistence, recreational, and aesthetic values of both bears and their prey will be considered in the final management decisions.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage brown/grizzly bears on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national and international interests must be considered. There are many beneficial uses of brown/ grizzly bears. Present use priorities may not be the priorities of the future, and brown/grizzly bear management must continue to consider all uses.

2. In many areas of the state, recreation is the most important use of brown/grizzly bears. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards

of being aware of or observing bears in natural interactions with their environment. These uses are held to be generally compatible. Management of brown/grizzly bears will seek to provide maximum opportunities for all these recreational uses.

3. Recreational hunting has traditionally been the dominant use of brown/grizzly bears in Alaska. This use will be encouraged in most areas, and salvaging of hides and skulls will remain a condition of taking bears. A few Alaskans utilize brown bears for food. In areas where people have traditionally utilized brown bears for food, the Department will manage bears to meet the needs of these people within the limitation of maximum sustained yield.

4. In areas with intensive hunter use, brown bears will be managed for an optimum sustained yield of animals. Management techniques may include, but are not limited to, harvest of bears of both sexes, liberal seasons, and access improvement.

5. Certain areas of the state will be managed to provide brown/grizzly bear hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, and population manipulation.

6. Recreational observation and photography of brown/grizzly bears will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of bears, certain areas exceptionally suited to viewing bears may be zoned in time or space to restrict other uses in favor of observation of bears.

7. The commercial harvesting of brown/grizzly bears for the sale of animal products will be opposed. The domestication of brown/ grizzly bears is not considered a wise use of the resource and will be discouraged.

8. Permits may be issued for capturing, holding, importing and exporting brown/grizzly bears for stocking, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

9. The Department will plan for access to improve opportunities for use of brown bears. In areas where brown bears are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, off-road vehicle trails, hiking or horse trails, canoe routes, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Concern by a well-intentioned but misinformed national public may hamper effective management of this species and threatens future use by recreational hunters. One misconception is that because brown/grizzly bears are threatened in other portions of their range, they are threatened in Alaska. Also, some people believe that distinct, and therefore unique, subpopulations of brown/grizzly bears exist which need absolute protection. Management of bear populations and use of bears must continue to be based on scientific evidence. True taxonomic relationships and the fact that brown/grizzly bears in most parts of Alaska are still relatively abundant, provide sound basis for continued beneficial uses, both consumptive and nonconsumptive.

* In Alaska, maulings and fatalities associated with "unprovoked" bear attacks occur nearly every year. Usually such attacks are associated with bears which have become habituated to humans, or which, because of the wilderness nature of their habitat, have no fear of humans. Bears rapidly become accustomed to the presence of humans and the ready source of food that human habitations and activities provide. Open garbage dumps and the excesses or indulgences of humans at recreation sites and campgrounds quickly make nuisances of bears which become dependent on such sources of food. Many nuisance bears become a threat to human safety and property and must then be destroyed. Proper garbage disposal and refraining from feeding "tame" bears are necessary to avoid eventual confrontations that endanger human life and lead to destruction of the bears. State law prohibiting the feeding of bears or other wildlife should help reduce the number of confrontations. Backcountry travelers, tourists and new residents of the state should be made aware of the fact that brown bears are dangerous and should be advised of the precautions necessary to handle potentially dangerous associations with bears.

BISON MANAGEMENT POLICIES

Species Background

Bison (Bison bison) now in Alaska originated from a 1928 transplant of animals from Montana to the Big Delta area. The herd grew to more than 500 animals in the early 1950's but then declined due to overpopulation of its range. Bison from the Delta herd were used to establish other herds in Alaska including the Copper River herd in 1950, the Chitina herd in 1962, and the Farewell herd in 1965. Removal of animals by hunting has stabilized each population in recent years. Approximately 500 bison were present in Alaska in 1980.

Bison are grazing animals requiring grasses, sedges, forbs and some browse. Suitable forage on Alaskan bison ranges is largely limited to riverbars, streamside bluffs, meadows and recently burned areas. Grasses on river bluffs and bars, which leaf out early in the spring, are important spring and summer forage. Increased use is made of forbs and grasses growing under conifers and in meadows during late summer and fall. Forage in winter is found in sedge meadows and wind blown areas along river bars. Agricultural development in the Delta area has provided additional forage for bison in the form of cultivated crops, primarily barley. Timbered areas are used as resting habitat throughout the year.

Starvation during winters with deep or crusted snow is thought to be the primary cause of natural mortality. Calves are especially vulnerable. Calves are also susceptible to drowning during river crossings. In Alaska, predation on bison apparently has not been significant. Observed natural losses to other causes have been negligible.

Carefully controlled recreational hunting has stabilized bison numbers in each herd. Harvest quotas have been predetermined and hunts have been controlled by permit or by season length adjustment. Most bison hunters are residents from Anchorage, Fairbanks and communities near the herds.

Species and Habitat Management Policies

1. The Department recognizes that responsible bison management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of bison. When others conduct research on bison within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on bison. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in bison management. Because suitable year-round bison range is limited in Alaska, loss of existing range to human development or competing use by domestic livestock will have a detrimental effect on the herds' welfare. Existing bison ranges should be placed in a land classification that will preclude other, conflicting uses of the land. Bison numbers will be managed to maintain herds in balance with the long-term productivity of winter habitat. When economically and practically feasible the Department may enhance bison ranges through burning, land clearing, fertilization, and/or seeding.

3. Bison management entails control of population size commensurate with the carrying capacity of winter range, and manipulation of sex and age ratios to optimize productivity of populations. The option of using either-sex harvests may be necessary for effective management.

4. Transplanting bison for stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of bison will generally be opposed. Transplants of bison may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of bison as determined by comprehensive study; 2) prior study must establish that the introduction of bison will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

5. Situations may arise requiring the removal of an animal or the reduction in numbers of a bison herd in response to a specific problem. Controls will be implemented only after an investigation by Department personnel has determined a valid need exists. The Department will discourage undue competition with bison by human activities including agriculture and animal husbandry. It is the owner's responsibility to protect his property from damage by bison. Reasonable efforts must be made to protect life and property by means other than the destruction of bison. When removal of bison is necessary, humane methods will be used and all usable parts will be salvaged. Whenever appropriate, control of bison will be accomplished by recreational hunting.

6. Bison will be managed to provide sustained yields of animals for various human uses and for wild carnivore populations that utilize them for food. When the use of bison by predators and by humans exceeds the capabilities of the bison population to sustain those uses, the bison and predator populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. In no case will the predator population be eliminated in favor of human users.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage bison on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of bison. Present use priorities may not be the priorities of the future, and bison management must continue to consider all uses.

2. Recreation is the most important use of bison. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing bison in natural interactions with their environment. These uses are held to be generally compatible. Management of bison will seek to provide maximum opportunities for all these recreational uses.

3. In areas with intensive hunter use, bison will be managed for an optimum sustained yield of animals. Management techniques may include, but are not limited to, harvest of bison of all sexes and ages, liberal seasons, access improvement, and habitat manipulation.

4. Certain areas of the state will be managed to provide bison hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, regulation of sex and age of animals taken, and population manipulation.

5. Recreational observation and photography of bison will be encouraged through public information and education. Areas exceptionally suited to viewing bison will be identified for the public.

6. The commercial harvest of wild bison for the sale of animal products will be opposed. The bison is one of the few game animals that has been domesticated with some degree of success, and is one of the few species which, by law, may be transferred to private ownership for domestication. Because bison for domestication purposes are available from other sources, the Department does not consider the transfer of wild bison to private ownership for commercial or other purposes a wise use of the resource and will discourage this use.

7. Permits may be issued for capturing, holding, importing and exporting wild bison for stocking, rehabilitation, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's management policies can be demonstrated.

8. The Department will plan for access to improve opportunities for use of bison. In areas where bison are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, off-road vehicle or snow machine trails, and hiking or horse trails. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

CARIBOU MANAGEMENT POLICIES

Species Background

Barren-ground caribou and introduced domestic reindeer occur in Alaska. Although these two animals exhibit striking differences in behavior and other aspects of their biology, they are technically considered to be a single species, Rangifer tarandus.

Historically, populations of caribou have fluctuated widely in numbers over all of their ranges in Alaska. Some areas in the state that presently have few or no caribou have well-worn trails made by large populations in the past. Of about 300,000 caribou present in Alaska in 1980, over 200,000 occur in two large herds in arctic Alaska. The remainder are distributed over much of the state in at least 23 additional more or less discrete herds.

Typical caribou range consists of extensive alpine or arctic tundra areas. Spring, summer and fall demands are met by these areas. Here calving and breeding occur, relief from insects is attained on windswept ridges, and high quality tundra or alpine forage is available. These same areas often furnish winter needs, but if available, timbered areas, particularly spruce-lichen communities, are utilized. In arctic Alaska and the Alaska Peninsula sedge-lichen communities are important in winter.

With teeth adapted for eating soft, leafy vegetation, caribou are dependent in winter on fruticose lichens, grasses, sedges, and decumbent shrub vegetation. Lichens are slow- growing plant forms requiring up to 100 years for development of stands that can provide forage in significant quantities. Caribou utilize extensive areas for winter range, often using different areas in successive years as an adaptation to the very slow regrowing capability of lichens. This wide-ranging characteristic of caribou is one of the mechanisms evolved by the species as an adaptation to the limitations of the arctic environment.

An important habitat requirement of caribou populations is a suitable calving area. Calving grounds generally constitute a "center of habitation" for a caribou herd, and their use annually is the most consistent facet of otherwise vacillating and unpredictable movement patterns. The characteristics of calving areas are not well understood but probably are related to such factors as early availability of green vegetation following snowmelt, ease of movement, relief from insects, and unobscured visibility. With few exceptions, calving areas are in timber-free areas.

Among many interrelated natural factors limiting caribou population growth, weather and predation are important factors operating directly on small populations, while

weather, disease, predation, and emigration induced perhaps by social stress are important factors affecting large populations. Under some circumstances, production of young can rapidly outstrip predation and spectacular herd growth may occur on good ranges. Equally spectacular declines may occur when the carrying capacity of the range is exceeded or when predation and human exploitation exceed recruitment. Density related stress may cause emigration to new ranges, and reduced food quality and quantity and increased disease may lower calf production and survival.

The most critical period for caribou is just prior to and during calving. The availability of green forage is most important in meeting increased energy demands of migration to calving areas and of calving itself. Deep snow during spring can stress caribou. Newborn calves are susceptible to large scale mortality if severe weather strikes during the one-week period when most calves are born. Predation on calves and weatherinduced calf mortality largely determine whether populations increase or decrease. In infected populations, brucellosis can reduce the number of viable young born.

Caribou have traditionally been the single most important terrestrial food species for man over much of arctic Alaska, and are an important food supplement for Alaskans throughout their range. Harvests of caribou, dependent on the accessibility of the animals, have fluctuated as movements of herds have either brought them within reach or taken them beyond the range of hunters. Prior to the late 1960's, a sizable portion of the subsistence use of caribou was as food for dog teams, then the primary form of winter land transportation in much of rural Alaska. Since then snow machines have largely replaced dogs and have both reduced the subsistence demand and greatly facilitated the harvesting of caribou. Near urban centers aircraft and mechanized offroad vehicles have been the primary means of access to caribou populations not accessible by the road system.

Since 1900, the dominant use of caribou throughout northwest and arctic Alaska has been for food and clothing. Villages in western and southwestern Alaska which have access to caribou have had less reliance on caribou for their domestic needs.

Recreational use has been the dominant use in southcentral and much of interior Alaska where caribou herds have been neither large enough nor widely enough distributed to provide for subsistence needs on a continuing basis. As harvests of caribou populations near urban centers have approached maximum rates, interest in sport hunting more remote populations has increased and recreational use has expanded into southwestern Alaska and, to some extent, the arctic.

Most nonconsumptive use of caribou occurs when their movements bring them into contact with the road system. Generally caribou are not accessible for observation except by those people with access to remote areas. Erratic annual movements and distribution of caribou make it difficult to plan for nonconsumptive use in specific areas.

Species and Habitat Management Policies

1. The Department recognizes that responsible caribou management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of caribou. When others conduct research on caribou within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on caribou. Close cooperation will be maintained with Canada in management and research of caribou populations of mutual concern. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in caribou management. Caribou habitat requirements include alpine and arctic tundra as well as lichen-rich types of boreal forest. Caribou ranges typically produce a relatively small volume of usable forage per unit area. Consequently, successful caribou management depends upon the maintenance of large areas of suitable habitat with which movement of caribou is unrestricted. Wildfires have long been blamed for destroying caribou winter range, but it now appears that disturbance of boreal forest by fire may be critical for the periodic rejuvenation of some winter ranges. Wildfires also serve to maintain vegetation mosaics which act as fuel breaks to prevent excessively large fires which could consume large areas of caribou winter range. The Department will seek land use designations, resource management decisions, and corresponding fire management plans which will maintain and, if possible, enhance caribou habitat conditions.

3. Management of caribou entails control of population size commensurate with the carrying capacity of winter ranges, and manipulation of sex and age ratios to optimize productivity of populations. For caribou populations with productivity reduced by limited range or by imbalanced sex ratios, manipulation of the populations by harvest of either sex, as appropriate, may be necessary to increase production.

4. Transplanting caribou for restocking former ranges or stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of caribou will generally be opposed. Transplants of caribou may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following

minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of caribou as determined by comprehensive study; 2) prior study must establish that the introduction of caribou will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed. The introduction and maintenance of reindeer in areas of naturally occurring caribou populations is incompatible with caribou management goals.

5. Situations may arise requiring control of caribou. Controls will be implemented only after an investigation by Department personnel has determined a valid need exists. The Department will discourage undue competition with caribou by human activities including agriculture and animal husbandry. It is the owner's responsibility to protect his property from damage by caribou. Reasonable efforts must be made to protect property by means other than the destruction of caribou. When control by removal of caribou is necessary, humane methods will be used and meat will be salvaged. Whenever appropriate, control of caribou will be accomplished by recreational hunting.

6. Caribou will be managed to provide sustained yields of animals for humans and for wild carnivore populations that depend upon them for food. When the use of caribou by predators and by humans exceeds the capabilities of the caribou population to sustain those uses, the caribou and predator populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. In no case will the predator population be eliminated in favor of human users.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage caribou on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national and international interests must be considered. There are many beneficial uses of caribou. Present use priorities may not be the priorities of the future, and caribou management must continue to consider all uses.

2. Caribou are an important food resource for many Alaskans. In areas where residents have a subsistence dependency on caribou, allocation of allowable caribou harvests will give first priority to subsistence users. Obtaining meat is also an important consideration of

recreational hunting. This use will be encouraged where it will not conflict with subsistence use of caribou. Salvaging of all edible meat will remain a condition of taking caribou. In selected areas where the human population is dependent upon caribou for food, or areas with intensive hunter use, caribou will be managed for the maximum sustained yield of animals. Management techniques may include, but are not limited to, harvest of caribou of all sexes and ages, liberal seasons and bag limits and access improvement.

3. In many areas of the state, recreation is an important use of caribou. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing caribou in natural interactions with their environment. These uses are held to be generally compatible. Management of caribou will seek to provide maximum opportunities for all these recreational uses where not in substantial conflict with subsistence use.

4. Certain areas of the state will be managed to provide caribou hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, regulation of sex and age of animals taken, and population manipulation.

5. Recreational observation of caribou will be encouraged through public information and education. Hunting is generally considered compatible with recreational observation of caribou. Because of the erratic nature of caribou movements, specific areas where caribou can be consistently observed can rarely be designated. In general, areas closed to consumptive uses of wildlife will provide for nonconsumptive uses of caribou when caribou are seasonally present.

6. The commercial harvesting of caribou for the sale of animal products will be opposed. The domestication of caribou is not considered a wise use of the resource and will be discouraged.

7. Permits may be issued for capturing, holding, importing and exporting caribou for stocking, rehabilitation, public education and scientific study, but only after demonstration that suitable habitat or holding

facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

8. The Department will plan for access to improve opportunities for use of caribou. In areas where caribou are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, off-road vehicle or snow machine trails, hiking or horse trails, canoe routes, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Petrochemical development, expansion of the mining industry and transportation systems, and an increasing human population combine to pose considerable problems for caribou. Aside from the inevitable increased demands on the caribou resource by consumptive and nonconsumptive users, the most important consequences of development will be alteration of habitat and disturbance of caribou during critical periods. The long-term effects of dissecting a caribou range with transporation corridors and gas and oil pipelines are impossible to predict, but may mean constricted ranges and reduced caribou populations in the future. Disturbance of caribou on calving grounds by construction, transportation or other developmental activities may cause substantial mortality, and disruption of migrations may result in fragmentation of populations. Impacts of development and conflicting land uses on caribou must be minimized by comprehensive land use planning. Construction activities should be scheduled where and when caribou are least affected.

* A revival of interest in domestic reindeer herding has the potential for serious conflicts with caribou. The relatively sedentary nature of reindeer can result in severe overutilization of ranges, reducing their carrying capacity for both reindeer and caribou. In addition, unless they are closely herded, reindeer herds suffer attrition of animals which run off with passing caribou, necessitating construction of fences or elimination of caribou to maintain the reindeer herds intact. Finally, feral reindeer which join caribou herds may serve as vectors of disease, and when incorporated into caribou populations, may introduce

undesirable genetic characteristics into the wild caribou stocks. Experience from large-scale and largely unsuccessful reindeer herding attempts along much of northwestern, western and southwestern Alaska during the early to mid 1900's suggests that reindeer herding should be limited to areas where caribou and reindeer will not come into contact and where caribou will not need to forage in the forseeable future.

* Increased human development and more intensive land use in caribou habitat will increase the probability of man-caused fires and will necessitate more aggressive suppression of natural fires threatening those developments. Such altering of natural fire regimes in terms of frequency and size of fires will likely have adverse impacts upon caribou.

  Intensive fire management will be needed to insure that the desired amount of fire is allowed in the system--enough to maintain productive habitat conditions and to provide natural protection from artificially large conflagrations, but not so much as to prevent the establishment of lichen-rich plant communities important to wintering caribou. An enlightened fire prevention policy will be needed to prevent an excessive number of man-caused fires. At the same time a near-natural fire regime should be approximated through the use of prescription fires. The Department will encourage the adoption of a comprehensive fire management policy by fire control agencies in Alaska. Such a policy should recognize the historic role of wildfire in northern ecosystems and should establish guidelines for the wise use and management of fire in the future to provide for the long-term management of caribou habitat.

* Predation can be detrimental to the welfare of caribou when caribou populations are small and predator populations large. Human utilization of small caribou populations requires restriction of take to annual surpluses or less, thereby bringing use by humans into competition with use by predators. To the extent that competing uses are not compensatory, predator populations must be managed in addition to restrictions on human utilization to insure the maintenance and enhancement of caribou populations.

DALL SHEEP MANAGEMENT POLICIES

Species Background

Dall sheep (Ovis dalli) occur throughout the Chugach, Wrangell, Alaska and Brooks Ranges, the Kenai and Talkeetna Mountains and the Tanana Hills. Their distribution appears to be limited to areas in these mountains where climatic conditions are favorable. Areas of heavy snowfall such as the south slopes of the Chugach and Alaska Ranges have few if any Dall sheep. Sheep are absent from southeastern Alaska and the Aleutian Range. The statewide population of Dall sheep in 1980 is estimated at 50,000. Sheep populations are expected to remain relatively stable, fluctuating in size in response to favorable or harsh weather conditions.

Dall sheep depend on plant associations found in alpine habitats. Sheep often use different winter and summer ranges. Summer forage is probably in excess of population needs, but winter food resources are often limited. Winter ranges are usually located at the mouths of tributaries along major drainages where prevailing winds clear winter snow from food. Winter ranges are a critical component of Dall sheep habitat. Mineral licks are also an important element of sheep habitat. In addition to providing mineral nutrients, the use of mineral licks also serves to mix otherwise separate populations and is probably of importance in maintaining genetically healthy herds.

Climate may be the most important factor determining sheep numbers and distribution. Heavy snowfall precludes sheep occupation of some areas, and accumulation of snow on sheep ranges may prevent access to winter feed. Overwinter survival of lambs is less than adult sheep, and in severe winters survival of lambs is very low. Newborn lambs are particularly susceptible to unfavorable spring weather such as cold wind, rain and snow. Predation may be important in limiting population increases or causing localized depletion in some circumstances. Parasites, diseases and accidents combine with weather and predation to affect sheep population size.

Sheep were originally hunted by man for meat, hides and horns, and later, during the early days of Alaska's settlement, for commercial sale also. Market hunting became illegal as hunting regulations were instituted, but subsistence take continued as a minor use in some areas. Sheep are now taken primarily by recreational hunters. Traditionally, mature rams were preferred by recreational hunters and this selectivity was subsequently formalized in regulations. Viewing, photography and associated nonconsumptive wilderness values are important uses of sheep that are concentrated where unhunted sheep populations are accessible by road. Opportunities to hunt sheep will be reduced as large portions of sheep range become national parks. Increasing demand and reduced hunter success are expected.

Habitat and Species Management Policies

1. The Department recognizes that responsible Dall sheep management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of sheep. When others conduct research on Dall sheep within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on Dall sheep. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in Dall sheep management. Because sheep ranges are usually climax vegetation communities not in need of periodic renewal by habitat alterations, protection of important habitats such as winter ranges, lambing grounds, migration routes and mineral licks is more important to sheep welfare than habitat manipulation. The Department will seek land use designations and controls that will maintain important sheep habitat. Introduction of domestic animals which may compete with Dall sheep for available forage or which may introduce diseases or parasites will be opposed.

3. It is recognized that management techniques for sheep may change with future advances in knowledge of sheep biology. For example, while ram-only hunting harvests generally do not decrease sheep populations, experimental either-sex hunts have proven effective in reducing herd numbers while increasing lamb production and survival. Management for more productive populations may become necessary as hunting pressure increases.

4. Transplanting Dall sheep for restocking former ranges or stocking vacant habitat may be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of sheep will generally be opposed. Transplants of sheep may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of sheep, as determined by comprehensive study; 2) prior study must establish that the introduction of sheep will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

5. Dall sheep will be managed to provide sustained yields of animals for humans and for wild carnivore populations that depend upon them for food. When the use of Dall sheep by predators and by humans exceeds the capabilities of the sheep population to sustain those uses, the sheep and predator populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. In no case will the predator population be eliminated in favor of human users.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage Dall sheep on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national and international interests must be considered. There are many beneficial uses of Dall sheep. Present use priorities may not be the priorities of the future, and sheep management must continue to consider all uses.

2. Recreation is the most important use of Dall sheep. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing Dall sheep in natural interactions with their environment. These uses are held to be generally compatible. Management of Dall sheep will seek to provide maximum oportunities for all these recreational uses.

3. In most areas of the state high quality recreational hunting is the dominant use of Dall sheep. Management of sheep will seek to provide maximum recreational hunting opportunities consonant with maintaining high standards of aesthetic quality of experience. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, regulation of sex, age, and horn size of animals taken, and population manipulation.

4. In those few areas where sheep have traditionally been used for subsistence, allocation of allowable sheep harvests will give first priority to subsistence users.

5. Recreational observation and photography of Dall sheep will be encouraged through public information and

education. Hunting is generally considered compatible with recreational observation of sheep. Certain areas exceptionally suited to viewing sheep may be zoned in space or time to restrict other uses in favor of observation of sheep. However, with large portions of sheep range included within national parks in Alaska, the need for further exclusion of consumptive use in favor of observation must be clearly demonstrated before such actions will be taken.

6. The commercial harvesting of Dall sheep for the sale of animal products will be opposed. The domestication of Dall sheep is not considered a wise use of the resource and will be discouraged.

7. Permits may be issued for capturing, holding, importing and exporting Dall sheep for stocking, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

8. The Department will plan for access to improve opportunities for use of Dall sheep. In areas where sheep are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, off-road vehicle trails, and hiking and horse trails. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Expanding human land use may adversely affect sheep through the alteration of habitat, through disturbance of sheep use of critical areas, or through introduction of diseases from domestic animals. Mineral licks, winter ranges, lambing areas, and migration routes are particularly susceptible to damage or interference from such activities as mining, grazing of domestic animals, construction in transportation and utility corridors, and development of alpine recreation sites. Critical habitats must be protected from alteration or undue disturbance.

* Increases in numbers of hunters, development of access, and improved transport methods have led to reduced availability of legal rams, even in once-remote and lightly hunted areas. On some ranges, the average size of rams available to hunters has decreased as older

rams in the population have been removed. In a few locations most legal rams are removed annually. In addition to reduced hunter success, increased hunting pressure has lowered the quality of the hunting experience. Management measures to regulate hunter density and distribution, and to increase the number of legal rams available to hunters, will receive greater emphasis.

SITKA BLACK-TAILED DEER MANAGEMENT POLICIES

Species Background

Sitka black-tailed deer (Odocoileus hemionus sitkensis) are found in varying abundance throughout most of southeastern Alaska from Dixon Entrance north to Yakutat Bay and along the Gulf of Alaska from the Copper River west to Cape Fairfield, including Prince William Sound, and on the Kodiak-Afognak Island group. Deer are indigenous to the mainland and islands of the Alexander Archipelago; their presence on more northerly and westerly ranges is a result of transplants conducted between 1916 and 1952.

Alaskan deer populations have historically fluctuated in response to winter weather severity. Islands in southeastern Alaska where winter conditions are most severe, and where wolves are present, have had the greatest extremes in deer numbers. Deer have been most abundant on the islands of the Alexander Archipelago and on the mainland south of Ernest Sound. Some deer are usually present along the entire mainland north of Ernest Sound, but populations there have never been high. In Prince William Sound the greatest deer densities occur on Hawkins, Hinchinbrook and Montague Islands, whereas relatively few deer are found on the mainland. Deer in the Sound have been at fairly low numbers since the last major die-off occurred in the early 1970's, but they have shown signs of a gradual increase in recent years. Kodiak-Afognak deer populations are increasing in areas of range expansion but have declined in some areas where they have been long established.

During different seasons of the year deer utilize a variety of habitat types. However, uneven-aged old-growth forest is utilized extensively throughout the year. Generally the home ranges of most deer are relatively small, probably from 2 to 4 square miles. During snow-free periods deer are distributed from sea level to above timberline. When snow is present, deer range as high as they are capable, but they are usually forced out of higher areas by deep snows. During much of the year lowgrowing forbs are the most important plant species used. These are particularly abundant in alpine habitat during summer and, where alpine terrain is available, summer food is never a limiting factor. During winter, deer continue to utilize forbs when available under forest cover, but when about six inches of snow covers these species, deer begin using woody plants. Most species of available shrubs may be used to some extent during critical winter months, but huckleberry appears most important. Tips of cedar, spruce, and hemlock trees are also used, but these provide barely a maintenance diet. When snow depth under timber cover exceeds 18 to 24 inches, deer begin to concentrate on the open beaches, utilizing dead beach grass, sedges or kelp. These plant species will not maintain basic metabolism for extended periods and winter mortality begins.

Clearcut logging has had more impact on deer habitat in Alaska than any other human factor. Until recently in southeastern Alaska, many cuts exceeded 1,000 acres in size. These openings in the forest produce a great amount of summer forage for 5 to 10 years, but in winter snow covers the vegetation and it becomes unavailable to deer. In 15 to 20 years following cutting, coniferous regrowth forms a closed canopy and most deer forage species are shaded out. The forest floor becomes devoid of vegetation except for mosses and lichens, and it may be 200 years or more before sufficient vegetation is again available in natural openings to support moderate deer populations. In the climax forest, small openings resulting from uneven-aged forest allow for growth of a variety of understory species. Recently there has been a trend toward smaller cuts which result in greater interspersion of vegetation types ("edge effect") and uneven-age forest stands. Although an improvement over the large cuts, the result is still a reduction of deer habitat. In areas of extensive logging deer populations have been reduced and will not recover to previous levels of abundance. Clear-cut logging has had minor effects upon deer habitat in Prince William Sound and Kodiak-Afognak Islands because most logging there has occurred in areas of minor importance to deer and has been in relatively small blocks.

Deer in Alaska are at the northern margin of their range in North America and are more susceptible to slight changes in habitat and climatic conditions than populations to the south. Winter accumulation of snow creates critical survival conditions in many years. Deep snows render much otherwise available food inaccessible. In severe winters deer populations may be greatly reduced.

Wolf predation is an important cause of mortality for some deer populations. Predation has had its greatest impact on deer populations decimated by malnutrition, often further depressing deer numbers, and retarding recovery of reduced deer populations for prolonged periods. Since the last extreme winter of 1968-1969 in southeastern Alaska south of Frederick Sound, deer populations on islands inhabited by wolves have remained at low densities while populations on islands north of Frederick Sound, which had similar or perhaps more severe winter conditions but no wolves, have recovered to moderately high densities.

Other natural mortality factors may cause or contribute to significant losses of deer, but few such occurrences have been documented. Throughout their range in Alaska, deer have been the most important big game species providing meat for the larder. Most deer hunters are residents of Alaska. Hunter success in most areas has been good with usually more than half of the hunters taking at least one deer. The annual kill has fluctuated between 6,000 and 15,000 deer. Generally harvests, including either-sex hunts, have not

significantly affected deer numbers. Seasons and bag limits have at times been curtailed when deer populations in specific areas were low, but these low densities were usually caused by factors other than hunting. Given favorable weather conditions and reasonable levels of predation, deer populations have historically increased in spite of hunting pressure. With protection of sufficient winter habitat and management of predation, deer populations should be more than adequate for public use in the foreseeable future.

Species and Habitat Management Policies

1. The Department recognizes that responsible deer management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of deer. When others conduct research on deer within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on deer. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in deer management. Canopy interception of snow and the presence of understory vegetation in climax spruce-hemlock forest are essential for deer over most of their winter range in Alaska. Climax forest at low elevations is critically important to deer survival when snow accumulation at higher elevations makes food unavailable. Timber managers will be encouraged to retain climax forests in critical deer winter range areas and to plan size and layout of clearcuts on other important deer ranges to maintain the capability of such areas to support deer populations.

3. Transplanting deer for restocking former ranges or stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of deer will generally be opposed. Transplants of deer may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of deer as determined by comprehensive study; 2) prior study must establish that the introduction of deer will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

4. Situations may arise requiring control of deer. Controls will be implemented only after an investigation by Department personnel has determined a valid need exists. It is the owner's responsibility to protect his property from damage by deer. Reasonable efforts must be made to protect property by means other than the destruction of deer. When control by removal of deer is necessary,

humane methods will be used and meat will be salvaged. Whenever appropriate, control of deer will be accomplished by recreational hunting.

5. Deer will be managed to provide sustained yields of animals for various human uses and for wild carnivore populations that depend upon them for food. When the use of deer by predators and by humans exceeds the capabilities of the deer population to sustain those uses, the deer and predator populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. In no case will the predator population be eliminated in favor of human users.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage deer on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of deer. Present use priorities may not be the priorities of the future, and deer management must continue to consider all uses.

2. Deer are an important food resource for some Alaskans. In areas where residents have a subsistence dependency on deer, allocation of allowable deer harvests will give first priority to subsistence users. Obtaining meat is also an important consideration of recreational hunting. This use will be encouraged where it will not conflict with subsistence use of deer. Salvaging of all edible meat will remain a condition of taking deer. In areas with intensive hunter use, harvests will be regulated to provide the optimum yield of animals. Management techniques may include, but are not limited to, harvest of deer of all sexes and ages, liberal seasons and bag limits and access improvement.

3. In many areas of the state, recreation is the most important use of deer. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing deer in natural interactions with their environment. These uses are held to be generally compatible. Management of deer will seek to provide maximum opportunities for all these recreational uses where not in substantial conflict with subsistence use of deer.

4. Certain areas of the state will be managed to provide deer hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, regulation of sex and antler size and conformation of animals taken, and population manipulation.

5. Recreational observation and photography of deer will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of deer, certain areas exceptionally suited to viewing deer may be zoned in time or space to restrict other uses in favor of observation of deer.

6. The commercial harvesting of deer for the sale of animal products will be opposed. The domestication of deer is not considered a wise use of the resource and will be discouraged.

7. Permits may be issued for capturing, holding, importing and exporting deer for stocking, rehabilitation, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

8. The Department will plan for access to improve opportunities for use of deer. In areas where deer are managed for optimum sustained yield and/or the maximum recreational opportunity, access may take the form of roads, airstrips, hiking or horse trails, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Clearcut logging of large areas in Alaska is detrimental to deer populations because it results in long-term losses of deer habitat. Smaller clear cut units which reduce detrimental effects or alternative

cutting methods such as selective cutting which maintain favorable deer habitat should be employed, and some areas of climax forest should be retained. Recognition of wildlife values in land use management is necessary. Since most deer habitat in Alaska is administered by the U.S. Forest Service, it is incumbent on that agency to pursue compatibility of resource values in its management of multiple uses of the public land. It is essential that the Department of Fish and Game and the U.S. Forest Service coordinate land use plans to assure maintenance or enhancement of wildlife habitats to ensure that future needs of the wildlife resource and of public use are met.

* Wolves in southeastern Alaska exert a strong depressant effect on some deer populations already reduced by severe winter conditions, retarding the recovery of deer populations from low levels of abundance. Management of wolf populations to reduce predation on depressed deer populations is very difficult because Federal and State statutes and regulations limit allowable methods of control and the dense vegetative cover limits the effectiveness of permitted methods. In addition, efforts to manage wolf numbers are invariably controversial, sometimes resulting in a political climate under which any management action is difficult. Yet predator and prey populations alike require management if both are to benefit and the values of both are to be realized by man.

ELK MANAGEMENT POLICIES

Species Background

In Alaska, elk (Cervus canadensis roosevelti) occur only in the northern Kodiak Archipelago on Afognak Island and nearby Raspberry Island. Established on Afognak Island in 1929 by a transplant of eight calves from Washington State, the elk population grew rapidly to a peak of 1,200-1,500 animals by 1965. A decline associated with over-utilization of winter range began in the mid-1960's. Unusually heavy accumulations of snow and cold temperatures during the winters of 1970 and 1971 caused massive die-offs and by 1972 only about 450 animals remained. The elk population gradually increased in the late 1970's and in 1980 was estimated at about 750 animals. Even during recent relatively mild winters, however, losses to malnutrition have occurred and it is unlikely that population levels of the mid-1960's will be reached again without significant improvements in habitat quality. Transplants to southeastern Alaska in the early 1960's failed to establish viable populations.

Elk attained their highest population levels in the grass-shrubland areas of southwestern Afognak Island and Raspberry Island. Willow stands along streams and bogs and dense stands of elderberry initially provided abundant winter forage but were depleted when elk populations became excessive prior to the mid-1960's crash. The understory vegetation found in mature spruce forest now is an important source of winter forage for elk which supplements the depleted grass-shrubland ranges. Mature forest provides cover for elk and reduced snow depths under the forest canopy facilitate access to forage. The spruce fringes near sea level appear to be especially critical habitat for elk during severe winters.

Losses during severe winters will continue to be the major population regulatory mechanism affecting Afognak's elk population, until such time as hunting becomes effective in controlling elk numbers. A different situation exists on Raspberry Island where heavy harvests of this accessible herd necessitated a closure to hunting in 1968. Although poaching is suspected to be a limiting factor, this herd has grown slowly and now supports a limited legal harvest.

Elk meat was rumored to have been on local tables for several years prior to the first legal hunt in 1950. During 30 years of hunting over 1,500 elk of both sexes have been harvested. When the population was at its highest, hunters were relatively successful. Since 1971, however, harvests have averaged about 25 elk annually and hunter success has averaged 16 percent. Good elk populations now occur in interior, western and eastern Afognak Island, where dense timber and difficult access result in relatively poor hunter

success. A few elk are taken incidental to deer and bear hunting.

An increased number of elk could be harvested on a sustained basis, as the average annual harvest is less than 10 percent of the population. Harvests may increase on herds accessible to roads. Logging roads now link Kazakof, Perenosa and Izhut Bays. Other less accessible herds will continue to remain largely unharvested.

Species and Habitat Management Policies

1. The Department recognizes that responsible elk management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of elk. When others conduct research on elk within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on elk. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in elk management. Productive elk range includes a variety of early successional communities, alpine/sub-alpine vegetation and mature climax forest which provide food and cover. The Department will encourage land use practices which maintain or improve elk habitat by providing proper combinations of all necessary vegetative cover types. Logging in elk winter ranges will be supported only where it is determined to be compatible with elk habitat requirements.

3. Management of elk often entails control of population size commensurate with the carrying capacity of winter ranges, and manipulation of sex and age ratios to optimize productivity of populations. The option of using either-sex harvests is necessary for effective management. For elk populations depressed to levels below range carrying capacity by factors other than food availability, bull-only harvests or season closures may be recommended until limiting factors cease to depress those populations. For populations whose productivity has been reduced by limited range or by imbalanced sex ratios, manipulation of the populations by harvest of either sex, as appropriate, may be necessary to increase production.

4. Transplanting elk for stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of elk will generally be opposed. Transplants of elk may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of elk as determined by comprehensive study; 2) prior study must establish that the introduction of elk will not adversely affect the numbers, health, or utilization

of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage elk on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of elk. Present use priorities may not be the priorities of the future, and elk management must continue to consider all uses.

2. Recreation is the most important use of elk. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing elk in natural interactions with their environment. These uses are held to be generally compatible. Management of elk will seek to provide maximum opportunities for all these recreational uses.

3. In areas with intensive hunter use, elk will be managed for an optimum sustained yield of animals. Management techniques may include, but are not limited to, harvest of elk of all sexes and ages, liberal seasons and bag limits, access improvement, and habitat manipulation.

4. Certain areas of the state will be managed to provide elk hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, regulation of sex, age, and antler size and conformation of animals taken, and population manipulation.

5. Recreational observation and photography of elk will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of elk, certain areas exceptionally suited to viewing elk may be zoned in time or space to restrict other uses in favor of observation of elk.

6. The commercial harvesting of elk for the sale of animal products will be opposed. The domestication of elk is not considered a wise use of the resource and will be discouraged.

7. Permits may be issued for capturing, holding, and exporting elk for stocking, rehabilitation, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

8. The Department will plan for access to improve opportunities for use of elk. In areas where elk are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, snow machine trails, hiking or horse trails, canoe routes, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Potential losses of elk winter habitat to logging are an important consideration in the management of sustained elk populations. The most valuable stands of commercial timber grow along the coast; and many are critical winter habitat for elk. Depletion of willow and elderberry stands, invasion of spruce into grass-shrubland communities, and growing competition for forage from an increasing deer population make maintenance and enhancement of existing elk winter ranges increasingly important. While clearcut logging results in temporary increases in growth of seral forbs and browse species, much of this vegetation is unavailable under winter snows. In addition, elk generally utilize the edges of clearcuts most heavily and large clearcuts are of little benefit. Thorough assessment of vegetation succession and elk use of clearcuts following initial logging activity will be necessary in developing alternative cutting methods which will produce favorable elk habitat in logged areas while maintaining economically efficient logging operations.

* Illegal kills of elk have retarded desirable growth in the accessible Raspberry Island elk herd. While development of an extensive logging road system on Afognak Island will improve distribution of hunters and facilitate

attaining desirable harvests on some elk herds, increased poaching can be expected. Enforcement of hunting regulations will require greater emphasis as access to elk improves.

MOOSE MANAGEMENT POLICIES

Species Background

Moose (Alces alces) are widely distributed in Alaska, occurring in a variety of habitats ranging from climax communities of upland shrubs and lowland bogs to successional shrub and forest communities. Areas of alpine or riparian willows, fire regrowth and man-made clearings support the bulk of the population throughout the year. During the summer and fall moose are found in areas of adequate browse from sea level to at least 4,500 feet, but in winter snow accumulations force most moose to lower elevations, restricting them spatially to constricted winter ranges.

Moose were relatively scarce over much of Alaska in the early 1900's, but the presence of suitable habitat allowed moose to extend their range into areas not previously occupied, and clearing of land and fires which accompanied exploration and development created favorable browse habitat conducive to large moose populations. Predator control during the 1940's and 1950's, combined with relatively mild winters, contributed to moose population growth. By the early 1960's moose were abundant over much of their range.

Except for expanding moose populations in northwestern and arctic Alaska, populations in most areas of the state have experienced declines from 1960 levels. Conservative estimates place the 1980 statewide moose population at about 120,000 animals. Declines have been widespread and generally synchronous and are the result of low recruitment of young animals into the breeding population and continuous mortality among adults. Although hunting has been a significant cause of adult moose mortality in heavily hunted areas, it was not a major factor involved in widespread declines.

Moose populations in lightly hunted and even unhunted areas have experienced similar population reductions. Deteriorated range conditions were probably the major factor causing the declines, although other factors may have accelerated some declines or subsequently acted to keep populations at low levels. Several severe winters compounded the problems of inadequate range, and predation contributed to declines in some areas.

Inadequate range becomes most critical during the winter, affecting primarily the production and survival of calves. Calves are the population segment most susceptible to winter losses. In addition, cows debilitated by poor nutrition in winter may give birth to weakened calves which are highly vulnerable to predators and other mortality factors. Winter

severity contributes to calf mortality, which on some moose ranges has reached 80 to 90 percent and generally averages above 50 percent.

Moose have long been one of the most important meat species in Alaska, providing for the subsistence needs of natives, early settlers, prospectors and explorers. For the past two decades the species has supported relatively intensive recreational utilization. Recreational hunting for meat dominates use of moose in large portions of the state, and moose remain an important source of meat for many Alaskans.

Most recreational moose hunting occurs in those areas of Alaska that are accessible by road or off-road vehicle trails, along major rivers with boat access, or areas with suitable landing sites for light aircraft. Small harvests are reported from large areas which are less easily accessible.

Subsistence use is generally centered near villages and outlying bush residences. Riverboats and snow machines are the transport methods most commonly used and have expanded the area utilized by individual villages for subsistence hunting. The number of subsistence moose taken is unknown because much of the harvest is not reported by the users, but in some areas it is apparently in excess of sustained yield levels for local moose populations.

Moose also provide considerable nonconsumptive enjoyment for many Alaskans. Moose are commonly observed in urban areas and along roads, especially in winter, as these developments frequently occupy winter ranges of local populations.

Moose populations can be expected to fluctuate in response to the amount and quality of their transitory habitat, the severity of winter conditions and the amount of predation. Demands for all uses of moose will increase as the human population grows. The adaptability of this species to a variety of natural conditions and to the various activities of man allows for a wide range of management possibilities.

Species and Habitat Management Policies

1. The Department recognizes that responsible moose management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of moose. When others conduct research on moose within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on moose. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in moose management. Moose populations depend upon distinct habitat types of limited size for vital activities such as mating, calving and feeding. These critical areas will be designated and protected. Much of the most productive moose range is in early post-disturbance successional stages. Therefore, disturbances such as fire, logging in small blocks, and selective land clearing may be encouraged where increased moose production is appropriate. When possible the Department will improve moose habitats through the use of fire, mechanical means or other methods.

3. Management of moose often entails control of population size commensurate with the carrying capacity of winter ranges, and manipulation of sex and age ratios to optimize productivity of populations. The option of using either-sex harvests is necessary for effective management. For moose populations depressed to levels below range carrying capacity by factors other than food availability, bull-only harvests or season closures may be recommended until limiting factors cease to depress those populations. For populations whose productivity has been reduced by limited range or by imbalanced sex ratios, manipulation of the populations by harvest of either sex, as appropriate, may be necessary to increase production.

4. Transplanting moose for restocking former ranges or stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of moose will generally be opposed. Transplants of moose may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable

habitat to support a viable population of moose as determined by comprehensive study; 2) prior study must establish that the introduction of moose will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

5. Situations may arise requiring control of moose. Controls will be implemented only after an investigation by Department personnel has determined a valid need exists. The Department will discourage undue competition with moose by human activities including agriculture and animal husbandry. It is the owner's responsibility to protect his property from damage by moose. Reasonable efforts must be made to protect life and property by means other than the destruction of moose. When control by removal of moose is necessary, humane methods will be used and meat will be salvaged. Whenever appropriate, control of moose will be accomplished by recreational hunting.

6. Moose will be managed to provide sustained yields of animals for various human uses and for wild carnivore populations that depend upon them for food. When the use of moose by predators and by humans exceeds the capabilities of the moose population to sustain those uses, the moose and predator populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. In no case will the predator population be eliminated in favor of human users.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage moose on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of moose. Present use priorities may not be the priorities of the future, and moose management must continue to consider all uses.

2. Moose are an important food resource for many Alaskans. In areas where residents have a subsistence dependency on moose, allocation of allowable moose harvests will give first priority to subsistence users. Obtaining meat is also an important consideration of recreational hunting. This use will be encouraged where it will not conflict with subsistence use of moose. Salvaging of all edible meat will remain a condition of taking moose. In selected areas where the human population is

dependent upon moose for food, or areas with intensive hunter use, moose will be managed for the maximum sustained yield of animals. Management techniques may include, but are not limited to, harvest of moose of all sexes and ages, liberal seasons and bag limits, access improvement, and habitat manipulation.

3. In many areas of the state, recreation is an important use of moose. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing moose in natural interactions with their environment. These uses are held to be generally compatible. Management of moose will seek to provide maximum opportunities for all these recreational uses where not in substantial conflict with subsistence use of moose.

4. Certain areas of the state will be managed to provide moose hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, regulation of sex, age, and antler size and conformation of animals taken, and population manipulation.

5. Recreational observation and photography of moose will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of moose, certain areas exceptionally suited to viewing moose may be zoned in time or space to restrict other uses in favor of observation of moose.

6. The commercial harvesting of moose for the sale of animal products will be opposed. The domestication of moose is not considered a wise use of the resource and will be discouraged.

7. Permits may be issued for capturing, holding, importing and exporting moose for stocking, rehabilitation, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

8. The Department will plan for access to improve opportunities for use of moose. In areas where moose are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, off-road vehicle or snow machine trails, hiking or horse trails, canoe routes, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Land use practices are contributing to moose population declines. Fire control has effectively reduced the frequency and extent of burning of lowland forested areas and old browse ranges that traditionally returned such areas to productive moose range. Carrying capacities of existing winter ranges are decreasing as a result of the over-utilization of forage species, the growth of browse plants beyond the reach of moose, or replacement of desirable browse species by unsuitable plants. Vegetational succession on abandoned homesteads which once produced excellent moose browse, has likewise advanced to unproductive stages. Urban sprawl is displacing some once-prime moose winter range. Road placement in valley bottoms has caused further losses of critical winter range, and roads and fences near urban centers have become barriers to moose migrating from summer to winter ranges. Railroads and roads in critical winter habitat or crossing major migration corridors result in direct loss of many moose to vehicle collisions. Browse rehabilitation is necessary in many areas to rejuvenate old ranges or to create new ranges so pressures on existing winter areas can be reduced. where loss of winter range to development is accelerating. The role of fire as a natural component of wildlands should be recognized and fire suppression practices should be limited to situations where human safety or other resource values clearly warrant control.

* Populations of moose may decline in some areas to a level where they can no longer support established consumptive use. As the resource declines various segments of the public can be expected to demand management of the resource for their exclusive benefit. In some instances the level of demanded use may exceed the capability of the population to support harvest. Harvest should not be allowed to exceed limits imposed by sound biological principles. Priorities for use of

the resource will be established after evaluating public demands, herd status, and the relationship of local management to moose management elsewhere in the state.

* Increased hunting pressure and the vulnerability of moose to hunters in some areas could easily result in overharvest. A persistent effort to monitor harvest and to set and enforce appropriate hunting regulations will be required to protect these moose populations.

* Public opposition to female moose hunting has existed in Alaska for many years. Antlerless moose hunts by permit or during a special season have been conducted with varying degrees of acceptance and criticism. Unfortunately, recent declines in moose populations in some areas of Alaska strengthened opposition to antlerless hunts and culminated in legislation requiring substantial public support before such hunts can be authorized. Antlerless hunting is, however, a useful management tool, and efforts must be continued to explain the benefits of retaining this management option.

* Predation rates on some moose populations are high, reflecting continued large populations of predators and low populations of moose. The resulting extremely low survival rate of moose calves, exhibited now for several years, will seriously impact the reproductive performance of affected moose populations for many years to come because the breeding cohort passing out of the populations will not be fully replaced. Predator populations, particularly those of wolves, require management to maintain predation at levels not exceeding the capability of moose populations to support such predation. Populations of wolves, other predators and moose must be brought into balance if the benefits of all of these species to man are to be realized. In some areas it may not be desirable or feasible to reduce populations of predators, and in these instances moose populations can be expected to decline to low levels.

MOUNTAIN GOAT MANAGEMENT POLICIES

Species Background

Mountain goat (Oreamnos americanus) populations in Alaska are distributed along the coastal mountains from Dixon Entrance to Cook Inlet and inland to the Wrangell and Talkeetna Mountains. Introduced populations are also present on Baranof and Kodiak Islands.

Population surveys conducted since 1959 indicate that populations were relatively stable until the early 1970's when severe winters caused area-wide declines. Overhunting, particularly in easily accessible areas or on ranges close to urban centers, also contributed to declines in some goat populations.

From early spring until fall mountain goats primarily utilize alpine and subalpine areas which are often extremely rugged and precipitous. Characterized by heavy snow accumulations in winter and short, cool summers, these areas support grasses, sedges and forbs which comprise the bulk of the goats' diet. With the onset of winter snows goats move to rocky, windblown ridges and ledges where forage is available. Movements to winter ranges may cover distances of up to 10 miles or more. Heavy snows may force goats to lower timbered elevations where forage such as brush, ferns and conifers is utilized. Mature coniferous forest reduces ground snowcover and is of importance to goats during winter. Movements of considerable distance through the forest zone are indicated by sightings of goats on saltwater beaches.

Limited data suggest that mortality from winter weather conditions is the primary natural limiting factor on goat populations. In addition to limiting availability, precipitous terrain and excessive snow accumulations contribute to mortality through avalanches and accidental falls. Predation, particularly by wolves, may also be a major limiting factor on some goat populations.

Historical use of mountain goats by man included utilization by coastal natives for meat, cosmetics and ornamental purposes, and by early white settlers as a personal and commercial meat source. Mountain goats are now hunted primarily for recreational values and meat. The species is increasing in popularity as a big game animal in Alaska, partly in response to decreasing opportunities to hunt other species of big game.

In general, accessibility has been the major factor affecting the intensity of use of goat populations. Goats near urban centers, along roads, or near lakes or salt water have received considerable hunting pressure. Relatively inaccessible goat populations have received much less pressure but

hunter efforts in such areas are increasing. Necessary reductions in season lengths and bag limits, and imposition of permit systems have accompanied increased utilization.

Aesthetic values of mountain goats have in recent years received increased recognition. Opportunities for viewing and photographing goats are available at several established goat observation areas in southeastern and southcentral Alaska. In addition, nonconsumptive use occurs incidental to other outdoor activities throughout the goats' range.

Species and Habitat Management Policies

1. The Department recognizes that responsible mountain goat management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of mountain goats. When others conduct research on mountain goats within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on mountain goats. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in mountain goat management. Mountain goats depend upon distinct habitat types of limited size for vital activities such as mating, giving birth and feeding. Winter range in or near mature forest is the habitat type most vulnerable to alteration by man and is therefore in greatest need of special designation and protection.

3. Transplanting mountain goats for restocking former ranges or stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of mountain goats will generally be opposed. Transplants of mountain goats may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of mountain goats as determined by comprehensive study; 2) prior study must establish that the introduction of mountain goats will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage mountain goats on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of mountain goats. Present use priorities may not be the priorities of the future, and mountain goat management must continue to consider all uses.

2. Recreation is the most important use of mountain goats. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing mountain goats in natural interactions with their environment. These uses are held to be generally compatible. Management of mountain goats will seek to provide maximum opportunities for all these recreational uses.

3. Certain areas of the state will be managed to provide mountain goat hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, and population manipulation.

4. Recreational observation and photography of mountain goats will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of mountain goats, certain areas exceptionally suited to viewing mountain goats may be zoned in time or space to restrict other uses in favor of observation of mountain goats.

5. The commercial harvesting of mountain goats for the sale of animal products will be opposed. The domestication of mountain goats is not considered a wise use of the resource and will be discouraged.

6. Permits may be issued for capturing, holding, importing and exporting mountain goats for stocking, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

7. The Department will plan for access to improve opportunities for use of mountain goats. In areas where mountain goats are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, hiking or horse trails, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for

incompatible uses of the resource, however, and will be encouraged.

Problems

* Knowledge of most facets of goat ecology in Alaska and of the influence of hunting and land use on goat populations is limited. Research should be expanded to provide necessary management information. Until such information is obtained, a conservative harvest program must be maintained.

* Clearcut logging adjacent to and within goat winter range is increasing annually. Many of the areas scheduled for logging are thought to be important wintering areas. Alteration of large portions of habitat used by goats for winter range may reduce availability of forage and cover. Removal of timber and construction of roads may also pose barriers to migration between summer and winter ranges. Forest areas used by goats for wintering or migration should be identified and logging activities should be controlled to minimize adverse impacts on goat populations.

* Hunting pressure has been concentrated in easily accessible areas, particularly along roads. This has resulted in overharvest in some localized areas while some areas with difficult access remain, for the most part, unhunted. Because goats apparently remain on the same summer ranges and winter ranges annually, populations depleted in heavily hunted areas are not readily replenished by surrounding unhunted goat populations. Management will require restricted hunting in easily accessible areas, thereby encouraging hunting in more remote areas.

MUSKOX MANAGEMENT POLICIES

Species Background

Populations of muskoxen (Ovibos moschatus) in Alaska are presently found only on Nunivak and Nelson Islands, on the northern part of the Seward Peninsula, in the vicinity of Cape Thompson-Pt. Hope, and on the North Slope between the Sagavanirktok River and the Canadian border. This species, extirpated from its original range on Alaska's Arctic Slope in the mid-1800's, was re-introduced into Alaska with a transplant of 31 Greenland muskoxen to Nunivak Island in 1935 and 1936. Following a slow initial increase, the Nunivak population increased rapidly after 1950, growing to about 750 animals in 1968. Transplants of muskoxen to Nelson Island and to northwestern and arctic Alaska sites, natural mortality, and hunting subsequently reduced the Nunivak population to about 500 animals in 1980. The Nelson Island population has grown rapidly to about 120 muskoxen by 1980. Muskoxen transplanted to northwestern and arctic Alaska appear to be healthy and are reproducing, but no significant increase in the total number has been noted. Predation by wolves and brown bears may be a factor in preventing an increase in these small nucleus populations. The total number of muskoxen in northwestern and arctic Alaska in 1980 is estimated at about 100.

Both Nunivak Island and Nelson Island are far south of the normal range of muskoxen, whose historic range in the state probably was limited to the Arctic Slope westward to the Colville River. The primary winter habitat requirements for muskoxen seem to be windblown tundra areas with very light snow accumulation which permits them to feed on grasses and sedges throughout the winter. Both Nelson Island and Nunivak Island have areas meeting these requirements for acceptable muskox habitat. Frequent high winds expose the vegetation on coastal sand dunes and hills, providing easy access to forage during the winter.

Unlike mainland habitats, Nunivak and Nelson Islands lack large predators. On Nunivak Island, the chief causes of mortality to muskoxen are insufficient food, accidents and old age. Animals also wander off the island in winter and are unable to return when the ice shifts or melts.

Public use of muskoxen has been very limited. Ranges occupied by muskoxen are remote, expensive areas for people to visit. A few sightseers and photographers have visited Nunivak and perhaps more will in the future. Just knowing muskoxen are present in the state is satisfying to many people. In 1975 carefully regulated sport hunting was initiated in Alaska. Muskoxen provide a unique and valuable trophy and Alaska provides the only opportunity for hunters to be able to take this species in the United States.

Species and Habitat Management Policies

1. The Department recognizes that responsible muskox management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of muskoxen. When others conduct research on muskoxen within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on muskoxen. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in muskox management. Because muskoxen are dependent in winter on areas of limited size characterized by little snowcover and exposed herbaceous vegetation, care must be taken to assure that such areas on muskox ranges remain productive and available for use by muskoxen. Muskox populations must be managed within the carrying capacity of their ranges, and competition from domestic animals and land uses which preclude use of winter range must be avoided.

3. Management of muskoxen may entail control of population size to levels commensurate with the carrying capacity of winter ranges, and manipulation of sex and age ratios to optimize productivity of populations. The option of using either-sex harvests may be necessary for effective management.

4. Transplanting muskoxen for restocking former ranges or stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of muskoxen will generally be opposed. Transplants of muskoxen may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of muskoxen as determined by comprehensive study; 2) prior study must establish that the introduction of muskoxen will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage muskoxen on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of muskoxen. Present use priorities may not be the priorities of the future, and muskox management must continue to consider all uses.

2. Recreation ultimately will be the most important use of muskoxen. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing muskoxen in natural interactions with their environment. These uses are held to be generally compatible. Management of muskoxen will seek to provide maximum opportunities for all these recreational uses.

3. Muskoxen may provide significant benefits as a food resource for those Alaskans who live in close proximity to muskox populations. In areas where people may utilize muskoxen primarily for food, the Department will manage muskoxen to provide food and for other uses, within the limitations of optimum sustained yields.

4. In areas with intensive hunter use, muskox will be managed for an optimum sustained yield of animals. Management techniques may include, but are not limited to, harvest of muskox of all sexes and ages, liberal seasons, and access improvement.

5. Certain areas of the state will be managed to provide muskox hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access, control of the number and distribution of hunters, regulation of sex and age of animals taken, and population manipulation.

6. Because of the remoteness of muskox habitat, the opportunities for recreational observation of muskox are limited. Therefore, appreciation of muskox will be encouraged through public information and education programs.

7. The muskox is one of the few wild animals in Alaska that may offer some potential for domestication. Scientific investigations designed to determine the feasibility of this use will be encouraged. The Department will oppose domestication as the sole use of the species and will also oppose it in situations which may interfere with management of wild muskox populations. The commercial harvesting of wild muskoxen for the sale of animal products will be opposed.

8. Permits may be issued for capturing, holding, and exporting muskoxen for stocking, public education, and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

9. The Department will plan for access to improve opportunities for use of muskox. In areas where muskox are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of airstrips, snow machine trails, and hiking trails. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to nonmotorized means. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Muskox populations confined to islands with limited winter habitat and without natural predators must be intensively managed to maintain the herds in balance with the available habitat. Since the number of animals that can be transplanted to other areas is limited by the amount of good muskox habitat elsewhere and by the extremely high cost of transplants, other forms of removal must be considered including hunting for both sexes, capture for scientific and educational purposes, and if necessary, controlled slaughter.

* Hunting is an effective tool for the management of muskox populations, providing for substantial beneficial public use and economic benefits to local communities. However, hunting of muskoxen may be opposed by various anti-hunting groups on the basis of the relative scarcity of the species in Alaska and on the alleged lack of sporting quality to the hunt. It is important that the values of hunting be demonstrated and that a recurrence of unnecessary losses and wastage of muskoxen resulting from political opposition to hunting of Nunivak muskoxen during 1968-1974 be avoided.

WOLF MANAGEMENT POLICIES

Species Background

Wolves (Canis lupus) occur throughout the Alaskan mainland and on some of the major islands in southeast Alaska. Historically, population levels have fluctuated in different regions in response to prey availability, predator control efforts, hunting and trapping. Wolf populations generally increased during the 1960's and then leveled off during the 1970's. Some areas have experienced decreases in wolves in recent years. Since the early 1970's wolves have increased in numbers and they are now generally abundant in most areas of the state. In 1980, the statewide wolf population was conservatively estimated to be about 8000.

Wolves usually occur in packs which consist of related individuals including parents and young of the year, young of the previous year and often other adult animals. Social order in the pack is characterized by a dominance hierarchy with a separate rank order among females and males. Fighting is uncommon within packs except during periods of stress. Dominance order is maintained largely through ritualized behavior.

Pack sizes are variable, commonly ranging from 2 to 5 in southeastern Alaska and 5 to 12 in the remainder of the state, although packs of up to 36 individuals have been observed. The range of a pack may include over 1,500 square miles. However, where food resources are optimal a pack may subsist within an area of a few hundred square miles. Even with adequate food, the ranges of packs often overlap to some degree. During winter in arctic Alaska, packs may at times abandon their usual range due to the temporary absence of their major prey species, the migratory caribou. During early summer, when pups remain at dens, most adults center their activities around dens. This reduces their mobility, although adults may travel 20 miles or more from dens while hunting. Active dens are usually at least 15, and often 25 or more miles apart.

The diet of wolves varies according to season, location, and prey species availability. Moose and caribou are the major prey over much of Alaska but Dall sheep are also taken. In southeastern Alaska, deer and mountain goats are important food sources. During winter these big game species constitute almost the entire diet of wolves. Snowshoe hares are an important food source during years of hare abundance. During summer young ungulates often make up the major portion of the diet. Small animals such as voles, lemmings, ground squirrels, snowshoe hares, beaver, and occasionally birds and fish are important supplements.

Generalizations about wolf-prey interactions are difficult to make because of differences between areas and prey species. Evidence from various studies of wolf-prey relationships suggests that the effect of wolf predation is largely dependent upon the relative densities of predators and prey, and the size and reproductive success of the prey populations. The effect of wolf predation can range from minor significance, in which wolves remove far less than the annual recruitment to the prey population, to one in which wolves can retard prey population growth or reduce a prey population by removing the annual recruitment or more.

Studies of wolf populations indicate that the high reproductive potential of wolves is seldom realized. Several factors may regulate wolf population levels either through reduced productivity or direct mortality. These include reduced fertility, social inhibition of breeding, malnutrition and starvation (especially among pups), cannibalism and the other forms of intra-specific strife, disease, accidents and predation. The importance of these factors varies. Various studies of wolf ecology suggest that food supply is a primary determinant of wolf densities. When prey are abundant or easily taken, wolves exhibit increased productivity. More and larger litters of pups are born, and more pups survive their first year of life. Conversely, when food is scarce, fewer, smaller litters are produced, and mortality of pups through starvation and cannibalism increases. Natural mortality appears to be greatest during the first year of life.

Wolves may partly compensate for human utilization by increased production and survival of young. In many cases wolves can compensate for a harvest of 50 percent of the autumn population. However, where wolves are vulnerable to aerial hunting techniques excessive human exploitation can reduce wolf populations.

The treatment of wolves in Alaska has changed greatly during this century. In 1915, Alaska's first territorial legislature established a bounty on wolves. Prior to 1960 there were no restrictions on the taking of wolves and from 1948 to 1959 the Federal government conducted intensive wolf control operations in many parts of Alaska using poisons, aerial shooting and trapping. In 1959 the State assumed management authority for wolves and in 1960 the use of poisons was discontinued. In 1963 the Board of Fish and Game classified wolves as both furbearers and big game animals. Regulations governing methods of harvest, seasons and bag limits were promulgated, thus providing additional protection for wolves. In 1968 the legislature authorized the Board of Fish and Game to abolish bounties and in 1969 bounty payments were suspended in all but three Game Management Units in southeastern Alaska.

Prior to the 1930's relatively few wolves were taken by hunters or trappers over much of Alaska, primarily because there was insufficient economic incentive to stimulate harvests in excess of needs by local residents for clothing manufactured from wolf pelts. Bounties on wolves provided some additional incentive to take wolves, but it was not until pelt value increased markedly during the 1960's that efforts to take wolves increased significantly. Even with the elimination of the bounty in 1969, the continuing increase in pelt value has provided substantial economic incentive for people to hunt and trap wolves.

Since the elimination of aerial hunting in 1972, most wolves have been taken by trapping or by hunters who use aircraft to land and shoot wolves or use snow machines to track the animals. The latter techniques are effective in treeless areas. Some wolves are taken by recreational hunters incidental to hunts for other big game animals.

Most wolf pelts taken in Alaska enter the commercial fur market, although wolf pelts remain important in the manufacture of various types of clothing worn or sold by Alaskan residents. Wolf fur is also used in some local handcraft industries.

In recent years nonconsumptive use of wolves has gained in popularity. In those areas of the state where the open nature of the terrain enables observation of wolves, increasing numbers of hikers and other visitors find opportunities to observe wolves and other wildlife in a natural setting. In forested areas opportunities to observe wolves are limited, but the opportunities to listen to howling wolves or to observe their tracks are highly valued by some people.

Species and Habitat Management Policies

1. The Department recognizes that responsible wolf management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of wolves. When others conduct research on wolves within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the people of the state. The Department will cooperate with other agencies or individuals whose research may provide useful information on wolves. Occasionally research may require temporary limitations on public use of study populations.

2. Because wolves are largely dependent upon ungulate populations, they will continue to be a viable component of the Alaskan environment if ungulates are managed successfully and wolves are provided with some degree of protection from human exploitation. Maintenance of suitable habitat for ungulates is of great importance in maintaining an adequate prey base for wolves. Management of ungulate harvests by man must consider the requirements of both wolf and ungulate populations affected by human harvests to assure the continued well-being of both.

3. Management of wolves depends on wolf productivity and mortality in conjunction with the capability of prey species populations to sustain predation and human use. When the use of prey by wolves and by humans exceeds the capabilities of the prey population to sustain those uses, the wolf and prey populations may be managed, and the use by humans regulated, to bring the use and capabilities into balance. The various subsistence, recreational, commercial, and aesthetic values of both wolves and their prey will be considered in the final management decisions. Reductions in wolf populations may be conducted when determined to be necessary by the Department. In the absence of other control mechanisms, aerial hunting may be conducted in accordance with procedures adopted by the Board of Game. Bounties are not considered a desirable means of control.

4. Transplanting wolves for restocking former ranges or stocking vacant habitat in Alaska can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of wolves will generally be opposed. Transplants of wolves may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient

and suitable habitat to support a viable population of wolves as determined by comprehensive study; 2) prior study must establish that the introduction of wolves will not adversely affect the numbers, health, or utilization by man of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

5. Situations may arise requiring the removal of a wolf or the reduction in numbers of wolves in response to a specific problem involving safety of human life or property. Control will be implemented only after an investigation by Department personnel has determined a valid need exists. In cases of potential damage to private property it is the owner's responsibility to protect his property from damage by wolves. Reasonable efforts must be made to protect life and property by means other than the destruction of wolves. When control by removal of wolves is necessary, humane methods will be used and pelts will be salvaged. Whenever appropriate, control of wolves will be accomplished by public hunting or trapping. Poison bait will not be used for control.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage wolves on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national and international interests must be considered. There are many beneficial uses of wolves. Present use priorities may not be the priorities of the future, and wolf management must continue to consider all uses.

2. Hunting and trapping of wolves for commercial and domestic uses are of great benefit to many Alaskans and will be encouraged with other beneficial uses of wolves. In selected areas with intensive hunting and trapping use, wolves may be managed for optimum sustained yields.

3. In many areas of the state, recreation is an important use of wolves. Recreational uses include: sport hunting and trapping in their various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing wolves in natural interactions with their environment. These uses are held to be generally compatible. Management of wolves

will seek to provide maximum opportunities for all these recreational uses.

4. Recreational observation of and appreciation for wolves will be encouraged through public information and education. Although hunting and trapping are generally considered compatible with recreational observation of wolves, certain areas exceptionally suited to viewing wolves may be zoned in time or space to restrict other uses in favor of observation of wolves.

5. The domestication of wolves is not considered a wise use of the resource and will be discouraged.

6. Permits may be issued for capturing, holding, importing and exporting wolves for stocking, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

Problems

* Increasing human demands on moose, caribou and deer populations that are declining or are already at low levels and the effect of wolf predation in retarding recoveries of these populations creates a serious management dilemma. The temporary reduction of wolf numbers to encourage an increase in the number of ungulates may be desirable is not easily accomplished because of the controversial nature of the wolf, the practical problems in achieving significant reductions in wolf populations, and the complexity of predator-prey relationships. The wolf evokes powerful sentiment from both those who see it as a destroyer of game coveted by man and those for whom it is a symbol of wilderness. Both opinions are powerfully expressed through political and legal channels and both influence the management of wolves in Alaska. Opposition to wolf control programs (especially those involving aerial hunting) is widespread, and it promises to remain a serious obstacle to wolf managment programs regardless of how well the action is justified in terms of the future welfare of both ungulate and wolf populations. As scientific understanding of the role of wolves as predators and their effect on ungulate populations improves, it must be accurately conveyed to the public. Recent studies have shown that many earlier assumptions regarding beneficial or inconsequential effects of wolf predation are simplistic or limited in application. Responsible management of wolves must consider the complex inter-relationships of predator and prey, the

welfare of each, and the beneficial uses of both that can be derived by man.

* Illegal aerial hunting of wolves in Alaska continues to be a problem in some areas. Lack of escape cover for wolves in some areas and the high value of wolf pelts are incentives to illegal activity. In addition, the remote nature of the area make enforcement of protective regulations difficult. Increased enforcement efforts and more severe penalties for the illegal use of aircraft in hunting wolves could alleviate some of the problem.

FURBEARERS MANAGEMENT POLICIES

Species Background

Wildlife classified as fur animals in Alaska includes wolf*, wolverine, marten, mink, beaver, muskrat, lynx, land otter, coyote, red and arctic foxes, short-tailed and least weasels, arctic ground squirrel, red squirrel, flying squirrel, marmot and raccoon. Many of these species are widely distributed in the state; consequently most are represented to some extent in any given area. The Arctic Slope, the Aleutian Islands, many islands in the Bering Sea, the northern Gulf of Alaska, and southeastern Alaska have relatively few species present although large numbers of any one species may occur. On a number of islands furbearers are present as a result of introductions for fur farming or from efforts to establish harvestable populations. Each individual species may vary in abundance according to habitat preferences, availability of food, or cyclic patterns. Information on numbers, distribution, or utilization of the various species is limited. Much of what is known is acquired from mandatory sealing of pelts, fur export reports, some field observations and reports from trappers.

Furbearer population levels and trends depend primarily on the abundance of food. Species such as wolverine and otter which rely on a variety of prey species or beaver which rely on a relatively stable vegetative food source are less subject to fluctuations than those furbearers such as lynx, arctic fox and marten which are dependent on a single or only a few prey species. At times diseases cause significant reductions in furbearer populations. Rabies, mange, and distemper affect fox populations, beavers are subject to endemic hemorrhagic disease, and in southeastern Alaska, nutritional steatitis affects those mustelids that feed on rancid fish fat. Those species which occupy aquatic or riparian habitats, particularly beaver, muskrat, and mink are subject to flooding or "glaciering" conditions. A number of the smaller furbearers including weasels, muskrats, squirrels, and marmots are prey to larger furbearers or other mammalian and avian predators.

Commercial and domestic utilization are the most important uses of furbearers in much of Alaska. Some recreational trapping and nonconsumptive use occurs near urban centers, but viewing and photography are limited to relatively few species whose habits provide opportunities for observation. Most furs are sold but some are retained for domestic use in parkas, mukluks, or as trim for garments. Wolf, wolverine, muskrat, and beaver are the species most used in the domestic manufacture of garments, but almost all species are utilized

* The wolf in Alaska is described separately under the wolf management policies.

to some extent, particularly when the furs are not in prime, marketable condition. Beaver, muskrat, ground squirrels, and to a limited extent lynx and red squirrels are also used as human or dog food. The few furbearers taken by sport hunters are usually taken on an opportunistic basis in conjunction with hunts for other species. Wolves and wolverines are generally considered trophies by sport hunters.

Furbearer trapping seasons and bag limits have remained relatively unchanged since statehood. Seasons have generally been timed to coincide with periods of pelt primeness. Liberal seasons and bag limits have had little effect on populations of most species of furbearers except for small, localized areas of overharvest associated with ease of access. The vulnerability of beavers to intensive trapping and of wolverines in tundra regions to tracking by snow machine has resulted in depressed populations of these species in some areas, requiring curtailment of seasons. In most areas of the state and for most species, however, harvests are affected primarily by abundance and availability of furbearers, and by market values. At low levels of abundance or in inaccessible areas, trapping effort usually ceases when it becomes unprofitable; then the high reproductive potential of most species rapidly restores populations to carrying capacity. Trapping is done primarily to supplement income derived from other sources. Few full-time professional trappers operate in the state.

Snow machines are the most commonly used mode of transport for trapping or hunting furbearers, although aircraft are also used extensively. Snowmachines are the standard means of transport at all bush communities and provide rapid and efficient coverage of large areas surrounding settlements. Aircraft are useful for trapping in areas far from human habitation and are also used as an aid in locating and shooting foxes and wolverines from the ground. In southeastern Alaska, boats are the primary transport means for trappers because most trapping activity occurs along the beach fringe.

Wolverine (Gulo gulo) occur throughout mainland Alaska and on some islands in southeastern Alaska. Population densities are variable depending on suitable habitat and, in some western and northern areas, on the degree of harvest. Wolverines are most abundant in interior Alaska and the Alaska Peninsula and least abundant in southcoastal areas. Sparse populations exist over most of southeastern Alaska, with moderate numbers in the Stikine, Taku, Chilkat, Yakutat and gulf coast areas. Wolverines are generally abundant over the remainder of the state, particularly in forested and alpine habitats. Densities are relatively low on portions of the arctic slope, northwestern coastal tundra areas, and on the Yukon-Kuskokwim Delta.

In comparison to other furbearers, wolverine never attain high densities, due in part to their large territorial requirements and apparently low reproductive rate. Wolverines eat a variety of foods; much of their food is scavenged and a dependable source of carrion may be important in maintaining populations.

More than 800 wolverine are harvested each year by hunters and trappers. Southcentral Alaska and the Yukon River drainage yield the largest harvests with about 250 and 200 wolverine, respectively, taken there. Although sealing (marking) of wolverine skins is required, some skins used domestically for parkas, ruffs and garment trim are not reported; consequently, reported harvests are minimum numbers. Trapping is the most common method of taking wolverines in forested areas such as in interior and southcentral Alaska, while in the open country of western and arctic Alaska or in alpine areas ground-shooting from snow machines or with the aid of aircraft predominates.

Use of wolverine varies between areas. In western and arctic Alaska, wolverine are in high demand for domestic use in garments and few are sold commercially. Most skins never leave the villages. Coastal villagers acquire pelts by bartering with interior residents or purchasing from commercial furriers. In interior and southcentral Alaska most skins are sold commercially with some kept for domestic use.

Closed seasons and the remoteness of many areas provide some measure of protection for wolverine populations. Where lack of cover renders the animals vulnerable to tracking with mechanized vehicles, local extirpation may occur, especially near settlements. High prices for pelts and the demand for local use of skins in garments provide continuous incentive to trappers and hunters. In forested areas with relatively low wolverine densities the species is not actively sought and many that are taken are caught in wolf sets or are shot opportunistically.

Marten (Martes americana) occur throughout most of the state but are absent north of the Brooks Range, on the Yukon-Kuskokwim Delta, and the Alaska Peninsula. Marten were introduced to Prince of Wales and Baranof Islands in 1934 and to Chichagof and Afognak Islands in the early 1950's; they are abundant on Admiralty Island, but are otherwise absent from most of the islands in southeastern Alaska, Prince William Sound, and the Kodiak Archipelago. Marten distribution coincides with that of climax spruce forests. Their dependence on mature spruce habitat makes this species particularly susceptible to forest fires and clearcut logging practices. In northern interior Alaska extensive burns have resulted in reduced populations of marten over large areas. Much good habitat is still present in interior Alaska, however, and marten are abundant over the area as a whole. Marten are less abundant south and west of interior Alaska.

In good marten habitat, population densities may be as high as four animals per square mile. Although males occupy a larger home range than females, neither generally ranges over an area greater than one square mile, except during the breeding season or in mountainous terrain. In mountains marten may undertake seasonal altitudinal movements in response to changing food availability. Microtine rodents constitute the main source of food for marten although a variety of prey is utilized, depending on availablity. The red squirrel is a minor item in their diet. Berries may be an important food in late summer and fall.

Marten harvests have fluctuated widely in the past, but in the period from 1962 to 1972 averaged about 8000 per year. In 1973 the harvest increased to about 18,000. The price of marten fur, a primary determinant of trapping effort on the species, increased during the mid-1970's and provided incentive for intensive trapping effort. Harvests in interior Alaska have been relatively low (2000-3000 per year) despite high marten densities; here low trapping effort is probably a result of the availability of other employment in the area. Currently, southeastern and western Alaska have the largest harvests, with each area exporting 4000 or more pelts per year in recent years. Most marten trapped are sold commercially. A few are kept in western Alaska for domestic use in hats or as trim on garments and slippers.

Mink (Mustela vison) are common throughout the state except for the Kodiak Archipelago, the Aleutian Islands, the offshore islands of the Bering Sea, and most of the Arctic Slope. Mink are usually associated with riparian habitats - streams, ponds, marshes, and salt water beaches, and their diet reflects the variety of food species available there. Small mammals, birds, fish, and insects and other invertebrates are eaten. Southeastern Alaska and the northern Gulf of Alaska Coast-Prince William Sound area have relatively stable, high-density mink populations, distributed primarily along the coastal fringe where their food supply, including a variety of small mammals, marine invertebrates and fish, is diverse and abundant. Mink populations in interior Alaska areas are characterized by lower densities and greater fluctuations than southcoastal populations as a result of seasonal or unstable food sources, and lower productivity of freshwater habitats. Microtine rodent populations typically fluctuate drastically and are a primary factor affecting mink abundance. An abundance of mice or hares in upland areas will sometimes prompt mink populations to expand inland in search of prey.

Factors controlling mink population levels other than food are not well known. In some areas spring flooding may reduce populations by drowning young mink in dens. In southcoastal areas nutritional steatitis may be important; it was a significant mortality factor to mink raised commercially in past years.

Traditionally mink have been one of the most important commercially trapped species of furbearers in the state. Reduced pelt prices, increased levels of employment, and availability of welfare, have resulted in reduced trapping effort in many areas in the past decade, and mink are currently underharvested over much of the state. Western Alaska, particularly the Yukon-Kuskokwim Delta, has always been an important mink trapping area. Mink from this area are not only much larger than in other parts of Alaska but they are more uniform in color which, in combination, contribute to consistently higher prices. Large harvests also occur in southeastern Alaska. Elsewhere in the state harvests are variable, depending as much on the abundance of mink as on current market values. In some locations such as near Fairbanks and along the Copper River Highway near Cordova interest in recreational trapping is high despite price or abundance considerations. The majority of trapping effort, however, continues to be commercial in nature. Most mink trapped are sold to outside buyers. A few are retained for use as garment trim on slippers, gloves, hats and parkas.

Beaver (Castor canadensis) are presently distributed over most of mainland Alaska from the Brooks Range south to the middle of the Alaska Peninsula and into southeastern Alaska. Beaver are rare in much of Prince William Sound and southeastern Alaska except in the Yakutat forelands and some of the major mainland river drainages. They are present in low numbers on many southeastern Alaska islands. In southwestern Alaska there has been a significant decline in the beaver population north of the Kvichak watershed, particularly near settlements. Beaver are abundant in remote areas and are increasing there because of reduced wilderness trapping. Populations are also high and increasing on the Alaska Peninsula southwest of the Kvichak watershed. Beaver were introduced to islands in the Kodiak area in the 1920's and are now well established in suitable habitat on Kodiak, Afognak, Raspberry and several other islands. Beaver populations in interior and western Alaska are moderate to high and are generally increasing except in the lower Yukon-Kuskokwim area where overtrapping has occurred. Very few beavers were present in northwestern Alaska prior to the 1930's, but since the 1950's populations there have been increasing and expanding into the Selawik and lower Kobuk drainages.

Distribution and abundance reflect habitat availability except in areas where overtrapping has occurred. The most productive beaver habitat is characterized by a dependable water supply with little fluctuation in stream flow and by willow, aspen, cottonwood, or birch vegetation. Beavers are found from sea level to elevations of 4000 feet; they are absent on treeless tundra bordering the Arctic Ocean and the Bering Sea, and on the Aleutian Islands. Populations fluctuate naturally in response to availability of food in

localized areas. In some years high water levels force beavers out of lodges where they become vulnerable to predation. Endemic hemorrhagic disease can reduce populations when beavers attain high densities.

Beavers are unique in the degree to which their activities modify riparian habitats. Beaver dams stabilize watersheds, reducing flooding and silting. Raising of water tables and impoundment of water alters vegetative cover and provides aquatic and riparian habitat for many species of wildlife. Although some species of fish benefit by increased production of fish food and rearing areas for young fish, dams often create serious barriers to spawning anadromous fish.

Since the 18th century Russian fur trade, beavers have been one of Alaska's most important furbearers. Heavy utilization of beaver in early territorial days led to a period of scarcity in the early 1900's, but populations have recovered in most areas. Although prices of beaver pelts have not risen as dramatically as other furs, beavers remain an important furbearer in Alaska.

Trapping pressure varies between areas. The largest harvests come from the lower Yukon-Kuskokwim River drainages where about 3500 beavers are taken annually. Trapping is also heavy in the Bristol Bay drainages where more than 1600 beavers are taken each year. Harvests in interior and southcentral Alaska are relatively small; poor prices, restrictions on take, difficult trapping conditions and relatively high employment rates contribute to low trapping effort. Trappers on Kodiak Island annually take about 200 beavers, but the traditional low prices offered for coastal beaver pelts discourage effort there. Southeastern Alaska trappers also take about 200 beavers per year, mostly from the mainland; harvests tend to fluctuate widely between years.

Most beaver trapping occurs near human settlements by local residents. Because beaver are easily overtrapped, concentrated trapping near villages and along road systems may result in overharvests and depletion of local populations. This is especially evident in southwestern Alaska where beaver are five times as abundant in remote locations as compared to areas near villages. The percentage of beavers less than one year old (kits) in the harvest may also be indicative of harvest pressure. Up to 30 percent of the harvest near some southwestern and western Alaska villages are kits, as contrasted to 10 percent kits or less on the average in more remote areas.

Beavers are trapped mainly for commercial use, but in some areas such as western and northern interior Alaska they are also used for human and dog food. Pelts, particularly those from kits, may be used domestically for garment trim or for

hats, mittens and slippers. Beaver castors are used as a perfume base and are valuable to trappers as a component of scent lures.

Beavers are one of the few furbearer species that provide for nonconsumptive use. Much viewing and photography take place not only near the larger human settlements, but also in "bush" areas.

Muskrats (Ondatra zibethicus) occur throughout all of the Alaska mainland south of the Brooks Range except the Alaska Peninsula west of the Ugashik Lakes. The species was introduced to Kodiak Island in 1929 and later to Afognak and Raspberry Islands, but is absent from most other Alaskan islands. The densest muskrat populations are found in five areas: the Yukon Flats surrounding Fort Yukon, Minto Flats, Tetlin Lakes, the Yukon-Kuskokwim Delta and the Selawik-Kobuk-Noatak area. Four fifths of the annual muskrat harvest comes from these areas. Muskrat abundance elsewhere in the state varies depending on localized wetland habitat conditions. Population fluctuations can be substantial. In southeastern Alaska, muskrats have never been abundant and are currently present in fair numbers only near Haines, Juneau, and the Stikine River. Muskrats were once very abundant on the Copper River Delta but are now relatively scarce throughout the northern Gulf of Alaska coast. Populations over most of the remainder of the state are generally at moderate levels, down from higher densities of past years.

Muskrats are vulnerable to unfavorable weather conditions affecting their wetland habitat. Populations are reduced by winter kill when the ice becomes too thick and animals are forced to emigrate into limited forage areas, or when ponds and lakes dry up. In years of heavy snow, muskrats are flooded out in the spring. Losses to predation and starvation increase under such situations. Reduced muskrat populations in some areas of Alaska can be attributed to adverse winter and spring conditions of recent years.

Hunting and trapping have relatively little effect on muskrat populations. The species is highly productive (about 15 young produced annually per adult female) and capable of repopulating depleted habitats rapidly. Heavy harvests can be sustained if habitat conditions remain good. A relatively small proportion of the total good muskrat habitat is hunted or trapped, usually only areas of high density populations within three or four miles of major streams and lakes. Unharvested areas act as reservoirs of breeding stock.

Although the open season for harvesting muskrats extends from November into June, most are taken in the last six weeks of the season. Eighty percent or more of the muskrat harvest is taken by shooting with small caliber rifles; trapping is usually considered too time consuming.

In the 1950's, muskrats ranked first in numbers of furbearers harvested in Alaska, and were among the top four in total value. Low prices combined with increased employment and availability of welfare are responsible for current greatly reduced trapping efforts, although recent pelt price increases may increase harvests. Most muskrats are taken for commercial sale of fur, but some are utilized domestically for food and for parkas and trim on boots and slippers. In western and northwestern Alaska domestic use exceeds commercial use. In northern interior Alaska muskrats are an important food in the spring. Muskrats also provide some nonconsumptive use, particularly near human population centers to which they readily adapt, but observation of muskrats occurs much less than with the more conspicuous beavers.

Lynx (Lynx canadensis) occur throughout Alaska except on the Aleutian Islands, the islands of the Bering Sea and some of the islands of Prince William Sound and southeastern Alaska. Lynx are relatively uncommon in southeastern Alaska, being present only on the larger river systems where they have emigrated from interior populations. The lynx is primarily an inhabitant of the northern boreal forest where it feeds largely on snowshoe hares. It occasionally occurs on the tundra beyond treeline, and in starvation years individuals venture far out onto the tundra in search of arctic hares, lemmings, and ptarmigan.

In response to snowshoe hare population cycles, lynx numbers fluctuate with a 10-year periodicity in abundance. The amplitude of lynx population fluctuations is very great as indicated by records of exported pelts. Population highs are not synchronous throughout Alaska and broad two to four year peaks of catch probably reflect consecutive population peaks in different areas. In increasing lynx populations the females breed in the first year of life and almost 100 percent of the females conceive. Large litters and high survival of kits are common. After snowshoe hare populations decline, female lynx may not breed during their first year, the number of kits produced is reduced, and those kits that are born have low survival rates.

Lynx fur has again become popular for parkas, coat trim, jackets, hats and muffs after a long period of unpopularity. High prices in recent years have resulted in intensive trapping effort. Harvests during the 1971 to 1974 period of peak abundance were about 2000 to 2500 annually, half of which came from interior Alaska. Trapping effort is centered around villages and along road systems and the majority of the harvest is by local residents. Most pelts are sold but some are kept for domestic use. The meat is occasionally used for human and dog food.

Land otters (Lutra canadensis) are most abundant in the southeastern Alaska and Prince William Sound coastal regions

and in the Yukon-Kuskokwim Delta, although they are found throughout the state except on the Aleutian Islands, islands of the Bering Sea, and the arctic coastal plain east of Point Lay. Land otter populations are relatively stable, especially in coastal areas where marine food is always abundant. Shellfish, crustaceans, insects, fish, frogs, birds, small mammals and vegetable matter are all eaten. Parasites and diseases are not normally important mortality factors. Flooding in the spring may sometimes drown young otters in dens.

Land otter harvests are probably larger in the southeastern and southcentral coastal areas than in interior Alaska. Overtrapping is usually not a factor affecting populations, but temporary reductions in local populations can be effected by an efficient trapper. From 1000 to 2000 land otters are taken annually, most near villages or communities in southeastern Alaska, Prince William Sound and the Yukon-Kuskokwim Delta. Land otters are an important furbearer on the Kodiak Archipelago where 200-250 are taken and sold annually. Pelt prices affect trapping effort because otters are difficult to catch and to skin. Most otter hides are sold commercially, but in the northwestern area they are often used domestically for trim on garments and slippers. Otter hides that are used domestically are usually those which are taken late in the season and are less than prime. Land otters often provide excellent viewing opportunities, especially around coastal towns where they are often seen in the harbors.

Coyotes (Canis latrans) apparently first arrived in Alaska about 1915. A rapid population expansion occurred, with the center of abundance first in the Tanana Valley around 1930 and later in southcentral Alaska. At the present time coyotes occur as far west as the Alaska Peninsula and the north side of Bristol Bay, but are rare north of the Brooks Range. Although not especially abundant, coyotes are common in many areas, particularly in the drainages of the Tanana, Copper, Matanuska and Susitna Rivers, and on the Kenai Peninsula. Populations may become locally abundant periodically.

Although snowshoe hares may be important prey in some areas and at certain times, coyotes eat a large variety of foods. The diversity of their foods and their adaptability to a variety of habitats including those affected by man are probably factors which have allowed them to coexist successfully against indigenous wolf populations.

Relatively few coyotes are trapped and those which are taken are usually caught incidental to trapping for fox, lynx, and wolf. A few coyotes are taken by sport hunters. Most coyotes are sold commercially. Some are used for parka ruffs and mittens. Prior to 1969 there was a statewide bounty of $30 for coyotes. No bounties have been paid since 1969.

Red foxes (Vulpes vulpes) occur over the entire state except for some of the islands of southeastern Alaska and Prince William Sound. The species is native to Kodiak Island but on many of the other islands where it occurs it was introduced by fox farming operations in the early 1900's. Red foxes are most abundant south of the arctic tundra although they are present in arctic and northwestern coastal tundra regions where their distribution overlaps that of arctic foxes. The best red fox habitat appears to be in interior Alaska and on the coastal areas south of Norton Sound, including the Alaska Peninsula. Red fox populations along the northern Gulf of Alaska coast and in southeastern Alaska are sparse, with most foxes occurring in the major mainland drainages which connect to interior areas.

Red fox populations fluctuate in response to availability of food or to disease. Fluctuations of snowshoe hare and rodent populations will cause the fox populations to fluctuate also. In coastal areas such as Kodiak Island and the Alaska Peninsula, red foxes feed on carrion on the beaches and are not so dependent on small mammal populations; populations in these areas are therefore more stable. Fox populations are affected by diseases such as rabies, mange and distemper, and occasional large-scale die-offs occur as a result of disease epidemics.

Red foxes are one of the more important furbearers in the state. In recent years the value of their pelts has increased greatly, which may result in increased trapping pressure; however, foxes are probably not overtrapped anywhere in the state. The estimated red fox harvest in 1973-74 was 14,580.

Silver and cross foxes, color variations of the red fox, are in high demand for wall mounts. Most red foxes taken are sold commercially, but some are used domestically for garments including parkas, ruffs, hats, and trim. In some areas such as McKinley National Park and along the North Slope Haul Road and other roads and trails, red foxes provide substantial enjoyment to viewers and photographers. The species readily becomes accustomed to the presence of humans and once so conditioned can be observed at close range.

Arctic or white foxes (Alopex lagopus) are found in Alaska along the coast from the Aleutian Islands north. On the mainland (except the lower Alaska Peninsula) and St. Lawrence and Nunivak Islands the white color phase predominates while on the Pribilofs and most of the Aleutians west of Unalaska, the blue phase predominates. Blue foxes were transplanted to the Pribilofs, Aleutians and many other islands by fox farmers.

Arctic foxes are noted for their extreme fluctuations in population levels. Periodic peaks in arctic fox populations

occur approximately every four years in Alaska, Canada and Greenland and are tied to cyclic fluctuations in small rodent abundance. Arctic foxes have a high reproductive potential, breeding at one year of age and averaging four to eight pups per litter. Apparently there is a reduced production of pups during periods of food scarcity. Studies in Canada have shown that average litter size varies directly with lemming numbers. Although microtine rodents are the primary prey, arctic foxes are highly efficient predators on the eggs and young of waterfowl, and are an important factor governing the nest locations of seabirds.

Considerable variation exists in the yearly harvest of Alaskan arctic foxes. Because pelt prices have remained relatively stable the size of the annual harvest has been most affected by cyclical abundance of foxes. The average annual harvest since 1912 (derived from the number of furs exported) has been about 4,000 white fox pelts. Arctic foxes are the most important furbearer north of the Brooks Range because they are the only furbearer that occurs in large numbers. Approximately 40 percent of the arctic fox harvest comes from the arctic slope. The highest catch per unit of area, however, comes from the Bering Sea islands where about 30 percent of the harvest is taken. Most Alaskan white fox furs are sold and utilized outside of Alaska.

Short-tailed weasels (Mustela erminea), also known as ermine, are present throughout Alaska except for the Aleutian Islands west of Unimak Island and the offshore islands of the Bering Sea. Least weasels (Mustela rixosa) have a similar range except that they are not found in southeastern Alaska south of Glacier Bay, in the mountains in the southeastern corner of southcentral Alaska, nor on Kodiak Island. The ermine favors wooded or brushy terrain with some topographic relief whereas least weasels prefer damp, marshy habitat with its high microtine populations. Ermine are seldom numerous anywhere within their range. The smaller least weasel is sparsely distributed throughout its range except in some years of peak rodent populations.

Weasels are voracious predators that take a variety of rodents, young snowshoe hares, young birds, eggs, fish and invertebrates. When live prey is scarce weasels utilize carrion and berries or other vegetable matter. Weasels are not selective among prey species but take them in direct proportion to their abundance and availability. Weasels in turn fall prey to raptors and other carnivorous furbearers.

Most weasels are now taken incidental to trapping for other species. Weasel pelts are sold although their value is low. Some skins are used for trim on parkas and slippers and in the manufacture of tourist items.

Arctic ground squirrels (Spermophilus parryii) are found in well-drained tundra areas throughout Alaska from sea level to the uplands. They are most abundant in mountainous terrain. Ground squirrels live in colonies where there are loose soils on well-drained slopes, vantage points from which the surrounding terrain can be observed, and bare soils surrounded by vegetation in early stages of succession. Colonies in high areas or well-drained slopes are least affected in the spring by water from melting snow. Hibernation protects ground squirrels from the low temperatures of winter, and lasts as long as seven or eight months. Ground squirrels feed on a variety of food including seeds, roots and bulbs, plant stems and leaves, mushrooms, insects, carrion and bird eggs. Quantities of seeds and vegetation are stored in underground chambers. Ground squirrels are an important food source for raptors, weasels, foxes, wolverines and grizzly bears.

Residents of the Arctic Slope, northern interior Alaska, and northwestern Alaska trap, snare and shoot ground squirrels and use them for food and parkas. Ground squirrels are an important food supplement for these people in the spring soon after the squirrels emerge from hibernation. Local residents extract fat and oil from squirrels by boiling and eat the fat along with the lean meat of other animals. Elsewhere in the state, utilization of the arctic ground squirrel fur is much less than other furbearers. Nonconsumptive use of ground squirrels occurs in alpine areas but except for park areas and upland campgrounds, observation of ground squirrels is usually incidental to other outdoor activities.

Red squirrels (Tamiasciurus hudsonicus) are found over most of Alaska where white spruce are present and also occur in mainland coastal spruce-hemlock forests. These squirrels are abundant in the interior, especially along river bottoms with abundant stands of white spruce. They are highly dependent on spruce seeds as a food source; squirrel populations fluctuate in response to spruce cone abundance, with sharp declines when spruce cone failures come in consecutive years. Squirrels will utilize spruce buds in winters when there are no cones, but there may be severe attrition in the squirrel population. Red squirrels may have some effect on the scattering of spruce seeds, aiding reforestation.

Red squirrels are prey for a variety of predators including marten, fox, lynx, and many raptors. They are also hunted and trapped by man, mostly for recreation, with some utilization for food, fur, and trap bait. Some are taken in traps set for other species. The hides have a low economic value and the fur harvest is insignificant. Many red squirrels are shot as nuisances around human dwellings as they can be destructive to insulation if they gain access to a building. Red squirrels are one of the most commonly observed small mammals in Alaska. Viewing and photography are significant uses in campgrounds, waysides and other recreation sites.

Northern flying squirrels (Glaucomys volans) are a relatively little-known species which inhabits the boreal forest in interior, southcentral, and southeastern Alaska. The species is rarely seen due to its nocturnal habits. Flying squirrels eat a variety of seeds, fruits, and other vegetable material and scavenge on carrion. This proclivity for meat results in flying squirrels often being caught in traps set for other species. The fur is of no commercial value.

Hoary marmots (Marmota caligata) are present throughout most of the mountainous regions of Alaska, but are generally absent from lowland regions such as the Seward Peninsula, the Yukon-Kuskokwim Delta, the North Slope, and the lower Alaska Peninsula. None are present on the Kodiak Island group or the outer islands in the southeastern Alaska group. Hoary marmots prefer the precipitous sides of canyons and valleys where boulders are large and have accumulated to a depth sufficient to give subsurface protection from predators.

Marmots are sometimes trapped and the fur used for parkas. If the pelts are taken in the fall while they are prime and softly furred they make a fine garment. There is not much commercial use of marmot fur, however, and little information is available on the harvest. Marmots may be seen in some of the national parks, notably Mt. McKinley National Park, and provide opportunities for interesting viewing and photography.

A closely related species, the woodchuck (Marmota monax), is present in eastern interior Alaska, in a small area lying between the Yukon and Tanana Rivers east of Fairbanks to the Alaska-Yukon border. Woodchucks prefer open woodlands and thickets, near fields and clearings on dry soil. They have a very spotty distribution in Alaska.

Raccoons (Procyon lotor) have been released by private individuals in southeastern Alaska and on Kodiak Island in the past, and several small populations have become established. Only occasional sightings are reported in southeastern Alaska, but on Kodiak Island raccoons are rapidly expanding their range and are expected to have a detrimental impact on the island's seabird rookeries if they cannot be contained or eliminated.

Species and Habitat Management Policies

1. The Department recognizes that responsible furbearer management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of furbearers. When others conduct research on furbearers within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest

of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on furbearers. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in furbearer management. Some furbearers require distinct habitat types of limited size for vital activities such as feeding and reproducing. These critical areas will be designated and protected. Many species of furbearers depend on small mammal populations for prey, and many of these in turn require seral vegetation communities to maintain productive populations. The Department will advocate land management policies which recognize the role of wildfire in maintaining habitat diversity.

3. Numerous transplants of furbearers have been made in Alaska with a variety of results. Even though viable populations of furbearers have been established in some areas, most transplants have provided little benefit. Some transplants have resulted in serious conflicts between the transplanted species and indigenous wildlife. Because furbearer transplants often have unforeseen detrimental effects, introductions of furbearers will be generally opposed, but may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of the transplanted species, as determined by comprehensive study; 2) prior study must establish that the introduction of a species will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

4. Situations may arise requiring control of furbearers in response to a specific problem involving safety of human life or property. Controls will be implemented only after an investigation by Department personnel has determined a valid need exists. It is the owner's responsibility to protect his property from damage by furbearers. Reasonable efforts must be made to protect property by means other than the destruction of furbearers. When control by removal of furbearers is necessary, humane methods will be used. Whenever appropriate, control of furbearers will be accomplished by public trapping or hunting. Poisons will not be used for control.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage furbearers on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national and international interests must be considered. There are many beneficial uses of furbearers. Present use priorities may not be the priorities of the future, and furbearer management must continue to consider all uses.

2. Hunting and trapping of furbearers for their economic value are the major uses of furbearers in the state. Many Alaskans depend on the sale of fur to supplement their income, particularly where employment is either unavailable or only seasonal. In most areas, furbearers will be managed for optimum sustained yield of economic benefits.

3. In some areas of the state, recreation is an important use of furbearers. Recreational uses include: hunting and trapping in their various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing furbearers in natural interactions with their environment. These uses are held to be generally compatible. Management of furbearers will seek to provide maximum opportunities for all these recreational uses.

4. Recreational observation and photography of furbearers will be encouraged through public information and education. Hunting and trapping are generally considered compatible with recreational observation of furbearers. Because their habits or relatively low numbers make most species of furbearers difficult to observe, management solely for the purpose of observation will usually be opposed. Certain areas exceptionally suited to viewing observable species of furbearers may be zoned in time or space to restrict other uses in favor of observation of those species.

5. Permits may be issued for capturing, holding, importing and exporting furbearers for stocking, fur farming, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

Problems

* Pressure to ban leg-hold traps has come about as a result of public awareness of the inhumane potential of these devices when improperly set and infrequently checked. Prohibitive legislation may result in the loss of important commercial and recreational utilization of the furbearer resource. The Department should advocate efficient and humane trapping methods to promote the continued opportunity to participate in trapping.

* Loss of habitat is potentially a serious problem for furbearers. Presently the most significant loss is that occurring through successional changes in vegetation resulting from fire suppression activities. Normally wild fires benefit furbearers by creating favorable habitat for prey species such as snowshoe hares and microtine rodents (although marten are adversely affected by loss of old growth forest). Establishment of hardwood species along waterways after coniferous vegetation is burned is also of significant benefit to beavers. The control of wildfire should be discouraged except when resources with a superior value will be destroyed by the wildfire or where domiciles or property damage are the major consideration. Close liaison should be maintained with the various fire control agencies to assure that public monies are not expended unnecessarily in the control of wildfire.

  Oil pollution has not affected habitat on a significant scale but it has the potential for serious and extensive damage to aquatic, riparian, and marine coastal furbearer habitats. Outer Continental Shelf oil extraction and transport will almost certainly result in some detrimental pollution of coastline habitats, and accidental onshore spills will impact riparian habitats. Stringent precautions must be observed in oil development activities to minimize adverse impacts. Oil spill containment and cleanup capabilities must be improved.

  Other resource and human development activities also result in loss of furbearer habitat. Clearcut logging in southeastern Alaska affects large areas and important habitats for some species. Water impoundments, placer mining and dredging, gravel removal, urbanization and construction of transportation and utility corridors all have localized impacts which, when taken together, add up to significant long-term habitat alteration. Important furbearer habitats should be identified in conjunction with proposed developmental activities so stipulations

may be considered which minimize detrimental effects to furbearers.

* The generally underharvested furbearer populations in the northern portion of Alaska have significant economic potential that is not being realized. Many furbearer populations are capable of much larger harvests than they are now sustaining. The formation of marketing associations would tend to provide a higher and more stable market for all furs and offset the unstable marketing conditions which now result in substantial economic loss. Development of an extension training program directed to the proper care and handling of pelts would also tend to increase the value of the harvest and increase utilization of furbearer populations. The Department probably would not initiate fur marketing associations or furbearer extension programs, but would cooperate with educational and other agencies to enhance the value of furbearers.

* Overharvesting of the furbearer resource occurs primarily on beaver and wolverine. There is a potential for overharvest of other species (possibly otter, mink and marten) if the high market conditions which would stimulate an overharvest occur. Beaver are easily overharvested because they establish fixed colonies which are accessible and susceptible to repeated trapping. Overtrapping of beaver is a recurring problem in some areas, particularly the lower Yukon-Kuskokwim River drainages and the northern Bristol Bay drainages. Wolverine are particularly vulnerable in the Northwestern and Arctic regions in the winter when they are easily tracked and pursued on snowmachines. High pelt prices and a strong domestic demand provide incentive for heavy trapping and hunting pressure on wolverine. Restrictive regulations where required to protect the resource should be implemented. Season closures in some areas may be the only viable solution to the overharvest of wolverine. Successful implementation of harvest restrictions will depend on the cooperation of resource users and on increased enforcement of regulations.

* Significant loss of public trapping opportunity may occur from the exclusion or prohibition of public trapping on extensive land areas conveyed to private ownership or federal limited use status under terms of the Alaska Native Claims Settlement Act. The Department should advocate strong consideration of continued consumptive use of furbearers on all categories of federal lands and should solicit the cooperation of private landowners to facilitate public use of furbearers.

* As the land area available for public trapping decreases, competition for available areas will increase, resulting in increased conflicts between trappers as well as heavy pressures on furbearer resources. Some restrictions on harvest may be necessary to protect the resource. Some trapper conflicts may be alleviated through better communication and agreements among trappers, and through trapper education efforts. Theft of traps and trapped animals may be curbed to some extent by enforcement activities, but trappers themselves must aid in the policing of their own activities.

* High market values for several species of furbearers will stimulate increased trapping effort. Existing information on distribution, population trends and habitat requirements for many furbearers is inadequate for management at high intensities of trapping pressure or for assessment of the consequences of habitat alteration. The Department should seek adequate funding to develop needed inventory techniques and conduct needed research.

* Accidental trapping of dogs near populated areas results in posting of private land against trespass and increases public anti-trapping sentiment. Increased awareness of the problem by trappers should be encouraged as well as increased community controls on free-roaming dogs.

* Some furbearers, particularly foxes, are known to carry diseases which are harmful or lethal to other wildlife and humans. Rabies is the most common disease which reaches epidemic proportions. Echinococcus multilocularis and E. granulosis is carried by foxes and wolves, and Trichinosis is also carried by several species of furbearers. Trapping and hunting of both red and arctic foxes should be encouraged in areas which have a potential to produce high fox populations and are prone to rabies outbreaks. Hygienic techniques should be encouraged to prevent the transmission of parasites and diseases from furbearers to humans, particularly in areas where these problems are known to exist.

* Beaver chronically cause problems by blocking road culverts with dams and by flooding or cutting down trees on private property. Blockage of streams by beaver dams also prevents movements of spawning anadromous fish. The Department should encourage public trapping of beaver in areas where damage to public and private property occurs, and where important salmon spawning streams are blocked. Public utilization of beaver in problem areas is preferable to Departmental

control efforts. The Department should also encourage appropriate siting, design and construction considerations in public and private road building projects.

* Red squirrels cause damage to human property by destroying insulation, damaging human food caches and general destruction of many different items such as mattresses, sleeping bags, etc. Information on controlling squirrel damage should be consolidated into a publication which would be made available to anyone needing assistance.

* Furbearers introduced to islands have had serious adverse effects on nesting seabird populations and on other species such as the Aleutian Canada goose. Introductions of furbearers, such as the recent establishment of raccoons on Kodiak Island, must be prevented to protect indigenous insular wildlife populations.

SMALL GAME MANAGEMENT POLICIES

Species Background

Small game in Alaska includes blue grouse (Dendragapus obscurus), spruce grouse (Canachites canadensis), ruffed grouse (Bonasa umbellus), sharp-tailed grouse (Pediocetes phasianellus), rock ptarmigan (Lagopus mutus), willow ptarmigan (L. lagopus), white-tailed ptarmigan (L. leucurus), snowshoe hare (Lepus americanus), arctic hare (L. arcticus) and European rabbit (Oryctolagus cuniculus).

Ptarmigan are the most common and popular gamebirds in Alaska. Willow and rock ptarmigan are distributed throughout the state. White-tailed ptarmigan are restricted to mainland mountainous areas from the Alaska Range south. All three species make altitudinal migrations in spring and fall, although white-tailed ptarmigan generally move shorter distances than willow or rock ptarmigan. Willow ptarmigan occur in willow-grown flats and foothills near timberline during summer and fall and move to lower riparian habitat in winter. Rock ptarmigan breed above timberline to about 3500 feet, but often winter below timberline. White-tailed ptarmigan generally remain above timberline throughout the year and can be found in areas up to 5000 feet in elevation.

Grouse are widespread and at times locally abundant. Blue grouse are common in spruce-hemlock forests of southeastern Alaska but their range extends only as far north as the Dangerous River. Sharp-tailed and ruffed grouse are distributed through interior Alaska in a broad band that encompasses most of the Yukon River drainage. Both species also occur locally in areas south of the Alaska Range. Ruffed grouse are usually found in hardwood forests and replace spruce grouse where aspen, birch and willow stands occur. The sharp-tailed grouse prefers transitional habitats between forests and tundra or grasslands. Spruce grouse are the most widespread and numerous of Alaskan grouse, being present in spruce-birch and spruce-hemlock forests over most of the state. Little information is available on abundance, except on a comparative basis.

The grouse and ptarmigan have evolved so that each major vegetative type in Alaska provides habitat for one or more species during some period of the year. Disturbances such as burning, timber removal and agriculture produce vegetative changes that decrease the habitat quality for small game. Spruce grouse are an important exception since they tend to occupy mature or climax habitats. Ruffed and sharp-tailed grouse thrive in disturbed communities. Fire has been a prevalent factor producing and maintaining ruffed and sharp-tailed grouse habitat. Favorable habitat resulting from burning lasts for up to 60 years but, because of this relatively short time span, the maintenance of habitat for these species requires a pattern of repeated burning.

Recent trends in fire control, particularly in the vicinity of human population centers, is resulting in less habitat available for these species.

Snowshoe hares occur over most of Alaska although they are scarce or absent north of the Brooks Range, in coastal southwestern Alaska, on

the Aleutian Islands and on the islands of southeastern Alaska and the northern Gulf of Alaska. Snowshoe hares were successfully introduced to Kodiak and Afognak Islands and several other small islands.

Hares can be found in most habitats; however, the more open aspen and birch communities with brushy understories of willow, alder, highbush cranberry and wild rose, and stream-side areas with willows seem to be preferred. Habitat disturbances such as wildfire and clearing of timber usually benefit snowshoe hares, since regrowth of herbaceous and woody species provides food and cover. However, increased fire control is decreasing prime habitat for hares. Climax communities of dense spruce do not provide suitable brushy understory for snowshoe hares.

Arctic hares occur in coastal areas from the Alaska Peninsula north to the arctic coast. The preferred habitat for arctic hares is brushy tundra and windswept rocky slopes, along with alder thickets and willows in the low, wide river valleys near the coast.

European rabbits were established by the release of domestic animals on a number of islands including Umnak and Hog in the Aleutians, and Middleton Island in Prince William Sound.

Small game populations fluctuate considerably over the years, and little is known of annual population status except in relatively small, localized areas. A feature common to most Alaskan small game populations is a recurrent cycle of abundance and scarcity. Inland populations of the various Alaskan grouse and ptarmigan demonstrate marked, generally synchronous, fluctuations involving seven to nine years between peaks. These patterns are evident over large geographical regions, but the abundance of a given species in a local area may vary from the general pattern at any given time.

Because of lack of knowledge regarding the factors governing population fluctuations, management programs aimed at stabilizing grouse and ptarmigan densities from year to year are not presently feasible. Habitat management has not been attempted in Alaska, but ruffed and sharp-tailed grouse populations would probably respond to habitat manipulation. Higher densities could probably be attained through intensive

habitat manipulation although it is doubtful if "cyclic" lows could be prevented.

Hare populations are extremely cyclic in inland areas of the state; hare numbers may vary by factors of 100 or more between years. Snowshoe hares reach their greatest density about every 10 years, with catastrophic population declines during intervening periods. Coastal populations of arctic and snowshoe hares seem less cyclic and exhibit erratic oscillations in numbers. In years of high snowshoe hare populations, girdling of willow and other browse plants, and to a lesser extent spruce saplings, occurs over large areas. Such girdling can seriously reduce the amount of available browse for a number of years and may affect moose populations as well as the hares themselves.

Hares, grouse and ptarmigan are important prey species for several avian and mammalian predators. Lynx depend almost entirely on snowshoe hares for food, and populations of lynx fluctuate with hare populations. Both red foxes and wolves also depend to a great extent on hares. Raptors such as the great horned owl and goshawk utilize hares as a major part of their diet, and their numbers are influenced by snowshoe hare populations. The number of grouse and ptarmigan taken by predators not only varies according to their abundance, but also with predator densities and availability of other prey species. Even in years when grouse and ptarmigan sustain relatively heavy losses to predators, their long-term population trends do not appear significantly altered.

Recreational hunting by Alaskan residents is the primary use of small game near urban centers, whereas small game are hunted primarily for food in many rural areas. Most small game hunting occurs near human population centers. Some hunters use snow machines, ATV's, boats or aircraft to hunt in less accessible areas. Most recreational small game hunting in remote areas, however, is incidental to quests for big game and serves mainly to supplement camp rations. Nonresident hunters contribute little to the small game harvest. Hunter effort and harvest levels of small game depend mainly on abundance and accessibility. The high natural mortality and fecundity rates of small game populations preclude hunting as a factor limiting populations over large geographic areas, but hunting may influence abundance in local areas. Small game hunting seasons and bag limits in most areas have changed little since statehood.

Nonconsumptive uses of small game vary significantly between areas. Most viewing and photography occurs adjacent to major human population centers. Besides being an important hobby of many urban-area residents, viewing and photography of small game occur incidental to other outdoor pursuits, such as berrypicking, skiing, snowshoeing, hiking, and mountain climbing.

Species and Habitat Management Policies

1. The Department recognizes that responsible small game management must be based on scientific knowledge. An active Department program will be maintained to increase knowledge of the population status and the biological and ecological requirements of small game. When others conduct research on small game within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on small game. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in small game management. Some small game populations depend upon distinct habitat types of limited size for vital activities such as breeding, nesting and feeding. Critical areas will be designated and protected. Some species require vegetation in early successional stages. Disturbances such as fire, logging, and selective land clearing may be encouraged where increased production of such small game species is appropriate. When it is desirable and feasible the Department will engage in habitat manipulation by the use of fire, mechanical means, or other methods.

3. Attempts to transplant exotic species of game birds have never succeeded in Alaska, and each major vegetative type in the state naturally supports at least one species of game bird. Because transplants often have unforeseen detrimental effects, introductions of small game will be generally opposed, but may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a viable population of the transplanted species, as determined by comprehensive study; 2) prior study must establish that the introduction of a species will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage small game on the

sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national interests must be considered. There are many beneficial uses of small game. Present use priorities may not be the priorities of the future, and small game management must continue to consider all uses.

2. Small game are an important food resource for many Alaskans. In areas where residents have a subsistence dependency on wildlife, allocation of allowable small game harvests will give first priority to subsistence users. Obtaining meat is also an important consideration of recreational hunting. This use will be encouraged where it will not conflict with subsistence use of small game. The Department will encourage the salvage of all edible meat, and salvage will remain a condition of taking some small game. In selected areas where the human population is dependent upon wildlife for food, or areas with intensive hunter use, small game will be managed for the optimum sustained yield of animals. Management techniques may include, but are not limited to, liberal seasons and bag limits, access improvement, and habitat manipulation.

3. In many areas of the state, recreation is an important use of small game. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing small game in natural interactions with their environment. These uses are held to be generally compatible. Management of small game will seek to provide maximum opportunities for all these recreational uses where not in substantial conflict with subsistence use of small game.

4. Certain areas of the state will be managed to provide small game hunting opportunities of the highest aesthetic quality. This concept recognizes the value of the opportunity to be selective in hunting, to enjoy uncrowded hunting conditions, to make use of undeveloped areas, and to enjoy various other experiences which enhance wildlife-oriented activities. Management techniques may include, but are not limited to, regulation of access and control of the number and distribution of hunters.

5. Recreational observation and photography of small game will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of small game, certain areas exceptionally suited to viewing small

game may be zoned in time or space to restrict other uses in favor of observation of small game.

6. The commercial harvesting of small game for the sale of animal products will be opposed. The domestication of small game is not considered a wise use of the resource and will be discouraged.

7. Permits may be issued for capturing, holding, importing and exporting small game or their eggs for stocking, public education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated.

8. The Department will plan for access to improve opportunities for use of small game. In areas where small game are managed for optimum sustained yield and/or maximum recreational opportunity, access may take the form of roads, airstrips, off-road vehicle or snow machine trails, hiking or horse trails, and canoe routes. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Federally-administered parks, wildlife refuges, wild and scenic rivers and national forests, and private lands established under the terms of the Alaska Native Claims Settlement Act will affect public use and state management of small game in these areas. Hunting and/or access may be prohibited, limited or otherwise affected. The Department will solicit cooperation of the respective land management agencies and landowners to allow public use of the lands for hunting. Seasons and bag limits and methods and means of hunting may require adjustment to conform with Federal regulations.

* Alteration or loss of small game habitat due to logging, expansion of residential areas, industrial and mineral development and fire suppression will affect numbers of small game in some accessible areas that presently receive heavy hunter use. The Department should identify important small game habitat and make recommendations on land use practices. The Department will also propose and encourage habitat improvement by the various land management agencies.

* Many areas of the state receive little or no use due to problems of access. The Department may consider encouraging wider distribution of use by providing information to the public regarding small game populations that are not being utilized. In some cases, the Department may recommend providing improved access.

* Because of manpower and funding restrictions, data on population status and harvest levels of small game are not gathered in some portions of the state. The Department should seek adequate funding to develop needed inventory techniques and to conduct necessary population and harvest assessments.

* Hunting adjacent to roads and near urban centers may pose public safety hazards, and local opposition to hunting may develop and result in restrictions such as closed areas. The Department should anticipate such conflicts and, where appropriate, limit hunting by time and space zoning. The Department will generally oppose efforts to effect closures except where a clear need exists.

* As small game hunting near urban centers increases, conflicts with nonconsumptive users will occur in a few accessible locations where small game are traditionally observed. Intensive local harvests of ptarmigan in the spring can reduce the summer population of birds available for observation. Restrictions on hunting in these areas may be necessary, especially in the spring, if hunting significantly reduces the birds available for nonconsumptive use during the summer.

* Although small game populations generally increase or decrease independently of hunting, many people believe that population lows are caused by overharvest. The Department should inaugurate an active educational program on small game population cycles and dynamics.

* Many small game hunters regularly dress and clean the animals they have bagged along highways and leave the offal and skin or feathers on the road right-of-way. Other people often find such practices offensive. The Department should discourage such practices by an active and vigorous educational program or, if appropriate, consider regulations that would prohibit careless and thoughtless disposal of animal remains.

WATERFOWL MANAGEMENT POLICIES

Species Background

Alaska annually supports millions of breeding waterfowl* and many additional birds which are enroute to or from Canadian and Russian breeding grounds. Wetlands in western, central and northern Alaska are the primary waterfowl production areas. Among these, the Yukon Flats in interior Alaska and the Yukon-Kuskokwim Delta are the most important, but other coastal wetlands and valleys of major rivers also contribute many birds. Extensive wetland habitat is present on Alaska's North Slope, but cold temperatures limit productivity there. Breeding habitat in southern portions of the state is limited to coastal sedge flats and river deltas, and inland wetland basins and stream valleys. Nevertheless, significant numbers of birds are produced in such areas.

Numbers of waterfowl produced vary annually and between regions of the state. Production is influenced primarily by spring weather and flooding. Production is less in years with "late" springs than in years when snow and ice disappear early in the season. Flooding in river valleys or from storm tides on coastal wetlands can delay nesting or destroy nests and significantly reduce production. However, flooding in river valleys has beneficial effects of nutrient exchange which fertilize ponds, increasing the food they produce for waterfowl.

An estimated 3,600,000 game ducks, 3,000,000 sea ducks, and 800,000 geese nest in Alaska, producing fall flights of about 10,300,000 ducks and 1,200,000 geese. In addition, about 60,000 whistling swans and 4,500 trumpeter swans summer in the state and produce a combined fall flight of about 80,000 swans. Approximately 100,000 lesser sandhill cranes produce a fall flight of about 110,000 to 115,000 birds.

Large concentrations of migrating waterfowl utilize near-coastal and tideline areas for feeding and resting. These areas are ice-free early in the spring and late in the fall, thus allowing birds to arrive in Alaska before inland breeding areas are open and to remain during the fall after inland production areas freeze; both are critical time periods. The Alaska Peninsula in particular supports spectacular fall concentrations of migrating waterfowl. The entire world population of cackling Canada geese and the North American populations of black brant and emperor geese are seasonally found on the lagoons and deltas of the Bering Sea side of the Peninsula.

* A list of waterfowl species in Alaska follows this account.

Although most of the waterfowl which nest in Alaska migrate south of the state to winter, several million birds remain through the winter in coastal and off-shore waters of southwestern, southcentral and southeastern Alaska. Sea ducks and divers predominate among birds overwintering in Alaska, but some dabblers and all emperor geese also remain.

The lack of industrial or resource development activities on wetlands has allowed most Alaskan waterfowl habitat to remain in pristine condition. Barring significant habitat alterations in any part of their range or uncontrolled use of waterfowl by man, most populations of waterfowl are expected to remain at historic levels for the foreseeable future.

Recreational use of waterfowl in Alaska is relatively light. Availability of birds to hunters in the fall is limited in most of the state by the early freeze-up of wetlands and the resultant exodus of many birds before the hunting season. Although most subsistence use occurs in the spring, the closed hunting season precludes recreational hunting during this period.

Although major subsistence use of waterfowl in spring is a relatively new tradition, it is an important activity to many rural Alaska residents. It is the dominant use of waterfowl in the western and northernmost regions of the state. Subsistence use, once limited to the immediate vicinity of towns and villages, now also occurs some distance from communities as a result of improved transportation modes.

Recreational use of waterfowl dominates in southwestern, southcentral and southeastern Alaska. Because of difficulties of access to remote waterfowl areas, most recreational hunting occurs relatively near urban centers. Except for Alaska Peninsula hunting areas, which are accessible only by air, most heavily used hunting locations are easily accessible by car, boat or small plane.

Nonconsumptive uses occur primarily at roadside waterfowl concentration areas near urban centers. Travelers on the marine ferry system and on cruise ships also have excellent opportunities to observe waterfowl.

All uses of waterfowl are expected to increase at least in proportion to the increase in Alaska's human population, depending upon available leisure time and fuel supplies.

Species and Habitat Management Policies

1. The Department recognizes that responsible waterfowl management must be based on scientific knowledge. An active Department program will be maintained, when necessary, to increase knowledge of the population status and the biological and ecological requirements of waterfowl. When others conduct research on waterfowl within Alaska, the Department will request a description of proposed studies and make recommendations in the best interests of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on waterfowl. Occasionally research may require temporary limitations on public use of study populations.

2. Alaska is a member of the Pacific Flyway Council, one of four such councils created to act in an advisory capacity to the Federal government on national waterfowl management problems. The Department recognizes other state, national and international interests in Alaskan-reared waterfowl and will cooperate with management activities at these levels when compatible with the best interests of the resource and the Alaskan public.

3. The future of waterfowl and waterfowl-related recreational activities in Alaska depends on maintenance of adequate production, migration and wintering habitats. The future of these habitats depends on land use and environmental quality controls by governmental agencies and sympathetic private landowners in Alaska and elsewhere. The Department will protect key waterfowl areas in Alaska to assure maintenance of waterfowl populations and continued beneficial human uses of waterfowl. Habitat improvement may be conducted on selected waterfowl areas to enhance use by waterfowl and public use of waterfowl.

4. Transplanting waterfowl to establish or maintain a species or subspecies can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of waterfowl will be generally opposed. Transplants of waterfowl may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) The proposed transplant site must provide sufficient and suitable habitat to support a viable population of the transplanted species, as determined by comprehensive study; 2) Prior study must establish that the introduction of a species will not adversely affect the numbers, health, or utilization of resident species;

3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

5. Situations may arise requiring management of waterfowl to alleviate agricultural depredations or other problems. Although it is the owner's responsibility to protect his property from damage by waterfowl, the Department may instruct the owner as to how this can be done. Reasonable efforts must be made to protect property by means other than the destruction of waterfowl.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage waterfowl on the sustained yield principle for the benefit of the resource and the people of the state, and also recognizes that national and international interests must be considered. There are many beneficial uses of waterfowl. Present use priorities may not be the priorities of the future, and waterfowl management must continue to consider all uses.

2. Subsistence is the dominant use of waterfowl in western and northern areas of Alaska, and numbers of birds taken there probably exceed the statewide annual recreational harvest. Management of waterfowl requires consideration of the importance of spring harvests to rural Alaskans as well as the effects on the resource of such use. Subsistence will be given preference among uses in Alaska, but protection of the resource will remain the foremost consideration.

3. Recreation is the most important use of waterfowl near population centers and in the southern portions of Alaska, and waterfowl-related recreation is enjoyed throughout the state in some form. Recreational uses include: sport hunting in its various forms; observation and photography, both incidental to other activities and as the primary objectives; and wilderness experience, including the aesthetic rewards of being aware of or observing waterfowl in natural interactions with their environment. These uses are held to be generally compatible. Management of waterfowl will seek to provide maximum opportunities for all recreational uses where not in substantial conflict with subsistence use of waterfowl.

4. Certain areas of the state will be managed to provide waterfowl hunting opportunities of high aesthetic quality. Management will emphasize use of undeveloped areas under uncrowded hunting conditions and the enjoyment of various other experiences which enhance wildlife- oriented activities. Management techniques

may include, but are not limited to, regulation of access and controls on the numbers and distribution of hunters.

5. Recreational observation of waterfowl will be encouraged through public information and education. Although hunting is generally considered compatible with recreational observation of waterfowl, certain areas primarily suited to viewing waterfowl may be zoned in time or space to restrict other uses in favor of observation.

6. The harvest of waterfowl for the purposes of commercial sale of meat, feathers or other parts is not considered a proper use of the resource and will be opposed. In general, the domestication of waterfowl is not considered a wise use of the resource and will be discouraged.

7. Permits for collecting, capturing, holding, importing and exporting waterfowl or their eggs for stocking, rehabilitation, public education and scientific study may be issued, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits which are consistent with the Department's goals and policies can be demonstrated and the applicant has received a Federal permit authorizing such activities.

8. The Department will plan for access to improve opportunities for use of waterfowl. In areas where waterfowl are managed for maximum recreational opportunity, access may take the form of roads, airstrips, hiking trails, canoe routes, boat landings, and shelters. Information about access may be disseminated. In areas managed primarily for aesthetic use conditions, access may be restricted to some or all of those nonmotorized means listed above. Seasonal time and area zoning may allow for incompatible uses of the resource, however, and will be encouraged.

Problems

* Pollution of uplands, coastal tidelands, estuaries or pelagic areas by oil or oil industry-related contaminants poses a critical threat to waterfowl and waterfowl habitat. Extensive Outer Continental Shelf (OCS) oil development and heavy tanker traffic in Prince William Sound, Bristol Bay and the Aleutian Islands could result in accidents devastating to coastal waterfowl habitat. Petrochemical contamination associated with onshore drilling, pipeline construction and operation, and coastline storage and loading facilities may impact upland and coastal waterfowl habitat or result in the loss of birds. The Department should provide rational recommendations for future OCS

lease areas and for future oil spill cleanup facilities, and it should document the effect of estuary contamination for mitigation purposes.

* Oil and gas drilling activities on barrier islands and onshore sites pose a serious threat to waterfowl. The removal of gravel from islands for drilling pads could cause a loss of nesting habitat and a loss of protection for the inshore lagoons. Equipment noise and increased aircraft use in support of drilling activities may adversely affect nesting and staging of waterfowl. The use of rolligons and similar A.T.V.'s during periods of thaw will alter water run-off patterns and could result in pollution of rivers and lakes. Better quantitative and qualitative data on bird populations and studies to determine effects of gravel removal from islands and other effects from human disturbance are needed to provide rational recommendations and stipulations on land use to protect waterfowl resources.

* Construction of dams could eliminate important waterfowl habitat in interior Alaska. For example, a dam on the Yukon River at Rampart would eliminate breeding habitat for over 2 million ducks and geese. Dams on other streams would have less devastating impacts but could result in significant losses. The Department must work closely with the Fish and Wildlife Service and other resource agencies to insure that waterfowl resources are adequately considered in review of dam proposals and that all feasible mitigation measures are adopted if dams are constructed.

* Timber cutting and log storage may adversely affect waterfowl and waterfowl habitat. A probable decrease in waterfowl food production occurs as a result of bark decomposition in log storage areas. Waterfowl losses have also been attributed to contamination by pulp mill effluents. Improved baseline data on coastal bird habitats, bird numbers and bird/habitat relationships are needed to provide recommendations to the Forest Service and logging companies to insure minimum habitat damage.

* Subsistence utilization of waterfowl on the Y-K Delta may be adversely affecting populations of cackling Canada geese, snow geese and Pacific Flyway white-fronted geese. Subsistence use may also contribute to future declines of other waterfowl populations. Enforcement of Federal and State laws should be concentrated on species requiring protection, and cooperation of local residents must be sought to direct subsistence utilization away from species whose stocks are declining. Periodic determination of subsistence harvest levels is desirable for all waterfowl species and necessary for selected species.

* Local encroachment on waterfowl habitat by road and airport construction, industrial and urban development and upland oil exploration and subsequent development is inevitable. Key waterfowl areas must be given adequate consideration through land use regulations, safeguards in development or mitigation measures.

* Increased disturbance from aircraft, boats, foot traffic and other sources in waterfowl concentration areas may adversely affect waterfowl or interfere with human uses of the resource. Measures must be taken to minimize such disturbance.

* New Native landowners and other private landowners will probably impose varying degrees of trespass restrictions on hunters. The Minto Flats, Yukon Flats and Tetlin areas will be the most affected. The State should secure ownership, easements or enter into cooperative agreements with land owners for as much good waterfowl hunting land as possible, to insure good waterfowl hunting opportunities in the future.

* Use of waterfowl by hunters and nonconsumptive users will continue to increase, especially near urban centers. A corresponding increase in user conflicts, crowding and reduced hunter success can be expected. Habitat enhancement, improved access and the control of user numbers will lessen these conflicts.

LIST OF WATERFOWL SPECIES IN ALASKA

	Common Name	Scientific Name
Dabbling Ducks	Aleutian Common Teal*	Anas crecca nimia
	Baikal Teal*	Anas formosa
	Blue-Winged Teal	Anas discors
	Cinnamon Teal*	Anas cyanoptera
	European Common Teal*	Anas crecca crecca
	Falcated Teal*	Anas falcata
	Green-winged Teal	Anas crecca carolinensis
	American Widgeon	Anas americana
	European Widgeon*	Anas penelope
	Black Duck*	Anas rubripes
	Chinese Spot Bill*	Anas poecilorhyncha zonorhyncha
	Gadwall	Anas strepera
	Garganey*	Anas querquedula
	Mallard	Anas platyrhynchos
	Pintail	Anas acuta
	Wood Duck*	Aix sponsa
Diving Ducks	American Goldeneye	Bucephala clangula americana
	Barrow's Goldeneye	Bucephala islandica
	Bufflehead	Bucephala albeola
	Canvasback	Aythya valisineria
	Common Pochard*	Aythya ferina
	Greater Scaup	Aythya marila
	Lesser Scaup	Aythya affinis
	Redhead*	Aythya americana
	Ringneck*	Aythya collaris
	Ruddy Duck*	Oxyura jamaicensis
	Tufted Duck*	Aythya fuligula
Sea Ducks and Mergansers	American Common Merganser	Mergus merganser
	Hooded Merganser*	Lophodytes cucullatus
	Red-Breasted Merganser	Mergus serrator
	Smew*	Mergus albellus
	Harlequin	Histrionicus histrionicus
	King Eider	Somateria spectabilis
	Pacific Common Eider	Somateria molissima
	Spectacled Eider*	Lampronetta fischeri
	Steller's Eider	Polysticta stelleri
	Old Squaw	Clangula hyemalis
	American Common Scoter	Oidemia nigra
	Surf Scoter	Melanitta perspicillata
	Western White-Winged Scoter	Melanitta deglandi
Geese	Aleutian Canada**	Branta canadensis leucopareia
	Cackling Canada	Branta canadensis minima

	Dusky Canada	Branta canadensis occidentalis
	Lesser Canada	Branta canadensis parvipes
	Taverner's Canada	Branta canadensis taverneri
	Vancouver Canada	Branta canadensis fulva
	Bean*	Anser fabalis
	American Brant*	Branta bernicla
	Black Brant	Branta nigricans
	Emperor	Philacte canagica
	Ross's*	Chen rossi
	Lesser Snow	Chen hyperborea
	White-Fronted	Anser albifrons
Swans	Trumpeter	Olor buccinator
	Whistling	Olor columbianus
	Whooper*	Olor cygnus

* Rare or restricted in range in Alaska.
** Rare and endangered.

Species Background

Land and Shore Birds

Alaska, despite its large size, has a comparatively limited variety of birds as a result of the rather uniform character of the habitats occurring in the state. Only 325 species have been recognized as occurring in Alaska. About half of the total are waterbirds, a relatively high proportion in comparison to most other states and indicative of the extent and importance of marine and freshwater habitats. About 170 species are landbirds, roughly divisible into groups inhabiting tundra, interior forest and coastal forest ecosystems. Less than one-fourth of the species occurring in Alaska are permanent residents of the state. The majority of species are new-world forms which migrate to Alaska to breed. In addition a few old-world species breed in Alaska and about a dozen species migrate to or through, but do not breed in, the state.

The relatively homogenous character of arctic and coastal tundra habitats results in a reduced diversity of species of birds in relation to other regions of the state. About 60 species breed in tundra areas and associated sedge wetlands. Common tundra species include snow buntings, lapland longspurs, gray-crowned rosy finches, horned larks, golden plovers and savannah sparrows. Passerines associated with alder-willow thickets along streams include tree sparrows, Wilson's and yellow warblers and yellow wagtails. Wetland habitat is used heavily by breeding shorebirds including greater yellowlegs, least sandpipers and semipalmated plovers, and by swallows, loons and grebes. The proximity of the northwest arctic coast to the Bering Straits results in a number of Asiatic species such as dotterels, Kennicott's arctic warblers and red-spotted bluethroats visiting Alaska during the summer.

The interior Alaska spruce and birch forests provide habitats for about 80 species of breeding birds. Common species include yellow, Wilson's, myrtle, and black-polled warblers; golden-crowned, Lincoln's, savannah, white-crowned and fox sparrows; ruby-crowned kinglets; dark-eyed juncos; robins and thrushes; flycatchers; and woodpeckers.

Coastal spruce-hemlock and alpine forests of southeastern Alaska and the northern Gulf of Alaska support a diversity of birdlife. Upland passerine species common to the spruce-hemlock and associated shrub habitat include crows, Steller's jays, robins and thrushes, kinglets, warblers, siskins, juncos and sparrows. Coastal tidelands, bogs and marshes support herons, grebes, loons, kingfishers, swallows, plovers, sandpipers, phalaropes, and a variety of other shorebirds.

A number of species are year-round residents of the state, many occurring in a variety of habitats. Among the most common are crows, ravens, gray and Steller's jays, redpolls, pine grosbeaks, white-winged crossbills, chickadees, snow buntings, woodpeckers, northern shrikes and magpies.

The major human uses of land and shore birds are nonconsumptive. Birdwatching is a popular recreational activity enjoyed by thousands of Alaskans. Observation and photography of birds occur primarily along roads and trails and near major communities. Travelers on the marine highway system or on sea tours cruising the Alaska coast have excellent opportunities to view many of the species associated with the coastal environment. In addition to direct use, many outdoor activities are enriched by the sight and song of birds. Many species of birds which breed in Alaska migrate seasonally and provide extensive opportunities for observation and enjoyment in other areas of North America. Scientific study of birds has provided much fascinating and valuable information on animal migrations, ecological relationships and evolutionary mechanisms.

Seabirds

Alaska's coastal and marine environments provide a diversity of habitats which support a variety of seabird species, some of which number in the millions. Species and relative abundance vary along different parts of Alaska's coast in response to nesting and feeding conditions.

In southeastern Alaska nesting colonies have been identified on numerous islands. Forrester Island has a nesting population of 350,000 birds including petrels, cormorants, murres, murrelets, guillemots, auklets, puffins, and gulls. Other known rookeries range in size from less than 1,000 to 20,000 birds and each contains several of the above species. Additional seabird colonies on the western side of the Alexander Archipelago and up the coast to Icy Cape have not been surveyed. Leach's storm-petrels are the most common known breeders, followed by horned puffins, common murres, ancient murrelets and rhinocerous auklets.

Some alcids, cormorants and many gulls winter in sheltered inside waters and on continental shelf waters. Birds that winter on off-shore waters include fulmars, petrels, murres, guillemots, puffins, murrelets, and auklets. Winter pelagic bird numbers are considerably lower than those in summer. No data are available to indicate population trends of most seabirds in southeastern Alaska; however, gull numbers appear to be increasing. During spring and fall migrations, millions of seabirds pass through southeastern Alaska. Chief migrants are short-tailed and sooty shearwaters whose summer populations in the subarctic north Pacific approximate 50 million birds.

Further north the islands and fjord lands of the southern and eastern coasts of the Kenai Peninsula and similar areas of Prince William Sound contain major nesting colonies of seabirds. The alcid family is represented by several species of auklets, murrelets, murres, puffins and one species of guillemot. Several species of gulls and terns and one species of kittiwake are present in suitable habitat. Double-crested and pelagic cormorants are less numerous but are distributed throughout the region. Glaucous-winged gulls, arctic terns and marbled murrelets are the most abundant species nesting in the region. Gulls and terns number in the hundreds of thousands while the marbled murrelet may exceed one million birds. Breeding and nonbreeding populations of murres probably number in the hundreds of thousands, while several million shearwaters use outer continental shelf waters in summer months.

The Aleutians, Pribilofs, Semidis, and other island groups together with the long coastline of mainland southwestern and western Alaska support seabird populations of greater variety and abundance than any location of comparable area in North America. Approximately 40 species of seabirds representing the families Procellariidae, Hydrobatidae, Phalacrocoracidae, Stercorariidae, Laridae, and Alcidae occur as breeding residents and as seasonal residents, or migrants during the course of a year. The endangered short-tailed albatross summers in Alaskan waters but breeds on islands in the mid-Pacific.

The Aleutians harbor enormous colonies of common and thick-billed murres, tufted and horned puffins, and pelagic cormorants. This area is the primary breeding ground for two species of kittiwakes, Pacific fulmars, and red-faced cormorants. Eight species of auklets and murrelets occur in the Aleutians with five species limited to or reaching their greatest abundance in this area.

The Pacific side of the Alaska Peninsula harbors seabird colonies along its entire extent. A colony on Aghiyak Island in the Semidi group contains approximately 1 million murres, kittiwakes, and fulmars. The Barren Islands, midway between the tip of the Kenai Peninsula and the Kodiak Archipelago, support an estimated 500,000 breeding seabirds annually.

Although much of the north side of the Alaska Peninsula is not generally suitable for nesting seabirds, rookeries are present on Amak and Unimak Islands, Cape Seniavin and on the Walrus Islands. The cliffs of Cape Newenham, with major colonies of murres, kittiwakes, puffins and cormorants, is one of the largest rookeries in the North Pacific and Bering Sea region. It, the Yukon-Kuskokwim Delta, and Nunivak Island each support over one million seabirds. Three other islands, St. Mathew, Hall and Pinnacle Islands, support an estimated 100,000 to 1 million seabirds. Principal nesting

seabirds include cormorants, fulmars, gulls, kittiwakes, murres, guillemots, auklets, and puffins. The largest northern fulmar colony in Alaska extends more than 5 miles along the cliffs of St. Matthew Island.

In northwestern Alaska, Diomede and King Islands and Cape Lisburne on the mainland all maintain breeding colonies of 1 million or more birds. Colonies containing 50,000 to 1 million birds occur at Cape Thompson, Fairway Rock, Bluff, and Cape Denbigh. Principal nesting species are pelagic cormorants, northern fulmars, glaucous gulls, black-legged kittiwakes, common and thick-billed murres, and 8 species of small alcids. Numbers vary with the seasons. Spring migrations tend to follow leads or cracks in the ice with resultant concentration of birds at such places. The distribution of birds in summer is centered around colonies. Nonbreeding shearwaters and fulmars tend to concentrate around upwellings where foods are concentrated.

The coastal habitat of arctic Alaska lacks the precipitous cliffs favored by many marine birds for nesting. The area north of Cape Lisburne supports relatively few breeding groups of seabirds. Principal nesters are glaucous gulls and three species of jaegers. Other gulls and terns are also arctic nesters. Some black guillemots nest in sheltered areas of Seahorse, Cooper and Igalik Islands, a few horned puffins breed on Seahorse Island, and small numbers of thick-billed murres nest near Barrow.

The birdlife of the Beaufort Sea consists of fewer species and lower numbers than that of the Chukchi or Bering Seas to the south. Marine birds of the Beaufort Sea can be divided into four habitat groups according to breeding and feeding requirements: 1) Inland birds that obtain most or all of their food from lakes or tundra during the breeding season but move to marine habitats following breeding. These include most breeding jaegers and some Sabine's gulls. 2) Coastal birds that nest on the tundra or beaches and scavenge food along the beaches. These include some Sabine's gulls and jaegers, and all breeding glaucous gulls. 3) Inshore birds that consume foods in shallow waters and that utilize barrier islands and river mouths for breeding, roosting and molting. These include arctic terns and black guillemots. and 4) Pelagic birds, predominantly nonbreeders, that are not directly dependent on land and range to or beyond the continental shelf. These include murres, nonbreeding jaegers and gulls.

Nesting habitat requirements vary between seabird species, ranging from fine loam soil for burrow nests to rock ledges on sea cliffs. Most seabirds are colonial nesters. Steep cliffs and isolated islets devoid of mammalian predators generally support the largest and most conspicuous colonies. Colony size and location may also be a function of the distance that adults have to forage. Species that are

pelagic feeders generally have larger colonies and place their eggs in burrows or crevices. Inshore foragers have smaller and more ubiquitous colonies in more exposed sites. Cliff-nesting species include common murres, cormorants, kittiwakes, glaucous-winged gulls, fulmars, guillemots, and some alcids. Petrels, puffins, and some murrelets and auklets nest in burrows on relatively open terrain or in crevices or fissures on cliff faces. Many of the gulls and several alcids utilize a variety of nesting sites including cliffs, gravel beaches and bare rock.

Most species of seabirds rely on the ocean for food. Variations in food preferences and foraging zones contribute significantly to species diversity. Food items range from euphasids, fish larvae and other plankton to squids, smelt, capelin, cod, blennies, and immature salmonids. Most pelagic (offshore) and some neritic (nearshore) species feed on organisms near or at the water surface. Other neritic species may dive to forage at the sea floor. Gulls, petrels, and fulmars are also scavengers. Some gulls, and particularly jaegers, specialize in robbing other species of their prey and are also predators on eggs and nestlings of other seabirds and on small mammals. Albatrosses, most procellarids, storm petrels, and alcids are typically pelagic feeders. Cormorants, jaegers, some petrels, and the larids concentrate in the nearshore environment. In some instances seabirds compete directly with man for fisheries resources. Some, such as scavenging gulls and fulmars, benefit from fisheries waste products.

Seabirds are a dynamic part of marine food systems. Hundreds of thousands of tons of biological material are cycled through seabirds each year. Some of the smaller seabird species, such as auklets or murrelets, are important prey for the peregrine falcon which is often associated with seabird colonies. Many species fall prey to land based predators such as foxes and mustelids.

Historically, most use of seabirds in Alaska has been as food by Alaskan natives. Gathering of eggs in spring by natives is common along coastal areas near villages. Some adult birds are also taken, primarily auklets.

Nonconsumptive use of seabirds by viewers and photographers occurs near coastal communities and appears to be increasing as Alaska's human population grows and access improves. Ultimately seabirds may serve as valuable biological indicators of marine habitat degradation.

Raptors

Raptors* which occur in Alaska include the bald and golden eagles, osprey, red-tailed or Harlan's, rough-legged and

* A list of raptor species in Alaska follows this account.

Swainson's hawks, marsh hawk, goshawk, sharp-shinned hawk, gyrfalcon, peregrine falcon, merlin, kestrel, and the great-horned, great grey, snowy, hawk, boreal, pygmy, saw-whet, screech, long-eared and short-eared owls. Except for goshawks, gyrfalcons and eagles, the diurnal birds of prey are usually only summer residents of Alaska. Except for short-eared owls which are summer residents the owls are present throughout the year. Migration times vary among species and with seasonal weather patterns, but summer residents generally arrive in April and leave during September.

Resident raptor populations currently appear to be at moderate densities, although marked fluctuations in abundance occur over time. These variations are thought to occur in response to changes in prey abundance. Although comparative data from earlier periods are not available, general observations suggest that, except for the endangered peregrine falcon, migratory species occurring in Alaska are at moderate levels of abundance. Breeding populations of bald eagles and ospreys, endangered or threatened in eastern and southern North America, do not appear reduced in Alaska. Numbers of two subspecies of peregrine falcons have declined in much of Alaska over the last 20 years. This decline has coincided with the documented declines of peregrine falcons throughout the world and is thought to be primarily the result of chemical contamination. Because of world-wide declines in peregrine populations any favorable nesting habitat supporting a breeding population is critical even if such habitats are not extensive.

Most habitat types in Alaska are utilized by raptors during the breeding season. As a group, raptors range widely in hunting activity, using a combination of vegetation types as foraging habitat during the nesting season. Nevertheless, the various species display marked preferences for particular types of nesting sites. Ospreys and bald eagles select lowland forests along river or lake systems or along the coast as nesting habitat. Golden eagles, gyrfalcons and rough-legged hawks prefer to nest on cliffs. The other buteos, the accipiters, merlins, kestrels and owls, except for the snowy and short-eared owl, are principally tree-nesters, and are found throughout forested regions. Of these species, goshawks display marked preference for hardwood forests, while kestrels utilize cavities in trees as nest sites. The peregrine falcon nests on cliffs along major river systems or in coastal areas usually associated with seabird nesting colonies. The marsh hawk, short-eared owl and snowy owl are the only consistent ground-nesters. These species select open areas for nesting. Except for gyrfalcons which remain in alpine areas throughout the year, resident raptors range widely over most major habitat types during the winter in search of food. To date, human-caused habitat changes that have occurred in Alaska have not significantly influenced raptor abundance.

Raptors do not have high reproductive potentials and, like many other predators, exist at relatively low densities. Given adequate nesting conditions, raptor abundance hinges primarily on the abundance and condition of the prey populations. The diet of raptors as a group varies seasonally and encompasses a wide array of species including birds, mammals, fish and insects. The abundance and distribution of these prey are important, and diseases or harmful residues carried by these species are of prime concern. Many of the common diseases carried by domestic fowl and by wild gallinaceous birds are known to be transmissible to raptors. Pesticide residues have been cited as the primary factor responsible for declines in peregrine falcon numbers throughout the world. Because little work has been done with migratory raptor species in Alaska other than peregrines, it is not certain whether toxic chemical residues have seriously depressed populations of these species. Findings presently available indicate that toxic chemicals are not significantly affecting resident populations.

Observation, photography and enrichment of wilderness experiences are recognized by the Department as the primary uses of raptors. However, the taking of a limited number of raptors under a tightly regulated falconry permit system is compatible with nonconsumptive uses. The number of persons interested in raptors for falconry purposes has been low in the past and has included Alaska residents, nonresidents and aliens. Only Alaska residents are permitted to possess raptors for falconry. The demand for birds to be used for falconry is expected to remain relatively low.

Small Mammals

About 40 species of small mammals** are found in Alaska. The house mouse and rat are introduced species associated with human habitations. A relatively large percentage of the indigenous species including the common, dusky, tundra and pygmy shrews, the brown, collared and bog lemmings, the red-backed, meadow, Alaska and tundra voles, the meadow jumping mouse and the porcupine are widely distributed in the state, although a number of these species have disjunct distributions and may occur sporadically in some areas. Some species, such as the Unalaska shrew and the black-footed lemming, are limited in their occurrence to a single island.

Habitat requirements are as varied as the number of species found in this group. Species such as the pika, which requires high altitude rock and talus slopes, or the northern bog lemming, which is limited to wet tundra and sphagnum bogs, are rather narrow in their habitat requirements. Others,

**A selected list of small mammal species in Alaska follows this account.

such as the common shrew or meadow jumping mouse, are adapted to a variety of habitats such as marshy, grassy, or forested areas.

Because of the high reproductive capacity of many of these species, the main factor limiting numbers is the availability of food. Voles and lemmings in particular are noted for rhythmic fluctuations in numbers generally with 3 to 4 years between peaks. Slow-growing vegetation in alpine habitats is rapidly exhausted by dense microtine populations, resulting in population "crashes" or movements.

Small mammals are an extremely important source of food for many terrestrial and avian predators. Most carnivorous furbearers utilize rodents for food and when populations of these small mammals are high they form a significant part of the summer diet of foxes, coyotes, wolves, and bears. Avian predators such as jaegers and many raptors utilize rodents.

Species and Habitat Management Policies

1. The Department recognizes that responsible unclassified game management must be based on scientific knowledge. A Department program will be maintained (contingent on funding) to increase knowledge of the population status and the biological and ecological requirements of unclassified game. When others conduct research on unclassified game within Alaska, the Department will request a description of proposed studies and make recommendations in the best interest of the species and the public. The Department will cooperate with other agencies or individuals whose research may provide useful information on unclassified game. Occasionally research may require temporary limitations on public use of study populations.

2. Maintenance of suitable habitat is of foremost importance in unclassified game management. Some unclassified game populations depend upon distinct habitat types of limited size for vital activities such as nesting and feeding. These critical areas will be designated and protected where necessary to insure the continued well-being of a species.

3. Transplanting unclassified game for restocking former ranges or stocking vacant habitat can be a useful management tool. However, because transplants often have unforeseen detrimental effects, introductions of unclassified game will generally be opposed. Transplants of unclassified game may be approved if substantial resource or public benefit can be shown. Proposed transplants must meet the following minimum requirements to be approved: 1) the proposed transplant site must provide sufficient and suitable habitat to support a

viable population of the transplanted species as determined by comprehensive study; 2) prior study must establish that the introduction of the species will not adversely affect the numbers, health, or utilization of resident species; 3) protection of the proposed transplant population from incompatible land uses must be assured; and 4) future public use of the resource must be guaranteed.

4. Situations may arise requiring control of unclassified game. Controls will be implemented only after an investigation by Department personnel has determined a valid need exists. It is the owner's responsibility to protect his property from damage by unclassified game. Reasonable efforts must be made to protect property by means other than the destruction of game. When control by removal of unclassified game is necessary, humane methods will be used. Nonselective means of control will not be used. Bounties are not considered a desirable means of accomplishing control.

Species Use Management Policies

1. The Department recognizes the Constitutional mandate of the State of Alaska to manage unclassified game for the benefit of the resource and the people of the state. For species which are harvested, the Department recognizes its obligation to manage on a sustained yield basis. The Department recognizes that national and international interests must be considered. There are many beneficial uses of unclassified game. Present use priorities may not be the priorities of the future, and unclassified game management must continue to consider all uses.

2. The Department recognizes recreational observation as the highest priority use of most unclassified game. Recreational observation includes general viewing, bird watching, and photography. In selected areas, the Department will provide for this use and will encourage recreational observation in all areas.

3. In general the Department will oppose the consumptive use of unclassified game unless substantial public benefit can be shown. The Department recognizes the traditional subsistence uses of some species of unclassified game.

4. The commercial harvesting of unclassified game for the sale of animal products will be opposed. The domestication of unclassified game is not considered a wise use of the resource and will be discouraged.

5. Permits may be issued for capturing, holding, importing and exporting unclassified game for stocking, public

education and scientific study, but only after demonstration that suitable habitat or holding facilities are available to the permittee. Permits will not be issued unless substantial benefits, which are consistent with the Department's goals and policies, can be demonstrated.

6. The Department recognizes falconry as a valid use of selected raptor species and will provide for such use under a closely regulated permit system.

Problems

* Many migratory bird species are exposed to contamination by chemical pollutants, especially insecticides and herbicides. Such compounds may seriously affect populations, either by causing direct mortality or by lowering reproductive success. Declining numbers of peregrine falcons resulting from chemical residues found outside Alaska are well documented. While other Alaskan raptors, seabirds, and other nongame bird species do not currently appear to be seriously affected by chemical residues, migrant species may experience similar declines in the future. Use of pesticides and other potentially harmful compounds is limited in Alaska at this time. Strict measures should be taken to control the future use of such chemicals within the state.

* Concentrations of shorebirds on coastal salt marshes and seabirds in colonies and around marine food sources make them especially vulnerable to oil pollution. Oil development provides a potential for tremendous losses of seabirds and shorebirds from large oil spills, and losses to chronic low-level pollution are probable. Baseline quantitative and qualitative data on coastal marine habitats and colony location, size and composition are needed to properly interpret population fluctuations and the implications of oil impacts. Surveys of dead or affected birds on beaches should be conducted to provide comparative data for impact assessments. These data are prerequisite to providing rational recommendations for future OCS lease areas, recommendations for future oil spill cleanup facilities, to document the effect of estuary contamination, and to quantify potential mitigation.

* Seabirds which nest in colonies are susceptible to repeated disturbance which can result in nest abandonment or high nesting mortality. Use of seabirds by nonconsumptive users will continue to increase, especially near urban centers. A corresponding increase in disturbance of birds and reduced nesting success can be expected unless measures to protect habitat and to control numbers and activities of users are initiated.

* Ocean floor mining operations for gold, platinum and other heavy metals may alter productivity of near shore waters through siltation, and thereby affect seabirds directly or indirectly dependent on planktonic organisms for food. Mining may also disturb bluff and cliff nesting seabirds. Mining should be regulated so as to minimize impacts on seabirds.

* Commercial fishing has an unknown impact on marine ecology with potentially adverse consequences for seabirds. Some seabirds prey on commercially-valuable stocks, and competition between seabirds and commercial fishermen may increase. Excessive exploitation by foreign fishing fleets may have reduced the range of at least one seabird species (ancient murrelet). Japanese gillnet fisheries have directly caused substantial seabird losses through entanglement in nets. Local seabird populations may be unable to sustain such losses indefinitely. The 200-mile foreign fishery limit passed by Congress will substantially reduce seabird loss, especially during the breeding season.

* Critical nesting habitat must be preserved if raptor populations are to be maintained in the future. Disturbances at nest sites during critical stages of the nesting season such as the egg laying, incubation, and early brooding phases, have probably been the major cause of direct, human-induced reproductive failure. Therefore, protection of raptor nesting habitat must include the following: 1) physical preservation of the nest sites; 2) preservation of the general nesting areas including feeding habitat; and 3) protection of the nesting areas from excessive human disturbance.

* The extremely high value placed on the endangered peregrine falcon and on gyrfalcons by falconers and collectors around the world creates an incentive for illegal traffic in this bird. Laws and regulations must be stringently enforced to minimize illegal use of raptors. Falconry is a legitimate and sporting method of hunting, and its practice poses no threat to the raptor resource when decisions regarding the number of raptors to be used annually for this purpose are based on the sustained yield principle.

* Some unclassified bird species, particularly gulls, terns and crows, pose threats to commercial air traffic. This is a major problem near several coastal communities where airports and sanitary land fills are in close proximity. Where such problems exist, the Department works closely with community governments and airport managers to remove or reduce attractions for birds and to eliminate concentrations of birds on or near runways. Any such activities will attempt to resolve the problem without killing birds or destroying important habitats but aircraft safety must be the foremost consideration.

LIST OF RAPTOR SPECIES IN ALASKA

	Common Name	Scientific Name
Eagles	Bald Eagle	*Haliaeetus leucocephalus*
	Golden Eagle	*Aquila chrysaetos*
	Osprey	*Pandion haliaetus*
Hawks	Goshawk	*Accipiter gentilis*
	Sharpshinned Hawk	*Accipiter striatus*
	Redtailed Hawk	*Buteo jamaicensus*
	Harlan's Hawk	*Buteo harlani*
	Swainson's Hawk	*Buteo swainsoni*
	Roughlegged Hawk	*Buteo lagopus*
	Marsh Hawk	*Circus cyaneus*
Falcons	Gyrfalcon	*Falco rusticolus*
	Peregrine Falcon	*Falco peregrinus*
	Merlin (Pigeon Hawk)	*Falco columbarius*
	Kestrel (Sparrow Hawk)	*Falco sparverius*
Owls	Great Horned Owl	*Bubo virginianus*
	Snowy Owl	*Nyctea scandiaca*
	Hawk Owl	*Surnia ulula*
	Great Gray Owl	*Strix nebulosa*
	Longeared Owl	*Asio otus*
	Shorteared Owl	*Asio flammeus*
	Boreal Owl	*Aegolius funereus*
	Saw-whet Owl	*Aegolius acadica*
	Screech Owl	*Otus asio*
	Pygmy Owl	*Glaucidium gnoma*

SELECTED LIST OF SMALL MAMMALS IN ALASKA

	Common Name	Scientific Name
Shrews	Common Shrew	*Sorex cinereus*
	Tundra Shrew	*Sorex tundresis*
	Dusky Shrew	*Sorex obscurus*
	Northern Water Shrew	*Sorex palustris*
	Pygmy Shrew	*Microsorex hoyi*
Bats	Big Brown Bat	*Eptesicus fuscus*
	Little Brown Bat	*Myotis lucifugus*
	Keen's Bat	*Myotis keeni*
Pikas	Pika	*Ochotona collaris*
Rodents	Collared Lemming	*Dicrostonyx groenlandicus*
	Bog Lemming	*Synaptomys borealis*
	Brown Lemming	*Lemmus trimucronatus*
	Red-backed Vole	*Clethrionomys rutilis*

	Common Name	Scientific Name
Rodent (cont.)	Meadow Vole	*Microtus pennsylvanicus*
	Long-tailed Vole	*Microtus longicaudis*
	Yellow-cheeked Vole	*Microtus xanthognathus*
	Tundra Vole	*Microtus oeconomus*
	Alaska Vole	*Microtus miurus*
	Deer Mouse	*Peromyscus maniculatus*
	Meadow Jumping Mouse	*Zapus hudsonius*
	House Mouse	*Mus musculus*
	Rat	*Rattus norvegicus*
	Porcupine	*Erethizon dorsatum*