ALASKA WILDLIFE MANAGEMENT PLANS

DRAFT PROPOSAL

SOUTHCENTRAL ALASKA

Alaska Dept. of Fish and Game

ALASKA WILDLIFE MANAGEMENT PLANS

A PUBLIC PROPOSAL FOR THE MANAGEMENT
OF ALASKA'S WILDLIFE

STATE OF ALASKA
Jay S. Hammond, Governor

Department of Fish and Game
James W. Brooks, Commissioner

Division of Game
Robert A. Rausch, Director

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FOREWORD

These Alaska Wildlife Management Plans are first and foremost proposals for wildlife management developed by the Division of Game for consideration by the public. The many ideas contained in the plans are only a beginning - they form a basis upon which the public can comment and recommend. The plans are not inflexible, and even after they attain a more final form and are implemented, they will be subject to change as wildlife populations and public needs demand such changes.

In addition to proposing management directions, the plans contain a wealth of information on the status and use of Alaska's wildlife populations. This valuable information was compiled from a number of widely scattered sources and much of it was not previously available in written form. These plans represent the most accurate assessment of wildlife status and use available to the Game Division at the time of writing in 1976. However, wildlife populations are dynamic, and much of the information on population status will require revaluation with time.

Virtually the entire Game Division staff participated in the preparation of these proposals. Coming as it did amidst many other important tasks of the Division, this planning effort was most demanding. I am gratified by my staff's cooperation and support in this endeavor; their accomplishment reflects their professionalism and dedication.

Robert A. Rausch

Robert A. Rausch, Director
Division of Game

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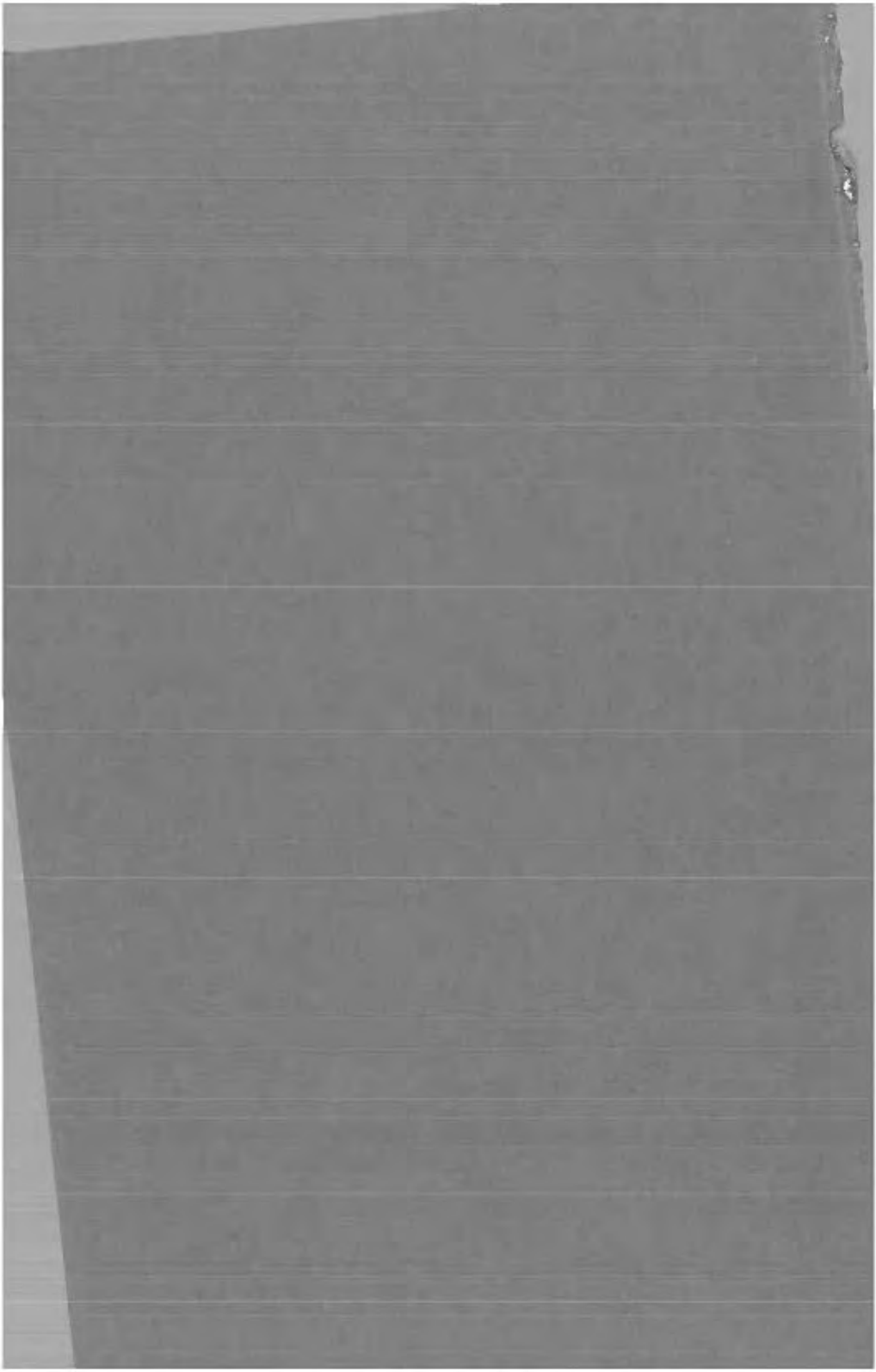

WILDLIFE MANAGEMENT IN ALASKA

THE PLANS, THE DEPARTMENT OF FISH AND GAME AND THE PUBLIC

Alaska's Wildlife Management Plans are the result of a long-term planning effort which first resulted in the development of the Alaska Game Management Policies in 1973. These plans are another step toward developing a program for wise husbandry of Alaska's wildlife resources and, basically, are recommendations to the public by the Department of Fish and Game for the management of all wildlife in the state.

The information and recommendations contained in these plans represent a concerted effort by Department staff to compile and review existing information on the status, distribution, and uses of Alaskan wildlife populations. Current and projected land use patterns and natural resource potentials and developments are also considered. Synthesis of these plans began at the field level where local needs and conditions were best understood.

The need for planning in the management of wildlife, and particularly in the allocation of use of wildlife, has become pressing in recent years. Alaska is experiencing unprecedented growth in human population at the same time that immense land areas, conveyed to private ownership or federal single-purpose classification, may be lost to multipurpose public use. Development and mobilization of resources are impacting wildlife and its habitat and are bringing more people into contact with once-remote wildlife populations. In simplest terms, Alaska faces a rapidly growing demand for wildlife use which is in sharp contrast to the shrinking resource area available to support such use. Moreover, as pressures on wildlife populations increase, there are increasing possibilities that any given use will have detrimental effects. There is, therefore, need for greater precision in management.

The complexity of resource allocations requires the systematic approach provided by planning. In keeping with mandates of Alaska's constitution, the Department's planning efforts are intended to eventually achieve optimum, diversified use of Alaska's wildlife throughout the forseeable future.

Publication and distribution of these recommendations mark the beginning of the second phase in this planning process: the public's review of the staff's recommendations and its involvement and participation in shaping the initial proposal into a statement of direction for wildlife management in Alaska.

The responsibility of the Department is to manage Alaska's wildlife resources for the benefit of the people. Therefore, it is incumbent on the Department to determine what the public wants from its wildlife resources. It is clear also that the Department will not be able to maintain the continuity of long-term management programs without the support of Alaska's people.

Development and implementation of the wildlife plans will affect Alaskans in several ways. First, the public will participate in the initial formulation of the basic long-term management direction. Second, the plans as presented for review will inform the public about Alaska's wildlife populations and their current and potential uses. They will also give the public a clearer understanding of the role and responsibilities of the Department of Fish and Game. Third, if implemented, the plans will provide Alaskans and other interested persons with an array of alternative uses of wildlife which can be maintained through purposeful management.

All interested people are invited to contribute to the wildlife management planning effort. The Division of Game recommendations contained in this and other booklets and maps are being distributed to the public throughout the state. Included is a questionnaire soliciting opinions about the management the Division is proposing. In addition to printed circulation of the proposed plans, the Division will hold public meetings in many Alaskan communities to obtain comment and discussion.

All public response will be considered in evaluating and modifying the proposed plans. Allocation of wildlife values among competing users and between conflicting uses is a complex problem which will have to be resolved through careful consideration of expressed public desires and the biological capabilities of the wildlife populations in question. Minority as well as majority demands should be accomodated if we are to retain the values afforded by a spectrum of wildlife-oriented experiences.

The Division will work closely with the Alaska Board of Game and with the Board's local advisory committees during the entire public review process. As the principal forum for the public's voice in Alaska's wildlife management, the Alaska Board of Game will modify and make the final determination on proposed wildlife plans. The Division of Game will assist the Board by providing a full report of the public review process and the response it engenders.

After the public review process, and revision and adoption by the Board of Game, the plans will be published and distributed to the public. Needless to say, the plans are not intended to be inflexible. Conditions change with time, and the plans will need to be adaptable. Revision of plans may occur as the result of periodic reviews or when individual situations require modification. Revision of plans will be made with participation by the public.

Implementation of the plans will begin as soon as practical after final acceptance by the Board of Game. Those areas or species now receiving the greatest use or in danger of losing those attributes called for by the plans should receive the earliest attention. Implementation will involve development of operational plans, formulation of regulations, internal Department actions such as research and management activities, and interagency cooperative actions as required.

Development and implementation of these management plans will be strongly affected by conveyance of 40 million acres of land into private ownership and by inclusion of up to 80 million acres of classified federal withdrawals into "Four Systems" federal management under terms of the Alaska Native Claims Settlement Act. Development of staff recommendations has proceeded with the knowledge that many changes in the contents of the final plans are inevitable. Management of wildlife on lands under federal jurisdiction or under private ownership will necessarily be commensurate with the land-use policies of the respective landowners. Important land-use decisions are being made now and in the next few years that will affect wildlife and its future use in the state. By developing wildlife plans now, we can improve the rationale by which land-use policies will be formulated.

WHAT THE PLANS CONTAIN

This regional booklet is only one portion of a comprehensive public proposal by the Division of Game, Department of Fish and Game, for the planned management of Alaska's wildlife resources. The proposal consists of: 1) seven regional booklets (of which this is one) containing recommendations for management of each species of wildlife, and 2) a set of eleven statewide maps outlining boundaries of individual species

management plan areas. The maps are intended to complement the material presented in the regional booklets. For complete understanding of the plans, the maps and appropriate regional booklets should be used together. These plans are for your review. Questionnaires have been included with the maps and booklets for your written comments. In addition, public meetings will be held throughout the state to explain plans and receive comment. You are invited to contact the Game Division staff to discuss these plans.

REGIONAL BOOKLETS

Each regional booklet is arranged in two parts. Part I contains an explanation of the planning effort and how the public will participate in the development of the plans. Included is an explanation of the management goals upon which the recommendations are structured. In addition, Part I presents a brief discussion of wildlife management in Alaska, reviewing the formal structure of management, the biological bases for wildlife use, and the problems encountered in managing wildlife. Part II contains the individual species/area management recommendations.

Each of the regional booklets corresponds to one of seven geographic regions of the state, depicted in the figure below.

All proposed management plans covering all or part of a region are included in the booklet for that region. The plans are arranged by species in Part II of each booklet, and each plan is titled and numbered to provide easy reference to the corresponding species map. Each individual plan includes:

1) A geographical description of the location of the area covered by the plan.

2) Goals - One primary goal and in some cases one or more secondary goals.

3) Examples of Management Guidelines - These are used to qualify or quantify in a more specific way the recommended management under a goal for any particular area.

   Management Guidelines are statements about:

   - the wildlife population: its size, sex and age structure and productivity.

   - use: season lengths and timing, bag limits, number or distribution of hunters or other users, access, transport, viewing, and aesthetic enjoyment.

   - habitat: alteration or protection.

4) A short summary of available information on the species and its use in the area to provide perspective for evaluation of the proposed management framework.

5) Statements of problems that may be encountered in managing for proposed goals. In general, problems deal with:

   - maintaining wildlife population levels: loss of animals or loss of habitat.

   - use of wildlife: exclusion of hunting, excessive access, noncompliance with regulations, state and federal legislation, and limitations on Department authority.

   - conflicts caused by wildlife: agricultural depredations, and safety of life and property.

6) A summary of the impacts of the proposed management in terms of its effects on the species in question, on characteristics of its use by man, on other species, and on other uses of the area.

MANAGEMENT GOALS

We have selected six management goals for these wildlife plan proposals. The goals are categories of use into which the various appropriate forms of human interactions with wildlife can be grouped. The goals provide direction for management with flexibility in mind. In most individual plans, multiple goals are assigned: a single primary goal and one or more secondary goals. Each goal emphasizes one general type of use opportunity. This does not necessarily mean that other uses will be excluded. Rather, it recognizes that if uses conflict, uses appropriate to the stated goals will receive preference. Furthermore, uses indicated by stated goals will be actively managed for. The overall content of each plan will further define goals for that specific area.

All proposed management goals are based on Alaska's constitutional mandate that its wildlife shall be reserved to the people for common use and shall be utilized and maintained on the sustained yield principle for the maximum benefit of the people. Use on a sustained yield basis for the maximum benefit of the people will take on different dimensions depending on individual situations. As an example, in rural Alaska the benefit of the people may, in large part, be concerned with the harvest of meat for domestic use, and yield would refer to pounds of meat or number of animals harvested. In another situation the greatest benefit to the people may accrue from only observing wildlife. Yield in this instance refers to the important but often intangible enjoyment derived from viewing or otherwise being aware of the presence of wildlife.

The choice of goals and their various combinations are intended to accommodate the variety of situations which exist in Alaska. The six wildlife management goals are:

1. TO PROVIDE AN OPPORTUNITY TO VIEW, PHOTOGRAPH AND ENJOY WILDLIFE.

2. TO PROVIDE FOR AN OPTIMUM HARVEST.

3. TO PROVIDE THE GREATEST OPPORTUNITY TO PARTICIPATE IN HUNTING.

4. TO PROVIDE AN OPPORTUNITY TO HUNT UNDER AESTHETICALLY PLEASING CONDITIONS.

5. TO PROVIDE AN OPPORTUNITY TO TAKE LARGE ANIMALS.

6. TO PROVIDE AN OPPORTUNITY FOR SCIENTIFIC AND EDUCATIONAL STUDY.

A thorough understanding of the goals is essential to understand and evaluate the plans. We urge you to study the following explanations of each goal.

1. TO PROVIDE AN OPPORTUNITY TO VIEW, PHOTOGRAPH AND ENJOY WILDLIFE.

This goal recognizes the great values of being able to see wildlife in a context not necessarily related to actual taking, and emphasizes yield in terms of aesthetic values. There are important areas where the combination of wildlife abundance, unique opportunity and human access result in this use accruing the maximum benefit to people. Emphasis is on viewing and photographing and may exclude all other uses. However, other uses including hunting may be allowed if compatible.

So-called "nonconsumptive" use of wildlife is popular in the state today. Viewing and photographing occur most frequently along the state's road and trail systems, areas which often receive heavy hunting use and which are most susceptible to human development. In some areas where unusual abundance, visibility, or accessibility of wildlife enable ready observation by the public without detrimental effects to wildlife, management for these purposes should be provided. Prompt identification, establishment and management of such areas is necessary to avoid losses to encroaching development and competing uses. Many of these areas have been previously identified.

Management which provides an opportunity to view, photograph, and enjoy a species is concerned with maintaining a sustained, observable population of that species. Human uses of wildlife or of the area supporting wildlife which significantly detract from the opportunity to observe the primary species may be regulated or restricted. Hunting for the primary species is generally excluded during the period when most observation takes place. Limitations on the number, distribution, or activities of viewers and photographers may be necessary where unlimited use would detract from the opportunity to observe wildlife or cause undue disturbance. Hunting may be allowed when year-round or area-wide observation does not occur. In some situations concurrent consumptive and "nonconsumptive" uses may be compatible.

Viewing and photographing are often compatible with other uses; this is reflected in the numerous plans where viewing and photography occur in combination with other goals. When applied as a secondary goal the emphasis on viewing and photographing is subdued, and uses addressed by primary goals may at times limit opportunities for observation. In some cases, however, management for other primary goals may enhance opportunities for observation of wildlife.

2. TO PROVIDE FOR AN OPTIMUM HARVEST.

This goal emphasizes yield of animals for human use. Within this goal are accommodated the needs for domestic utilization, especially by rural residents, but also by recreational hunters primarily interested in meat; commercial harvests; and situations involving maintenance of wildlife populations at specified levels. Aesthetic quality of experience and production of trophy animals may be compromised.

Direct domestic utilization of wildlife is important to many rural residents and is a valuable supplement to the larders of urban citizens. Emphasis of management will be to achieve an optimum harvest. This goal is also desirable in situations where excessive wildlife numbers develop and the welfare of wildlife populations or the safety of human life or property will require maintaining some lower optimum number of the species in question. Finally, management to provide for an optimum harvest is used where direct commercial utilization is warranted.

Optimum harvest can be defined as the amount or level of yield that is most favorable to some specified end result, whether it is productivity or density of a wildlife population, within the constraints of sustaining that population for future use. Such a harvest will differ from area to area, from species to species, and over time.

Management of populations under this goal will be intensive, involving manipulation of the numbers and/or sex and age structure of the population. Controls on methods and means of taking game, adjustments to lengths of

hunting seasons and bag limits and restrictions on the number of hunters are ways by which use will be regulated. In cases where production of food is important to local residents, the species may be managed to maximize sustained productivity, and use may be regulated to favor those people with the greatest dependency on the resource.

Management under this goal has wide latitude depending on the conditions and requirements of any particular area where it is employed. The goal is often compatible with the goal of providing the greatest opportunity to participate in hunting and with other goals by regulating the time and place of use. This goal may adversely affect aesthetic hunting considerations and the production of trophy class animals. "Nonconsumptive" uses may be available on an opportunistic basis.

This goal differs from the other five goals because it does not directly consider opportunity for use, but rather use itself. Perhaps the greatest similarity between this goal and other goals is with that of providing the greatest opportunity to participate in hunting. Under both goals the upper limit to consumptive use is the maximum harvest that a population can sustain. But whereas "greatest opportunity to participate in hunting" is dependent on the optimum harvest, attaining an "optimum harvest" is not dependent on providing the greatest opportunity to participate in hunting. Yield of the latter is participation. In the former, yield is in number of animals (biomass) that can be taken.

3. TO PROVIDE THE GREATEST OPPORTUNITY TO PARTICIPATE IN HUNTING.

This goal recognizes the recreational value of hunting and emphasizes the freedom of opportunity for all citizens to participate. In this case, the opportunity to participate is deemed more important than success or standards of quality of experience.

As Alaska moves away from the open frontier lifestyle, recreational hunting is an increasingly important use of wildlife in the state. Yet even as the demand for recreational hunting is growing, the area available for such use is decreasing. Extensive private land ownership and additional extensive parks, refuges and other lands designated for limited use will strongly affect recreational hunting opportunities in the state.

Providing the greatest opportunity to participate in hunting will not mean maximizing opportunity to kill. Management will consider participation more desirable than success. Opportunity must sometimes be limited to maintain harvests within the numbers that a wildlife population can sustain. Restricting harvest will usually involve altering methods and means of taking game, bag limits, and lengths and timing of seasons before limiting number of hunters. When participation must be limited, time allowed for a hunt will be limited before limiting number of hunters.

Management to provide the greatest opportunity to participate in hunting often will be similar to providing for an optimum harvest, because where demand to hunt is sufficient, full beneficial use of the resource will be allowed. Consequently these two goals are recommended in combination in many areas. Used as the only goal in an area, greatest opportunity to participate in hunting may compromise aesthetic considerations or reduce opportunity to take large (trophy) animals; "nonconsumptive" uses would be available on an opportunistic basis.

4. TO PROVIDE AN OPPORTUNITY TO HUNT UNDER AESTHETICALLY PLEASING CONDITIONS.

This goal emphasizes quality of hunting experience. To achieve it will often require limiting the number of people who may participate, as well as the means used to take game. Criteria for such areas include natural or wilderness character of the land, low hunter densities, and emphasis on hunting without the aid of mechanized vehicles.

Quality of experience is becoming increasingly important to a greater number of hunters, especially for those who value the aesthetics of the hunting experience as much or more than hunting success. For them the proliferation of off-road vehicles, riverboats, airplanes and the "hunter behind every bush" situation is distasteful. Under this goal, aesthetically pleasing conditions refers to a hunting experience which usually includes low hunter densities, controlled methods of transport, undisturbed wilderness character, and regulation of other conflicting uses, separately or in combination. Human activities which adversely affect the aesthetic quality of the hunting experience will be discouraged, limited, or prohibited. Opportunity as used here does not guarantee unlimited participation, and would normally imply limits on participation. Controls on hunter transport may reduce hunting success. This goal will not usually require large or dense populations of wildlife, nor will animals necessarily be of large (trophy) size. Harvests need not attain the highest levels that can be supported by the population.

The value of aesthetics is often considered when other goals are primary, and this goal is often used in combination with other goals to reflect the considerations of quality not explicitly stated in other goals. To the extent that other uses conflict with aesthetic values, timing and zoning of the area of use can be employed to obtain greater utilization of a wildlife population.

5. TO PROVIDE AN OPPORTUNITY TO TAKE LARGE ANIMALS.

This goal emphasizes the opportunity for hunters to take large animals. To accomplish this goal will usually mean that participation of hunters will be limited and the species population within the area may be manipulated to produce the maximum number of large animals.

Many recreational hunters are especially interested in taking a large animal. With development and increasing human pressures on wildlife resources, the opportunities for hunters to be selective for large animals are becoming fewer. Management under this goal may ensure that in some areas and for some species such opportunity will be retained. Areas recommended for management under this goal must have a reasonable number of large, old or trophy animals available or the potential to produce such animals. Opportunity as used here would not guarantee unlimited participation, but would provide a reasonable chance of success to those who do participate. Management will often be intensive, involving manipulation of the sex and age composition to produce large animals, and possible controls on number and distribution of hunters.

This goal and that of hunting under aesthetically pleasing conditions will often be compatible, and hunting both for large animals and under aesthetic conditions will be enjoyed simultaneously. Management for other goals is possible when the production of large animals is not affected. However, intensive management to produce large animals may

require taking other population segments by other users. For example, to produce large bull moose it may be necessary to harvest substantial numbers of female moose. This goal does not preclude "nonconsumptive" uses, and in fact may enhance "nonconsumptive" use experiences by providing improved opportunities to view large animals.

6. TO PROVIDE AN OPPORTUNITY FOR SCIENTIFIC AND EDUCATIONAL STUDY.

This goal recognizes the desirability and need to provide for scientific and educational use of wildlife to achieve a scientific basis for evaluating management options. Such management may require setting aside areas solely for this purpose, but in most cases, this use is compatible with other types of use.

The Alaskan wilderness, including its wildlife, is a unique natural laboratory for the scientific study of ecosystems and wildlife biology, and for the educational enrichment of the people. Scientific study and education have continually taken place in many areas of Alaska, reflecting the wide compatibility of such use with other uses of wildlife. Occasionally however, undisturbed or closely controlled conditions are necessary for study requirements and justify the designation of areas managed primarily for the scientific and educational study of wildlife. Study requirements would specify the extent to which other uses, both consumptive and nonconsumptive, would be allowed. In some cases, intensive population or habitat manipulation could be necessary to achieve study objectives. Participation could be limited.

This goal appears most often in combination with the goal of providing an opportunity to view, photograph and enjoy wildlife because they often have much in common. Educational studies are often enhanced by relatively undisturbed wildlife populations in areas established for viewing and photography. Providing for scientific and educational study is proposed as a primary goal in very few areas. Such limited direct application of this goal emphasizes the fact that opportunities for scientific and educational study exist throughout the state and special designation is unnecessary unless intensive population or environmental controls are required.

MANAGEMENT BACKGROUND

To properly evaluate the individual species plans presented in this volume, it is necessary to have some appreciation for the Alaska setting in which these plans are developed. There are, of course, biological or ecological characteristics of wildlife which affect its management. There are also a number of human institutions that affect management: constitutional and statutory authority, requirements, and constraints; policy; user requirements; and the demands of the "new Alaska." It is hoped that the following discussion touching on these considerations helps to place the plans in a more relevant perspective for public understanding.

THE LEGAL BASIS FOR WILDLIFE MANAGEMENT IN ALASKA

Wildlife management in Alaska was formally established in 1925 when Congress created the Alaska Game Commission "to protect game animals, land furbearing animals, and birds in Alaska, and for other purposes." Prior to 1925 protection of wildlife had been undertaken by the Departments of Treasury, Commerce, and Agriculture, and by the territorial governor.

The five-member Alaska Game Commission, appointed by the governor, represented each of four Judicial Divisions of the state and the U. S. Bureau of Biological Survey, later to become the U. S. Fish and Wildlife Service. This commission set hunting seasons and bag limits subject to approval by the Secretary of Interior. Emphasis of management was on establishment of wildlife refuges and on enforcement and predator control activities until the 1950's when research of game populations was increased.

With the attainment of statehood in 1959 a formal framework for State management of Alaska's wildlife resources was established. In addressing natural resources, Article VIII of the Constitution of the State of Alaska states:

> Section 1. Statement of Policy. It is the policy of the State to encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest.
>
> Section 2. General Authority. The legislature shall provide for the utilization, development, and conservation of all natural resources belonging to the State, including land and waters, for the maximum benefit of its people.
>
> Section 3. Common Use. Wherever occurring in their natural state, fish, wildlife, and waters are reserved to the people for common use.
>
> Section 4. Sustained Yield. Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses.

In accordance with these mandates, the Alaska Legislature established by statute a Department of Fish and Game, provided for a Commissioner as the principal executive officer of the Department, and created a Board of Fish and Game. The Division of Game was one of several divisions created to carry out the responsibilities of the Department.

Since statehood the role of the Legislature and the functions, structure, and interrelationships of the Board of Fish and Game, its advisory committees, and the Department have undergone changes in response to

public concerns over increased use of wildlife, increased conflicts between users, growing public involvement in government and increased public environmental concern.

Legislature

The Legislature, by virtue of its broad constitutional authority, has been a dominant force in establishing the character and direction of Alaska's management of wildlife. At statehood the Legislature enacted the Fish and Game Code of Alaska (Title 16) which established the Commissioner and Department of Fish and Game and a Board of Fish and Game, and defined the powers, duties and functions of each. In addition, this act, or amendments and additions to it, provided for: the authority to enforce laws and regulations; licensing of hunting and trapping, including specification of licenses and tags required and their fees; protection of fish and game from human activities; establishment of state game refuges and sanctuaries, and designation of critical habitat areas; suppression of and bounties for predatory animals; commercial use of fish and game; and the specification of unlawful acts, violations, and penalties therefor. Among the powers specifically reserved to the Legislature were those of regulatory and administrative legislative review, approval of areas set apart as fish and game reserves, refuges, and sanctuaries by the Board, the authority to change the amount of fees or licenses, and budgetary controls. This legislation, in essence, formed the basic framework for the entire scope of activities carried on by the Department and the Board.

Since statehood, the Legislature has variously added to, amended or repealed portions of the original State fish and game statutes, reflecting increased complexities of resource management, and increased demands on the Legislature by the people. In general, revisions of the statutes have served to clarify or expand legislative intent and to increase provisions for management, protection, regulation and use of wildlife. Although many of the revisions have affected the scope of activities of the Commissioner, the Department, and the Board, most have had little substantive effect on the interrelationships between these principals. Some recent state legislation however, has affected the traditional structure of Commissioner and Board authorities. The general effect of these recent legislative actions has been a diminution of Commissioner and Board authorities in favor of increased parochial advisory committee roles and increased public participation. Included in such acts are those relating to:

- Boards of Fisheries and Game. This 1975 act restructured the 12 member Board of Fish and Game into two, 7-member boards, one for fisheries and one for game; repealed the status of the Commissioner of Fish and Game as an ex-officio member of the Board; redefined the regulatory powers of the Boards; amended the provision establishing advisory committees to concurrently expand advisory committee authority to close seasons and limit the Commissioner's authority to overrule closures established by advisory committees.

- Taking of antlerless moose. This 1975 act expanded the authority of advisory committees and the Department while limiting the regulatory authority of the Board of Game by prohibiting the taking of antlerless moose except under regulations adopted by the Board after requisite recommendations for open seasons are made by the Department and by a majority of active local advisory committees for the game management unit or units affected.

Although it is important to recognize that the Legislature has delegated broad regulatory authority to the Board of Game, it is also important to

understand that the Legislature has the authority to affect that delegation at any time. For example, seasons and bag limits, normally set by the Board, could legally be established by the Legislature. However, the Legislature has generally restricted its activities to more general and enabling legislation.

Governor

The Governor, as chief executive of the State, is responsible for the conduct of the Department of Fish and Game in serving the people of Alaska. All actions of the Department are subject to review and concurrence by the Governor. In addition, the Governor may invoke independent executive actions. Under his strong constitutional authority, the Governor has brought about major reorganization of the Department in the past. In 1962 most of the functions and powers of the Department relative to the collection, accountability, and custody of fish and game revenues was transferred to the Department of Revenue by executive order. Similarly, the Division of Protection, with primary responsibility for enforcement of all fish and game laws and regulations for the Department, was transferred to the Department of Public Safety in 1972.

Commissioner of the Department of Fish and Game

The Commissioner is the principal executive officer of the Department of Fish and Game. He is appointed by the Governor for a term of 5 years, subject to confirmation by the Legislature, and serves at the pleasure of the Governor. The Commissioner functions to "manage, protect, maintain, improve, and extend the fish, game and aquatic plant resources of the state in the interest of the economy and general well-being of the state" (AS 16.05.020). To that end, he supervises and controls the Department, including appointments of personnel and assistants necessary for the general administration of the Department and he may delegate his authority to subordinate officers.

Among the powers and duties of the Commissioner are administrative, budgeting and fiscal powers; the collection, classification and dissemination of statistics, data and information; the emergency opening or closure of seasons or areas; and the capture, propagation, transport, purchase, sale, or exchange of fish or game or eggs for scientific or stocking purposes.

In addition to that authority specifically provided to the Commissioner by statute, the Board may delegate to the Commissioner authority to make regulations. However, such delegation in the past has been limited and specific in nature.

Division of Game

The Division of Game was established in 1959 under provisions of the act creating the Department of Fish and Game. As one of several divisions of the Department, the Division of Game functions in meeting the legislative charge to the Commissioner to "manage, protect, maintain, improve and extend the.....game.....resources of the state....." as well as in providing such assistance to the Board of Game as it requires in the performance of its functions. In each of these areas, the Division attempts to maintain a public posture by disseminating information and encouraging public involvement in the management of Alaska's wildlife.

The Division of Game conducts many activities to meet its responsibilities including:

* Assessment of game population status involving biological

research, surveys and inventories of game populations, and compilation and analysis of harvest statistics.

* Identification and protection of important wildlife habitats. The Division provides information and recommendations to federal, state and local agencies which plan for, manage, regulate, or otherwise affect lands in Alaska or their use, to minimize detrimental impacts of land and water uses upon wildlife habitat in Alaska.

* Preparation of reports on the status, management and use of Alaska's wildlife resources, for public information, scientific publication and use, and to provide the Board of Game with information it requires to promulgate regulations.

* Recommending appropriate regulations for consideration by the Board of Game.

* Enforcement of regulations. Although primary responsibility for enforcement of fish and game regulations falls to the Division of Wildlife Protection in the Department of Public Safety, Game Biologists are authorized as enforcement officers and maintain an active profile in the enforcement of regulations.

* Providing the public with information, assistance and other services. The Division disseminates reports of Division activities to the public, contributes to Departmental information and education activities including television and radio programs, a Fish and Game magazine and newspaper articles, distributes regulation pamphlets to the public, and provides personal assistance and explanation on an individual inquiry basis.

At present, the Division of Game is staffed with approximately 110 full-time positions. About 75 positions are filled by professional biologists, all of whom possess at least a Bachelor's degree in wildlife management or other biological sciences. Many possess Master's degrees or higher. The remainder comprise the support staff of clerical, technical, and statistical positions. In addition to the Division headquarters in Juneau, regional offices are maintained in Fairbanks, Anchorage and Juneau. A total of 21 area field offices are maintained in major communities throughout the state.

Activities of the Division of Game are largely funded by a federal-state matching funds arrangement, made possible through a "Fish and Game Fund" and the Federal Aid in Wildlife Restoration Act of 1937.

Under the Federal Aid in Wildlife Restoration Act and its amendments, funds from an excise tax on sporting arms and ammunition, including pistols, revolvers, bows and arrows, and parts and accessories are made available to the various states on a matching basis for use in wildlife restoration work, including land acquisition, research, development and management projects, and for use in hunter safety programs. Monies are made available on a maximum share basis of 3 federal to 1 state dollar basis. Provisions in the act require the various participating states to maintain funds obligated to fish and wildlife restoration work as defined by the act.

The Alaska Legislature established the Fish and Game Fund at the same time the Department was established. Most of the money comprising the Fish and Game Fund derives from the sale of state sport fishing and hunting licenses and special permits, although funds from other sources are possible. Funds gained from license sales or permit fees cannot be used for other than the protection, propagation, investigation and restoration of sport fish and game resources and the expenses of administering the Sport Fish and Game Divisions of the Department.

Board of Game

The Board of Game, as presently constituted, was established in 1975. Originally established in 1959 as an eight-member Board of Fish and Game, the Board was subsequently enlarged by statute to 10 and then 12 members before being divided into two Boards, one for fisheries and one for game. The Board of Game now has seven members, appointed by the Governor and subject to confirmation by the Legislature. The staggered term of office for members is four years. Members serve at the pleasure of the Governor.

The primary functions of the Board of Game in conserving and developing the game resources of the state are the promulgation of regulations affecting use of wildlife and the establishment and conduct of advisory committees.

The Board of Game is empowered to make regulations for:

(1) setting apart game reserve areas, refuges and sanctuaries in the waters or on the lands of the state over which it has jurisdiction, subject to the approval of the Legislature;

(2) establishment of open and closed seasons and areas for the taking of game;

(3) establishment of the means and methods employed in the pursuit, capture and transport of game;

(4) setting quotas and bag limits on the taking of game;

(5) classifying game as game birds, song birds, big game animals, furbearing animals, predators or other categories;

(6) investigating and determining the extent and effect of predation and competition among game in the state, exercising control measures considered necessary to the resources of the state and designating game management units or parts of game management units in which bounties for predatory animals shall be paid;

(7) engaging in biological research, watershed and habitat improvement, and game management, protection, propagation and stocking;

(8) entering into cooperative agreements with educational institutions and state, federal, or other agencies to promote game research, management, education, and information and to train men for game management;

(9) prohibiting the live capture, possession, transport, or release of native or exotic game or their eggs; and

(10) establishing the times and dates during which the issuance of game licenses, permits and registrations and the transfer of permits and registrations between registration areas and game management units or subunits is allowed. (AS 16.05.255)

In addition, the Board of Game may adopt regulations upon the recommendation of the Department, by the majority vote of affected local advisory committees, or by written petition by interested residents of an area as regards the establishment of subsistence hunting areas, the control of transportation methods and means within subsistence hunting areas, and the establishment of open and closed seasons and areas to protect subsistence hunting. (AS 16.05.257)

Promulgation of regulations by the Board must be in accordance with Alaska's Administrative Procedure Act (AS 44.62) which requires among

other things that:

1. Meetings of the Board be open to the public and that reasonable public notice be given for such meetings.

2. A procedure be used for adopting regulations which includes:

   a. prior public notification of proposed actions,

   b. opportunity for any interested person to present statements, arguments, or contentions in reference to a proposed action, and,

   c. opportunity for an interested person to petition the Board for the adoption, amendment, or repeal of a regulation.

3. Regulations be codified and published.

The Boards of Fisheries and Game are empowered to establish advisory committees in various parts of the state for the purpose of providing the Boards with recommendations on fish and game in their areas of jurisdiction. The Boards set the number and terms of the members of advisory committees, delegate one member of each committee as chairman and give him authority to hold public hearings on fish or game matters. Advisory committees have the authority to declare emergency closures during established seasons under procedures established by the Board. Furthermore, advisory committees must recommend openings of antlerless moose seasons in their respective areas, in conjunction with Department recommendations for open seasons, before the Board of Game may adopt regulations for the taking of antlerless moose.

The Board of Game meets at least once each year, but may meet more often as it considers necessary. Special Board meetings may be called at any time by the Commissioner or at the request of two Board members.

Public

Alaska's people are the ultimate managers of their wildlife resources. Through the electoral process and other mechanisms of government responsiveness, the public can and does effect the management of wildlife in Alaska.

Wildlife management in Alaska is an exceptionally public process. Aside from the economic interest in resource utilization, few other resources elicit public attention to the extent that fish and wildlife do because an intimate association with wildlife has been an important part of the Alaskan lifestyle. There is a traditional sense of personal ownership of wildlife that doesn't exist to the same degree with other natural resources. Other contributing factors are the increasing importance of outdoor recreational activities and the widespread public association with "ecological awareness."

Alaska's constitution reserves the state's wildlife to the people for common use consistent with the public interest. In order to assume an active and productive role in the management and use of wildlife, the public must be cognizant of the responsibilities demanded by such a role. The public has a responsibility to be informed about the status of wildlife resources and the options for their use. The public should also be informed about the governmental management framework - which agencies are involved, what their responsibilities are, how their functions and authority are interrelated, and what legal, budgetary, and administrative constraints limit their actions. Citizens should be aware of the opportunities to express their concerns as provided by statute, directive and policy: the legislative stage, the public forum provided by the Board of Game, public hearings and meetings, petitions,

and personal contact. The public should participate in the regulatory process and should actively support current regulations. Finally, all wildlife users should bear their share of costs of conservation. Although many people who do not hunt or fish derive substantial benefits from fish and wildlife, in Alaska almost all costs of wildlife management by the Department of Fish and Game are borne not by the general public, but by those individuals who purchase hunting and fishing licenses, guns and ammunition, and fishing tackle.

BIOLOGICAL CONSIDERATIONS

Wildlife Habitat

The dependency of wildlife on its habitat is of fundamental importance, yet many people are unaware of the relationships involved. Habitat is a combination of many interrelated factors which provide living space for a species. Food and cover are general terms for basic necessities that are often complicated and variable according to season and circumstance. Suitable and often different areas are needed for breeding, nesting, rearing young, resting, escaping and feeding. Not only must all these essential components be present in a habitat to make it "habitable" for a species, but they must be accessible to the animals. Some migratory birds satisfy their habitat needs by depending on habitat components over the breadth of two continents while some small mammals live their entire lives in the space of a backyard. But the "backyard" must have the necessary variety of areas to be good habitat. For many species, the more "edge effect" created by interspersion of vegetative types, the better the habitat. The suitability of a habitat is the first concern in any effort to establish, maintain, or enhance populations of a species.

There is a limit to the number of animals supported by a unit of habitat, and this limit varies from season to season and from year to year as the adequacy of the essential habitat factors vary. When expressed as an average density of animals that can be supported this limit is called the carrying capacity. When carrying capacity is exceeded by a population, habitat can be damaged, and the result is often a reduction in the carrying capacity followed by a decline in the wildlife population.

A species usually relies on more than one specific habitat area or factor for the essentials of life. The area or factor in shortest supply determines the maximum number of animals that a habitat can support. This is known as a limiting factor. If food is the limiting factor, and the supply is increased, the carrying capacity for that species will increase until it becomes limited by the shortage of another factor, such as a place to escape from predators. Specific habitat areas of great importance to a wildlife population are called critical areas or critical habitat. Such areas are critical because they are limiting, and their loss or reduction would result in elimination or reduction of the population.

Habitat changes are continuously occurring naturally. Vegetation associations succeed one another as each successional stage, through its occupancy, makes conditions more favorable for its successor until a climax vegetation stage is established. Climax communities remain in tenuous balance with the long-term forces of climate and geological change. There are reversals in the process as well, and these normally are sudden and drastic in comparison to the subtle progress of succession. Fire is perhaps the most spectacular, but there are many others, such as deposition of material by rivers and glaciers, effects of windstorms, insect infestations, and man-made clearings. Wildlife populations change in response to changes in habitat, as it becomes more or less

favorable for the species.

Manipulation of habitat (including protection when necessary) is therefore a prime tool in managing for desired populations of wildlife. With the proper techniques the successional stages most favorable to a species can be maintained on a long-term basis, variety of desired vegetation can be improved beyond natural occurrence, and special habitat necessities can sometimes be artificially provided. Response of wildlife to habitat improvements can be dramatic.

Some qualifications on the benefits of habitat improvement should be noted. Habitat improvement programs are directed at increasing or maintaining numbers of desired wildlife populations. Since a habitat favorable for some species may be less favorable for others, manipulation of habitat will mean reductions of some species populations as well as gains to others. Also, manipulation of habitat does not always result in increases of wildlife because the effectiveness of habitat improvements may be limited by the influence of uncontrolled factors such as climate and soil quality. There also are a number of species which are dependent upon climax vegetation associations. Because their populations cannot be benefitted through short-term vegetation changes management must be directed to other factors which are alterable.

Population dynamics

Maintenance of populations at carrying capacity, however useful as a management concept, is rarely achieved under natural, unmanaged conditions. How many individuals of a species there actually are in an area at any time is a result of the interplay of the population with the allowance of its living area. Wildlife is often "out of phase" with its habitat in a never-ending see-saw of adjustments to the excesses and shortages of its environment. The processes of adjustment by which a population's size is balanced with its habitat are termed population dynamics. Essentially, these are the opposing forces of reproduction and mortality.

Reproduction is the main way new individuals are recruited into a population (migration may add animals, too). The increase of a population, excluding the effects of movement or mortality, is limited by the reproductive potential of that species. The number of young each female can produce in a year, the minimum and maximum ages at which breeding may occur, the sex ratio of breeding adults, and longevity of individuals, all together determine the maximum rate of increase that a population may exhibit. Wildlife populations, however, rarely increase at their maximum rate. Mortality is the main reason, of course, but other factors may depress reproductive success. For example, not all females capable of breeding find males; or younger animals capable of breeding may be inhibited in attempting to breed because of dominance exerted by older individuals; and many species give birth to fewer young in times of adversity. Such depressants on reproduction are commonly self-regulating mechanisms, through which animals respond to conditions of overcrowding, food shortages, or poor nutrition.

Mortality operates against population growth by removing animals. Starvation, predation, hunting, inclement weather, diseases and parasites, accidents, and strife between animals all contribute to losses of wildlife. The relative importance of any one factor is generally dependent on two things: the effects of other mortality factors, and the density of the population. Animals injured by accident or strife may have difficulty obtaining food and may starve. Others, weakened by starvation or debilitated by disease, may fall easy prey to predators. In the absence of predation and hunting, populations can outgrow their food supply and starvation will be the major cause of mortality. Some factors, such as predation, starvation, and disease, increase in their importance as the density of the population rises and these are known as density-dependent mortality

factors. Success of predators increases as their prey becomes more abundant. Starvation is more common as competition for food increases. Transmission of disease is facilitated by crowding of animals. The reverse situation is also true. As a population is reduced, relatively fewer losses occur to these factors. Also, greater losses to one cause will result in reduced losses due to other factors. To some extent, change in one kind of loss is compensated for by change in another kind of loss.

These direct and indirect compensatory relationships between reproductive performance, various mortality factors, and population density make it possible to some extent for human use of wildlife to replace other kinds of mortality.

Losses to wildlife populations are replaced by reproduction. If everything is working right and habitat quality is reasonably good, animals characteristically produce more young than are needed for replacement. This creates a "surplus" of individuals, both young and old, that is trimmed off by the various mortality factors. The surplus may be small if the new individuals are accommodated by excellent habitat, or it may be large as the population exceeds the capacity of the habitat. Wildlife management seeks to take advantage of compensatory relationships to make some of the surplus available for human use.

Removal of animals lowers population density. Fewer animals are then lost to density-dependent mortality factors. Lowered density results in reduced competition for food, which in turn increases survival of young, for it is the young (and the very old) which suffer the greatest losses to starvation. Within limits, increasing the removal of adult animals continues to boost the survival of young. Furthermore, lower population density makes more food available, more animals breed successfully as a result of being in good physical condition, and more young are produced and raised by each female.

The productivity of a species in terms of its use by humans is called "yield." Normally, yield applies to consumptive use, but it can also include so-called "nonconsumptive" use as well. Management of wildlife is aimed at producing a sustained yield, that is, utilizing a wildlife population at such a level that the capability of the population to continue to provide such use is not impaired. Sustained yield is the central concept in the management of any renewable resource.

There is usually a range in intensity of use that wildlife populations will sustain, from no use to that which is the maximum allowable. Human use is another force acting on a population, affecting, and in turn being affected by, the compensatory relationships of the various natural reproductive and mortality factors. Consequently, a wildlife population will establish an equilibrium with the forces acting upon it, as long as the minimal species requirements are met.

PROBLEMS OF MANAGEMENT

Management of wildlife has its share of problems. Although many problems can be foreseen and avoided by giving careful thought to the future, dealing with wildlife and with people is full of surprises and the wildlife manager must be "ready for anything."

The difficulties faced by wild animals in their daily lives become part of the problems faced by wildlife managers. Many of the crucial problems faced by wildlife in obtaining enough good food, having a chance to reproduce, and avoiding an untimely death are known. Many remain nature's secrets. A large part of the wildlife manager's job consists of learning to recognize these crucial problems, and trying to either minimize or make allowance for them.

Perhaps a larger part of the manager's job involves regulating man's use of wildlife and its habitat. There are two broad problem areas involved. The most difficult is attempting to insure that use and development of resources other than wildlife cause the least difficulties for wildlife and its habitat. The second broad problem area involves developing a system of wildlife use that enriches the lives of the public in various ways without impairing the welfare of wildlife species, their habitat, or their relations with other species. The latter problem is the wildlifer's "first love," but more often than not he's "married" to the former!

Taken together, these two broad problem areas include a whole spectrum of potential difficulties for wildlife, wildlife managers, and the public who wishes to enjoy wildlife. Problems range in importance from critical to mere nuisances, depending on their nature, location, duration, season and magnitude. The most important problem affecting the well-being of wildlife in Alaska and indeed, in most parts of the world, is loss of suitable living space, or habitat. Alaska is fortunate in that the wildlife habitat that has been lost or significantly damaged is small at this time, but the trend toward increasing losses is clear.

Many other problems exist, and the following review may give readers a feeling for the variety and importance of problems encountered in wildlife management. For convenience, problems are grouped according to these circumstances: natural factors, land use, use of wildlife, and management limitations.

Natural Factors

Loss of habitat occurs through nature's processes, sometimes suddenly but more often slowly enough for animals to adjust. Given time, meadows may become brushlands, and brushlands become forests. For example, the great 1947 Kenai burn, a huge wildfire on the Kenai Peninsula, allowed thousands of acres of young willow, aspen and birch to replace mature forests with prime food, and stimulated a boom in moose numbers. But after 30 years the prime food plants have grown out of reach or have been eaten up; the prime moose habitat is gradually being lost, and the number of moose the area can support has declined. Similar situations have occurred throughout much of Southcentral and Interior Alaska, as modern, efficient fire suppression techniques have reduced the frequency and extent of burning. On the other hand, natural and man-caused fires have affected wildlife populations, such as caribou, red squirrels, and spruce grouse, that are dependent on long-established (climax) vegetation.

There are other examples: ponds or sloughs used by beavers may gradually fill in with silt and dead plant remains, and either become too shallow or develop a wide "beach" of sedges and grasses that makes food gathering a dangerous proposition, and the beavers quit using the ponds.

Sometimes the animals cause their own problem. The Nelchina caribou herd grew so large that it decreased its own food supply by eating and trampling more than the plants could produce. An important part of the caribou habitat was lost, and will not recover for many years. But, to repeat, these are all examples of relatively long-term changes, and while great changes may occur in numbers of the species affected, the change each year may be moderate.

In a few cases, change may be rapid and catastrophic. A much earlier fire on the Kenai Peninsula apparently destroyed the caribou habitat then available. Caribou disappeared from the Kenai, and did not return until transplanted by man 60 to 70 years later. The 1912 eruption of Katmai was a catastrophe that quickly eliminated much wildlife habitat on the Alaska Peninsula, and the 1964 earthquake caused the ocean floor to rise several feet in some areas of southcentral Alaska, dramatically

affecting all marine life, including marine mammals and waterfowl.

Another major, natural limiting factor, or problem, for wildlife is weather. Alaska's climate is often harsh and there are numerous examples of the limiting effects of weather on wildlife. In the winters of 1971, 1972 and 1974 unusually cold weather caused sea ice in the Bering Sea to extend hundreds of miles south of its usual limit; sea otters were trapped, unable to feed and float as they normally do, and many died. Winters of prolonged, unusually deep snow have caused major die-offs of moose at Yakutat, and in Southcentral and Interior Alaska. In some cases 50 percent or more of the moose may have died, mainly because it became too difficult to get around in search of food.

Hard snow crusts formed by unusual winter rain have caused grouse to die from freezing, because the birds were unable to burrow in the snow at night to sleep. Similar crusts caused by the bright spring sun have at times aided wolves in pursuit of moose. In some years, frozen or wind-blown snow crusts may prevent caribou from feeding on parts of their winter range; crusts or deep snow may affect sheep similarly.

Mid-winter flooding or unusually great depths of overflow ice have driven beavers from their houses, much to the benefit of passing wolves or wolverines which find beavers easy prey on land. Severe spring floods may drown beaver kits, calf moose, and other young-of-the-year. Of course, the effect of any of these events depends on their severity, how long they last, and whether or not they strike an especially vulnerable spot in the species' annual cycle of living.

There may be times when weather is so severe that animals (especially young ones) die outright from exposure, but usually, as in the examples above, bad weather makes it so hard for animals to use some critical part of their habitat that they die from starvation, with a little extra "push" from a combination of various lesser factors such as disease or parasites, predators, and accidents.

Food supply, or nutrition, is a crucial factor not only during hard winters, but at other times as well. Ample food of good quality is especially important to pregnant and nursing females, whose food needs are greatly increased. A lack of proper food may result in weak offspring which may be susceptible to disease, or be caught by a predator. Some young may not even be born, or may be born dead. In fact, if the female has been undernourished prior to breeding season, she may not conceive when she mates, or perhaps she will have fewer offspring than normal.

Moose, deer, and caribou depend on "fattening-up" during the summer in preparation for a rugged rutting season and a long winter. Males lose most of their fat during the rut, and are actually in only fair condition when winter comes. If winter weather is particularly severe, or winter food is scarce, males are more likely to die than females. Calves and very old animals are even more susceptible.

As more is learned about wildlife nutrition, it becomes evident that food quality is as important as quantity. Some species of food plants are more nutritious than others, some parts of plants are more nutritious than other parts, and in general younger plants are more nutritious than older plants. A bunch of brush is not necessarily a bunch of good wildlife food!

Predation. If the moose, caribou, sheep, grouse or other species have managed to survive all the other natural hazards of life so far discussed, there is no time to be smug, because there may be a bear, wolf, weasel, hawk or some other predator looking for its next meal! When prey species (those normally eaten by another species) are at low numbers, in poor condition, or have trouble escaping because of deep snow or lack of

suitable habitat, predators can eat enough prey to reduce or hold down numbers of their prey. The effects may be short-term, or they may extend over several decades, depending on the species involved and the circumstances. There usually is little doubt that prey numbers will eventually recover, but in the meantime few of the prey species may be available for the remaining predators, scavengers, or for various uses by people. For example, in recent years, severe winter weather has been an important cause of declining moose numbers in Interior Alaska. In the Tanana Flats, near Fairbanks, hunting and predation contributed to this decline. Hunting has been almost completely eliminated to encourage the recovery of the moose population, but so far no recovery is in sight. Wolves have been one of the major factors preventing moose numbers from rapidly recovering, and in the Tanana Flats, their depredations may accelerate and deepen the moose decline to very low numbers. The situation prompted wolf control programs in an effort to allow moose to recover more rapidly. Predators are rarely the sole reason for declines of wildlife populations, but under certain circumstances they can be a primary cause for depression of prey numbers.

There are additional natural hazards for wildlife. Accidents and disease sometimes kill wildlife, but often these hazards are either caused or promoted by other hazards. For example, a hard winter or late break-up may cause more accidents, because animals are in poor condition and more accident-prone.

In summary, a variety of natural mortality factors affect wildlife populations; these factors usually are interrelated, and their impact varies from negligible to considerable. Wildlife managers must know what these factors, or problems, are, and either devise ways of reducing them, or tailor management to allow for effects of these hazards.

Land Use

Land ownership was pretty simple before Alaska became a state. There were a few military reservations, and a large petroleum reserve. A handful of large National Parks, Monuments and extensive Wildlife Refuges existed, plus large National Forest holdings in Southeastern Alaska and smaller ones in Southcentral Alaska. Most of Alaska, though, was public domain, uncommitted to any special uses.

Times changed, the State of Alaska was given the right to select 104 million acres as part of its dowry from the federal government, and before long the question of Alaska Native Land Claims arose. In 1971 the Alaska Native Claims Settlement Act gave Alaskan Natives the right to select approximately 40 million acres of land in Alaska, and also provided for inclusion of up to 80 million acres in National Parks, Refuges, Forests and Wild and Scenic Rivers. Native selections were recently completed and are awaiting certification. Various proposals have been made for how the 80 million acres, called "d2" lands, should be assigned to the government agencies involved, and Congress has to make the final decisions by December 1978.

However those final decisions turn out, lands in Alaska will be in a crazy-quilt pattern of private, state, and (several) federal agency ownerships. The rights, regulations and rules of the various owners will make resource use of all kinds much more complex, and generally more restrictive than ever before. For wildlife management to contribute effectively to the well-being of wildlife species, and to provide for continued use of wildlife in various ways, some major problems must be addressed.

Perhaps the most basic problem is that even as demands for use of wildlife increase, the amount of land available for public use will decline, simply because the amount of land in private ownership will increase.

Land granted to native groups will be private land. Like any landowner, native groups will place their own interests first, and the lands granted to them are their main resource in becoming economically self-sufficient. Self-sufficiency may be based on resource development, subsistence use, or both, but whatever combination develops, public access to wildlife on those lands will no longer be a right, and opportunities to use wildlife will decrease.

Some state-owned lands may go into private control, too, through sale or lease. This would also decrease opportunity for public access to wildlife. By statute, one Alaskan has as much right to use wildlife as another, but, also by law, the landowner can regulate trespass on his own land as he sees fit.

The dilemma of increasing demand for wildlife use is only a little less complicated on public lands where constraints of private ownership are not in effect. In substantial portions of the 80 million acres of d2 lands under consideration by Congress, wildlife uses such as hunting, trapping, observing, or otherwise enjoying wildlife may be severely restricted or prohibited. Loss or severe restriction of these uses in large areas of federal domain is in itself a problem for those desiring to hunt and trap, or use wildlife in other ways, but the problem is compounded because the demand for these uses is not likely to go away. Rather, it will shift to other areas still available for these uses. Wildlife management programs then must cope with this concentrated demand and the stress it places on resources of a reduced land area.

With the many future owners of Alaska's lands and their diverse interests, a great challenge will be to achieve agreement on management that will benefit wildlife no matter whose land they're standing on. Many species will regularly cross property boundaries, and it will be very important that habitat preservation or manipulation and other management measures undertaken for the benefit of wildlife are a truly cooperative venture among landowners.

Development of Alaska's natural resources has spurred interest in Alaska ever since the first Russian ship groped its way through the storms and fog to find and claim "The Great Land." The history of development in Alaska is really more a chronicle of exploitation, crammed with a thousand shaky schemes to make men rich and sprinkled with a few that succeeded. Alaska survived, more by its vastness, remoteness, and by chance than by the enlightenment of men. Alaska is still vast but it is no longer remote, and its future condition as an unique environment for wildlife and for people depends upon the attitudes and actions of society much more than in the past.

Resource development, such has logging, mining, oil extraction, dam construction, and other activities are often viewed as the beginning of the end for wildlife. This is not always the case, but such resource uses do present potential problems to wildlife, wildlife habitat, and wildlife management because they often involve rapid and substantial habitat changes that persist for long periods of time. To most people, the change most immediately obvious when development occurs is a loss in aesthetic quality. Development involves change, and with few exceptions people view such change as an aesthetic loss. Although it is not mentioned in the following discussion, the degradation of aesthetic quality is a problem common to all forms of development.

Logging practices in Southeastern Alaska have been a source of concern to wildlife (and fisheries) biologists for years, and recently became national news when a court decision banned clear-cutting. Modern logging in Southeastern Alaska usually involves clear-cutting of mature forests because that is the most economical method in areas of even-aged trees where few or no roads exist, the country is rugged, and forests are a kind of jungle. "Clear-cutting" means cutting all timber on a selected

piece of ground. The ground cover vegetation is pretty well cleared also, by heavy equipment used in logging.

Although shrubs of various kinds grow up in clear-cuts, there is some question of how beneficial they may be to deer, particularly in large clear-cuts, where deer may be reluctant to go far from the edge of timber, or deep snow prevents them from doing so. Clear-cuts provide new deer browse (primarily in snow-free periods) for 15 to 20 years, but after that little food is available. Effects of clear-cuts on other species are even less well known. Where logging occurs next to salmon streams, siltation, stream blockage, and higher water temperatures may reduce or eliminate the stream's suitability for spawning or for young salmon and for other aquatic life, and may indirectly affect brown bears, black bears, and numerous furbearers that feed along these streams. Bald eagles nest in trees along the beaches, and they apparently require virgin timber for nesting. Even in very old clear-cuts that now have trees, eagles apparently do not nest.

Logs are usually stored in floating rafts which are held in sheltered bays, or estuaries, where freshwater streams mingle with the ocean. Estuaries are prime "nurseries" for many marine invertebrates and fishes, and pollution from logs and bark that is soaked or worn off can seriously affect the marine life of estuaries. Log rafts often scrape around the shallow bottom in response to tide or wind, and this too damages the habitat so important to young marine life. Thus, various birds and mammals that feed on the marine life of estuaries can be affected by what seem at first glance to be remote and unrelated events.

Logging in other parts of Alaska has not been extensive since the gold-rush days, but it is increasing in response to both domestic and foreign demand. Not much is known about effects of logging in these areas. Although logging was intensive in many places in the early days, no one paid much attention to its effects on wildlife. It may be that logging in Interior and Southcentral Alaska, can, with careful planning, benefit certain wildlife species without doing great harm to others.

Mining for many years has been synonymous with habitat destruction in parts of the U.S. where open-pit mines were developed. Alaska has had little of such methods, although scores of creek bottoms have been turned upside down by placer mining and dredging for gold. Now, 10 to 60 years after most gold mining shut down, it's hard to say what the impact has been or what it will amount to when another 50 years have passed. Much silt in numerous streams may have taken its toll on salmon and grayling, but impacts on wildlife are not well known. If extensive gold mining began once more, certainly habitat losses would result, but the importance of the losses is hard to predict.

In some cases roads or trails opened to reach mineral claims or mines have created erosion, thawing of permafrost and slumping, or other damage to habitat. Although some individual cases may do minimal damage, the accumulated damage may become significant, particularly if a great increase in mining should occur.

In the past, roads and trails built by and for miners provided access for commerce of the day. Some of these routes became roads which today allow thousands of wildlife users to reach new or different areas. The results have been both good and bad. Wildlife users were able to disperse to enjoy different areas and perhaps less crowding, but in certain areas the added hunting pressure was undesirable and proved detrimental to some big game species. Should new access be created by a future surge in mining, wildlife managers will have to be prepared to cope with the possibility of too much access by highly mobile hunters and other recreationists.

Impoundments, or lakes created by man-made dams are another form of

development that creates wildlife management problems. In general, the greatest problem caused by dams and their lakes is simply loss of the wildlife habitat to flooding. Few dams have been built in Alaska thus far, and relatively little habitat damage has occurred. Two proposed dams, however, illustrate the potential.

The Rampart Dam proposal was made in the early 1960's. With a dam near Rampart, on the Yukon River, the Yukon Flats would have been flooded, with the impoundment reaching nearly to the Canadian border. Ft. Yukon and several smaller villages would have been displaced along with several million acres of prime waterfowl, furbearer and big game habitat. Electric power was the purpose of the dam, and it was finally decided that the dam was not a good investment considering the returns it would bring. For wildlife resources of the state (and the nation), it was a fortunate decision. There is no way that production of wildlife in other areas could have been increased enough to make up for the losses that would have resulted from such a massive loss of prime habitat.

The "Devil's Canyon", or Susitna Dam, is a project currently being seriously considered. Its purpose is also the generation of electric power. A pair of dams would be built on the upper Susitna River where the river flows through a deep, relatively narrow valley. Habitat loss would be small compared to the Rampart Dam proposal, yet valuable wintering areas for moose and migration routes of caribou would be flooded, and increased human access would probably result. The effects of flood control on wildlife habitat below the dam are poorly understood, but it is known that periodic flooding is one of the main events that keeps river bottoms fertile and productive.

"Transportation corridor" is a currently-used phrase for a place to put roads, pipelines, electric lines or other systems for moving people, material or energy. Numerous transportation corridors for various anticipated uses have been proposed in Alaska. The best known such corridor in Alaska today is the Trans-Alaska Pipeline corridor, with its roads, camps, pipes and storage tanks.

For wildlife management, the problems of transportation corridors include habitat loss and disturbance of wildlife at critical times, but probably of more importance is how to regulate access and resource use next to the corridor, and how to insure that the pipeline, road or whatever may be built, interferes as little as possible with normal animal movements and behavior. While a single corridor through an area may have limited impact on wildlife, multiple corridors would very likely create much more serious problems by compounding the smaller influences of individual corridors.

Urbanization and related effects of an increasing human population, such as sprawling suburbs, private recreation property, roads, and fences, probably create more problems for wildlife and wildlife management than is commonly appreciated. Loss of wildlife habitat to urban expansion is often not very obvious, until comparisons are made with 5, 10 or 20 years past.

The amount of habitat lost in the Anchorage area over the last 10 years is startling, and can be appreciated only by comparing aerial photographs from 10 years ago and now. The same is true of the Fairbanks area, and to a lesser extent it is true of many smaller communities and roadside areas as well. In addition to habitat loss, disturbance by increased vehicle traffic, additional people, and more dogs and cats, places greater difficulties before wildlife as they attempt to find and use habitat once available to them but now gone or surrounded by "barriers." Conflicts between wild animals and people in urban and suburban areas often result in the elimination of the animals. Under such circumstances, wildlife numbers cannot help but decline.

A second impact of urban growth is the effect upon adjacent recreation areas. Urban dwellers characteristically look longingly to the country, and if possible they will buy recreation property somewhere near their homes. Again, the Anchorage area is a good example; many privately owned recreation lots have sprung up in the Matanuska Valley. Where formerly old homesteads and random fires created clearings that produced abundant winter food for moose, now private owners carefully guard their quota of maturing forest which they understandably treasure. The resulting reduction in winter range may have strong and long-term negative impact on the number of moose in the Matanuska Valley. Although it is a wildlife management problem, there may be no solution, at least within the choices presently available to the manager.

Pollution has only recently become a household word, even though it has long been a common problem. Alaskans are fortunate in having few serious pollution problems, but they do occur. Perhaps the most important source of pollution with respect to wildlife is oil development and transportation.

The effects of oil (or its by-products) may be direct, as when oil products spilled on lakes, rivers or oceans immobilize birds, ruin their waterproofing, or poison them. Oil spills are now infamous for the problems they have created for waterfowl and marine birds.

Indirect effects are more subtle, and in the long run they may be more important. Oil products can upset natural systems by killing or crippling small organisms upon which larger forms feed, or by similarly affecting young stages of larger forms. Either way, there's potential for impacts on game or food fishes, shellfish, waterfowl, sea birds and marine mammals. The indirect impacts of just a single spill are poorly understood, yet the potential for repeated spills exists and is probably increasing. Although more is being learned about the effects of oil spills, and more effort is now made to clean them up, the chief problem seems to be how to avoid them in the first place.

Use of Wildlife

Of all the problems of wildlife management, none are more perplexing to the wildlife manager, nor stir the emotions of the public like wildlife uses. People who would not blink an eye if Hoover Dam were plunked in the middle of Alaska, reservoir and all, are ready to fight if cow moose hunting is suggested! And how many years has it been since the "wolf controversy" didn't warm up the Alaskan winter and save a thousand souls from cabin fever? The list of wildlife issues that bring out the best, or the worst, in people seems endless. Alaskans have a personal and proprietary interest in wildlife, and as many views on wildlife uses as there are feathers on a falcon.

Is that a problem? No, and, yes. No - the public has the last word on how wildlife should be managed and their interest and input is essential if management is to turn out as they want it. But, yes - not everyone can be satisfied. Then, too, there are some people whose views are strictly self-serving, and who contribute more to the problems than to solutions.

Before a manager can think about how wildlife will be used and who will use it, he has to consider whether use can occur in the first place. For use to occur, wildlife populations must be maintained at levels where they can provide use; losses to natural factors must be considered and habitat must be maintained (land use).

To be used, wildlife must also be accessible. In many parts of Alaska little use occurs simply because people can't get to the animals. An increase in private land and some federal lands, discussed earlier, will

make wildlife even less available to the public. Everyone will feel more restricted as the human population and demands on wildlife grow, while wildlife populations and the lands where they can be used remain the same or shrink. What can be done?

There are a number of alternatives being used by other states where these kinds of problems are much more advanced than in Alaska: 1) increase access to remote areas; 2) make the public pay for access to private lands; 3) increase the number of animals in high use areas by means of habitat manipulation techniques; 4) accept more crowded conditions on public lands and at the same time reduce the success of the consumptive users; 5) limit the number of people who can use public lands to maintain satisfactory use experiences; and 6) rotate user groups on the same area (called "time and area zoning"). Most likely all of these alternatives eventually will be used in various combinations in Alaska. Increased restrictions on use seem inevitable.

The biggest problem of use is that of allocation or "who gets what." The public is made up of many interest groups who wish to use and enjoy wildlife in their own way; all have pretty much the same rights to do so, but there isn't enough wildlife to go around. There are many examples of user groups: the "locals" and the "outsiders," consumptive users and nonconsumptive users, recreational, "subsistence" and commercial users, residents and nonresidents, hunters and anti-hunters, majorities and minorities, and let's not forget the "haves" and the "have-nots."

One of the first questions to be settled is "who is which?" Is the man that kills a walrus and sells its ivory a subsistence user or a commercial user? Is a city dweller who hunts moose for meat a recreational hunter or a subsistence user? Is a hunter who photographs wildlife more a consumptive or nonconsumptive user?

If and when you can tell one user from another, the next point to consider is what each user's level of need is and how much use is adequate to satisfy it. Where should the priorities be? Physical need? Economic survival? Recreational enjoyment? There are few easy answers.

Although there are many instances of conflicting demands, one major problem which has befuddled nearly everyone is how to identify and fairly and adequately allocate resource uses between recreational and subsistence users. The State Constitution says that wildlife is "reserved to the people for common use," which means all Alaska residents have equal rights to use wildlife. However, many people living in the bush on low cash incomes depend more on wildlife (and other resources) for part of their livelihood than do urban-oriented people with regular jobs. The supply of wildlife is limited, so when the number of hunters increases, or when numbers of wildlife decline, somebody is going to return from the hunt empty-handed. The subsistence users are most severely affected, so it seems reasonable to give them some preference in use of wildlife. This has been done to some extent by adjusting seasons and bag limits to favor residents of a particular area, by a reduced fee (25¢) for hunting, fishing and trapping licenses for families with an income of less than $3,600, by regulating use of airplanes or vehicles, and various other techniques. Recently the Board of Game was given the power to establish subsistence use areas if it is shown that recreational hunting will prevent subsistence needs from being met. In such areas regulations specifically favoring subsistence users (but not legally barring others from use) could be adopted.

Economic conditions in the state are changing, and more rural residents are earning substantial incomes which enable them to purchase more of their needs. The distinction between a subsistence user and a recreational user is often very fuzzy and is becoming more so. There is actually a broad spectrum of what is called subsistence use, that ranges from

nearly total dependence on natural resources to very little use. Just where to draw the line establishing what combination of resource use and wage earning qualifies as subsistence use and what does not is difficult. Then, too, many Native groups as well as other Alaskan residents have expressed the view that subsistence is not simply an economic matter, but a lifestyle and cultural necessity also, even though they have willingly abandoned many traditional means (a cultural element) of obtaining such subsistence.

This has complicated the problem further in that while the subsistence user's dependency on the resource is still very real, the impact of his use on wildlife has changed markedly from what it once was. Instead of spears and bone fishhooks, he now uses high-powered rifles and gillnets, and he now travels by powerboat, snow machine and aircraft. In short, he now has much the same impact on wildlife populations that his "recreational" counterpart does, and in some cases, a much greater impact. The result has been harvests of some species in certain areas which have been in excess of people's needs, too large for the species to support on a continued basis, or both.

Conflicts between other user groups at times assume major proportions. Take the wolf controversy as an example. There are some who feel "the only good wolf is a dead wolf." Others blindly extoll the virtues of wolves under any circumstance while ignoring their "faults." Surely there is a balanced approach possible, a middle ground, but sometimes it seems it is a "no man's land" and the wildlife manager is square in the middle! The result: costly, time-consuming court suits at the expense of the resources involved and the public.

The general problem of hunters versus anti-hunters is not likely to be solved overnight. Because both groups share an enthusiasm for wildlife and a basic concern for its welfare, as well as similar rights to enjoy their preferred wildlife use, the wasted energies of unproductive confrontations could be far better used to benefit both interest groups and the wildlife resource. Certainly this is one more area to pursue "detente."

What does the future hold? Increased demands and more conflicts, certainly. It will be a challenge to avoid the unfortunate polarization of Alaskans that seems to accompany conflicting interests. As competition increases, parochialism will become even more obvious in the attempt to retain local jurisdiction. Overlaps in advisory committee, borough, village council and state and federal agency jurisdictions may create chaos unless some integrated workable system for allocation is developed.

From past experience, it is clear that whatever uses or combinations of uses are provided for, actions are necessary to ensure that overuse is avoided. There are many technical considerations. Should hunting of females be allowed, and if so, under what circumstances? Should predator control be used, and under what circumstances? What measures must be taken to avoid overhunting? Should vehicles be restricted? Should hunter numbers be limited? Seasons closed? How can illegal hunting best be detected and controlled?

Under some circumstances, illegal hunting or trapping can be an especially critical problem. In an area with intensive legal hunting, a large illegal kill can force curtailment of legal uses, and in situations where wildlife populations are at low levels, illegal kills can tip the balance and cause the populations to decline.

Enforcement of hunting, trapping, and fishing regulations is primarily the responsibility of the Division of Fish and Wildlife Protection, in the Department of Public Safety. However, most Fish and Game biologists are also deputized. Even so, the total number of enforcement officers is relatively small and consequently enforcement coverage of the state

is thin because of the state's size and because of the seasonal need to concentrate enforcement efforts on crucial problem areas.

Additional factors complicate the problem. Over such a large area it is extremely difficult to keep track of thinly scattered, highly mobile hunters. Also, many hunters are from out of state and are able to avoid prosecution by leaving Alaska before the violation is discovered or before a "hard" case can be put together. Contributing importantly to indifferent disregard for game regulations is the lack of meaningful penalties for convicted violators. The Alaska court records show a long history of suspended sentences and "slap on the wrist" penalties that have had little effect, except perhaps to encourage continued violations. Recently there has been some improvement in sentencing of violators and a continuation of this trend is most desirable.

Management Limitations

One final category of problems, here called management limitations, is perhaps the most important of all because it affects the capabilities of the Department of Fish and Game in solving all those other problems heretofore discussed, and hence its ability to meet its responsibilities to the resource and to the public. These limitations have to do with the Department's relationship to other agencies, the Legislature, and the public.

Both the state and federal governments have wildlife resource management responsibilities, but the objectives of each are not always in concert. Federal agencies such as the National Park Service, the Fish and Wildlife Service, the Forest Service and the Bureau of Land Management have been around for a long time. Their actions are sometimes ponderous, slowed by massive bureaucracies, governed by long-standing policies and inflexible guidelines, administered by officials far removed from Alaska, and influenced by a national public with concerns which sometimes differ markedly from those of Alaskans.

To be sure, there are advantages to such a slow-but-steady system, the chief of which is perhaps that it is less subject to fickle or irresponsible management actions or local political influences. But there are as many instances where inaction is as damaging as the wrong action, and in Alaska, where changes are occurring at breakneck speed and where unique situations demand special considerations, innovative approaches to resource management are needed.

Alaska, as other states, has traditionally exercised jurisdiction over its resident wildlife species, including those on most federal lands within the state. Wildlife within national parks, however, is managed by the federal government in that national parks are traditionally closed to hunting and trapping. Federal wildlife refuges are generally open to hunting, but various regulations control use of airplanes, all-terrain vehicles and snow machines, and otherwise influence the distribution, numbers, and access of recreationists. Thus these regulations essentially become part of the State regulations affecting wildlife use. As more federal reserves are dedicated by Congress, additional rules and regulations will undoubtedly come into effect.

In addition, State jurisdiction over most species of birds, marine mammals and endangered species has been superseded by federal regulations made pursuant to national legislation and international treaties. Use of any species so affected is allowed only under the guidelines established by the federal government. Waterfowl hunting regulations must fit the general framework of federal regulations and be approved by the Secretary of the Interior. Management of marine mammals was withdrawn from the State by the Marine Mammals Protection Act of 1972, but under provisions of that act walrus management (subject to federal approval) was returned

to the State. Management of other marine mammals may follow the same costly and circuitous route. Federal laws protecting endangered species and some groups of birds also set some restrictions on State wildlife management.

Land use policies of federal and state agencies and of private landowners strongly affect management of wildlife. The Department of Fish and Game owns very little land. As a result, it is most often only advisory to other agencies on matters such as land use planning, habitat protection or manipulation, land disposal, and access regulation. In some cases this arrangement has been a stumbling block to various management efforts.

Funding largely determines what and how much the Division of Game can accomplish, not only by limiting the amount of work that can be conducted, but also by limiting the number of biologists on the staff (and therefore the time each man can devote to different tasks). Everyone knows a dollar doesn't go far in Alaska, and for the Game Division the mileage has been getting worse. Why? Because budgets have not kept pace with inflation or need. Each year more and more money goes to pay for "fixed costs" (salaries, rents, and equipment) and less and less is left for "operations" - (transportation, supplies, and contractual services).

One important problem arising from the small staff available is that not all parts of the state receive the attention they should. Although field offices are maintained in many of the state's larger communities, additional field staffing is required in various areas where the mushrooming need for more and better quality information on wildlife has become apparent.

In addition, unprecedented demands on the staff have resulted from the interaction between State and federal agencies on such matters as "d2" lands, marine mammal management, Outer Continental Shelf oil leasing, Coastal Zone Management, oil pipeline impacts and various other matters, all of tremendous importance to the future welfare of wildlife in Alaska.

Because there is so much to do, some things can be done well and others don't get done at all. One of the casualties of the "crunch" has been activities directed at keeping the public fully informed as to the status of wildlife, the reasons behind certain regulations, and, in general, what the Game Division is up to. The result? A serious credibility gap which has had far-reaching impacts on many Department programs.

Information and education activities aren't the only ones to suffer. Research activities needed to acquire badly needed information on wildlife have been cut back, and many survey and inventory programs are reduced to the "bare bones." Inadequate information is available about some species such as furbearers and unclassified wildlife because all the attention is focused on "problem" species such as caribou, moose, wolves and bears.

The cry for money is a chronic complaint among government agencies and it rarely catches a sympathetic ear. Nevertheless, the problems of funding are acute for the Game Division and they impose serious limitations on the Division's capability to meet its responsibilities.

Control of the Department's budget is only one of several ways the Legislature affects wildlife programs. Each year, legislation is passed which affects wildlife and its use either directly by governing use, or indirectly by influencing other land uses which in turn impact wildlife.

Because legislation is generally relatively inflexible and permanent (unlike fish and game regulations which are annually reviewed and revised, or policies which can be changed on short notice), legislation directly affecting wildlife is valuable and necessary to long-term direction and

continuity in wildlife programs if it is carefully considered, addresses matters of broad scope and provides a framework within which regulations may be promulgated and management can remain flexible. In contrast, detailed and specific legislation directed at regulation of individual programs removes the "elbow room" needed by managers to cope with dynamic wildlife situations. Once enacted, laws are infrequently repealed and by their very existence become traditional. Such "fixtures," if undesirable, reduce options and therefore the effectiveness of managers.

Legislation not directed at wildlife also can have significant secondary impacts on wildlife. Legislation affecting classification of lands for agriculture, private ownership, or state parks can be a detriment or sometimes may benefit wildlife through changes in, or protection of, habitat. Also, such measures, and others which influence settlement and transportation, affect utilization of wildlife by changing its accessibility.

The Division of Game operates within the general set of administrative operating rules and regulations, and legislative and fiscal schedules common to all State agencies. These assorted processes of State government all affect wildlife management programs to various degrees.

Finally, the public affects the things wildlife managers do by influencing actions of elected and appointed government officials including legislators, governors, commissioners, and members of the Board of Game. It is the actions of such officials which set the bounds on what professional managers can do.

Because wildlife managers act in the public interest as custodians of the public's resource, they welcome and encourage public interest and involvement in management decisions. There are times, however, when public sentiment can impede sound management, sometimes threatening the resource itself, but more often reducing or eliminating reasonable utilization. Popularity is not always synonymous with public interest.

We have already said something about the problem of identifying the various "publics." Everyone knows that with most issues there is a vocal minority and a silent majority, and the perceived public desire may not necessarily be the real broad-based public opinion. Yet it is the perceived public opinion that sways elected and appointed government officials, whose actions have the dual motivations of seeing to the public interest and of staying in office. Also, the public, or segments of it, are sometimes subject to emotionalism and rapid polarization over issues, and government officials sometimes react with corresponding brevity. The result: actions of the moment, in response to limited, special, and/or short-lived interests, having long-term consequences on the entire public body.

With wildlife management, as with politics, everyone seems to be an expert on the subject. However, while use and enjoyment of wildlife are common to all, the expertise required to manage wildlife is not. The problem comes in balancing scientific professionalism with public involvement. The public should understand that wildlife management must be based on biological and ecological principles and that it should be conducted with the highest standards of professional scientific expertise. Wildlife managers in turn should be responsive to changing public attitudes concerning wildlife and its use, and managers should be more cognizant of their custodial role. Essentially it is a problem of communication, in both directions. It is hoped that the information and proposals contained in these Alaska Wildlife Management Plans will be the basis of an improved mutual understanding and effective communication.

PART II:
INDIVIDUAL SPECIES MANAGEMENT PLANS

This section contains every individual species management plan located in the Southcentral Alaska Region. The plans are arranged by species alphabetically, and each species is introduced by a general description of that species in the region.

All individual plans are titled and numbered for easy reference to the maps provided with this booklet. Use of the maps will help in locating the areas described under "Location" in each individual plan.

Because wildlife in Alaska has long been managed according to administrative regulatory units called "Game Management Units", familiar to many Alaskans, most location descriptions indicate which Game Management Unit or Units the plans are located in or use some Game Management Unit boundaries as individual plan area boundaries. A Game Management Unit map has been included with the color-coded wildlife plans maps to help in understanding the precise location of proposed areas.

BLACK BEARS IN SOUTHCENTRAL ALASKA

Black bears (*Ursus americanus*) are widely distributed in Southcentral Alaska, with highest densities occurring in Prince William Sound, on the Kenai Peninsula, and in the lower Susitna Basin. Bear densities are generally lower in interior sections than in southern or coastal areas where foraging seasons are longer and food complexes more diverse. Black bears are absent from most of the islands in the northern Gulf of Alaska.

The areas in which black bears occur coincide closely with the distribution 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 fruit-bearing shrubs and herbs, lush grasses and succulent forbs are particularly attractive to black bears. Extensive, open-canopy areas are generally avoided. Coastal black bear habitat in the northern Gulf of Alaska is restricted by topography to a narrow band of relatively flat land covered by spruce, hemlock and alder which rapidly grades into near-vertical mountains and glaciers. This area has numerous glaciers which bisect the narrow band of bear habitat, forming islands of habitable terrain. These discrete islands of habitat may contain separate bear populations. Elsewhere in southcentral Alaska, spruce and spruce-birch forests form extensive black bear habitat. In spring, black bears are frequently found in moist lowland areas where early growing green vegetation is available. In July and August, coastal black bears congregate along streams in Prince William Sound to feed on spawning salmon. During fall, concentrations of black bears frequently occur in alpine areas in years when 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 homing ability in returning 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 year-to-year 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, Trichinae, is present in some bears and is transmissable 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 when orphans as young as five months of age have survived without maternal care.

Black bears in Southcentral Alaska are used primarily for recreational hunting for skins and meat. Despite traditionally liberal hunting seasons and bag limits, the harvest of bears remains relatively small except near coastal communities in Prince William Sound, where large increases in hunting pressure have resulted from development and growth of human populations.

Black bear hunting is popular in spring when bears are one of the few species of big game that can be legally taken. Hunters seek bears shortly after the bears emerge from hibernation, when the hides are usually of excellent quality. 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.

Sport 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 to a greater availability of sows that have become separated from grown cubs.

PROBLEMS

* Black bears rapidly accustom themselves 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 who become dependent on such sources of food. Many nuisance bears become a threat to human safety and property and must then be destroyed or otherwise removed. 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.

* Coastal populations of black bears in Prince William Sound 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 must adjust hunting pressure to avoid overharvests.

6. SUSITNA-NELCHINA BLACK BEAR MANAGEMENT PLAN

LOCATION

Game Management Units 11, 13, 14A, 14B and 16 except Mt. McKinley National Park.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting black bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage recreational hunting of black bears to achieve greater utilization of the black bear resource.

2. Regulate access and methods of hunter transport, if necessary, when in conflict with management objectives for other species.

3. Increase public awareness of black bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Black bears are common throughout forested portions of the Susitna-Nelchina area; however, estimates of numbers are not available. Black bears usually occupy densely vegetated areas where they are not easily enumerated. Within the area bears are most abundant in the drainages of the Susitna and Matanuska Rivers and in the area south of the Tazlina River and west of the Copper River. They are uncommon to rare in the northern portions of the Nelchina Basin.

Black bears are hunted only lightly over much of the area, even though liberal hunting seasons and bag limits have prevailed since statehood. Interest in hunting black bears is presently not high and most bears are taken incidental to hunts for other species, particularly sheep and moose. Some bears are also taken as nuisance animals around cabins. Annual fluctuations in the kill of black bears reflect the availability of bears to hunters rather than population levels. Bears are most vulnerable to hunters when they forage for berries in open or alpine areas in the fall. In years of poor berry production bears are less visible to hunters.

Approximately 250 to 300 black bears are killed each year with about two-thirds of the total coming from the lower Matanuska River and the Susitna River drainages. About one-half of the bears taken in the Nelchina basin come from the area south of the Glenn Highway. More than three-fourths of the bears are taken by Alaska residents. Little guiding directed specifically at black bears occurs. Some nonresidents take black bears on guided "combination" hunts in the Nelchina Basin and in the eastern drainages of the Susitna River.

Hunter access to remote areas is primarily by aircraft or boat. The majority of the harvest is taken near road systems by road-based hunters.

PROBLEMS

* Construction of the Trans-Alaska oil pipeline has resulted in numerous bear-human conflicts in the vicinity of construction camps and work areas. Black bears rapidly accustom themselves to the presence of humans and the ready source of food human habitations and activities provide. Open garbage dumps and the excesses or indulgences of workers at construction sites and camps quickly make nuisances of bears who become dependent on such food sources. Poor garbage disposal practices and improper food storage in residential areas, back country camp and cabin sites and at campgrounds also contribute to the problem. Sooner or later, nuisance bears become a threat to human safety and property and must then be destroyed or otherwise removed. Attention to proper garbage disposal and refraining from feeding "tame" bears are necessary to avoid eventual confrontations that endanger human life and lead to destruction of bears.

* Continuing urban development, expansion of agriculture, and the probable construction of a new capitol will reduce lowland habitat utilized by black bears. The Department will identify important habitat areas and request habitat protection measures from the appropriate land management agencies.

* Some private lands are currently posted against public trespass, and conveyance of land into private ownership under terms of the Alaska Native Claims Settlement Act may restrict public access for hunting and trapping in additional large tracts. The Department should solicit the cooperation of private landowners to facilitate progressive management of black bears. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* A proposed expansion of Mt. McKinley National Park into upper drainages of the Susitna River will eliminate recreational hunting within its boundaries. Additional loss of hunting opportunity is a possibility if a proposed state park is established in the southwestern portion of the Talkeetna Mountains. The Department of Fish and Game and the Department of Natural Resources should jointly develop a management system whereby hunting within state parks continues to the extent it is compatible with other uses of the parks.

IMPACTS

* A small increase in hunting pressure on black bears may occur but would have little effect on bear populations.

7. KENAI BLACK BEAR MANAGEMENT PLAN

LOCATION

Game Management Units 7 and 15.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of black bears.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy black bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a moderate but productive black bear population.
2. Encourage recreational hunting of black bears to achieve greater utilization of the black bear resource.
3. Increase public awareness of black bear behavior to reduce adverse bear-human interactions.
4. Encourage public viewing of black bears.
5. Regulate access and methods of hunter transport, if necessary, when in conflict with management objectives for other species.

THE SPECIES

Black bears are widely distributed throughout the Kenai Peninsula and have always been relatively common. Although there are no established methods for censusing black bears, public reports and miscellaneous observations by Department personnel indicate populations are high. Black bears occur from alpine tundra to sea level. Population densities appear to be dependent upon the frequency and quantity of salmon runs and berry crops. Bears are particularly abundant along the coastline and the western slope of the Kenai Mountains.

Black bear hunting is a popular pursuit on the Kenai Peninsula. Liberal hunting seasons and bag limits--August 10 to June 30, 3 bears per hunter--have been in effect for a number of years. Both have had a negligible impact on bear populations. Prior to 1973 the only harvest data available were from 1969 harvest questionnaires. These data indicated a minimum annual harvest of 73 bears. Since 1973 the Department has acquired harvest data through mandatory sealing of hides and skulls. The annual Kenai Peninsula harvest for the years 1973 through 1975 was 109, 107 and 146, respectively. Boars have comprised about 55 percent of the annual kill. Most of the harvest (approximately 80 percent) occurs during the fall. Less than two percent of the hunters ever take the full bag limit of 3 bears. About 50 percent of the hunting pressure originates on the Kenai Peninsula. Non-Alaska residents account for about 17 percent of the total kill. The remainder of the harvest is taken primarily by hunters from Anchorage. Alaskan residents generally average three days per successful hunt. Nonresidents average more days hunted than residents because they hunt specifically for black bear, while most residents take bears incidental to hunting other species. Approximately 10 percent of nonresident outings are guided hunts. Most nonresident hunters pursue

black bears for trophy hides while resident hunts are for a combination of meat and hide. Large black bears are sought as trophies by resident and nonresident hunters. The frequency of large bears in the population does not appear to be different than that found in other less heavily hunted portions of the state. Most Peninsula residents hunt black bears along roads or employ boats. In recent years, the use of aircraft by non-Peninsula residents has increased. Inclement weather often limits airplane use, however. Bear-human conflicts usually result in the demise of about 2 bears annually. Often these conflicts result from inadequate garbage disposal which draws bears into areas of human activity.

Black bears are most available for viewing and photography during early spring and late fall as they either emerge or prepare to enter winter dens. During this period they are highly conspicious in relation to vegetation and snow cover. Most non-hunting activities consist of roadside viewing in the northern mountainous portions of the area. Black bear photography during this time period usually involves a hike to alpine tundra. At irregular intervals black bears can be observed at camp grounds scavenging discarded food items. Some black bear viewing and photography occur during the summer along salmon streams where bears tend to concentrate for feeding. Most non-hunting use is by non-Peninsula residents primarily from Anchorage or out of state.

PROBLEMS

* Increases in human populations and accompanying urban sprawl will increase bear-human conflicts and the number of bears killed in "defense of life and property." Improper garbage disposal at camp grounds attracts bears and creates a threat to public safety. Liberal hunting seasons and bag limits near residential areas and high recreational use areas should reduce numbers of nuisance bears. The Department should encourage proper garbage disposal procedures and should inform the public on measures to avoid encounters with bears.

* Black bears may be a significant predator on moose calves. The Department should initiate research to determine the extent and significance of bear predation on moose populations.

IMPACTS

* Bear populations adjacent to human population centers will be reduced. Bear populations in most other areas will remain stable or increase depending on food sources.

* Hunting seasons and bag limits will be as liberal as possible without overharvesting the bear populations.

* Most areas will have no restrictions on methods of hunter transport. Areas where restrictions are imposed on access and methods of hunter transport for other game species will result in similar restrictions for black bear hunters.

* Opportunities for non-hunting uses of black bears will not be restricted.

8. WEST CHUGACH BLACK BEAR MANAGEMENT PLAN

LOCATION

All of Game Management Unit 14C, and in Game Management Unit 7, the drainages of Glacier Creek and Twentymile River.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt black bears under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy black bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Harvest black bears within Chugach State Park at a time when a minimum of conflict would occur with people using the Park for purposes other than hunting.

2. Maintain black bear hunting seasons and bag limits in areas outside Chugach State Park to minimize bear-human conflicts.

3. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

4. Encourage public viewing and photography of black bears.

5. Increase public awareness of black bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Incidental aerial and ground observations, harvest figures, and reports of black bears in residential areas indicate bears exist in the West Chugach area at a moderate to high level. Present abundance is probably comparable to levels of the past several decades. Most of the area comprises excellent black bear habitat, although a large portion of lowland residential area within Anchorage and surrounding communities is no longer available to bears. Natural mortality among bears in the area has not been documented. Deep, long-lasting winter snows may cause mortality to adults, as well as cubs, by slowing emergence from hibernation and delaying the availability of new green vegetation.

Black bears have been hunted in the area for at least the past 60 years. Harvests prior to 1973 are unknown, but thought to be comparable to present levels. Since the fall of 1973, when sealing of black bears first become mandatory, a total of 31 bears have been legally taken, eight in 1973, four in 1974 and 19 in 1975. These substantial harvest fluctuations do not reflect similar total population changes but rather changing habitat use patterns which affect visibility of bears; in some years, poor berry crops result in few bears utilizing open subalpine areas and the harvest is reduced. More bears (65 percent) have been taken in the fall than in the spring and most bears taken were males. A large percentage of bears are taken either as a result of chance encounters or incidental to hunting other species such as moose. Of the 19 bears shot in 1975, two were killed in resident's backyards and eight were killed during the moose hunting season.

Nearly all bears are taken by local residents, without utilizing the services of a guide. Most hunting is undertaken from established roadways or by foot travel to back country. Several roads and numerous connecting trails provide excellent access to most of the area. Except for the lands around Upper Lake George, most bear country within the area can be reached by a one to ten mile walk from major access points. Boat travel up the Twentymile River allows fair access to its upper reaches.

Current hunting seasons and bag limits in the West Chugach area remain liberal except for the area within Chugach State Park where the bag limit is reduced to one bear and hunting is allowed after Labor Day when Park public visitation rates drop off. Motorized vehicle restrictions have been imposed in the area since 1968.

Other popular uses of black bears include viewing and photography. Although such use occurs at any time of year when bears are active, viewing is particularly good in late summer and early fall when single bears and family groups are frequently found feeding in alpine berry patches. Portage Glacier Road, the Seward Highway south of Bird Creek, and the Eklutna Road are locations where bears are often observed. Recently established closed areas in Eagle River and the Anchorage hillside area may increase opportunities to view bears.

PROBLEMS

* In addition to the loss of excellent black bear habitat resulting from urbanization in the West Chugach area, urban sprawl coupled with high bear populations annually result in numerous potentially harmful bear-human encounters. Most confrontations in residential areas result from inadequate garbage disposal practices. Poor food storage measures or garbage disposal in back country campsites or local picnic areas are also a source of problems. Proper garbage disposal and food storage practices should be encouraged to reduce the necessity of eliminating or removing "nuisance" bears.

* The opportunity for public hunting of black bear in the area has been and will continue to be progressively reduced through the establishment of various hunting closures. Military lands are currently closed to public hunting as are some private lands in the area. Additional trespass restrictions will be possible on Native selection lands in the Knik, Hunter, Eklutna and Peters Creek Drainages. The Portage Glacier area and several areas within Chugach State Park are closed to bear hunting. The Department should solicit the cooperation of private landowners to facilitate progressive management of black bears. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act. The Department should also continue to oppose hunting closures in other portions of the area except when clearly in the interests of public safety.

IMPACTS

* No significant effects on black bear populations, on existing habitat or on other species within the area are anticipated. Recreational uses such as camping, hiking, sightseeing and snowmachining will likewise not be affected.

* Except for a possible lengthened spring hunting season within Chugach State Park, seasons, bag limits and vehicular use restrictions will not be liberalized.

* Information regarding areas of high bear abundance and viewability will be available. Non-hunting transportation restrictions should not be further limited. A possible increased hunter harvest is not expected to reduce the number of viewable bears.

* "Nuisance" bears will continue to require a considerable expenditure of effort by the Department in removing offending bears and in working directly with the various landowners to reduce attractions to bears.

10. PORTAGE GLACIER BLACK BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 7, the drainages into Portage Creek bounded on the west by the Anchorage-Seward Railroad and on the east by Placer Creek, Portage Lake, the mouth of Byron Creek, Glacier Creek and Byron Glacier.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy black bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round closure to black bear hunting.

2. Encourage public viewing, photographing and enjoying black bears.

THE SPECIES

Black bears are common in the Portage Glacier Area and are often observed on the surrounding mountain sides. Part of the population is believed to be transient, and the actual number of bears varies with seasonal food availability. Between 10 and 20 black bears occupy the area. Black bear habitat has been altered somewhat by development, but there has not been a significant reduction in black bear numbers.

Viewing and photographing black bears are the main human uses of the species in the area. Most black bears are seen in or near campgrounds and picnic sites. The scenic values of the Portage Glacier Area are its primary attraction for people. The availability of wildlife for viewing adds to the visitors' experience. Human use of the Portage Glacier Area has almost doubled since the early 1970's; an estimated 286,000 people visited Portage Glacier in 1975.

PROBLEMS

* Black bears enter Portage Glacier campgrounds and may pose a threat to visitors. Campers should be warned of potential dangers and advised of precautionary measures to be taken, particularly in the storage of food or disposal of garbage.

IMPACTS

* Present wildlife use opportunities should continue with little change.

11. PRINCE WILLIAM SOUND-GULF COAST BLACK BEAR MANAGEMENT PLAN

LOCATION

Game Management Unit 6.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting black bears.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy black bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Regulate hunter access, distribution and methods of transport, if necessary, to maintain desired black bear harvest levels.

2. Regulate access and methods of hunter transport, if necessary, when in conflict with management objectives for other species.

3. Encourage public viewing and photography of black bears in a wilderness situation.

4. Increase public awareness of black bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Black bears are abundant over much of Prince William Sound and the Northern Gulf of Alaska Coast. They are absent on Kayak, Middleton, Perry, Naked, Green, Montague and Hinchinbrook Islands and are seen occasionally on Hawkins Island. The black bear habitat is excellent. It has received relatively little human disturbance.

Black bear abundance in the area has varied considerably in the past but the reasons for such fluctuation are not known. Winter mortality induced by severe winter and late spring breakup is believed to be the primary factor controlling the population. Spring bear hunting in Prince William Sound may also affect bear abundance.

Spring black bear hunting in the area has become a very popular recreational activity, especially for Anchorage and Fairbanks hunters. Most hunters seek any legal bear and are not too concerned with trophy aspects of hide or skull size. Probably less than 10 percent of the harvest is taken by hunters seeking black bear meat. The majority of the harvest occurs in the spring when black bear concentrate along the beach fringe, especially on alder slides and grassy meadows at the heads of bays. Prior to leaf emergence they are very vulnerable to hunters for a period of about one month. Hunters commonly utilize boats to cruise the beaches to locate bears.

Hunting pressure in Prince William Sound has been fairly intensive since statehood and was the reason for gradual reductions in the bag limit from three bears per year down to one by 1969. The season (September 1 to June 30) has not changed since statehood.

Harvest records from 1974 to 1975 indicate about 100 to 150 black bear are annually taken in the area, with 80 to 85 percent coming from Prince William Sound. Seventy-five to 90 percent of the animals are taken during the spring season, and males constitute about 70 percent of the harvest. Alaskan hunters take about 85 percent of the total harvest; local area hunters take less than 25 percent.

PROBLEMS

* Although little logging has occurred in Prince William Sound up to the present time, large scale clear-cut logging may be conducted on private lands when Natives receive title to lands selected along the eastern side of Prince William Sound under the terms of the Alaska Native Claims Settlement Act. Alteration or loss of black bear habitat in the area may significantly affect bear populations because limited suitable habitat exists. The department should recommend logging practices which will minimize adverse impacts on black bear habitat.

* Construction of the Trans-Alaska oil pipeline, terminating in Valdez, has resulted in numerous bear-human conflicts in the vicinity of construction camps and work areas. Black bears rapidly accustom themselves 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 workers at construction sites and camps quickly make nuisances of bears who become dependent on such food sources. Sooner or later, nuisance bears become a threat to human safety and property and must then be destroyed or otherwise removed. Attention to 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.

* Increasing hunting pressure on black bears, particularly during the spring when bears are most vulnerable to hunters, may result in excessive harvests. Close monitoring of harvests will be necessary to determine if reduced hunting seasons are required.

* A lack of information on black bear reproduction, survival, and movements in Prince William Sound makes management of bears difficult. The Department should conduct studies to obtain needed information.

IMPACTS

* For the present there should be no change in black bear hunting regulations. If harvests become excessive some changes in hunting season length and timing or controls on hunter distribution would be implemented.

BROWN BEARS IN SOUTHCENTRAL ALASKA

Brown bears (*Ursus arctos*) occur throughout Southcentral Alaska, including Montague, Hinchinbrook and Hawkins Islands in Prince William Sound. Although precise data on bear abundance in the region is lacking, there is a general understanding of the species' status. In areas surrounding human population centers and on the Kenai Peninsula and lower Matanuska-Susitna Valley area where human development continues to expand, reductions in brown bear populations have occurred. In the Nelchina Basin and surrounding mountain ranges bear populations have shown substantial increases in the past decade.

Brown bears were once classified into a large number of species and subspecies, but the brown 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, *U. a. 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*. No reproductively isolated populations are known to exist in Southcentral Alaska.

All habitat types are utilized by brown bears, but grass communities appear to be most important. Where bears occur in forested areas, substantial meadows, muskegs, sedge flats, or other grassy areas are present. Grasslands appear especially critical for bears during the spring when other high quality bear foods are scarce.

The brown 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, salmon and berries constitute the major food items. Bear predation on moose and caribou may be significant in some areas. 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 between coastal and interior brown bears.

Little information is available regarding natural controls on brown bear populations or the degree of population fluctuations. Except for dental and skeletal disorders, the diseases reported for brown bears are remarkably few. Brown 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 is 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 garbage dumps, and endanger human safety. Losses of free-ranging livestock sometimes necessitate removal of offending bears.

Recreational hunting and viewing are the predominant uses of brown bears in Southcentral Alaska. With increases in hunting pressure, regulations affecting season lengths and methods of transport have became more restrictive so that allowable harvest levels were not exceeded. Guided hunters have had the highest success rates due to the efficiency of their hunting methods. Since the early 1960's, the annual kill in Southcentral Alaska has been about 18 percent of the statewide harvest; 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, allowing for 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 available for harvest due to natural separation of sows from grown cubs.

Growing national interest in brown bears is certain to increase the demand for nonconsumptive use opportunities. Limited opportunities for nonconsumptive use exist in Southcentral Alaska because there are few natural areas where bears can be regularly observed.

PROBLEMS

* Well-intentioned concern by a national public may hamper effective management of the species and threatens future use by recreational hunters. One misconception is that because brown bears are threatened in one portion of their range, they are threatened in all areas. Also, some people believe that distinct, and therefore unique, subpopulations of brown 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 bears in most parts of Alaska are still relatively abundant, provide sound support for continued beneficial uses, both consumptive and nonconsumptive.

* The eventual survival of the brown bear does not depend on the designation of vast tracts of "unspoiled wilderness." Conflicts with bears in large national parks indicates that beyond merely providing space for bears, man must come to understand bears--their requirements, behavior and their place in ecosystems; then apply this knowledge in land use decisions. The value of brown bears as a renewable resource should be acknowledged and considered in land use classification. Important brown bear habitats must be preserved by exclusion of incompatible development, and in areas where humans and bears co-exist, proper precautions should be observed to avoid confrontations. Proper disposal of garbage is of singular importance in this regard.

12. NELCHINA BASIN BROWN BEAR MANAGEMENT PLAN

LOCATION

Game Management Units 11, 13 and 14B, excluding the Paxson and Klutina Lake Brown Bear Management Plan areas.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage recreational utilization of brown bears in the area.

2. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Brown/grizzly bears are distributed throughout the Nelchina Basin. Historical information is limited but bears appeared to be numerous during the early 1900's and fairly common during the intervening years except during the early 1950's when intensive poisoning of wolves also reduced bear numbers. Bears have been increasing for the past decade and are presently abundant. Most natural grizzly bear natural losses are probably related to food supplies and intraspecific strife. Available information indicates that bears survive well their first two years; subadults, after separation from the sows, may suffer considerable losses by being forced into marginal habitats and by direct attacks from older bears, presumably boars. Natural mortality among adult grizzly bears is probably low.

Grizzly bear hunting has been for recreational-trophy purposes almost exclusively. Annual harvests in the Nelchina Basin have averaged 58 bears. Males have comprised 57 percent of the harvest. Guided nonresidents have accounted for more than half of the grizzly harvest. The proportion of males in the kill has increased slowly since 1961. Average ages and skull sizes of bears harvested west of the Copper River have been increasing but have decreased slightly in the Wrangell Mountains. Bears taken recently by hunters have averaged 7-8 years old. Hunting pressure has been high but well dispersed in the area since the 1950's. The sex and age structure of the bear population has been little changed by hunter harvest since the 1960's. Nelchina Basin bears are not generally vulnerable to overharvests except where hunters are concentrated. Human expansion at Kenny Lake and along the Nabesna Road has resulted in localized overkills, due to destruction of "problem" bears. Most bears are probably taken by hunters near discarded remains of ungulate hunter kills, but they are also vulnerable during salmon runs on the upper Gulkana River and in the vicinity of Klutina Lake.

PROBLEMS

* During early summer when natural foods are least available, hungry bears raid cabins and frequent garbage disposal sites, often with disastrous consequences for bears. Legal and illegal killing have reached a high level in some local areas. The Department should encourage proper disposal of garbage and storage of food at cabin

sites and residences and should disseminate information on avoiding encounters with bears. Regulations providing for legitimate defense of life or property should be rigorously enforced.

IMPACTS

* The brown bear population will be maintained at a moderate level of abundance by hunting.

* Hunting will reduce the average age of harvested bears, decrease the percentage of males in the kill, and increase survival of subadult bears.

* Harvests will be regulated by adjustments of hunting seasons.

* Current restrictions on use will continue.

* Use of guides or commercial transportation services will not be affected.

13. UPPER COOK INLET BROWN BEAR MANAGEMENT PLAN

LOCATION

All of Game Management Unit 16.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Design brown bear hunting seasons to maintain the desired bear population size and structure.

2. Maintain a highly productive brown bear population.

THE SPECIES

Brown bears are abundant in the area but data on population size are unavailable. Brown bear habitat in the area has been altered little by human encroachment. Other factors probably have more impact on bear populations, especially annual variations in food supplies.

Past brown bear harvests in the area have not been excessive, and at this time hunting effort appears to be light. Average age and skull sizes of bears taken differ little from the 10-year average, suggesting the population's status has not been altered. Harvests have exceeded 40 animals in three of the past ten years, although as few as 23 animals have been taken in one year. Over 50 percent of the bear harvest is taken by nonresidents, indicating high use of the area by the guiding industry.

There have been spring and fall brown bear hunting seasons since 1969. The spring season generally extends from May 10 or 15 to May 25 or June 10 to 15. Fall seasons begin on September 1 or 10 and continue until October 10 or 15. Brown bear hunters are required to not hunt the same day they have been airborne, and cubs and sows accompanied by cubs are protected by regulation. Season lengths are apparently effective techniques for regulating the harvest in this area. When hunting seasons were reduced in length the total harvest was also reduced those years.

The area is not known for large brown bears, but nearly all bears taken are utilized as trophies. The hide and skull are salvaged, but the meat is seldom used for human food. Bears carry trichinae, but danger to people can be minimized if the meat is properly cooked.

Access to the area is difficult. Aircraft are the most important means of access, but boats are also used. Climatic constraints on brown bear hunting are significant, particularly during fall. There is probably much brown bear habitat that is unhunted due to inaccessibility. Viewer use is probably low in this area, because brown bears are generally dispersed widely and the area does not receive many human visitors.

PROBLEMS

* The future loss of brown bear habitat may be significant in this management area. Mining activity, including the possibility of

strip mining for coal; oil and gas exploration and extraction; proposed construction of a new state capitol; increased use of land for home sites and summer camps; and increases in the number of roads being constructed will alter or eliminate brown bear habitat. Greater human activity will also increase the frequency of adverse bear-human interactions which will result in the destruction of bears. The Department should identify areas of critical brown bear habitat and make recommendations to reduce adverse developmental impacts. The Department should also inform the public on means to minimize adverse bear-human encounters. Proper garbage disposal should be encouraged.

* Final land disposition as provided for by the Alaska Native Claims Settlement Act will increase the amount of private land in the area, and much of this land may be posted against public trespass. The Department should solicit the cooperation of private landowners to facilitate progressive management of brown bears. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* A proposed expansion of Mt. McKinley National Park into the northwestern part of the area may ultimately result in the loss of this area to hunting. A proposed expansion of Denali State Park into the northern portion of the area may also limit hunting. Should the Denali extension be approved, the Department should advocate retention of hunting opportunity in the area. Increased hunting pressure in areas remaining open to hunting may require additional restrictions to maintain harvests within allowable levels.

* The remote nature of much of the area limits hunter access and dense vegetative cover makes hunting for brown bears difficult. The maintenance of liberal season lengths will provide continued opportunities for hunting bears. In addition, the degree of overlap between seasons for brown bears and other big game species can be manipulated to allow a greater brown bear harvest.

IMPACTS

* If the average age of male brown bears in the harvest increases, seasons may become more liberal and the degree of overlap with seasons for other big game species may increase. A decrease in the average age of male bear would result in more restrictive seasons.

24. KENAI BROWN BEAR MANAGEMENT PLAN

LOCATION

Game Management Units 7 and 15.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting brown bears.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain an optimum brown bear population level.
2. Encourage sport harvests of brown bears to reduce human conflicts with bears.
3. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.
4. Discourage land use practices that adversely affect brown bear habitat.

THE SPECIES

Brown bears range over most of the Kenai Peninsula. Bears are present in moderate numbers in those portions of the Peninsula draining into Cook Inlet and they occur in low numbers over the remainder of the area except for occasional local concentrations along the coast. Reports from hunters and incidental observations indicate that the population is growing. Presently the population is estimated to be between 150 to 250 bears.

Historically, brown bears were never abundant on the Kenai Peninsula, although the population was probably considerably larger before the Peninsula was settled. Persecution by settlers appears to have been the cause for the reduction in numbers. Urbanization, road construction and increased recreational use have altered part of the area making it no longer suitable brown bear habitat.

Brown bear-human conflicts are becoming more prevalent. In most cases, problems have been resolved by proper garbage disposal, but in some instances it has been necessary to destroy bears. A significant number of bears are also killed in defense of life and property primarily by persons hunting other species. The total number of non-sport kills may approach the sport kill in magnitude in some years.

The reported brown bear harvest on the Kenai Peninsula has varied from two to eleven and has averaged about five per year. Male bears harvested since 1961 have averaged 5.2 years in age with a mean skull size of 22.1 inches. Hunting pressure has been light with most bears taken incidental to hunting for other species. Anchorage and Kenai Peninsula hunters harvest almost all of the brown bears taken on the Kenai. Occasionally, bears are killed by nonresident hunters but the nonresident harvest is

nominal. Limited guiding for brown bears occurred in the past but in recent years there has been none. Because of the relatively poor chance for success, guides offered brown bear hunts in combination, usually with a moose hunt. Reductions in the moose season have made this impractical. Trophy brown bears are available on the Kenai Peninsula but, because of the heavy forest and brush cover, hunting conditions are difficult. Many of the bears harvested are attracted to and killed in the vicinity of moose kills. Because bears are difficult to locate and opportunities to be selective are extremely limited, few bear hunters are attracted to the Kenai.

The length of the brown bear season has varied little since statehood, although the dates of the season have changed. The bag limit on brown bears was changed from one per year to one every four regulatory years in 1968. The hunting of brown bears has had little effect on the population. The population appears to be growing, and the harvest appears to be well below the sustained yield level. Since 1961, 55 percent of the harvest has been males.

Nonconsumptive use of the brown bear resource has been limited. Bears are occasionally viewed from the road or by hikers and fishermen, but most viewing and photography occurs incidental to other activities.

PROBLEMS

* Increased urbanization and recreational use of the Kenai Peninsula will result in more potentially dangerous bear-human encounters. The Department should emphasize the importance of proper garbage disposal around residences and camp grounds, and should advise people of areas of chronic problems, and procedures for avoidance of brown bears.

IMPACTS

* Bear populations will be reduced near residential areas and near high recreational use areas.

* Effects on the total Kenai Peninsula brown bear population will be insignificant. Bear abundance is expected to continue at present levels.

25. WEST CHUGACH BROWN BEAR MANAGEMENT PLAN

LOCATION

Game Management Unit 14C and, in Game Management Unit 7, the drainages of Glacier Creek and Twentymile River.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy brown bears.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt brown bears under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit brown bear hunting in Chugach State Park.
2. Encourage public viewing of brown bears in a wilderness setting.
3. Control hunter access and methods of transportation outside of Chugach State Park to maintain aesthetic hunting conditions.
4. Control the number and distribution of hunters, if necessary, to maintain desired harvest levels.
5. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Incidental aerial and ground observations, harvest figures and reports of brown bears in residential areas indicate that bears exist in this area at a low level. Population estimates are difficult to make, but probably less than 25 to 35 brown bears inhabit the entire area. Present numbers may be only slightly reduced from levels of the past several decades; large concentrations of brown bears have probably never existed in this area due to the lack of substantial salmon spwaning streams.

A significant portion of lands within the area are not conducive to brown bear habitation, mainly because the wilderness characteristics bears require are lacking. Timbered and subalpine areas at the upper reaches of several drainages still provide excellent habitat.

Brown bears have been hunted in the area for at least the past 60 years. Harvest levels prior to 1961 are unknown, but were probably somewhat higher than in recent years. Between 1961 and 1975, only 21 brown bears were legally harvested throughout the entire area; only one was taken in the past four years. Nine of the 21 bears were taken in the Eklutna drainage, and four were taken in Ship Creek. Eight additional bears have been killed in defense of life and property during the past 15 years. Of the total of 29 bears, 14 were males, 14 were females, and 1 was of unknown sex. All bears were taken by residents of local communities. Hunting is not believed to have had any effect on the present population levels.

Chugach State Park, the area of major bear habitation, has been closed to brown bear hunting since 1973. The Portage area, the Anchorage

hillside area, portions of Eagle River, and the military reservations are also closed to hunting. Consequently, there are few drainages where bears can still be hunted, and hunting pressure is very light. Most bears are taken incidental to hunting goats, sheep, moose, or black bears. Prior to 1973, the Park or other lands open to bear hunting had variable hunting seasons of about 30 days duration during September and October. During recent years, the season has run from September 10 to October 10 with a bag limit of one. Since 1968, hunters have been allowed to take only one bear every four regulatory years.

Access to locations where bears may be hunted is mainly via the Hunter Creek trail or the Twentymile River. The Eklutna Road and the Girdwood-Crow Creek Road also provide initial access for bear hunting. With the exception of the Twentymile River, where motorized boats are allowed, all backcountry travel is by foot or horseback. Vehicular transportation restrictions have been in effect in the West Chugach Management Area since 1968 and within Chugach State Park since 1972. Access restrictions within the Park apply to both hunting and nonhunting uses.

Other uses of brown bears include viewing, photography and observation of bear sign. No area is considered good for viewing, although if bears are to be seen anywhere, the Eklutna drainage is the most likely location. Bears may also be seen in the Eagle River and Bird Creek drainages on rare occasions. Observations of footprints in silty riverbeds or mucky ponds are probably the most commonly "viewed" evidence of bears. Such sign can often be seen near most backcountry trails.

PROBLEMS

* Significant habitat loss has occurred and will continue as a result of extensive urbanization in Anchorage and surrounding communities. Increased recreational use of wilderness areas will also make additional habitat unsuitable for brown bears. Whenever possible the Department will discourage human activities which are harmful to wilderness brown bear habitat.

* Present hunting use is limited primarily by the inaccessibility of those areas open to hunting. Future Eklutna Native land selections in portions of the Knik and Hunter Creek drainages may further exclude public hunting. These lands contain some of the best remaining brown bear habitat within the entire area. The Department should solicit the cooperation of private landowners to facilitate progressive management of brown bears. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Potentially harmful bear-human encounters will always remain a possibility. Few such instances have occurred in the past, although with increased recreational use of the area more are anticipated. All caution should be taken to insure proper garbage disposal in both residential and back country areas. Bears which cause chronic problems will be removed or dispatched.

IMPACTS

* The brown bear population in the area will continue to be insignificantly affected by hunting.

* No changes in current hunting regulations are expected.

* Nonconsumptive use of brown bears and other recreational uses of the area will continue to increase.

26. LOWER MATANUSKA-SUSITNA VALLEY BROWN BEAR MANAGEMENT PLAN

LOCATION

All of Game Management Unit 14A.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting brown bears.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a secure brown bear population.
2. Encourage sport harvests of brown bears.
3. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

No estimates of brown/grizzly bear abundance are available for this area, but bear density is low. Harvest data indicate bears may have been more abundant in the past. Brown bear habitat has been considerably altered in this area by urbanization, agricultural and industrial development, and mining.

Despite a low brown bear population, conflicts between bears and people occur every year, usually because bears are attracted to garbage; some bears are killed. Complaints have been annually received by the Department regarding brown bears near human dwellings.

Hunting pressure is light because the area is difficult to hunt and the bears are sparsely distributed. The average annual harvest for the 196273 period was about nine animals, while in 1974 the harvest was three bears and in 1975, two bears. Shifts in hunting season timing may account at least in part for these differences. Most bears are taken incidental to hunts for other species. In most years residents harvest more bears than nonresidents. Few bears are taken by guided hunters. Nearly all persons take brown bears for trophies. Hides are usually well cared for and eventually become wall rugs. Access to hunting areas or camps is usually by auto, plane or boat, and then by foot. Adverse fall weather occasionally may significantly restrict the amount of hunting in the area. Hunting has little effect on the bear population.

PROBLEMS

* Loss of brown bear habitat is a major problem in this area. Mining activity, including strip mining for gravel and the possibility of strip mining for coal; oil and gas exploration; possible construction of a new state capitol; increased agricultural use of land; proliferation of subdivisions; and expansion of the road system have and will further reduce brown bear habitat and increase chances of bear-human encounters. It will probably be impossible to limit

these influences on brown bear habitat in this area; however, critical brown bear habitat should be identified and recommendations made to minimize adverse impacts of development.

* Access problems for brown bear hunters are increasing. Many areas are posted by landowners against trespassing. In addition, the final land disposition provided for by the Alaska Native Claims Settlement Act will increase the amount of private holdings in the area. Much of this land may be posted to trespassing. The Department should solicit the cooperation of private landowners to facilitate progressive management of brown bears. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* A proposed state park in the southwestern portion of the Talkeetna Mountains may result in the elimination of hunting from this area. The Department should attempt to work with the Division of Parks of the Department of Natural Resources to maintain hunting should the park become a reality.

* A proposal to make a portion of the area an agricultural reserve could increase pressure to eliminate brown bears from the area to protect livestock. No brown bears should be taken in the area for predator control except where individual problem bears can be identified. The Department will assume an advisory position when brown bears prey on livestock in the area. Livestock owners must expect some limited loss to predation.

* The problem of individuals taking brown bears out of season as defense of life and property kills is a recurring one in this area. Though bears occasionally pose a threat, the regulatory provisions dealing with destruction of animals that "threaten life and property" should be rigorously enforced. The maintenance of relatively few bears in this area should reduce the frequency of such conflicts.

* The relatively low density of brown bears, the type of habitat occupied by bears, and the wariness of bears make for difficult hunting in this area. The harvest may be manipulated to achieve desired levels by adjusting the degree of overlap between brown bear and other big game seasons.

IMPACTS

* The brown bear population will be maintained at optimum levels by sport hunting.

34. PRINCE WILLIAM SOUND BROWN BEAR MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 6 from Valdez to Icy Cape, including Hinchinbrook and Montague Islands.

MANAGEMENT GOAL

To provide an opportunity to hunt brown bears under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control the number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

2. Design hunting seasons to maintain the desired brown bear population size and structure.

3. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Brown bears are common in Prince William Sound from Valdez Arm to Icy Bay and on Montague and Hinchinbrook Islands. They are occasionally reported on Hawkins Island but do not appear to be resident there. Brown bears are not normally found in the northern or western portion of Prince William Sound.

Due to their secretive habits and preference for dense vegetative cover brown bears are difficult to inventory. Until a good censusing technique is developed, indices to population status such as magnitude of harvest and average age or skull size of bears in the harvest will be used. Currently the population may be somewhat lower than during the 1960's. Brown bear habitat is generally excellent. Disturbance by humans has been minor. The 1964 earthquake raised portions of Montague Island by as much as 31 feet. The uplift has greatly curtailed salmon production with unknown consequences for bears.

Hunting pressure is currently moderate, although a few areas are heavily hunted. The annual harvests of brown bears in the area have ranged from 13 to 63 bears with a 15-year annual average of 32. Peak years were 1967 and 1968 with harvests of 60 and 63 animals, respectively. The kill has been below average for the past several years (24 in 1975). During the past 15 years, males averaged 61 percent of the harvest, with hide size averaging 14.3 feet, skull size 23.4 inches and age 6.4 years. All 1975 male harvest statistics were higher than the 15-year average. Sixteen bears were taken illegally or in defense of life and property during the past 3 years, a considerable increase over previous years.

Most hunting and harvest occur during the 16-day spring season with half of the harvest by nonresidents. Local hunters take few bears. Normally about 10 guides operate in the area, and one air charter service takes out several hunting parties. Airplanes are the major means of transportation for bear hunters. Some boat hunting occurs in Prince William Sound, but few brown bears are taken by boat hunters. The proportion of hunters that are successful is unknown since unsuccessful hunters are not required to report.

An analysis of harvest data for the past 15 years indicates that hunting is not adversely affecting the brown bear resource in the area. The availability of big bears probably was reduced slightly following peak harvest years of 1967 and 1968, but it appears that many bears are now present. Prince William Sound and the Gulf Coast have not produced many trophy brown bears, although a few Boone and Crockett class animals have been taken.

PROBLEMS

* Human ignorance and carelessness with brown bears at construction sites, logging camps and residential areas have invited bear-human encounters which have resulted in destruction of bears. Poor food storage and garbage disposal practices, and unfamiliarity with bear behavior are the basis for the problem. Human activities associated with possible mineral and oil development and expanded logging have the potential for greatly increased conflicts with bears. The Department should encourage proper food and garbage handling procedures and should enforce applicable regulations relating to waste disposal. The public should be made aware of actions to avoid or reduce encounters with bears.

* Development of resources on large tracts of private land acquired by natives under terms of the Alaska Native Claims Settlement Act may result in loss of important brown bear habitat. The Department should advise and work with private landowners to minimize effects of development on the brown bear resource.

* A shift in hunting pressure to Prince William Sound from other areas and local increases in numbers of people could produce over-harvests and adversely affect the quality of bear hunting. The brown bear harvest and hunting pressure will be closely monitored and, if necessary, a system to regulate hunter density and success may be implemented.

IMPACTS

* The brown bear population size and sex and age structure will continue to be little affected by hunting.

* A permit system for hunting will be implemented if density of hunters or size of harvest becomes excessive.

35. KLUTINA LAKE BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 13D, that area within two miles of Klutina Lake and the Klutina River from Klutina Lake to the Richardson Highway.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy brown bears.

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage public viewing and photography of brown bears during prime viewing periods.

2. Allow hunter harvest at a time when not in conflict with viewing and photographic opportunities.

3. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Spawning and dead salmon along the drainages of Klutina Lake and the banks of the Klutina River have provided food for local brown bears for as long as local residents can remember. A high density of bears congregate in the area and are particularly accessible for viewing and hunting. The peak periods of bear abundance, related to peak salmon spawning periods, are July 20 to August 15 for Manker, St. Anne and Mahlo Creeks, and August 15 to September 15 for Haley Creek and the outlet of Klutina Lake.

The popularity of the Klutina Lake area for fishing and camping has increased tremendously in recent years, due in part to state maintenance of the Klutina Road. As a consequence the opportunity for observing bears in the area has become better known, and this use has increased substantially. Hunting of bears occurs in September and October. The average annual reported kill from 1970 to 1975 has been three bears. Concentrations of bears have given hunters the opportunity to be selective.

PROBLEMS

* Hunting without special restrictions could eventually remove most of the bears from the area, eliminating opportunities to view and photograph bears. By scheduling hunting after the peak of salmon spawning, vulnerability of bears would be reduced and the resulting hunting pressure would be sufficient to prevent bears from becoming nuisances to recreationists.

IMPACTS

* Opportunities to observe and photograph brown bear with minimal restrictions will be maintained.

* Adverse bear-human interactions should be reduced.

36. PAXSON BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 13B, the Paxson closed area including the eastern drainage of the Gulkana River lying west of the Richardson Highway and the western drainage of the Gulkana River between the Denali Highway and the north end of Paxson Lake where the Gulkana River enters Paxson Lake.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the area closed to brown bear hunting.

2. Encourage public viewing and photography of brown bears.

3. Regulate number and activities of visitors to the area, if necessary, to protect brown bears from human disturbance and harassment.

4. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Large numbers of salmon spawn in the Gulkana River during late summer, providing resident and nonresident visitors excellent opportunities to view salmon and the brown bears attracted by the fish. The area has been closed to the hunting of big game for many years. The area, located at the junction of the Richardson and Denali Highways, is visited by many travelers, particularly during the fall when large numbers of hunters pass through.

PROBLEMS

* Since the establishment and year-round use of the Paxson garbage dump, brown bears have been attracted to the dump, creating a serious public safety problem. People visit the dump to view bears and bears, attracted by food in the dump, become accustomed to the presence of people and lose their fear of man. Serious human injury is probable if the situation is allowed to persist. Disposal of garbage should be regulated to prevent use of the dump by bears. As initial corrective actions are taken, activities of bears should be monitored to prevent human encounters with bears already accustomed and partially dependent on the dump as a source of food.

* Adverse bear-human encounters are possible with bears feeding on spawning salmon. Numbers and activities of visitors may be limited to partially alleviate this problem. The Department should advise the viewing public on means to minimize adverse encounters with bears, including refraining from feeding bears.

IMPACTS

* Regulation of the Paxson dump will reduce the number of bears in the area except during the salmon spawning season.

* Viewing of bears would occur under natural conditions.

* The safety of human visitors would be greatly improved.

* Big game hunting closures would continue in the Paxson area.

WOLVES IN SOUTHCENTRAL ALASKA

Wolves (*Canis lupus*) occur throughout Southcentral Alaska except the coastal area from Kachemak Bay to Cordova and the Islands of Prince William Sound. They are abundant over most of their range but occur in lower numbers in the heavily populated Matanuska Valley and Anchorage areas. Limited information suggests that wolf numbers have varied in accordance with prey availability.

Two new wolf populations have become established in the past decade. Wolves disappeared from the Kenai Peninsula in the 1910's, about the same time that caribou disappeared. In the early 1960's wolves naturally immigrated to the Kenai Peninsula and have since become well established. On the Copper River and Bering River deltas wolves were rare visitors prior to the establishment of a moose population in the 1950's. Since the late 1960's a sizable wolf population has become established.

In the past, extensive poisoning of wolves over most of Southcentral Alaska by the U.S. Fish and Wildlife Service caused drastic reductions in wolf numbers. Control work in the Nelchina Basin between 1948 and 1953 reduced the population to an estimated 12 or fewer wolves. In 1957 wolves in the Nelchina basin received complete protection and by 1967 the population had completely recovered and aerial hunting and trapping were again allowed.

In most of Southcentral Alaska, wolf populations in the 1960's were moderately high. Aerial wolf hunting appears to have reduced wolf numbers in certain areas where they were vulnerable to this hunting technique. Following the cessation of aerial wolf hunting in 1972, wolf populations increased to high levels in many areas.

Wolves are presently abundant over most of Southcentral Alaska and show signs of increasing even in the heavily populated Anchorage and Matanuska Valley areas.

Wolves usually occur in packs which may consist of related individuals including parents and young of the year, young of the previous year and often other adult animals. The 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. In the Southcentral Region pack sizes usually range from 5 to 12, although packs of 36 individuals have been seen. The range of a pack may include over 1,000 square miles. However, where food resources are optimal wolves may subsist in areas as small as a few hundred square miles. Even with adequate food, the ranges of packs often overlap. 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 in Southcentral Alaska varies according to season, location, and prey species available. Moose and caribou are the major prey, although Dall sheep are also taken. During winter these big game species constitute almost the entire diet of wolves. Snowshoe hares are an important supplement during some years. During summer, young ungulates 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 conditional upon the relative densities of predators and prey, and the size and reproductive potential of the prey species populations. The effect of wolf predation can range from one of 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 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 giving birth to more, larger litters of pups, and more pups survive their first year of life. Conversely, when food is scarce, fewer, smaller litters are produced, and mortality of pups because of starvation and cannibalism increases. Natural mortality is greatest during the first year of life. Fifty to sixty percent of the pups born each spring die within eight months.

Wolves may compensate for human utilization by increased production and survival of young. In some cases wolves can compensate for a harvest of 50 percent of the autumn population. Excessive human exploitation, however, 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. 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. 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 bounty payments were suspended in all but three Game Management Units in Southeastern Alaska.

The nature of human use of wolves in the Southcentral Region has also changed during this century. Prior to the 1960's the major incentive for wolf hunters and trappers was the bounty because wolf hides were of relatively low value. During the 1960's the value of pelts increased markedly and, in combination with bounty payments, resulted in increased efforts to take wolves. Even with the elimination of the bounty in 1968, the value of pelts, which has continued to increase, has provided a significant economic incentive for people to hunt and trap wolves. Since 1962 the reported annual harvest of wolves in Southcentral Alaska averaged 190 and ranged from 53 to 376 wolves with the largest numbers taken during the winters of 1965-66, 1967-68 and 1974-75. Prior to the elimination of aerial hunting in 1972 aerial hunters accounted for about 61 percent of the harvest each year. Trapping is presently the most important consumptive use of wolves. A small number are also taken each autumn by guided and unguided nonresident hunters incidental to hunts for other big game animals. The trophy value of wolves continues to gain importance.

Wolf pelts continue to be an important item for many Alaska natives who manufacture items for sale from them. A portion of the wolf pelts harvested in Southcentral Alaska are sold to natives in Northern Alaska

In recent years nonconsumptive use has increased in Southcentral Alaska. Much of the area is forested, limiting the opportunity to view wolves, but listening for wolves is becoming increasingly popular. The value of hearing wolves howl surpasses that of actually observing them to some people. Opportunities for viewing wolves in McKinley Park are good and some people are successful in seeing them there. The Denali Highway also offers many people the opportunity to see or hear wolves.

PROBLEMS

* Increasing human demands on moose and caribou populations that are declining or already at low levels and the effect of wolf predation in retarding recoveries of these populations creates a serious management dilemma. The reduction of wolf numbers to encourage an increase in the number of ungulates is not easily accomplished given the controversial nature of the wolf and the practical problems in achieving significant reductions in wolf populations. 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 is widespread, especially on the national level, and it promises to remain a serious obstacle to wolf control programs, especially those involving aerial hunting, no matter how well the action is justified in terms of the future welfare of both ungulate and wolf populations. The role of wolves as predators and their effect on ungulate populations must be accurately conveyed to the public. Recent studies have shown many earlier assumptions regarding beneficial or inconsequential effects of wolf predation to be simplistic or limited in application. Responsible management of wolves must consider the complex interrelationships 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 Southcentral Alaska continues to be a problem. 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 makes enforcement of protective regulations difficult. Increased enforcement efforts and more severe penalties for the illegal use of aircraft in hunting could alleviate some of the problem.

1. ALASKA WOLF MANAGEMENT PLAN

LOCATION

Entire state except Game Management Units 7, 14C (see West Chugach Wolf Plan location description), 15, and national parks or other areas closed to all hunting and trapping.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of wolves.

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting and trapping wolves.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain wolf trapping seasons and bag limits consistent with suitable wolf population levels during periods of pelt primeness.

2. Maintain wolf hunting seasons not necessarily limited to the period of pelt primeness, with restrictive bag limits.

3. Promote efficient and humane trapping methods.

4. Maintain wolf:ungulate ratios that will allow for ungulate reproduction adequate to sustain ungulate populations, wolf populations and human utilization of each.

5. Promote public understanding of the interrelationships of wolves with other wildlife species in the northern environment.

6. Encourage public viewing, listening, and photography of wolves in a wilderness setting.

7. Increase public awareness of wolf behavior to reduce adverse wolf-human interactions.

THE SPECIES

Wolves occur throughout mainland Alaska and on many islands in Southeastern Alaska. Although wolf abundance varies greatly between areas and from year to year, Department estimates indicate a statewide fall wolf population of 8,000 or more. Southeastern Alaska has historically supported the greatest wolf densities in the state. Wolves are common or abundant on the Southeastern mainland coast from Yakutat Bay south and moderate on islands south of Cape Fanshaw. Track sightings and wolf-killed deer on 1,168 square-mile Revillagigedo Island between 1970 and 1972 indicated about 125 wolves, approximately 1 wolf per 10 square miles. Wolf numbers there have since declined; winter aerial surveys between 1973 and 1975 indicated a winter population of between 30 and 40 animals. Wolves are rare on the mainland coast between Icy Cape and Yakutat Bay and absent from Admiralty, Baranof and Chichagof Islands. Wolves in Southeastern Alaska generally reach greater densities on islands, perhaps because deer are important wolf prey on islands and are more abundant and vulnerable than mountain goats, the primary mainland wolf prey.

South of the Alaska Range, historical accounts of wolf numbers in the Nelchina and Copper River Basins date from the early 1900's. Wolves were reported to be abundant around 1900 but declined to low numbers by 1907 and were uncommon until the late 1920's. Wolves were apparently numerous during the 1930's and 1940's until a federally-administered wolf control program reduced wolf numbers considerably. This program lasted from 1948 until 1953 in the Nelchina Basin and until 1955 in the Copper River Basin. An estimated 12 wolves remained in the Nelchina Basin in 1953. Wolf hunting and trapping were prohibited in the Nelchina Basin between 1957 and 1965-66. Wolves in the Nelchina had increased to approximately 450 animals by 1965, a density of 1 wolf per 55 square miles. Wolves were less numerous in the late 1960's but had again increased by 1972. In 1976, estimates of wolf density in the Nelchina Basin are approximately 1 wolf per 70 square miles, and densities in the Copper River Basin may be comparable. Wolves are much less numerous in the Copper River Delta, and a resident population did not become established there until about 1971. By 1975 an estimated 20 wolves occupied an area east of the Copper River. Wolf numbers in the Matanuska and lower Susitna River Valleys are unknown, although wolf pack sizes, which may be directly related to abundance, have increased from an average of 2.5 wolves per pack in 1972-73 to 4.4 in 1973-74 and 5.2 in 1974-75. Packs west of the lower Susitna River averaged 4.4 wolves in 1972-73, 2.0 in 1973-74 and 5.9 in 1974-75. The general increase in average pack size suggests an increasing number of wolves, but these data are inconclusive because few packs were counted in some years.

Wolves occur throughout lower Cook Inlet and the drainages of Bristol Bay, including Unimak in the Aleutian Islands. Wolf densities in Southwestern Alaska are unknown, but populations appear to be comparatively low on the Alaska Peninsula. Wolves are more numerous from the Lake Clark area west to the foothills of the Kilbuck Mountains. Wolves are most abundant where both caribou and moose occur, and in these areas appear to be increasing in numbers.

The broad expanse of Interior Alaska north of the Alaska Range to the Brooks Range is probably the most important wolf habitat in the state. Although there are few wolves in the Yukon-Kuskokwim Delta and on the Seward Peninsula, wolf densities in the rest of the region are the greatest in the state, except for Southeastern Alaska. Wolf densities from the middle Koyukuk River south to and including the drainages of the Kuskokwim River ranged between 1 wolf per 40 square miles to 1 per 80 square miles during 1971 through 1975. The Holitna River area and tributaries of the upper Kuskokwim support the greatest number of wolves in the southern part of the region. Wolves are also abundant in areas of the Nowitna and Innoko Rivers and along the middle Yukon. Although far less numerous on the Yukon-Kuskokwim Delta, wolves have been recorded within the city limits of Bethel in recent years. Wolf populations in the Koyukuk, Tanana and Upper Yukon drainages are in excellent condition, presumably because the region supports diverse ungulate populations. Within this broad interior region, wolves have increased since the late 1950's when control activities, including shooting from aircraft and poisoning, were discontinued. Intensive wolf surveys have been done only in a 7,000 square-mile area south of Fairbanks to the Alaska Range which corresponds to Game Management Subunit 20A, and there only since 1973. Surveys in the winter of 1975-76 indicated a wolf population in excess of 200 animals prior to removal of wolves from the area, a density of 1 wolf per 35 square miles. Whether wolf density estimates derived from Subunit 20A can be applied to the rest of the area is uncertain, although wolves south of Delta Junction have also been increasing in recent years and current densities probably equal those recorded for Subunit 20A. Wolves also appear numerous in the Tanana Hills and from the White Mountains north to the southern slopes of the Brooks Range, but densities have not been documented.

Northwestern Alaska and the North Slope also support wolves, but densities are generally lower than south of the Brooks Range. Wolves occur as far north as the Beaufort Sea, reaching greatest abundance in the foothills and mountains of the Brooks Range in the southern portion of the region. Wolves were scarce in the Arctic in the early 1900's, perhaps a reflection of low caribou numbers. By the 1930's, both caribou and wolves had substantially increased and continued to increase until the early 1950's. Federal wolf control efforts and public aerial hunting resulted in a sharp decline in the wolf population, and by the late 1960's wolves again became scarce in the Arctic. Wolves have subsequently increased following closure of the area to public aerial hunting in 1970. Wolf densities in 1975 varied from 1 wolf per 60 square miles to 1 wolf per 120 square miles for a total North Slope wolf population of approximately 600 animals. Populations in Northwestern Alaska are less well known, but are probably similar to North Slope densities. Wolves are most abundant in this region in the drainages of the Koyuk, Shaktoolik, Ungalik, and Unalakleet Rivers. They also appear to be increasing in number in this region.

Little is known of wolf natural mortality except in a general way and in localized areas where wolves have been studied intensively. Natural controls of wolf numbers seem to stem mainly from vagaries of prey abundance and availability. Low prey abundance leads to poor wolf pup survival and perhaps a decline in the proportion of breeding females. Natural mortality rates may be affected considerably by human exploitation. Canadian investigations of nonhunted wolves reported lower pup survival and a lower proportion of females producing pups in comparison to Alaska's wolves, indicating that increased mortality due to one factor may be compensated for by lower losses to other causes. Some wolves undoubtedly suffer injuries, perhaps occasionally death, while pursuing large ungulates. A substantial decline in wolf populations between 1907 and 1925 throughout Interior Alaska has been attributed to diseases such as mange, rabies and distemper, reportedly introduced by domestic sled dogs.

The status of wolf habitat can presently be viewed only in terms of the habitat of important wolf prey species. Hooved mammals are the major source of food for wolves over much of Alaska, although small mammals, such as voles, lemmings, ground squirrels, hares, and beavers are occasionally important dietary supplements in summer. Moose are the most important prey species in much of Interior Alaska although wolves also take caribou and Dall sheep. Wolves on the North Slope rely heavily on caribou, with moose and Dall sheep being less important. Deer and mountain goats are the most important prey species in Southeastern Alaska: deer on islands and mountain goats on the mainland. Moose have been declining in numbers over much of Alaska as a result of a decade of recurring harsh winters and decreasing quality and quantity of moose browse. Caribou, also important in wolf diets, have decreased in some areas from high population levels in the mid-1960's. These declines have occurred in some areas as a result of range overuse due to trampling and overgrazing. Improved techniques in fire suppression and prevention by state and federal agencies have probably been detrimental to moose but have probably aided caribou. In Southeastern Alaska, clearcut logging practices are altering much of the climax deer winter range and may result in fewer deer and ultimately fewer wolves. U.S. Forest Service plans call for logging almost all commercial grade timber in Southeastern Alaska, and the second-growth, closed-canopy vegetation that will follow will decrease the quality of wolf habitat. Wolf habitat has been little altered by human expansion in the remainder of Alaska, except in the vicinity of settlements. Much of the Interior is currently economically unsuitable for industrial or agricultural development. Despite the recent and perhaps continuing increase in the number of wolves over the much of the state in the last decade, the status of ungulate populations indicates that wolf numbers will decline somewhat over the next few years. Moose populations seem to be increasing along the lower reaches of the Yukon and Kuskokwim Rivers, and wolves there are likely to become more common.

The increases in wolves during the past decade are probably related to a substantial reduction in efforts at organized predator control, bans on poisons, and more restrictive regulations on wolf hunting, specifically on shooting wolves from the air with shotguns.

Wolf harvest data are derived from a combination of bounty records, aerial permit reports, and since 1971, a mandatory sealing requirement on all wolves taken. The harvest data are considered reasonably complete although some people have taken wolves without collecting bounties and others may not comply with sealing requirements. A gap in data exists from 1969 when bounties were largely discontinued to 1971 when the sealing requirement was initiated. The known wolf harvest by hunters and trappers in Alaska has averaged 921 wolves annually since 1959. The fewest wolves reported taken were 221 in 1959-60 and the most were 1711 in 1967-68. A reported 1,090 wolves were killed during the 1974-75 regulatory year. About 38 percent of the wolves harvested since statehood were taken in east-central Alaska. Southeastern Alaska from Icy Bay south, comprising about 6 percent of the state's land area, has produced more than 13 percent of the reported annual harvest. The wolf harvest has generally consisted of slightly more males than females. Pups comprise 40 to 50 percent of the kill each year.

Snow must be deep enough to allow tracking of wolves from the air and for aircraft landings if wolf harvests are to be significant. There is an unknown degree of noncompliance with the statewide wolf sealing requirement. In remote areas less than half of the wolves taken in some years may be reported, often because pelts are used locally. Illegal aerial hunting also occurs except in Southeastern Alaska where it is impractical due to the heavy forest cover. Since bounties are still paid on wolves from Icy Bay south, the unreported harvest there is probably small, although some bounty collectors may falsely state where the animals were taken.

The intensity of consumptive use of wolves varies considerably. Hunting and trapping pressure is comparatively light in the western portion of the state. Hunting pressure on wolves seems high in eastern and central Alaska, but it is doubtful whether the current kill is significantly impacting wolf numbers. Wolves in eastern Alaska have apparently increased since aerial hunting was prohibited in 1971 despite growing public interest in trophy wolf hunting and rising value of wolf pelts. Wolf numbers in the Nelchina and Copper River Basins appear to have fluctuated independently of harvests. Ground hunting and trapping are the only feasible methods of taking wolves in Southeastern Alaska. Harvests may, at times, have exceeded 50 percent of the population on Revillagigedo Island, but there is no evidence that the harvests have permanently reduced wolf numbers. On the North Slope, wolves were significantly suppressed by aerial hunting until the region was closed to aerial hunting in 1970. Wolf numbers north of the Brooks Range subsequently increased. It appears that continued aerial wolf hunting can reduce wolf numbers where open terrain affords the animals little escape cover. The number of wolves taken annually statewide is generally dependent on winter snow conditions.

Hunting and trapping seasons for wolves have remained liberal since statehood. Poisons were banned in 1960, and with their classification as big game animals in 1963, wolves received additional protection from regulations on seasons and bag limits. Aerial hunting permits were issued during the 1960's and early 1970's, but were suspended in 1972. Wolves in the Nelchina Basin were protected from 1957 through June, 1966. Current hunting regulations stipulate a limit of two wolves over most of the state with an August through April season; there is no closed season or limit on wolves in Southeastern Alaska. Trapping seasons generally extend from October or November through March or April with no limit on the number that can be taken. Since 1972 most wolves have been taken by ground shooting (44 percent) or by trapping (41 percent).

Trapping success by individuals is generally low since many are inexperienced trappers. The majority of wolves harvested are taken by comparatively few people. A combination of aerial spotting and shooting after landing is becoming increasingly common. A few wolves are killed by hunters incidentally to hunting for other big game species. Most are harvested between December and March, with March the most important month. Most people taking wolves are resident Alaskans. While nonresident guided hunts are becoming more popular, and nonresident trapping occurs extensively on military lands, the number of wolves taken by nonresidents is small. Wolves are sought primarily for the commercial value of the pelts in northern and western Alaska. Over the rest of the state a combination of recreation and commerce motivates wolf hunters and trappers. In Southeastern Alaska, trapping and hunting of wolves seems to occur primarily for recreational purposes, since wolf fur quality there is generally poor. Access to wolf hunting areas is primarily by airplane. Snowmachines, both for hunting and checking traplines, are important means of access in areas without roads and near remote villages. Most wolves in Southeastern Alaska are taken with traps set along beaches where the lines can be checked by boat or plane.

East-central Alaska, bordered on the north by the Brooks Range and on the south by the Alaska Range, produces the most desirable trophy wolves in the state. Wolves there are generally larger, and their pelts are often light gray, the color most preferred for trophies and by furriers. Wolves in Southeastern Alaska, though still sought for trophies, are generally smaller and darker and have shorter, more coarse and less dense fur than Interior wolves.

The number of people that enjoy seeing, hearing, or otherwise experiencing wolves in Alaska each year is unknown. Relatively few people see wolves except from aircraft. A growing number of people are frequenting remote areas during summer months, however, and incidental nonconsumptive use may be increasing. The northern Brooks Range, where the open terrain facilitates long-distance observation, may offer some of the best opportunities for the nonconsumptive use of wolves in Alaska.

PROBLEMS

* A substantial portion of wolf range in Alaska has been selected by local residents under terms of the Alaska Native Claims Settlement Act. Once title to public lands is conveyed to private ownership, public use on such lands may be restricted or prohibited. The Department should solicit the cooperation of private landowners to facilitate progressive management of wolves. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Substantial land areas will be placed in parks, monuments, wild and scenic rivers, and wildlife refuges, all under federal jurisdiction, under terms of the Alaska Native Claims Settlement Act. Extensive portions of these federally-administered areas may be closed to hunting and trapping or such use may be limited by access restrictions. The Department should seek cooperation from the appropriate federal agencies to allow hunting and trapping to continue within these areas.

* Adverse wolf-human interactions have occurred more frequently in recent years, particularly at pipeline construction camps and along the Trans-Alaska Pipeline Haul Road. Several people have been bitten by wolves that have grown accustomed to humans. Most of these animals have subsequently been destroyed, primarily to test for rabies. In most instances, private company regulations specifically prohibit feeding wild animals and these regulations should be strictly enforced. The Department may consider additional regulations to discourage adverse interactions.

* Wolf prey populations over much of the state are declining or are currently at low levels. Predation by wolves may conflict with human use of prey species in some areas. Wolf hunting and trapping should continue with liberal seasons and bag limits. If it is established that predation is causing declines or maintaining low densities of prey species, the Department may consider more liberal methods and means of harvesting wolves. Should public hunting efforts prove incapable of lowering the wolf population to relieve predation pressure on prey species, the Department should consider direct control by Department employees for a limited specified period and to meet specific objectives.

* The reduction of wolf numbers to encourage an increase in the number of ungulates is not easily accomplished given the controversial nature of wolves and the practical problems associated with achieving significant reductions in wolf populations. All wolf control efforts by the Department should be justified on the basis of substantial data and only after it has been shown public hunting and trapping harvests will not achieve the stated management goals. The role of wolves as predators and their effect on prey populations must be accurately conveyed to the public. Recent studies have shown many earlier assumptions regarding the beneficial or inconsequential impacts of wolf predation to be simplistic or limited in application. The Department must convey to the public all aspects of wolf biology in an objective manner; the public must understand that responsible wolf management will consider the complex relationships between predator and prey, the welfare of each and the beneficial uses of all resources that can be derived by humans.

* Domestic livestock may be established or reintroduced by private landowners in areas that currently support wolves. Demands for predator control will be forthcoming from the domestic livestock industry. Hunting and trapping harvest should be the primary means of suppressing problem wolves, and control actions, if necessary, will be directed at specific animals. The cost and responsibility of such control will be the responsibility of the industry and only as authorized under conditions of the state-issued permit. The Department should indicate to persons contemplating introduction of domestic livestock that some level of wolf predation must be accepted as a normal operating risk.

* Wolves in parts of interior and Arctic Alaska are subject to illegal aerial hunting, and a proportion of people inhabiting rural areas are not complying with sealing regulations. Such activities make it difficult to accurately assess annual harvests and population parameters. An increased enforcement effort by the Division of Fish and Wildlife Protection and a more active enforcement role by the Department of Fish and Game, coupled with more severe penalties for offenders, could alleviate some of the problems.

* Recurring wildfires are generally beneficial to browse plants important to wolf prey species. Fire suppression and prevention efforts by state and federal agencies have improved to the point that habitat quality and quantity for moose are declining in some areas. The Department should identify critical habitat areas and make recommedations to the appropriate agencies regarding the possible beneficial aspects of fires in specified regions.

* Extensive logging activities in Southeastern Alaska may result in a decline in deer and mountain goat populations with a subsequent decline in wolves. The Department should make recommendations and seek agreements with appropriate management agencies to minimize adverse logging impacts on wildlife.

IMPACTS

* Wolves will not be eliminated from any region and will continue to be a viable part of Alaska's wildlife.

* The reduction of wolf populations in some areas of Alaska by limited permit aerial hunting by the public or by organized control efforts by the Department will allow a faster recovery of depressed ungulate populations.

* Selective reductions of wolf populations will decrease the opportunity for use of wolves by hunters, trappers and nonconsumptive users in some areas.

* Regulations governing harvest will be manipulated to maintain desired population levels of wolves. In general, liberal hunting and trapping regulations and seasons will continue, although restrictions on sport hunting may be imposed to make wolf hunting compatible with hunting regulations stipulated for other big game species.

3. WEST CHUGACH WOLF MANAGEMENT PLAN

LOCATION

Game Management Unit 14C and in Game Management Unit 7, the drainages of Glacier Creek and Twenty-Mile River.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy wolves.

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting and trapping wolves.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit hunting and trapping of wolves in Chugach State Park.
2. Encourage public viewing, listening and photography of wolves in Chugach State Park.
3. Increase public awareness of wolf behavior to reduce adverse wolf-human interactions.
4. Promote public understanding of the interrelationships of wolves with other wildlife species in the northern environment.
5. Maintain wolf:ungulate ratios that will allow for ungulate reproduction adequate to sustain ungulate populations, wolf populations and human utilization of each.
6. Control hunting and trapping seasons and bag limits, methods and means of taking, and methods of transport, if necessary, to distribute hunting and trapping effort and to maintain the harvest at desired levels.
7. Promote efficient and humane trapping methods.
8. Maintain wolf trapping seasons and bag limits consistent with wolf population levels during periods of pelt primeness, outside of Chugach State Park.
9. Maintain wolf-hunting seasons not necessarily limited to the period of pelt primeness, with restrictive bag limits, outside of Chugach State Park.

THE SPECIES

Wolves are not abundant within the 2000 square-mile West Chugach area because much of it lacks the wilderness characteristics wolves require. Incidental observation during Game Division moose surveys, together with sightings by private individuals, indicate there are only 3 or 4 packs of wolves in this area. Prior to substantial human population increases, wolves were probably more abundant. In wilderness sections of the area, habitat requirements are thought to be adequate. A moderate ungulate population, consisting of moose, sheep, and goats, in addition to several small game species, is sufficient to support the present population of resident wolves.

Wolves have been hunted and trapped in the area for at least the past 60 years. Past harvest levels are unknown, but are not thought to have been greater than 5 or 6 per year. Present use of wolves within the area is light.

Hunting and trapping are prohibited throughout most of the area. Since 1971, when the Department initiated a mandatory wolf sealing program, only four wolves, 3 males and 1 female, have been legally harvested. All wolves were taken by local residents. Chances of taking a wolf by either hunting or trapping are very slight. Ignorance of existing regulations and/or accidental trapping may have resulted in some wolf fatalities unknown to the Department. Present harvest levels are not thought to be detrimental to the population.

Nonconsumptive use of wolves throughout the year has involved viewing, listening, photography and sign observation by hunters, hikers and skiiers in wilderness sections of the area. Favorite routes into areas where wolves may be seen or heard include the Arctic Valley road, the Ship Creek trail, the Eagle River road and trail, and the Eklutna road and trail. Winter access via snowmachine or cross-country skis allows greater mobility, therefore increasing the probability of observing wolves or their sign.

PROBLEMS

* Future Eklutna Native land selections within the drainages of the Eklutna and Knik Rivers and Hunter and Peters Creeks will place several thousand acres of fair wolf habitat into private ownership, thereby possibly excluding those lands from public use. The Department should solicit the cooperation of private landowners to facilitate progressive management of wolves. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Recent attacks on domestic dogs in remote residential areas of Eagle River present the possibility of future defense of life and property wolf kills. The cause for such attacks is unknown but may be related to an increased wolf population resulting from a hunting and trapping closure in Chugach State Park coupled with the decline of the West Chugach Management Area moose population. The present moose population is perhaps one-half of its 1971 level due to increased urbanization within former moose winter range. Residents should be encouraged to exercise preventive measures in those areas where domestic animals are vulnerable to wolf attacks.

* Because wolves are infrequently seen and inhabit wilderness areas, realization of all their values in terms of human use is difficult. Locations where wolves can most likely be seen or herd should be identified to the public, and greater public appreciation for wolves should be fostered through Departmental information programs.

* Breeding and movement disruption will occur as urbanization continues to infringe on wilderness habitat or where public use becomes intensive. Because of the wilderness nature of wolves it may prove beneficial to give careful consideration to any proposed access or facility improvements within the area.

IMPACTS

* To maintain a wilderness species such as the wolf in the area, some human access, and permanent facilities and associated human activities may be restricted.

* Changes in hunting regulations are not recommended for areas presently open to hunting or trapping.

* Identification of viewing or listening sites will require some restraints in numbers of users, but will increase use of the resource by visitors to the area. No detrimental effects on the wolf population within the area are expected.

5. KENAI WOLF MANAGEMENT PLAN

LOCATION

Game Management Units 7 and 15, the Kenai Peninsula.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting and trapping wolves.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy wolves.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a moderate but secure spring wolf population.
2. Maintain wolf trapping seasons and bag limits consistent with wolf population levels during periods of pelt primeness.
3. Maintain wolf hunting seasons not necessarily limited to the period of pelt primeness, with restrictive bag limits.
4. Control methods and means of taking wolves and methods of hunter and trapper transport, if necessary, to distribute hunting and trapping effort.
5. Promote efficient and humane trapping methods.
6. Maintain wolf:ungulate ratios that will allow for ungulate reproduction adequate to sustain ungulate populations, wilf populations and human utilization of each.
7. Encourage public viewing, listening and photography of wolves in a wilderness setting.
8 Increase public awareness of wolf behavior to reduce adverse wolf-human interactions.
9. Promote public understanding of the interrelationships of wolves with other wildlife species in the northern enviornment.

THE SPECIES

Wolves were absent from the Kenai Peninsula for a period of time extending from prior to 1930 until the early 1960's when the first reports of an occasional wolf were verified. The first pack sighting (10 wolves) was made in 1968 and the wolf population has since grown rapidly. In 1968 the center of distribution of Kenai wolves was Tustumena Lake, but wolves have since spread to all parts of the Kenai Peninsula except the coastal area from Seldovia to Cape Fairfield. Wolves are now abundant over most of the Kenai Peninsula. A census conducted in March of 1975 resulted in a population estimate of 90-105 wolves, but the actual population level may be as high as 150. Considering the growth rate of the wolf population on the Kenai Peninsula, natural mortality rates have been low. The high losses of moose calves to malnutrition and the weakened condition of adult moose resulting from severe winters from 1972-75 made food highly available, thereby benefiting the wolf population. Wolf habitat has been affected very little by man on the Kenai Peninsula. Wolves seem well able to live in close proximity to man so long as they are not persecuted. A sharp decline in moose, the prime prey species of wolves in this area, may eventually adversely effect the welfare of wolves but these effects have not yet been seen.

Harvesting of wolves on the Kenai Peninsula was initiated by a permit hunt in 1974. Six wolves were taken. In 1975 both hunting and trapping were allowed and the harvest increased to 15 with 6 wolves taken by traps and 9 by shooting. Although the 5 month season was liberal the harvest of wolves was much below the level required to stabilize the population.

In excess of 90 percent of the wolves harvested on the Kenai Peninsula were taken by residents of the Peninsula in the vicinity of their residence. The remainder were taken by residents of Anchorage.

Over 50 percent of the wolves harvested were taken for trophies with the remainder being sold to fur buyers. Almost all wolves were taken for recreational purposes. Those that were trapped and the pelts sold were taken for recreation, with the value received for pelts being a secondary benefit. Most wolves are taken by hunters and trappers utilizing snowmachines or operating from the road system. Some wolves have been taken by trappers utilizing aircraft for running their traplines. Harvesting of wolves occurs from November through March while most nonconsumptive uses occur in the summer and early fall.

Because wolves are seldom seen they do not lend themselves well to viewing. They are however, occasionally seen along the roadside or incidental to hunting and other recreational pursuits. Although wolves are seldom seen they are often heard howling at night and campers derive considerable aesthetic benefit from hearing them.

PROBLEMS

* The declining moose population and rapidly increasing wolf population, along with a U. S. Fish and Wildlife Service closure of Moose Range lands south of the Kenai River to wolf hunting and trapping may create an unfavorable wolf/moose ratio in these units. The Department should recommend liberalization of the wolf hunting season and bag limits; promote harvesting of wolves by directing hunting and trapping efforts to these units; negotiate with the U. S. Fish and Wildlife Service to rescind their closed areas; and if public hunting and trapping pressure is not adequate, the Department should critically research and evaluate other control methods.

* To maintain wolf/ungulate ratios that will allow for ungulate reproduction adequate to sustain ungulate populations, wolf populations and human utilization of each will require more precise information than presently available, particularly regarding wolves. The Department should participate in and encourage studies that provide information on wolf-prey relationships on the Kenai Peninsula.

IMPACTS

* Wolf numbers will be maintained in a favorable balance with their primary prey. This will avoid both the potential for extreme highs and lows in the population and at the same time will lessen management problems associated with extreme imbalances in predator/prey ratios.

* Optimum numbers of wolves will continue to be available for both consumptive and nonconsumptive uses and a productive population will be maintained.

* Utilization of wolves for consumptive purposes will continue. However, over the long run, as consumptive utilization increases or predator/prey ratios change, reductions in consumptive utilization may be needed. Such reduction would be implemented through reduced seasons and bag limits and methods of taking.

* No changes are foreseen in nonconsumptive uses unless such uses increase to a level that adversely affects production of young.

CARIBOU IN SOUTHCENTRAL ALASKA

Populations of barren ground caribou (*Rangifer tarandus granti*) in the Southcentral Region of Alaska have fluctuated widely in numbers, as they have historically over all of their ranges in the state. The region's largest population, the Nelchina herd, occupying the upper Copper, Nelchina and Susitna River basins, achieved a peak size of about 70,000 animals in 1962. The herd subsequently declined to 8,000 in 1972 and in 1975 numbered about 10,000. The population is gradually increasing.

The Mentasta herd, a smaller population, ranges on the northwest slopes of the Wrangell Mountains and the headwaters of the Copper River. This herd has numbered about 2,000-5,000 caribou over the past 15 years.

A small population of caribou exists in the northern Kenai Mountains. Caribou disappeared from the Kenai Peninsula in the early 1900's. A transplant of 44 caribou in the mid-1960's reestablished the species on the Kenai Peninsula. The population has increased very rapidly and in 1975 numbered about 450 animals.

Two additional caribou herds seasonally occupy portions of the region. In the vicinity of Rainy Pass, in the Alaska Range, a population containing an estimated 1,500 caribou has been relatively static in size for the past decade. Information on the herd is very limited. The McKinley herd ranges primarily on the north side of the Alaska Range in an area which includes Mt. McKinley National Park. This once large population now numbers less than 3,000 animals.

Although caribou utilize a variety of habitats throughout the year, much of their time is spent on the tundra or on treeless upland areas. In the Southcentral Region this zone generally lies between 3,000 and 5,000 feet in elevation where heath tundra, alpine tundra and sedge wetland plant associations dominate the vegetation. Timbered areas are used extensively as winter range but are abandoned as the snow melts.

A suitable calving area is an integral part of caribou habitat requirements. Calving grounds generally constitute a "center of habitation" for all caribou populations, and their occupation is the most consistent facet of otherwise vacillating and unpredictable movement patterns. The characteristics which distinguish calving areas are not well known but probably relate to such factors as availability of green vegetation following snowmelt, ease of movement and high visibility. With few exceptions, calving areas are above timberline.

Almost any vegetated habitat type can serve as caribou winter range, but the greatest use is made of timbered areas, especially spruce-lichen associations. Caribou have teeth adapted for eating soft, leafy vegetation, and 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 lichen ranges. The wide-ranging characteristic of caribou is one of the mechanisms evolved by the species to adapt to the limitations of the arctic environment.

Caribou depend upon climax vegetation; conditions favoring progression of vegetation through the successional series to climax stages, or the maintenance of climax vegetation, favor caribou. In Southcentral Alaska fires and overgrazing by caribou have depleted some caribou ranges. Extensive fires occurred in the Lake Louise Flats and upper Copper River basin prior to 1950. Lichens in these areas have not totally recovered. Fires on the Kenai Peninsula are cited as a probable cause for the

disappearance of caribou near the turn of the century. The range currently occupied by Kenai caribou contains luxuriant lichen growths. Overgrazing of large areas of the Nelchina range occurred during the period of high population levels from 1955 to 1969. Depletion of forage contributed to the Nelchina population decline and may now limit the size of the population that can be supported by the area.

Despite their physiological and morphological adaptations for coping with the arctic environment, caribou populations have always fluctuated numerically. Some areas in the state with few or no caribou have well-worn trails of large populations in the past. Among many interrelated natural factors limiting caribou population growth, weather and predation are important factors operating directly on small populations, while weather, disease and emmigration induced perhaps by social stress are important to large populations. If reproduction exceeds mortality, 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. Density related stress may cause emmigration to new ranges, and reduced food quality and quantity and increased disease may serve to lower calf production and survival.

The most critical time for caribou is the period just prior to and during calving. For those caribou that have survived the winter, the availability of new 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 short one week period when most calves are born. Predation on calves and weather induced calf mortality, determine in large part whether populations increase or decrease. In infected populations, brucellosis can reduce the number of viable young born.

Caribou in Southcentral Alaska, particularly the Nelchina herd, have experienced intensive sport hunting use for the past 25 years. Although aboriginal use by natives may have been significant, populations of caribou from 1900 to 1950 were neither large enough nor widely distributed so as to provide for the domestic needs of many residents situated in the Nelchina-upper Copper River area. Between 1950 and 1972, a large and wide-ranging Nelchina herd satisfied both sport and domestic demands.

Caribou utilization is determined by accessibility. In the past, movements of some caribou along or across road systems resulted in large harvests. With the development and widespread use of snowmachines harvests of accessible caribou became excessive. Early hunting seasons during the mid-1970's, which limited hunting to snow-free periods have held harvests at desirable levels. Access to Nelchina caribou is now limited to hunters utilizing aircraft or off-road vehicles, but Nelchina caribou are still more accessible than other caribou populations in the region. There are no roads and few trails or aircraft landing areas in the Wrangell Mountains range occupied by Mentasta caribou, and access to Kenai caribou is regulated by the U.S. Forest Service which prohibits use of off-road vehicles during snow-free periods.

Mechanized off-road transportation is prominent in the success of caribou hunters in this region, where more than three-fourths of the caribou harvest is taken by hunters utilizing such methods. About three-fourths of the caribou hunters in this region are Alaska residents. The proportion of nonresidents is higher in the Mentasta caribou area where a higher percentage of hunters are guided, than in the Nelchina or Kenai areas.

PROBLEMS

* Caribou management in Southcentral Alaska is faced by a tremendous growth in human population and development. Aside from the inevitable increase in demands on the caribou resource by consumptive and non-consumptive users, the most important consequence of development will be alteration of habitat. The long-term effects of dissecting the Nelchina caribou range with the Trans-Alaska pipeline, the proposed upper Susitna hydroelectric impoundments or similar projects are impossible to predict, but almost certainly will mean constricted habitat and reduced caribou populations in the future. Impacts of development and conflicting land uses must be minimized to the greatest extent possible by comprehensive land use planning and scheduling development activities where and when caribou are least affected.

* Increased human populations and more intensive land use will also mean a greater probability of fire. Loss of caribou range to fire may have serious adverse consequences for affected caribou populations. Important caribou ranges must be identified and prevention and suppression of fires must be given high priority in management of those lands.

* Predation is at times detrimental to the welfare of caribou populations when caribou populations are small and predator populations are 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 human utilization to insure the maintenance and enhancement of caribou populations.

19. KENAI LOWLANDS CARIBOU MANAGEMENT PLAN

LOCATION

Game Management Units 15A and 15B.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of caribou.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy caribou.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Protect caribou from unnatural disturbance and harassment, including hunting, to establish a minimum population of 150 caribou.

2. After the population increases to 150 caribou allow limited harvests until the post-hunting season population reaches 250 caribou; thereafter harvest the annual increment.

3. Encourage public viewing of caribou.

THE SPECIES

The Kenai Lowlands herd, presently numbering between 65 and 80 caribou, was established from transplants made in 1965 and 1966 by the Alaska Department of Fish and Game. The transplant appears to be successful to date. The herd has utilized the muskeg areas in the vicinity of the Kenai airport for calving and summer range and the Moose River Flats as winter range.

Although accurate censuses have been difficult to make, this herd appears to be growing at a moderate rate. Natural mortality factors working on this population are not well known. Predation by wolves, black bear and possibly coyotes is thought to occur but has not been documented. Predation is not thought to be a serious problem at this time.

The range utilized by this herd is very limited in size and is not typical caribou range. In addition, the quality of the habitat utilized by this herd is difficult to assess. The presently used winter range does not contain a significant amount of lichens and it is assumed that some other food items, probably sedges, are the primary winter foods. Since the herd has exhibited only a slow growth rate, it is assumed that range quality is not high.

In the past, fires have played a primary role in changing caribou ranges. Man-made fires in the late 1800's are believed to have destroyed most of the caribou ranges on the Kenai Peninsula and thus caused the extirpation of caribou before 1920. Several large fires have occurred since the caribou were extirpated, and these burns have kept large areas from reverting to the type of climax vegetation favorable for caribou.

Presently, the range utilized by this herd is thought to be under-utilized but the limits of their potential range are not known. In an effort to establish a sizable herd these caribou are presently completely protected from hunting.

The present uses of this herd are entirely viewing and photography. Almost all use is incidental to some other pursuit. Most caribou are observed by persons flying to or from the Kenai airport during the summer. Occasionally caribou are seen along the road system or by snowmobilers. Most use is by residents of the Kenai Peninsula.

PROBLEMS

* The winter food habits of this herd are not known and the winter range is not typical. Assessments of range quality and carrying capacity have not been made. Research on the winter food habits of this herd should be conducted.

* When this herd reaches huntable size, access restrictions imposed by the Kenai National Moose Range may prevent obtaining the harvest needed to control herd size. Agreements between the U. S. Fish and Wildlife Service and the Department of Fish and Game will be necessary to reduce the level of restrictions.

* Most of the calving area is in private ownership and subject to development. The Department should attempt to obtain the area through land trades or otherwise have it dedicated for wildlife use.

* Critical ranges may be subject to loss by fire. It will be necessary to delineate these ranges and protect them from fire by fire breaks or other means.

IMPACTS

* Implementation of this plan will allow continued herd growth until at least 1980. The herd may then have reached sufficient size to require limited harvest. Once hunting is initiated a change of emphasis will occur but nonconsumptive use will be unaffected.

* Hunting under this plan will control the herd size within the limits of the range and insure the long term welfare of the herd.

* Snowmachine activity may need to be limited on critical wintering areas.

20. KENAI MOUNTAINS CARIBOU MANAGEMENT PLAN

LOCATION

That part of Game Management Unit 7 bounded on the East by the Seward Highway and Sixmile Creek, on the South by the Sterling Highway, on the west by the Unit 7 boundary and on the north by Turnagain Arm.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large-antlered caribou.

SECONDARY MANAGEMENT GOALS

To provide for an optimum harvest of caribou.

To provide an opportunity to view, photograph and enjoy caribou.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a post-hunting season population of 300 caribou with an adult sex ratio of 50 bulls per 100 cows.

2. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain desired harvest levels.

3. Encourage public viewing and photography of caribou in a wilderness situation.

THE SPECIES

This herd is the result of introductions made by the Department in 1965 and 1966. Caribou became established in the area shortly after the transplant and flourished on the excellent range. The herd had grown to 119 animals by the fall of 1970 and reached 336 caribou in the fall of 1974. The annual rate of recruitment has averaged about 36 percent. Regulated harvesting has maintianed the post-hunting season population at about 300 animals since 1974.

Natural mortality has been low as demonstrated by the rapid rate of growth in this herd. Wolf predation is now occurring on this herd and its effects will become more evident in the future since wolf numbers are rapidly increasing. Production over the past two years appears to be down; this may be a function of wolf predation although the extent of such predation has not been documented.

The condition and quality of the range utilized by this herd is excellent. No significant changes in the habitat have occurred due to human activities and none are expected in the foreseeable future. Presently this habitat may support more caribou, but since they utilize the same summer and winter range, with lichens being extremely vunerable to trampling, a conservative approach to range stocking is being taken. After 5 winters of carrying 300 animals, an assessment of the range will be made. If it is found that the range is understocked the herd will be allowed to expand.

Moderate numbers of trophy caribou have been available in this herd. Since this herd has grown at such a rapid rate it has a very young age structure. With the herd stabilized each year for the next several years, the proportion of the herd in the older age trophy class will

increase. In view of the good bull:cow ratio of 70:100 and the changing age structure of the herd, the outlook for trophy production is excellent.

Harvesting of caribou was initiated in the fall of 1972 with a harvest of 6 caribou by 20 permittees. In 1973, 250 permits were issued and 12 caribou were harvested. In 1974 and 1975 an unlimited number of permits were issued and the total harvests were 44 and 87, respectively. The 1975 harvest was composed of 38 bulls and 49 cows. In 1975, 35 percent of the harvest was by residents of the Kenai Peninsula, 60 percent by residents of the Anchorage area and 5 percent by nonresidents.

Hunting pressure has grown rapidly as hunters have discovered this herd and focused more attention on it. Five-hundred-seventy-three permits were issued for the 1974-75 season and 869 for the 1975-76 season. A similar increase in pressure is expected for the future. With hunting pressure accelerating it may become necessary to limit the number of participants in the hunt in order to maintain adequate harvest controls. Hunters have expressed a high degree of satisfaction with the manner in which this herd has been managed. Their comments relate a great deal of satisfaction regarding success and enjoyment of the hunt. Harvesting of this herd has had no adverse effect on productivity or sex ratios. The harvest is very closely balanced between males and females, thus the availability of trophies has not been adversely affected.

Most use of caribou in this area is by recreational hunters, although some nonconsumptive use occurs. Guiding is of minor importance with only a few guides operating in the area. Nonconsumptive use is primarily incidental to hiking on the Resurrection Trail; a few people occasionally hike to the area primarily to view and photograph caribou. Some incidental viewing also occurs in conjunction with hunting for other species. Most nonconsumptive use takes place in the summer while hunting occurs primarily in the late summer and fall. Almost all of the harvest is taken between August 10 and October 15.

Access to this area is limited. Horses provide the easiest access, although most hunters backpack to the area over the Resurrection Trail. Aircraft access to Swan Lake puts the hunter within 3 to 4 miles of where caribou can be located.

PROBLEMS

* Hunting pressure is growing at a rapid rate. If pressure reaches too high a level, extreme congestion may occur and the present permit system may no longer provide adequate safeguards against overharvesting. The Department may have to limit the number of permits issued.

IMPACTS

* The proposed management will maintian the population at its present size and will maintain sex ratios and productivity at present levels. Productivity should remain relatively stable. Initially the number of trophy animals should increase but then will stabilize. The age structure of the herd will shift toward older animals.

* When permits become limited, some persons wishing to participate will not be able to hunt here annually. In addition, the hunting season may be shortened as hunting pressure increases.

* Present uses will continue for nonhunters and will possibly increase. No need for limiting nonhunting use is forseen.

* Increasing caribou hunting pressure may increase the harvest of moose and black bear.

22. EUREKA CARIBOU MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 13 bounded on the south by the Glenn Highway, on the west by Startup Creek and Crooked Creek, and on the north and east by the Little Nelchina River.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy caribou.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Protect caribou in the Eureka area from unnatural disturbance and harassment.

2. Maintain a caribou hunting closure in the area.

3. Encourage public participation in viewing, photographing and enjoying caribou.

4. Discourage use of mechanized vehicles in the area.

THE SPECIES

The Nelchina caribou population now numbers about 10,000 caribou and is slowly growing. For most of the past 20 years, a variable portion of the Nelchina herd has wintered near Eureka. Prior to 1972, early winter ingress of caribou in this accessible region resulted in heavy harvests. Hunters utilizing snowmachines were particularly successful. Hunting seasons since 1972 have closed before caribou have arrived or snow has fallen. The presence and viewability of caribou in the area since 1972 have provided considerable observation and photographic opportunities to highway travelers in the winter. Access to much of the area is provided by several off road vehicle trails which traverse or border the area.

PROBLEMS

* Indiscriminate recreational snowmachine use may frighten caribou away from observation areas. Snowmachine use should be limited to designated trails in the area. Authority to limit methods of access in the area lies with the Bureau of Land Management, whose concurrence and action in implementing appropriate regulations would be necessary.

* During periods of high small game populations, the area receives some use by small game hunters. Small game hunting activity may frighten caribou away from caribou observation areas. Small game hunting with caribou present should be closely monitored and if necessary limited closure on hunting of small game should be enforced during those winter months.

* Caribou concentrations near the highway pose a public safety hazard to passing motorists. In addition, the caribou population sustains limited but unnecessary losses to highway vehicle accidents. The Department should obtain the assistance of the Department of Highways in seasonally posting lower speed limits and warning signs to alert motorists to the presence of caribou.

* Viewers wishing to observe or photograph caribou have few pullouts or parking areas along the highway. Some motorists create a traffic hazard by stopping on the highway. The Department should obtain the assistance of the Department of Highways to create pullout and parking areas and to assure that such areas are plowed during the winter.

* A portion of the area may be selected by natives under terms of the Alaska Native Claims Settlement Act. Private landowners may prohibit trespass for viewing and photography. The Department should solicit the cooperation of private landowners to facilitate progressive management of caribou. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* All snowmachine use in the caribou observation area would be restricted to designated trails. Ample space outside of the area exists for snowmachine use, and designated trails would allow access through the caribou observation area to reach points beyond.

* Small game hunting in the area may be restricted when caribou are present.

* Public use of the area would benefit local roadside service establishments.

23. NELCHINA CARIBOU MANAGEMENT PLAN

LOCATION

In Game Management Units 13 and 14, the area bounded on the south by the Tazlina, Nelchina and Matanuska Rivers, on the west by the Alaska Railroad and the Game Management Unit 13 boundary, on the north by the crest of the Alaska Range and on the east by the Copper and Slana Rivers except for the Eureka Caribou Management Plan area.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting caribou.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of caribou.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Restrick harvests until the population increases to 20,000 caribou; thereafter harvest the annual increment.

2. Control access and methods of hunter transport, if necessary, to distribute hunter effort.

3. Maintain a minimum post-hunting season population sex ratio of 25 bulls per 100 cows.

4. Encourage fire suppression on caribou calving grounds and selected wintering areas.

THE SPECIES

The Nelchina caribou population numbered about 11,000 animals in 1975. The population attained peak levels of approximately 70,000 in 1962 and subsequently declined to a low of about 8,000 in 1972. The population has increased slowly since 1972. Mortality of calves ranges between 40 and 60 percent annually, with predation probably the most important natural factor. Losses of adults to causes other than hunting is estimated at between 6 and 9 percent annually. Considering mortality of calves and adult caribou to all causes except hunting, an annual increment of from 800 to 2,000 caribou may be available for human utilization and/or herd growth for every 10,000 caribou in the population. Hunting is currently managed to take 10 percent or less of the population.

Nelchina lichen ranges were overutilized by caribou during the period of excessive populations in the 1950's and 1960's. Ranges are now in fair to poor condition and will require many years for recovery. Poor quality winter ranges may have contributed to emmigrations of caribou from the Nelchina population eastward in the mid-1960's, and to reduced recruitment of young to the population during the late 1960's and early 1970's.

The Nelchina herd has been the most heavily sports-hunted caribou herd in Alaska since 1950. Harvests exceeded 4,000 caribou in most years from 1959 to 1971. Sharp restrictions in hunting seasons and bag limits in 1972, from an eight-month season to a six week season, and a three caribou bag limit to one caribou, reduced the kill to about 600. The harvest increased to 800 in 1973 and to 1,200 in 1974. In 1975, a further reduction in season length to three weeks reduced the kill to about 800 caribou. Large harvests in the period 1967-1971 and proportionally large kills on a reduced population since 1972 can be attributed to increased access, greater use of all-terrain vehicles, and increased hunting pressure. Impacts of pipeline construction now serve to

magnify these factors. Hunting, if not closely regulated may result in an overharvest. Severe hunting pressure contributed to the herd's decline from 1967 to 1971. Hunting has also created a strong imbalance in the adult sex ratio of the herd. Few large-antlered bulls are available in the population (less than 7 percent of the population in 1975). While this imbalance reduces the number of bulls available for hunters, it increases the number of calves the herd will produce for any given herd size.

About three-fourths of Nelchina caribou hunters are residents. Many of them are from Anchorage and Fairbanks. Relatively few caribou are taken by local residents. Hunter success has ranged from 34 percent to 40 percent since 1972, reflecting good accessibility of the herd to hunters. About 45 percent of successful hunters since 1972 used aircraft for transport. An additional 30 percent used off-road vehicles. With an early hunting season, caribou distribution makes them largely unavailable to road-based hunters. Most successful hunters reach caribou with aircraft access to lakes and unimproved strips in the Little Nelchina, Oshetna, Kosina, Watana, Butte and Coal Creek drainages. Well-used off-road vehicles trails also penetrate the Little Nelchina and Oshetna River areas, and the Butte Lake, Butte Creek and Watana Creek areas. A few caribou are taken by hunters using river access on the Susitna, McLaren and Nenana Rivers. Some caribou occasionally come within reach of hunters along the Denali Highway.

PROBLEMS

* Construction of the Trans-Alaska Pipeline may create an impediment to movement of caribou between summer and winter ranges. If caribou fail to cross the pipeline, the loss of useable range will reduce the sustainable size of the Nelchina herd. Despite provisions for buried sections of pipeline, if caribou movement across the pipeline corridor is impeded, the Department of Fish and Game will advocate provision of additional crossing facilities for caribou.

* The proposed Susitna River hydroelectric impoundments threaten to innundate some caribou habitat. In addition to loss of important caribou range, the impoundments may present a barrier to calving or post-calving movements of the Nelchina herd. If impoundments are constructed, regulation of water levels should be controlled to minimize the effects on caribou movements.

* Approximately 5,700 square miles of the area has been selected by Alaska natives under the terms of the Alaska Native Claims Settlement Act. Once title to public lands is conveyed to private ownership, public use on such lands may be prohibited. The Department should solicit the cooperation of private landowners to facilitate progressive management of caribou. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* The Nelchina population will increase slowly. Slight changes in population productivity resulting from shifting sex ratios will not significantly affect growth of the population or animals available for harvest.

* Controlled herd growth will allow partial recovery of depleted ranges which were overutilized during the period of large population size.

* Season lengths may be liberalized and season timing changed as the population increases.

* If off-road vehicle restrictions are imposed in some areas a greater number of hunters who do not utilize aircraft or off-road vehicles will have an opportunity to harvest caribou.

* Hunter transport services may see a gradual increase in demand as the allowable harvest increases.

24. NORTH WRANGELL MOUNTAINS CARIBOU MANAGEMENT PLAN

LOCATION

Those portions of Game Management Units 11 and 12 bounded on the south by the Cheshnina River and the crest of the Wrangell Mountains, on the west and north by the Copper River, and on the east by Suslota Creek, the crest of the Mentasta Mountains and the Nabesna Glacier and River.

MANAGEMENT GOAL

To provide an opportunity to hunt caribou under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

2. Maintain early-season use of caribou.

3. Maintain a minimum pre-calving caribou population of 2,500.

4. Maintain a minimum post-hunting season population sex ratio of 35 bulls per 100 cows.

5. Encourage fire suppression on caribou calving grounds and selected wintering areas.

6. Discourage land-use practices which adversely affect the wilderness character of the area.

THE SPECIES

The Mentasta caribou population has numbered between 2,000 and 2,500 animals for the past 15 years. A census during the summer of 1975 showed 2,456 caribou of which only 19.5 percent were calves. Bull caribou have usually been separated from calf-cow aggregations during the summer, so the total herd size is probably larger. Natural mortality is suspected to be the major factor limiting population growth at this time. The cause of the low natality of early calf mortality indicated by the low proportion of calves was unknown. The condition of the range is unknown. There is a relatively large proportion of large bull caribou in the Mentasta herd reflecting the effects of a relatively small hunter harvest.

Harvests now approximate five percent of the population. Harvests have rarely been excessive with the possible exceptions of the 1970 and 1971 harvests, but overlaps in winter distribution with the Nelchina herd in the vicinity of the Nabesna Road confuse harvest data analysis for those years. The herd is vulnerable to overharvest when caribou occupy winter ranges near the Nabesna Road during hunting seasons. A characteristic of hunter harvests is high selectivity for large bulls. Hunter harvests from the Mentasta herd during the past 4 years have averaged 74 percent bulls, indicating the continuing availability of large bulls. Approximately one-third of past harvests have been by nonresidents, and most of these hunters were probably on guided hunts. The herd is relatively inaccessible during the current early hunting season, with most hunters being flown in to dirt airstrips or small lakes as access points into the hunting

area. Horses and off-road vehicles are used to a limited extent. This type of hunt, where most hunters use aircraft to reach areas that they hunt on foot, frequently provides a high level of enjoyment per animal harvested. The harvests during recent years have mainly been at subalpine elevations on the slopes of Mt. Sanford and Mt. Drum. Most visitors to this area are hunters.

PROBLEMS

* Almost half the area is proposed for inclusion into the Wrangell-St. Elias National Park. Under Park Service management, existing subsistence use purportedly would continue but sport use of caribou would not be allowed. The Department should support congressional legislation which will provide for continued recreational caribou hunting in this area.

* About one-third of the area is withdrawn pending selections by Alaska Native village and regional corporations under the terms of the Alaska Native Claims Settlement Act. Private landowners may prohibit public trespass for hunting. The Department should solicit the cooperation of private landowners to facilitate progressive management of caribou. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* With increasing hunter pressure, the wilderness character of the area may deteriorate if more mechanized vehicles are used and more access trails are developed. Restrictions on hunting use of mechanized transport to designated routes or points of access may be instituted when aesthetics are adversely affected.

* Natural mortality on this herd has limited the degree of human utilization. Whereas current harvests have been about 5 percent of the herd size, it would be desirable to harvest 10 to 15 percent of the herd annually. However, increased harvest levels could not be maintained without a concomitant decrease in natural mortality. Recent evidence indicates that calf natality or survival is below normal. Exact causes of the high natural mortality should be identified and reduced to a lower level where possible.

IMPACTS

* The current number of pre-calving adult caribou, probably over 2,000, would be increased somewhat to reach the objective of 2,500 adult caribou.

* Neither restrictions on hunter density nor restrictions on access methods are foreseen in the near future.

* Opportunities for nonconsumptive use would not be changed under the proposed management.

* Use of air taxi services and guides has been moderately high and would remain unchanged.

* Protection of range from fires at caribou calving grounds and in areas of frequent overwintering would maintain critical food sources, although some portions of the timbered habitat should be allowed to burn to provide forage for local moose herds.

* Wolf numbers may be managed to obtain the desired abundance of caribou, as well as other species.

BISON IN SOUTHCENTRAL ALASKA

During historic time bison (*Bison bison*) in Southcentral Alaska have originated from transplants from the Delta bison herd, itself the product of an introduction from Montana in 1928. The Copper River herd resulted from a transplant of 17 bison to the Slana area in 1950, a transplant intended to establish a herd on the upper Nabesna River. Instead these animals traveled south from the release site and during the 1950's found a suitable year-round range near the Copper River in the Dadina River-Chetaslina River vicinity. By 1962, 61 adult bison were counted and in 1964 80 adults were observed. Since that time the herd size has been stabilized by hunting. Bison seen in areas other than their present home range have died or disappeared.

Another transplant of bison to Southcentral Alaska was made in 1962 when 35 bison were released in the Chitina River valley. Most of the Chitina transplant died during the winters of 1963-64 and 1964-65. However, a small band of about seven adults became established on the upper Chitina River above the confluence of the Tana River during 1963, either from the Chitina transplant, or from wanderers of the Copper River herd. The Chitina herd has increased since its establishment. Twenty-six adults were seen during 1974.

Bison are grazing animals requiring grasses, sedges and forbs for forage. Such vegetation in Southcentral Alaska is largely limited to river bars, streamside bluffs and meadows in timbered habitat. Grasses on the Copper River bluffs begin to leaf out early in the spring and are important early forage. Most bison gradually migrate up the Dadina River in the spring where grasses on dry bars serve as the primary summer forage. Increasing use is made of forbs and grasses growing as an understory under conifers and in meadows during late summer and fall. Timbered areas are used as resting habitat throughout the year and as protection from winter winds. Availability of winter forage is the most crucial factor limiting Southcentral bison herds. During autumn, Copper River bison move down from their summer ranges on upper Dadina River gravel bars to utilize sedges on frozen wet meadows and grasses on and along the edge of the windswept Copper River bluffs. When deep snows limit the availability of sedges in meadows, heavy grazing pressure is exerted on small areas of suitable bluff habitat. The density of grasses on grazed sites is one-third that on ungrazed sites. Starvation of bison has occurred during severe winters in these areas.

Chitina River bison apparently utilize Chitina River bars in summer as well as winter. Much of the potential bison range in this area has been severely damaged by grazing of horses. The remaining range used solely by bison is changing rapidly, apparently due primarily to reduced ground moisture. Management of the Chitina herd will be necessary to avoid heavy winter mortality.

Starvation during winters having deep or crusted snow is thought to be the primary cause of natural mortality, with calves of the year especially vulnerable. Predation has not been an apparent cause of losses, possibly because bison are especially rugged and aggressive in their own defense. Observed natural losses to other causes have been negligible.

Carefully controlled sport hunting has been used successfully to stabilize the Copper River herd. The allowable harvests have been predetermined, and the seasons have been closed when the desired harvests were approached. Finer adjustment of bison numbers to longterm maintenance of the bluff habitat has been occurring as more detailed knowledge of bison winter range, yearling recruitment, and seasonal

bison distributions as related to winter snowfall have become available. Hunters have gained access to the Copper River herd primarily with aircraft, although use of boats has increased in recent years. Most hunters have been Alaskan residents from Anchorage and from Copper River basin communities.

The Chitina bison herd has not been hunted, but it is believed that the herd's future welfare will depend on preventing herd growth substantially above its current level of abundance. Sport hunting is probably the best way to limit growth of this herd.

PROBLEMS

* Suitable year-round bison range is extremely limited in Southcentral Alaska. Loss of any component of existing range to human development or use by domestic livestock would have a strong deleterious 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 must be managed to maintain herds in balance with the long-term productivity of winter habitat. Range enhancement through fertilization, burning, or seeding may be economically and practically feasible. Any transfer of bison range to private parties or to the National Park Service may markedly complicate or preclude management of herd size or habitat enhancement projects.

3. COPPER RIVER BISON MANAGEMENT PLAN

LOCATION

In Game Management Unit 11, that area bounded by the Kotsina River and Long Glacier on the east, the Copper River on the southwest, the Nadina River and Glacier on the northwest and the crest of the Wrangell Mountains on the northeast.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt bison under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of bison.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport if necessary to maintain aesthetic hunting conditions.

2. Maintain a post-hunting season population of 60 bison.

THE SPECIES

The Copper River bison herd was established by a transplant of 17 bison from the Delta herd to the Nabesna Road in 1950. The herd relocated to the Dadina-Chetaslina River vicinity during the 1950's and increased steadily until stabilized by hunting at a level of 70-90 overwintering adults. Relatively little natural mortality has been observed in this herd. Observed carcasses and skeletons indicate that starvation during winters with deep snows is the most common source of natural mortality. Accidents, such as drowning and falling, and predation of calves are probably less important mortality factors.

Bison winter range has consisted primarily of sedges found on bog and pond margins, and grasses found along the Copper River bluffs. The windblown bluff habitat appears to have been relatively more important during winters with deep snowfall. Sedge within bogs is not utilized substantially before ground freeze; therefore, sedges have not deteriorated under heavy grazing pressure. The Copper River bluff habitat, however, Has deteriorated under grazing pressure and trampling damage. Grasses, the main forage on the bluffs, are being replaced by perennial forbs with large woody rootstalks that are resistant to grazing and trampling. Past bison use has reduced overwinter carrying capacity of the bluffs.

Hunting of Copper River bison (to maintain the population in balance with its habitat) began in 1964. An average of 14 bison harvested during 8 hunts in the past 12 years has stabilized herd size. Low natural mortality and close control of harvests by registration hunts have allowed for relatively intensive recreational utilization. Although there have been no restrictions on sex of kill, harvests have averaged 54 percent bulls.

Hunter success is dependent to a large degree on methods used and timing of periods during which hunting is allowed. Use of aircraft for spotting bison markedly increases hunter success because bison seen grazing in an area during any one day of the fall hunt are likely to be in the same

area on the following day. Bison graze on forbs in the timber during late summer and early fall where they are difficult to see and approach. By early winter, many bison have moved to frozen bogs and the Copper River bluffs where they are more easily seen and approached. Snow aids in locating and tracking bison. The trend of management has been to increase the quality of the hunt by adjustments that also decrease hunter success.

All but a small percentage of hunters participating in the Copper River bison hunts have been Alaskan residents. During the 1973 and 1974 harvests, 54 percent of the hunters were from Anchorage, 8 percent were from Fairbanks, 24 percent were from Copper River valley localities, and 13 percent were from other locations. During 1973 and 1974 harvests, 53 percent of the hunters registering for the hunt used aircraft, 40 percent used boats and 3 percent used horses and off-road vehicles. Not all hunters registering have hunted. Boats and aircraft have been the only practical means of transportation. There has been a minimal amount of guiding activity, although use of commercial air taxi operators has been high.

Because hunters have selected for larger bulls, there are few if any trophy-class bulls left in the herd. Younger bulls are not as distinguishable from cows by hunters as are older bulls, and heavy hunting pressure will probably not excessively lower bull: cow ratios.

PROBLEMS

* The size of the Copper River bison herd must be controlled in relationship to winter range on the Copper River bluffs. Range studies have shown that trampling has markedly reduced grass density, thereby increasing the risk of starvation of bison during winters with deep snowfall when bison are forced to depend on grasses on the bluffs for food. Range studies have also shown that trampling is altering the vegetation, with forbs resistant to trampling replacing shallow-rooted grasses. This herd should be gradually reduced below its current level until trampling damage is lessened. Range rehabilitation measures, such as fertilization or selective herbicides that act on forbs but not on grasses, may arrest the deterioration of the range.

* Most of the herd's range is either on land recently selected by Natives under terms of the Alaska Native Claims Settlement Act or is on land included in the proposed Wrangell-St. Elias National Park. Hunter access or range rehabilitation measures may be prevented or restricted. The Department should solicit the cooperation of private landowners and the National Park Service to facilitate progressive management of bison. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* The total herd size would gradually be reduced to 60 over-wintering adults and maintained at that level for 3 to 5 years. Ongoing range studies would monitor vegetative changes and herd size would subsequently be adjusted up or down.

* Numbers of hunters in the field may be controlled by permit.

* Mechanized hunter access will be restricted to designated corridors or areas.

* Photographers and other nonhunters would benefit from having a bison herd maintained at an optimum sustained level. Restrictions on numbers or access of nonconsumptive users are not foreseen.

* Range rehabilitation procedures may improve the density and growth of grasses while removing unpalatable, competitive forbs. Improved forage conditions would minimize winter mortality during severe winters.

* Use of the area by other species or for other purposes is not expected to be affected substantially by this bison management plan.

4. CHITINA BISON MANAGEMENT PLAN

LOCATION

In Game Management Unit 11, the drainage of the Chitina River upstream of the confluence of the Chitina and Tana Rivers.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt bison under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of bison.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control the number and distribution of hunters to maintain the harvest at desired levels and to maintain uncrowded hunting conditions.

2. Maintain the bison population at the carrying capacity of its habitat.

THE SPECIES

The Chitina bison herd has grown from a nucleus of about seven adult bison that survived the winter of 1963-64, following the transplant of 35 bison to the area in 1962. In 1976 the herd numbered 45 bison, including calves. A few wandering bison from the Copper River herd were observed after joining this herd during the 1960's, contributing to the increase. The average increase in total numbers each year since 1965 has been over 18 percent per year. The herd contains several large bulls.

The only substantial natural mortality factor known for this herd has been starvation during winters with deep snowfall. Predation by wolves or bears has not been observed. This herd has never been legally hunted by man.

Observations of this herd during both summer and winter have shown the herd to usually be north or east of Bear Island. Ground surveys near Bear Island have tentatively identified silverberry as the principal winter browse plant. Smaller amounts of balsam poplar and willow trees are also utilized. Silverberry plants in the vicinity of Bear Island show evidence of use by both bison and moose. Many plants are "hedged" and appear to be slow in recovering from heavy utilization. Patches of silverberry plants are dying due to unknown causes, possibly insufficient ground moisture. There is no alternate winter range of substantial quantity along the upper Chitina River. Dry bars above and below the Chitina bison herd's range have been utilized by horses which are in direct competition with bison for silverberry forage. Examination of the dry bar below Bear Island indicates that overwintering horses have almost destroyed the area as bison winter range by excessive utilization of silverberry. Because the limiting factor on this herd is winter forage, and since bison numbers have been rapidly expanding while preliminary range surveys show that the principal winter browse plants have been dying, and because substantial nearby alternate winter forage does not exist, there is a strong possibility of a large-scale winter die-off during the next winter with deep snow.

No legal hunting seasons have been established to date. Once hunting begins, continued availability of trophy-size bulls could be managed by limiting future harvests of bulls to allow some bulls to live to an old age. Because the herd is not accessible by highway vehicle and a relatively long air charter flight is required to view the herd, little nonconsumptive use by the public has occurred.

PROBLEMS

* Silverberry, apparently a key browse species for Chitina bison, is declining in the currently-used bison range. Continued increase in herd size may endanger the herd's immediate welfare by heightening the risk of large-scale starvation during a winter with deep snow and may endanger the herd's long-term welfare by overutilization of browse. Pending more definitive range studies, herd size should be gradually reduced through annual harvests. In addition range rehabilitative measures such as seeding and application of fertilizer may be employed. Competition with horses should be reduced or eliminated by such measures as requiring supplemental feeding of horses, corraling and feeding horses, or removing horses during the winter.

* Land utilized by the Chitina bison herd is included in the proposed Wrangell - St. Elias National Park. Traditional National Park Service polices will prohibit recreational hunting of bison if the park is established.

IMPACTS

* The total herd size will gradually be reduced to perhaps 30 animals and stablilized at that level pending more definitive range studies. Permits will be issued each year to obtain harvests of a specific number of cows and bulls to maintain a desirable bull:cow ratio which would ensure that a few trophy-class bulls remain in the herd. No specific attempt will be made to obtain maximum production of calves by altering population sex ratios.

* All hunters would have equal opportunity to obtain a permit to hunt bison. Time zoning would reduce hunter crowding. Additional transportation or methods and means restrictions would not be applied except to protect the habitat or prevent harrassment of bison.

* Competition with horses for winter forage will be reduced.

DALL SHEEP IN SOUTHCENTRAL ALASKA

Dall sheep (*Ovis dalli*) occupy alpine portions of all major mountain ranges in Southcentral Alaska. An estimated 2,000 sheep inhabit the Kenai Mountains north of Kachemak Bay and west of the Sargent Ice Field. About 3,000 sheep occupy the northwest and north slopes of the Chugach Mountains between Anchorage and the Canadian border, while another 3,000 are found in the Talkeetna and Watana Mountains. About 10,000 sheep inhabit the Wrangell Mountains, of which only the southwestern slopes are included in the Southcentral area. Approximately 2,000 sheep reside in the Alaska Range southwest of McKinley Park, however, only a relatively small part of this herd occupies the southeastern slopes which are included in the Southcentral region. These sheep are found primarily west of the Skwentna River and from Lake Clark Pass north to the Yentna River in those mountains protected from the heavy coastal snowfall by intermediate ranges. Sheep generally do not occupy the remaining south slopes of the Alaska Range, the south slopes of the Chugach Range, nor the eastern Kenai Mountains due to heavy accumulation of snow.

Like most northern ungulates, Dall sheep populations are subject to fluctuations in abundance. Numbers were reportedly high in the early part of this century. A major decline occurred in the 1930's and early 1940's, probably as a result of unusually severe winters, which left sheep herds throughout the state at low levels. Herds increased again throughout the 1950's and 1960's. Although data are not available for all populations, it appears that sheep numbers in Southcentral Alaska peaked in about 1968 and have been stable or declining slowly since then. Sheep populations are probably near the carrying capacity of winter ranges and may be expected to remain relatively stable or to decline with the occurrence of abnormally severe winters.

Dall sheep usually occupy alpine habitats. During summer, they occupy relatively large areas of their annual range and remain almost entirely above brushline. Alpine meadows and slopes are used for feeding and resting, while nearby cliffs or large rocky outcrops are required for escape cover. By early November, sheep begin to congregate on their winter ranges. These are areas of limited size where forage is available throughout the winter on windblown ridges or slopes, and where cliffs and outcrops are available to enable escape from predators. A herd occupying many square miles of summer habitat may be restricted to, and limited in size by, a winter range of relatively few acres. Some herds occupy winter habitats several miles removed from their summer range and migrate between the two, sometimes following traditional routes leading across timbered valleys. Breeding takes place from mid-November through early December.

With the beginning of snow melt in spring, most sheep move down from their windswept wintering grounds to the lower, south-facing slopes where green plants first emerge. At this time, they may be found down in alders and near the upper limits of timberline, much lower than at any other season.

Lambing occurs in May and early June. Parturient ewes seek isolation in the most rugged cliffs available to give birth to their single lambs. Escape terrain is particularly vital at this time to protect the comparatively immobile mothers and newborn young from disturbance and predator attack. Upon completion of lambing, the ewes and young follow the retreating snowline upward and move onto summer ranges. Rams may precede ewes by several weeks in moving to summer range.

Subsequent to lambing, sheep use natural mineral licks extensively. A number of such licks are well known in this region and others undoubtedly exist. Sheep, especially females and young, will frequently travel several miles over well-worn trails to congregate in mineral licks where

they spend hours eating the mineral-rich soil. Use of licks is heavy in early summer and gradually lessens as summer advances. Natural mineral licks are apparently of extreme importance to many sheep, although mineral requirements are not yet clearly understood. Some herds apparently do not have access to mineral licks and may substitute the use of certain plant species to obtain the required minerals.

Dall sheep are primarily grazing animals; bunchgrasses, particularly alpine fescue, and sedges make up the majority of their annual diet. These are supplemented by smaller amounts of browse such as alpine willow. Various forbs are consumed during summer, while lichens become important quantitatively in winter.

Climate is the most important factor regulating sheep numbers and distribution. Deep, dense snows prevent sheep from reaching winter forage and are important in limiting sheep distribution, particularly in the southern limits of Dall sheep range where heavy snow accumulations occur due to maritime influences. Sheep require relatively light snowfall and wind to survive during winter. Cold temperatures keep the snow powdery and soft, allowing winds to remove it from ridgetops and slopes, exposing winter forage. Warm winters or thaws result in dense, crusted snow which the sheep cannot dig through nor the wind remove. By late winter, sheep are often restricted to small areas of exposed, wind-scoured, low-quality vegetation which provides less nourishment than is used in daily activities. Sheep then survive partially by metabolism of stored body fat and tissue. If spring arrives late, body reserves may be used up and mortality occurs. Exceptionally severe winters, such as those which occurred in the early 1940's, have been the only factor known so far to have caused major "crashes" in Dall sheep.

Overwinter survival of lambs is normally low in comparison to adult sheep and severe winters depress it further. Newborn lambs are particularly susceptible to adverse spring weather such as cold wind, rain, or snow during the critical lambing period. Summer weather, while not as critical as that in winter, is also important in providing an adequate growing season and enough forage to enable sheep to store sufficient body fat for survival during winter.

Predation does not appear to be important in population control except under exceptional circumstances, such as when deep snows force sheep to feed far from protective cliffs. Parasites, diseases and accidents also take their toll, but apparently are usually of minor importance.

Sheep were originally hunted for subsistence and the market during the early days of Alaska's settlement but they now are taken primarily by recreational hunters. Traditionally, only mature rams with horns of 3/4 curl or greater configuration have been legal game during an August-September season. Dall sheep are recognized worldwide as one of North America's outstanding trophy animals, and they are an important sport-hunted species in Southcentral Alaska.

Sheep harvests in the area have been characterized by increases in numbers of hunters (about 1,890 in 1974) and slight decreases in number of rams taken (1967-1974 average of 463 rams). Success has slowly decreased with 27 percent of sheep hunters successful in 1974. About 30 percent of the harvest has been taken by nonresidents, who presently make up only 20 percent of the hunters. Their greater hunting success is probably attributable to the requirement that nonresidents must be accompanied by a guide while sheep hunting. Success of all hunters would undoubtedly be lower, were it not for the use of mechanized off-road vehicles, including aircraft, that are used for transport to otherwise inaccessible hunting areas.

The hunting pressure in Southcentral Alaska is causing a decline in the number of large rams in some herds even though adequate breeding stocks

remain. Increasing numbers of hunters are competing for a relatively stable or declining number of legal rams. Under these circumstances decreasing size and numbers of trophies taken and reduced hunter success can be expected.

While ram-only hunting harvests do not control sheep populations, carefully regulated, experimental either-sex hunts have proven feasible in controlling herd numbers. These provide more animals for harvest while apparently increasing lamb production and survival. Such intensive management may become necessary as hunting pressure increases.

Nonconsumptive uses of Dall sheep also are important. Two areas in the region are currently protected from all sheep hunting in order to provide easily accessible and relatively natural sheep herds for public viewing, photography and scientific study. These are at Sheep Mountain on the Glenn Highway and Cooper Landing on the Kenai Peninsula. Both are popular with tourists and residents alike.

PROBLEMS

* Expanding human land use may adversely affect sheep through the alteration of important habitat or through disturbance of sheep use of critical areas. Mineral licks, winter ranges, lambing areas, and migration routes are particularly susceptible to damage or interference from such activities as mining, 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 reduced availability of legal rams, even in once-remote and lightly hunted areas. In some locations most legal rams are removed annually. In some areas the average size of rams available to hunters has decreased. 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 should receive greater emphasis.

* Limitation of use to rams of 3/4 curl or larger has had little significant effect on population size or trend, even in areas where most legal rams are removed by hunters. Thus, ram harvests are of little utility to management where population control or productive manipulation is desirable. The effect of 3/4 curl management has been to create a strong imbalance in sheep sex ratios in many herds. Since some sheep populations are near the carrying capacity of the range and may be declining in some areas, the strong imbalance in sex ratios coupled with heavy hunting pressure results in few rams being available to hunters. Additionally, since relative densities of sheep populations are high, the production and survival of lambs is low. Low lamb survival results in relatively few legal rams being recruited into the population. Management of harvests providing the option for either sex hunting could benefit use significantly as well as benefit the resource. Harvests of either sex would allow for more animals to be taken. Reduction in population density could improve lamb production and survival, as well as decrease potential adverse impacts of severe winter weather on the total population. Increased production and survival of lambs would offset larger harvests and would increase the recruitment of rams to the population.

7. WRANGELL-MENTASTA MOUNTAINS SHEEP MANAGEMENT PLAN

LOCATION

The Wrangell and Mentasta Mountains in Game Management Unit 12 and that portion of Game Management Unit 11 lying to the east of Boulder Creek and north of Mt. Wrangell.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain minimal restrictions on hunter access and methods of hunter transport.

2. Maintain the sheep population in balance with its habitat, if possible.

3. Discourage land use practices that adversely affect important sheep habitat.

THE SPECIES

The Wrangell-Mentasta Mountains contain some of the best sheep habitat in Alaska, and as a result some of the largest sheep populations are located in this area. An estimated minimum population of 6,500 sheep inhabit the area. Sheep populations of highest density appear to occur near Wiki Peak near Ptarmigan Lake in the Wrangells and from Noyes Mountain southeast to the Nabesna River in the Mentasta Mountains.

Production of lambs appears to be high throughout the Wrangell-Mentasta Mountains, although survival rates to two years of age are generally unknown. Limited surveys indicate fluctuations in lamb survival rates from year to year. Recognizable rams comprise between 17 and 32 percent of various populations in the area.

The Wrangell and Mentasta Mountains have long been popular sheep hunting locations. Annual harvests have ranged from about 120 to 225 sheep, with about 70 percent of the kill occuring in drainages of the Nabesna River and in the vicinity of Ptarmigan Lake. In recent years approximately 400 hunters have reported hunting in the area. Three-fourths of the hunters are residents, and their success rate is about 33 percent. Nonresident hunters who are required to employ guides, have a hunting success of 75 percent.

Harvests have reduced the percentage of legal rams in the population and the availability of large horned rams. This is particularly obvious in the Nabesna River drainage and part of the Wiki Peak area, both of which support most the sheep harvest. However, there are portions of the area that receive little hunting pressure and have a relatively large number of large horned rams in the population. As hunting pressure increases it is expected such areas will receive more hunter effort and will exhibit corresponding reductions in proportions of large rams.

Hunter access is primarily by means of aircraft and all terrain vehicles, although horses are used in the Chisana and White River drainages and, around Beaver Creek. All terrain vehicles are used in the Mentasta Mountains, particularly on the southwest side; aircraft are the common

access vehicle in other areas. A limited number of airstrips are available in the Wrangell-Mentasta Mountains, although some gravel bars are adequate for airstrips. Access in some areas, such as glacial regions and much of the Wrangells north of Beaver Creek, is limited to walking. Access from the road system is confined to the Mentasta Mountains where hunters walk from the Nabesna Road.

PROBLEMS

* Establishment of a Wrangell-St. Elias National Park may substantially reduce hunting opportunity in the area by restricting or eliminating sport hunting or excluding certain access means. The Department should advocate continued sport hunting in this important hunting area to the extent that it does not conflict with other important uses of the area.

* An expansion of mining activity in the Chisana area could result in excessive disturbance to sheep and possible abandonment of some range. The Department should delineate areas and advocate protection for critical sheep habitat, and propose limitations on resource development to minimize impacts on sheep through agreements and coordination with the land managing agencies.

IMPACTS

* The proportion of large rams in the populations will decrease, but productivity of populations will remain high.

* Without regulation crowded hunting conditions may occur in areas with good access.

13. RAINY PASS SHEEP MANAGEMENT PLAN

LOCATION

Game Management Unit 16.

MANAGEMENT GOAL

To provide an opportunity to hunt sheep under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

2. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

In June 1970, the only aerial survey conducted on sheep in Game Management Unit 16 was completed. One-hundred and forty-eight sheep were seen, most of them from the Happy River drainage to the west and south. No subsequent surveys have been made. Although not all sheep seen were categorized, 105 adults were seen of which 27 were rams; 18 others were lambs. It is unknown if the present population is lower or higher than it has been in the past. No habitat studies have been conducted. Predation by wolves, wolverine, eagles, and possibly bears occurs, but its importance is unknown. Winters are severe in the area and are probably the primary limiting factor to extended population growth.

Hunter pressure is light, but increasing. Two-hundred and thirteen sheep hunters were reported in the Rainy Pass area in 1974, and they harvested 21 sheep, while the average for the previous seven years was 151 hunters and 12 sheep. Since 1973, twice as many residents as nonresidents have hunted in the area. Guides have hunted sheep in this area for many years, particularly in the immediate vicinity of Rainy Pass. Most sheep are taken as trophies, but horn sizes have not been exceptional. Most hunters use aircraft to get into the area, then hike and camp out to take sheep. The only known trail in the area is the Iditarod dog sled trail and it is doubtful that sheep hunters use it.

PROBLEMS

* Access to sheep populations in this area is limited to a few landing strips and lakes, with rivers restricting access by separating some sheep range from those landing sites. This makes it difficult to distribute sheep harvest over this area. Limited access concentrates hunters thereby decreasing the quality of the hunting experience in localized situations. If crowding by hunters is found to be detrimental to the quality of hunting in this area, permits may be issued to limit hunter densities where hunters concentrate.

IMPACTS

* Hunter densities will remain at a low level.

* Some guides may be affected if permits are not awarded to their clients.

14. WESTERN TALKEETNA MOUNTAINS SHEEP MANAGEMENT PLAN

LOCATION

Those portions of Game Management Units 13 and 14 enclosed by a line drawn from the Chickaloon River headwaters to Kosina Creek, down Kosina Creek to the Susitna River, down the Susitna River to Cook Inlet, then up the Matanuska River and the Chickaloon River to the starting point.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to distribute hunting pressure through the area and to maintain the harvest at desired levels.

2. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Approximately 80 percent of the sheep habitat in this area was surveyed by aircraft in 1974. A total of 423 sheep were seen including 114 rams, 246 ewes (and young rams) and 63 lambs. Little is known about sheep population size prior to the survey. It is probable that numbers were higher in the past than they are now.

Wolves, eagles, grizzlies, black bears and coyotes are all present in the area and are potential predators of sheep; however, their impact is unknown. Weather may be an important factor in population regulation; icing conditions are known to have caused declines in several sheep populations around the state. Little is known about the condition of the sheep range in this area; however, the ewe:lamb ratio is probably an indicator of fair to good range condition. No known extensive fires have taken place on the sheep range.

Hunter interest in the area seems to be low. This lack of interest may be due to the comparative difficulty in getting to most of this sheep habitat compared to other more accessible areas that have higher density sheep populations. Ram harvests in this area averaged 13 per year from 1970 through 1975 with about one-third of this harvest occurring in the Chickaloon River drainage. The proportion of legal rams in the population has been reduced by hunting in easily accessible areas. Most hunters in this area fly to camps and then hunt on foot, but this form of access is limited to a few suitable landing sites. Nearly all sheep hunting is recreational, although some hunters may hunt primarily for meat. Guided hunts are infrequent in the area. Sheep hunting seasons have traditionally been from August 10 through September 20 for 3/4 curl or larger rams only.

PROBLEMS

* Little information about sheep populations or the factors limiting them in this area is available. The Department should collect more productivity, mortality and range data for these populations.

* Access to sheep populations is restricted by the remote and rugged nature of much of the area. Final land disposition from the Alaska Native Claims Settlement Act will greatly increase the amount of private land within sheep habitat, as well as along access routes to sheep habitat, and may result in further access restrictions if private land is posted to trespassing. The Department should solicit the cooperation of private landowners to facilitate progressive management of sheep. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* A proposal to make the southwestern portion of the Talkeetna Mountains into a state park could eventually lead to the closure of that portion of the area to hunting. Should the park become a reality, the Department should work with the Division of Parks within the state Department of Natural Resources to develop a separate management plan for the Park emphasizing a blend of uses.

IMPACTS

* Permits may eventually be required to hunt in some areas.

* The number of hunters may increase as access to the area improves and restrictions in other areas result in more hunters willing to hunt in the western Talkeetna Mountains.

15. NELCHINA BASIN SHEEP MANAGEMENT PLAN

LOCATION

Game Management Unit 13 except for the areas included in the Tonsina and Sheep Mtn. Management Plans; that portion of Game Management Unit 11 lying to the west of Boulder Creek and the crest of the Wrangell Mtns; and that portion of Game Management Unit 14A lying south of the Matanuska River.

MANAGEMENT GOAL

To provide an opportunity to hunt sheep under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions and to maintain the harvest at desired levels.

2. Encourage public viewing and photograhpy of roadside sheep populations.

THE SPECIES

The Nelchina Basin has had fairly abundant sheep populations since at least the mid-1950's. Inventory counts have been made of portions of this area at various times in the past decade. In 1969, 833 sheep were counted in the Chugach Mountains east of Coal Creek. In 1973 counts in the Chugach Mountains west of Coal Creek totalled 475 sheep. Also in 1973, 176 sheep were counted in the Watana Hills, and 1542 sheep were seen in the Wrangell Mountains portion of the area. In 1974, 1558 sheep were counted in the Talkeetna Mountains portion of the area. The northern Talkeetna Mountains may contain an additional 1000 sheep. A total estimate of 5600 sheep in the Nelchina Basin area is conservative. Of the sheep that were classified, 9 percent were legal rams and 14 percent were lambs.

Major natural mortality factors include severe winters and wolf predation. Sheep habitat in this area has not been studied. Compared to other areas in the state, this area has only a moderate potential for producing large-horned sheep. Sheep here generally have 3/4-curl horns at 5 years of age and full curl at 8 years.

The average annual harvest from the Wrangell Mountains portion of the area has been approximately 71 rams. Harvests in the remainder of the area have averaged 152 rams annually. The current proportion of legal rams in the population, 9 percent, indicates that the combined annual harvest of 223 rams has not been excessive for this area. Hunter success has averaged 44 percent, being highest in the Wrangell Mountains and lowest in the eastern Talkeetna Mountains. Seventy-five percent of the hunters have been Alaskan residents, with the eastern Talkeetna Mountains most used by residents. A smaller proportion of Alaskan hunters use the Wrangell Mountains. Most sheep hunting is a combination of trophy and recreational use, although domestic use of the meat is important to many hunters. Most sheep hunting takes place early in the season. Early arrival of winter snow cover has markedly reduced harvests in the past. Most hunters use air transportation for access to the hunting areas. Horses, off-road vehicles, and foot travel from nearby highways are other less used means of transportation.

PROBLEMS

* The proper stocking level of mountain sheep on alpine ranges is unknown. Dall sheep studies on the Kenai Peninsula indicate higher productivity is possible where sheep numbers are controlled. Population levels cannot be managed by means of ram-only harvests. Range and sheep inventory data should be accumulated on major sheep ranges in the Nelchina area, and a pilot study should be initiated where sheep numbers are lowered and stabilized by hunting both ewes and rams.

* Land management policies and regulations by government and private landowners may limit or preclude human activities, which may, in turn, affect important sheep habitat or the aesthetic qualities of sheep hunting in the area. Cooperative land use planning and management between the Department, land managing agencies and private landowners may resolve conflicts through mutually acceptable solutions.

IMPACTS

* Depending on pilot studies now underway in other portions of the state, sheep numbers may be reduced by ram and ewe harvests until maximum annual increments of subadult sheep are reached. Stabilizing sheep numbers at this level should produce a reduction in overwinter mortality, larger lamb crops and increased recruitment of legal rams into the population.

* More restrictive regulations affecting hunter numbers or methods of transport will not be implemented except to resolve expressed, hunter dissatisfaction arising from crowding or transportation conflicts.

16. TONSINA SHEEP MANAGEMENT PLAN

LOCATION

In Game Management Unit 13, that area bounded on the west by the Richardson Highway, on the north by the Edgerton Highway, on the east by the Copper River, and on the south by the north bank of the Tasnuna and Lowe Rivers.

MANAGEMENT GOAL

To provide an opportunity to hunt sheep under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control hunter numbers and distribution to maintain uncrowded hunting conditions.

2. Control access and methods of hunter transport to favor walk-in hunters.

3. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Dall sheep in this area may number 200. Quantitative data on sheep population status and on sheep range conditions are not available.

Prior to 1973 sheep hunters made relatively light use of the Tonsina area. Although all-terrain vehicle access was possible via the Bernard Creek, Tiger Mine and Tonsina Trails, the number of hunters was small. Airstrips were not available and the lakes near sheep habitat were too small for safe aircraft landings. In 1968, 1970 and 1972 no sheep were reported harvested in the area. Aircraft landing strips were established and two guides operating with aircraft and a few local residents using pack animals started using the area in 1973 and 1974. Of the 24 legal rams reported taken in the area since 1968, eleven were killed in 1974. The area was designated a walk-in area (no mechanized vehicles or pack animals from August 5 to September 30) during 1975. Five legal rams were reported taken in 1975, four by Alaskan residents and one by a nonresident hunter.

PROBLEMS

* Non-compliance with the no-mechanized vehicles regulation was discovered in the area during 1975. The Department should actively disseminate information on access restrictions recently imposed on the Tonsina Management Area.

IMPACTS

* The Tonsina Management Area will continue to provide sheep hunting under aesthetically pleasing conditions.

* Hunter densities will be maintained at a low level by a permit system with a limited number of permits to be drawn, thereby limiting hunting opportunity.

17. UPPER CHITINA VALLEY SHEEP MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 11 in the upper Chitina Valley, bounded on the west by the Tana and Nizina Rivers, on the north by the crest of the Wrangell Mountains, on the east by the Canadian border, and on the south by the crest of the Chugach Mountains.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large sheep.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt sheep under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Limit the harvest of rams.
2. Control access, number and distribution of hunters and methods of hunter transport to maintain aesthetic hunting conditions and to distribute hunting pressure throughout the area.
3. Discourage land use practices that adversely affect the wilderness character of the area.

THE SPECIES

An aerial count of most of the Upper Chitina Valley area during 1973 disclosed 758 sheep of which 13 percent (96) were legal rams. Some of the best of this sheep habitat was not surveyed during 1973, and not all of the sheep in the surveyed areas were seen. The area probably contains 1,000 to 1,500 sheep, including 120 to 190 legal rams. Trend counts in portions of the upper Chitina Valley show that sheep populations have been relatively stable since at least the mid-1960's. Although relatively low lamb crops have been frequently seen, causes of lamb mortality and the condition of the range are unknown. This area has great potential for producing large-horned Dall rams. Not only have some of the largest sheep come from this area, but they attain their horn growth at an early age. On the average rams from this area attain three-quarter-curl by 5 years of age and full-curl by 7 years of age.

Current sheep hunting regulations limit hunters to one three-quarter-curl ram or larger during an annual 42-day season. Ram harvests from the Wrangell Mountains portion of this area for the 1972-75 seasons have annually averaged 84 rams. Harvests from the Chugach Mountains portion of this area have annually averaged 3 rams during the same period. Sheep density in the Chugach portion is much lower and access is difficult. Presently fewer large rams are available in the Wrangell Mountains than several years ago, although the total number of legal rams harvested has not changed appreciably. Seventy percent of the hunters since 1971 have been residents of Alaska, but most rams have been killed by nonresidents. Nonresidents are twice as likely to kill a sheep as are residents, reflecting the advantages of hiring a guide. Most sheep hunting in this area has been for trophies. Hunter access has been almost exclusively by aircraft.

PROBLEMS

* Although the proposal for establishing a Wrangell-St. Elias National Park includes provisions to allow high quality sheep hunting within the park at least temporarily, Congressional action establishing a park may eliminate any provisions allowing hunting. The importance of this area for sheep hunting must be conveyed to Congress if hunting opportunity is to be retained in the area.

* Sheep in the Wrangell Mountains have been relatively abundant for at least 10 years, but population declines can be expected to occur as they periodically have on many other sheep ranges in Alaska. Manipulation of key factors such as sheep population structure and numbers and reduction of predation may become advisable to ameliorate the effects of population reductions due to causes other than hunting. Such actions may become difficult or impossible under National Park Service management. Detailed cooperative planning including innovative management concepts will be needed to benefit all uses.

IMPACTS

* The proportion of large rams in the population will increase. Present sex ratios and productivity of the population will not be affected under ram-only harvests.

* Sheep harvests will be distributed among specified drainages by allocation of permits. Hunter crowding will be minimized.

* All hunters will have an equal opportunity to obtain permits, but not all hunters who desire to use specific portions of the area will be allowed to do so.

* Limits on the number of hunters will reduce the participation by guided hunters and will reduce demand for air taxi services.

* Harvests of mountain goats by sheep hunters will be reduced.

18. SHEEP MOUNTAIN SHEEP MANAGEMENT PLAN

LOCATION

In Game Management Unit 13, the Sheep Mountain Closed Area: the boundary beginning at Caribou Creek, Milepost 107 Glenn Highway, thence easterly along the Glenn Highway to Milepost 123, thence along a line north to Squaw Creek, thence downstream to Caribou Creek and to the point of beginning.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round sheep hunting closure in the area.

2. Encourage public viewing and photography of sheep and enhance viewing facilities.

3. Control access and activities of viewers and photographers, if necessary, to reduce disturbance to sheep.

4. Protect sheep from unnatural disturbance and harassment.

THE SPECIES

Observations from local pilots and guides in addition to Alaska Department of Fish and Game counts suggest that Sheep Mountain sheep are part of a more extensive subpopulation extending to the north and possibly to the south as well. Strong winds along the Matanuska River make portions of Sheep Mountain snow free and usable as winter range. In addition, the southern exposures of Sheep Mountain provide an area where grasses and forbs leaf out early in the spring. Sheep Mountain is probably an attractive core area of a much larger sheep range. Past total counts have varied from 84 to 227 sheep with legal rams usually comprising 20 to 25 percent. This is a substantially higher proportion than adjacent areas in the southern Talkeetna Mountains; however, percentages of lambs have been substantially less than in adjacent areas. A combination of protection from hunting plus segregation of the sheep population probably accounts for these composition differences. No habitat studies have been made on Sheep Mountain.

Sheep Mountain has been closed to sheep hunting since statehood. Past use has been mainly recreational viewing and photography. A large number of people look for sheep while driving past Sheep Mountain, a smaller number view sheep from roadside pull-outs, and a few people climb Sheep Mountain for close range viewing and photography. Sheep are usually close to the road and easily viewed during the spring, but they are usually higher on the mountain and less viewable during the remainder of the year. The lower portion of Sheep Mountain is not too difficult for humans to climb given sufficient time and stamina.

PROBLEMS

* Mining on Sheep Mountain and additional human settlement at its base will detract from the aesthetic qualities of viewing sheep in a setting of alpine scenery. This area should be given a land

classification that will make sheep viewing the highest priority of land use. Mining, use of motorized vehicles, and additional human development should be prohibited or severely restricted through time and area zoning.

* It is possible that excessive nonconsumptive use at higher elevations in the future may disturb sheep and cause their abandonment of areas visible from the road. Nonconsumptive use to that extent should be curtailed if it becomes a problem, possibly by restricting users to roadside areas.

IMPACTS

* No substantial change from past management objectives or previous game regulations for this area are anticipated. The area will remain closed to the hunting of sheep year-round.

* The age and sex structure and the number of the sheep on Sheep Mountain will not be modified directly, although these population parameters may be influenced by sheep management in adjacent areas. The sheep population is expected to fluctuate, however, due to natural conditions.

* Selective landscaping to remove some screening roadside trees and brush will improve viewability of sheep, and creation of more roadside pullouts will increase the capacity for nonconsumptive use. An interpretive center, located along the road by Sheep Mountain, will increase public understanding of sheep life history.

* Other uses of the area involving mechanized equipment including snowmachines would be prohibited, but uses such as cross country skiing and hiking would be enhanced.

* Restrictions on additional human development would preserve this area for future viewing use.

* Mining on Sheep Mountain would be prohibited or severely restricted.

20. WEST CHUGACH SHEEP MANAGEMENT PLAN

LOCATION

Game Management Unit 14C, and in Game Management Unit 7, the drainages of Glacier Creek and Twentymile River.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large sheep.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view and photograph sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Limig the annual harvest of rams.
2. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to distribute hunting pressure through the area and to maintain the harvest at desired levels.
3. Encourage public viewing and photography of sheep.
4. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Sheep are found throughout the mountainous portions of the area excluding Portage Creek and Twentymile River drainages and land east of Lake George and Lake George Glacier. Aerial surveys conducted in 1951, 1968 and 1972 resulted in counts of 477, 868 and 1050 sheep, respectively. A 1975 survey of selected areas showed concentrations similar to those of 1972. These surveys, coupled with the Peters Creek trend area counts (the lands between Eagle River and Eklutna River), which have been sporadically conducted since 1950, indicate that sheep numbers increased during the 1950's and have remained fairly constant since then. Depending on time of year and weather conditions, aerial survey counts are thought to represent 70-90 percent of the actual population.

Fairly extensive natural mortality among sheep in the area has been documented. Hunters and hikers have reported finding remains of both young and adult sheep in old snowslide sites or on wintering grounds. Natural mortality factors have probably not adversely affected current population levels.

Habitat conditions within drainages containing major sheep concentrations are considered excellent. Important drainages include Ship Creek, Eagle River, Peters Creek, Thunderbird Creek, Eklutna River, Goat Creek and Hunter Creek. Habitat conditions in Campbell Creek, Indian Creek, and Bird Creek are considered fair. Sheep habitat is limited in the Lake George area and from Glacier Creek south to Portage.

Sheep have been hunted in the area for many years, although harvest levels prior to 1962 are unknown. Between 1962 and 1967, approximately 35-40 sheep were killed annually. Since 1968, a yearly average of 30 three-quarter curl and larger rams have been taken. A high of 50 were harvested in 1969 and a low of 12 in 1973. In 1975, 29 were taken.

Several extremely large sheep have been taken from the area, although it is not known for producing exceptional trophies on a regular basis. In 1975, all sheep legally harvested were taken by local residents, and all but 5 of 80 unsuccessful hunters were also local residents. Only 2 hunters were nonresidents. In addition to legal kills, several illegal kills have been reported annually in the accessible sections of the area.

During the period 1968 to 1972 an annual average of 298 persons reported hunting sheep in the area. From 1973 to 1975, the average was 118. The decrease in hunter pressure is mainly attributable to a shortened season throughout most of the area. The hunting season extended from August 10 to September 20 from statehood until 1972. Since 1973 the season has been from the day after Labor Day until September 20 in most of the area where sheep are found. Hunter success has fluctuated between 10 and 27 percent over the past 8 years. Higher success has been achieved in recent years with reduced hunter pressure.

Access to hunting sites is via several major roads and numerous connecting trails. Hunter transport is restricted to foot travel and horseback. Because of access and transport limitations, hunting pressure and harvests have been fairly well distributed throughout the areas of major sheep concentrations. Harvests over the past 25 years have reduced the proportion of legal rams in the population from approximately 13 percent in 1950 to 7 or 8 percent during the past decade with no significant effect on population productivity or total numbers.

Other uses of sheep in the area include viewing and photography. Bands of 10 to 50 sheep are visible from the Seward Highway near Indian, the Eagle River Road and trail and the Eklutna road. No roadside viewing sites comparable to Sheep Mountain or the Cooper Landing Closed Areas are found within the West Chugach area, but several excellent viewing sites in proximity to mineral licks are located near the headwaters of Peters and Ship Creeks. Few people utilize these sites specifically for viewing. Opportunities for viewing and photography in accessible locations are best in late spring when sheep are at lower elevations on their winter and lambing ranges. Such opportunities diminish in summer and fall and are almost nonexistent during winter. Viewing and photography access restrictions are only slightly more lenient than those for hunting. Winter travel limitations for snowmachines have in some areas reduced opportunities to view and photograph sheep.

PROBLEMS

* Noncompliance with hunting regulations and transportation restrictions has occurred and may increase. These problems result from overlapping authority of various agencies involved in resource management in the area. Future public information and education actions by the Department should clarify nebulous regulations.

* Opposition to sheep hunting in Chugach State Park has been expressed by some Anchorage residents and by Chugach State Park staff. It is the Department's opinion that hunting is not significantly detrimental to the sheep population nor to opportunities to view and photograph sheep in the area. Hunting of sheep is already excluded in some sections of the area. Much of the Eklutna River drainage, the Eagle River drainage below the gorge, the Anchorage hillside area from Campbell Creek to Rainbow and the drainages of Falls Creek and Indian Creek are closed to sheep hunting. Sheep hunting is also prohibited on Fort Richardson. Native land selections in the drainages of Eklutna, Hunter, Knik and Peters Creeks will place extensive lands within private ownership and therefore possibly exclude them from future hunting or viewing use. The Department opposes any additional sheep hunting closures.

IMPACTS

* As hunting pressure increases, number and distribution of hunters will be controlled by permits.

* Use of sheep by nonhunters would be only slightly affected under proposed management. A greater number of large rams would be available for viewing and photography, but sheep may become more wary for a longer period in the fall.

* Other recreational activities and other species in the area would not be adversely affected by this management.

21. EASTERN KENAI PENINSULA SHEEP MANAGEMENT PLAN

LOCATION

Game Management Units 7 and 15 except the area within the Cooper Landing, Kenai Lake, and Tustumena Sheep Management Plan areas.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting sheep.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to distribute hunting pressure through the area and to maintain the harvest at desired levels.

2. Maintain a highly productive sheep population.

3. Encourage public viewing and photography of sheep.

THE SPECIES

Approximately 250 sheep inhabit this area. Sheep numbers increased steadily from the early 1950's through 1968 but have since fluctuated. The population is presently below the 1968 level. A major die-off of sheep occurred on Surprise Mountain in the winter of 1970-71 and that population has slowly declined since that time.

Lamb mortality at birth appears to be the major mortality factor limiting sheep numbers. Lamb mortality appears to be directly related to range condition but weather conditions at lambing time are also important. Winter losses of adult and subadult sheep have occurred when snow conditions prevented sheep from pawing through the snow to reach food. Such a die-off occurred on Surprise Mountain in the winter of 1969-70. Coyote and wolf predation occurs in this area, but its extent and effects are unknown.

Sheep ranges have been altered little by human activity in this area but range conditions are thought to be generally poor as the result of prior overutilization. The overutilized range condition existing on Surprise Mountain is probably representative of the area and is the primary factor limiting lamb survival. Parts of this area are also on the edge of Dall sheep distribution, and other factors, particularly weather cycles, may affect range and the availability of winter feed.

Large trophy sheep have been produced in this area in the past and large trophies are still taken occasionally. However, for the most part hunting pressure is so intense that rams are harvested the first year they become legal. Very few rams reach large trophy size. Between 20 and 25 rams have been harvested annually since 1962.

The hunting season has traditionally been August 10-September 20 with only rams with 3/4-curl or larger horns being legal. Most hunting occurs during the first two weeks of the season and most sheep are taken during that period.

Most hunters who pursue sheep on the Kenai Peninsula are either Anchorage area or Kenai Peninsula residents. Very few nonresidents or hunters from other areas of the state hunt in this area. Nearly all hunting is recreational, primarily in pursuit of a trophy. A few people hunt sheep primarily for the meat with trophies being of secondary importance. Very little guiding occurs in this area. Most hunters reach their hunting areas by hiking in from the road system. A few hunters fly into lakes to reach their hunting area.

Harvesting of rams only has greatly distorted the sex ratio of the populations and limited the availability of large rams.

A minor amount of viewing takes place along the road system, particularly in May and June when sheep are visible in several areas. Some viewing also occurs incidental to hunting for other species and hiking in the area. Opportunities for roadside viewing are much better in the nearby Cooper Landing Sheep Management Area.

PROBLEMS

* Failure to limit sheep populations through harvesting of all sexes and ages has resulted in range damage and has lowered production and survival of lambs. The Department should increase public awareness regarding the long term benefits of regulating populations through harvesting of both sexes if such management proves to be possible.

* Ready access to this area may eventually result in more hunting pressure than sheep populations will tolerate. The Department should closely monitor hunting activities and determine methods or means of limiting hunters when such a problem develops.

IMPACTS

* Little change in present use patterns will occur in the near future as the result of implementation of this plan.

* Concentrations of hunters may occur in accessible areas.

22. COOPER LANDING SHEEP MANAGEMENT PLAN

LOCATION

In Game Management Unit 7, that portion of the existing Cooper Landing closed area lying north of the Sterling Highway.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round sheep hunting closure in the area.
2. Encourage public viewing and photography of sheep and enhance viewing facilities.
3. Control access and activities of viewers and photographers, if necessary, to reduce disturbance to sheep.
4. Protect sheep from unnatural disturbance and harassment.

THE SPECIES

The Cooper Landing sheep population gradually increased from a low point in the early 1940's to a peak of 312 animals in 1973. Since then, it has slowly declined. The current population appears to be at the upper limits of the range carrying capacity. Adverse winter weather and crowded range conditions appear to be the predominant population limiting factors.

The area has been closed to both goat and sheep hunting since before statehood. The Sterling Highway bordering one side provides excellent year-round viewing opportunities, but most use occurs during the summer. One roadside pulloff area has posted notices calling attention to these opportunities. In addition, two well-developed trails provide year-round access through the area. A majority of the users are non-Peninsula residents. Wildlife photography, a popular pursuit in Alaska, occurs in the area to a limited but increasing extent. In recent years the area has served as a sheep research control area.

PROBLEMS

* If viewers or photographers create excessive disturbance in areas away from the Sterling Highway, sheep may abandon terrain easily viewed from the highway where the majority of observation takes place. Activities of users and behavior of sheep in the area will be monitored, and off-road activities will be controlled through permit procedures or access restrictions if roadside viewing opportunity is reduced.

IMPACTS

* All activities which currently exist in the area will continue. Viewing and photographing activities will be encouraged by providing users with interpretive literature.
* Activities of users which become disruptive to sheep will be controlled through permit or access restrictions.

23. KENAI LAKE SHEEP MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 7 bounded on the northwest by the Kenai River and the Sterling Highway; on the northeast and east by the Anchorage-Seward Highway; on the south by the north shore of Kenai Lake between the Anchorage-Seward Highway and Porcupine Island and a line extending from Porcupine Island to the south end of Upper Russian Lake; and on the west by the Russian River and Upper and Lower Russian Lakes.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large sheep.

SECONDARY MANAGEMENT GOALS

To provide an opportunity to hunt sheep under aesthetically pleasing conditions.

To provide an opportunity to view, photograph and enjoy sheep.

To provide an opportunity for scientific and educational study of sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Provide for limited harvests of full-curl rams.

2. Control the number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions and to maintain the harvest at desired levels.

3. Allow limited harvests of any sheep population segment, if necessary, to attain a desirable sheep population size or structure.

4. Encourage public viewing of sheep and enhance existing viewing facilities.

5. Encourage sheep research studies in the area.

THE SPECIES

Aerial trend surveys indicate that Dall sheep populations over most of the eastern Kenai Peninsula, including the Kenai Lake area, increased steadily from the early 1940's through the late 1960's and early 1970's. Since then most populations have declined. Within the Kenai Lake area, the Crescent Lake sheep population experienced a similar trend except that the population was purposely reduced in 1971. Since 1971 the Crescent Lake population has been maintained at a fixed level through either-sex sport hunting. The other sheep population in the Kenai Lake area, the Cooper Mountain herd, has continued to decline under ram-only hunting.

In 1970 the Department initiated a sheep research program to assess the impacts of various types of management. The Crescent Lake program consisted of harvesting ewes and some full-curl rams in an attempt to maintain the population below habitat carrying capacity. Between 1970 and 1974 a total of 124 sheep, including rams, ewes and lambs were taken by recreational hunters under permit conditions. Population statistics collected since initiation of this program indicate that the herd has

suffered lower mortality and higher lambing success than found in adjacent unhunted sheep populations. In essence, the Crescent Lake sheep population has provided a considerable number of sheep for consumptive use while maintaining the population at a stable level compared with herds found on nearby areas under no hunting or ram-only hunting regimes.

Participation in the limited ewe and full-curl hunts thus far has been almost exclusively by Alaska residents. Most sportsmen interested in pursuing ewe sheep are meat hunters, and this type of use is not attractive to nonresident trophy hunters. This pattern of use is expected to continue indefinitely. On the other hand, permit hunts for full-curl rams are expected to generate considerable enthusiam from both resident and nonresident hunters.

The Kenai Lake sheep population has long been available for nonconsumptive use. The area is bordered by roads on two sides and Kenai Lake provides boat access. Seasonal viewing along the highway is a popular pursuit by all classes of recreationists. The best opportunities to photograph sheep probably require overnight camping in alpine conditions.

PROBLEMS

* Public and political opposition to the hunting of ewe sheep may force cancellation of either-sex hunts and hinder current research programs in the area. The Department should conduct a public relations program to explain the benefits to be derived from either-sex sheep harvests.

IMPACTS

* The Crescent Lake sheep population will be maintained below range carrying capacity. Herd productivity will increase as should production of full-curl rams.

* Selective harvests of rams and ewes will continue through the use of limited permit hunts. Not all hunters who desire permits will receive them.

* The Cooper Mountain sheep population is expected to fluctuate according to range and weather conditions, and no substantial changes in sex and age composition are expected.

* Hunters should observe large numbers of sheep and will experience minimal competition and high hunter success.

* Present nonconsumptive uses will probably increase.

* Dall sheep research will continue with no conflicts with other uses expected.

* No effects on other species or other uses of the area are anticipated.

24. TUSTUMENA SHEEP MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 15 south of Skilak Glacier, River and Lake and within the Kenai National Moose Range boundary.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt sheep under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sheep.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport to maintain aesthetic hunting conditions.

2. Encourage public viewing and photography of sheep in a wilderness setting.

3. Discourage land use practices that adversely affect the wilderness character of the area.

THE SPECIES

The Tustumena area presently contains 700 to 800 sheep. The population peaked in 1968 when 989 sheep were observed on surveys and then declined until about 1974. A survey of a portion of the area in 1975 indicated that sheep may again be increasing.

Lamb mortality at birth appears to be the major factor limiting sheep populations in this area. Lamb mortality is a function of range quality and quantity and inclement weather at lambing time. Mortality of adults from malnutrition occurs when snow conditions are such that sheep can not paw through snow to reach forage. A sheep die-off was documented on Surprise Mountain in the winter of 1969-1970 and is thought to have occurred in the Tustumena area also. Predation by wolves and coyotes occurs, but it is not considered a limiting factor on the sheep population at this time.

Sheep ranges in this managment area have been unaffected by human activities. There are no developments in the area, and the only use has been recreational. The quality of the habitat may have been damaged by excessive sheep use in the late 1960's. Fewer sheep in the early 1970's may have allowed at least a partial recovery of the range.

The Tustumena area has produced trophy rams in past years, but heavy hunting pressure has reduced the availability of large trophies. About 10 percent of the legal rams in the area are full-curl or larger. Most rams are harvested the first year they reach legal size.

Hunting pressure is heavy and concentrated in the northern half of the area and is moderately heavy in the southern half. The annual harvest of sheep has averaged between 30 and 35 3/4-curl or larger rams. Most of the harvest and hunting pressure occur during the first two weeks of the season, but in recent years hunter effort has increased in the later part of the season. Hunting seasons and bag limits have not changed

since statehood. Hunters pursuing sheep in this area are almost entirely Kenai Peninsula and Anchorage area residents. Few hunters from other areas pursue sheep in this area because of the crowded hunting conditions. Hunting is mostly recreational hunting for trophies. A few individuals hunt primarily for recreation and meat. All animals killed are used for food. Harvesting of 3/4-curl and larger rams has distorted the sex ratio in favor of ewes with an increased potential population productivity.

Access to the north half of the area is by floatplanes landing on mountain lakes, by horse trails and by boat and foot trails from Skilak and Tustumena Lakes. Access is more restricted in the south half, being limited to boats from Tustumena Lake, with no established trails. In the northern half of the area, most hunting occurs within a few miles of the access lakes. Hunters willing to hike long distances from the lakes are much more likely to be successful.

PROBLEMS

* Too many hunters during the first half of the season reduces aesthetic hunting appeal of the area. Although crowding is greatly reduced in the last half of the season, few legal rams remain. Large trophy rams are not available in significant numbers because most rams are killed as soon as they become legal. The number of hunters should be reduced to eliminate crowded hunting conditions and to increase the proportion of large rams.

IMPACTS

* The number of large rams available to hunters will increase.

* Many people who have hunted this area on a regular basis for rams will no longer be able to do so. These who do participate in the ram hunt will find uncrowded conditions and a greatly improved chance of taking a large ram. There will be increased opportunities for non-trophy hunters to participate in the harvesting of ewes by permit.

* Increasing the average horn size of rams will improve the chances of nonconsumptive users to view and photograph large rams.

* The demand for charter flight services to the area may be reduced. Opportunities for guiding will probably be enhanced.

* No changes in other uses of the area are expected.

MOOSE IN SOUTHCENTRAL ALASKA

Moose (*Alces alces*) are presently found throughout Southcentral Alaska except for the islands in Prince William Sound and mountainous areas above 5,500 feet. Throughout the region, moose habitat requirements are fairly similar. Areas of alpine or riparian willows, river bars, man-made clearings and fire regrowth support the bulk of the population throughout the year. In low density willow areas, species such as birch, and aspen and various ground forbs provide sustenance. Dense spruce stands and alder thickets provide cover but little food. During the summer months moose are found in areas of adequate browse from sea level to at least 3,500 feet. During the fall rut numerous individuals or pods of moose range to 5,000 feet or more. Winter snows force most moose back to lower elevations restricting them spatially to constricted winter ranges. Calving takes place between mid-May and mid-June, frequently in dense spruce stands or on "islands" interspersed among sedge and grass marsh. Lowland river valleys are also commonly used parturition areas.

Prior to settlement of Southcentral Alaska, moose were relatively scarce over much of the area. Clearing of land and fires which accompanied exploration and development created favorable browse habitat conducive to large moose populations. By the 1950's, moose were abundant on all major Southcentral Alaska ranges. Since the 1960's, population levels have markedly declined regionwide. Moose numbers are now from one-third to two-thirds reduced compared to population levels of 10 years ago. Major factors causing the decline are believed to be habitat related, although predators may have had a significant influence on declines and continuing low population levels in some areas. Habitat deficiencies are generally manifested by the scarcity of essential browse during the critical winter months. Such a situation is most apparent in the case of the Kenai Peninsula and to a lesser degree in the Copper and Susitna River drainages. Detrimental effects of such shortages have taken different forms, but primarily affect the production and survival of calves.

Typically, expanding moose populations exhibit a high reproductive rate. A larger percentage of young cows become pregnant and the frequency of twin calves is high. The incidence of twinning goes down as moose reach or exceed range carrying capacity, the situation now prevalent over much of Southcentral moose range. When winters are severe or browse is unavailable, cows debilitated by poor nutrition may fail to furnish adequate quantities of milk to newborn calves.

On inadequate ranges and those with large numbers of predators many moose calves die during their first year of life. Calf mortality on some Southcentral moose ranges has reached 80 to 90 percent and generally averages above 50 percent for the area as a whole. Predation on calves, principally by wolves and bears, is perhaps greatest during the first six months of life. Losses to predation continue through winter but food shortages are believed to be the primary cause of mortality during this period. Calves are the population segment most susceptible to winter starvation. Calf mortality, coupled with natural losses and hunting mortality among adults has resulted in the population reductions.

Moose have long been one of the most important game species in Southcentral Alaska, initially providing for the subsistence needs of natives, early settlers, prospectors and explorers, and then for the past two decades supporting relatively intensive recreational utilization. Over 10,000 moose hunters went afield in the Southcentral Region during 1975 moose hunting season. Although today recreational hunting dominates use of moose in most sections of the region, moose continue to satisfy the domestic need for meat of many Alaskans.

Moose populations in the upper Copper and Susitna River drainages have been heavily hunted for meat and trophies by both guided and unguided recreational hunters. Annual harvests over the past decade have fluctuated between 800 and 2,000 moose, with females constituting up to one-third of the kill of the larger harvests. In addition to hunting on foot from the highway system, aircraft, off-road vehicles, boats, horses, motorbikes and snowmachines have been widely used. Many areas are laced with vehicle trails and evidence of aircraft use can be found around most lakes and landing strips within moose country.

Moose in the lower Susitna River Basin, from Talkeetna to Mt. Redoubt, have experienced increasing hunting pressure in recent years, especially from Anchorage-based hunters. The proportion of unguided hunters has risen dramatically with increasing use of private aircraft or commercial air transport services. Because of the inaccessibility of much of this country by other than float or ski-equipped aircraft, harvests have not been as high as to the east. Annual harvests have ranged from 300 to 900 with females comprising one-third of the take.

Harvests from the Matanuska Valley and vicinity have in past years provided up to 2,250 moose, about half of which were cows. In recent years, the kill has averaged 350 to 600, due to elimination of antlerless moose seasons. This area supports few commercial guides. Most hunting in this relatively accessible terrain is by recreational meat hunters utilizing a variety of motorized conveyances.

Kenai Peninsula moose harvests have ranged between 700 and 2,400 moose, with fewer kills in more recent years. Both guided and unguided hunters use the area, although guiding has become less popular as the moose population has declined. Much of the Kenai Peninsula is administered by the U.S. Forest Service or the U.S. Fish and Wildlife Service, both agencies effecting controls on the use of motorized vehicles. Nevertheless, hunters have enjoyed a relatively high rate of success by using aircraft, horses, boats and other permitted means of transportation.

PROBLEMS

* Just as man was in large part responsible for creating much favorable habitat and large populations of moose in Southcentral Alaska through his injudicious use of fire and land clearing practices, so is he now contributing to moose population declines through today's land use practices. Fire control has effectively reduced the frequency and extent of burning of lowland forested areas and old browse ranges, both unproductive for moose. Existing winter ranges are losing their capability to support moose due to the over-utilization of forage species or because browse plants are growing beyond the reach of moose. Vegetational succession on abandoned homesteads, once productive with invading browse has likewise advanced to unproductive stages. Urban sprawl in the Anchorage and lower Matanuska Valley areas is occurring in once prime moose winter range and much additional winter range is threatened by the proposed capitol relocation and the likely development of lower Susitna flatlands if a Knik Arm causeway is constructed. Road placement in valley bottoms has caused further losses of critical range, and roads and fences near urban centers have become barriers to moose migrating from summer to winter ranges; in some areas these barriers result in direct loss of many moose to vehicle collisions. Much browse rehabilitation work is necessary to rejuvenate old ranges grown beyond usefulness and to create new browse ranges so that pressures on existing winter browse areas can be reduced. This need is especially critical near urban centers where loss of winter range to development is proceeding at a rapid pace. The role of fire as a natural component of wildlands should be recognized and fire suppression practices should be limited, in areas where human safety is not a factor, to situations where resource values clearly warrant control.

* Opposition to female moose hunting has existed in Alaska for several 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 passage of a bill preventing antlerless hunts unless otherwise authorized by local advisory committees. 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 Southcentral moose populations are high, reflecting continued large populations of predators and low and decreasing populations of moose. The resulting extremely low survival rate of moose calves, exhibited now for several years, will seriously impact on 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. A balance in managed populations of wolves, other predators, and moose must be attained if the benefits of all of these species to man are to be realized.

25. PAXSON MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 13B, the Paxson closed area including the eastern drainage of the Gulkana River lying west of the Richardson Highway and the western drainage of the Gulkana River between the Denali Highway and the north end of Paxson Lake where the Gulkana River enters Paxson Lake.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round closure to moose hunting.

2. Encourage public viewing and photography of moose.

THE SPECIES

The abundance of riparian willow along the Gulkana River in the Paxson area has always attracted moose, especially during winters of heavy snow accumulation. During the 1974-75 winter approximately 75 moose utilized this small area. During the winter of 1975-76, with below normal snow accumulation, moose were less concentrated and generally wintered on the slope west of Paxson Lake, several miles to the south.

During summer months moose are not concentrated but visitors still have a high probability of viewing or photographing moose feeding in ponds along the highway.

This area has been of particular interest to many local resident and nonresident visitors due to the opportunity for viewing and photographing wildlife in its natural setting. The majority of the use is during the summer period when visitors are attracted to the area to view brown bear feeding on salmon in the Gulkana River.

PROBLEMS

* Accessibility of the area and increased human activity along the Richardson Highway increase the possibility for harrassment of moose during the critical winter months. If snowmachine activity increases, regulations will be needed to restrict or prohibit snowmachine use within the area.

* Portions of this area may be conveyed into private ownership under the terms of the Alaska Native Claims Settlement Act. If public access is denied on private land the state should take action to purchase access routes to allow viewing and photography.

IMPACTS

* The Paxson Closed Area should continue to provide an opportunity for viewing and photographing moose in their natural setting.

26. NELCHINA BASIN MOOSE MANAGEMENT PLAN

LOCATION

Game Management Units 11 and 13, excluding the Tonsina, Klutina, Northern Chitina, Southern Chitina, Matanuska Glacier, and the Talkeetna River Moose Management Plan areas.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters, and methods of hunter transport, if necessary, to distribute hunting pressure through the area and to maintain desired harvest levels.

2. Maintain a post-hunting season population sex ratio of not less than 15 bulls per 100 cows.

3. Harvest antlerless moose to maintain the moose population in balance with its habitat.

4. Manipulate habitat in selected areas to increase its carrying capacity for moose.

5. Discourage fire suppression on potential moose habitat in selected areas.

THE SPECIES

Moose numbers in the Nelchina Basin have fluctuated widely since the early 1900's. Moose were scarce between 1890 and 1910. They became common by the 1930's, in part due to increased moose forage resulting from forest fires. Additionally, disease reduced wolf populations which lowered predation rates. Frequent forest fires maintained good moose range conditions through the 1950's, and in combination with mild winters and intensive Federal predator control provided favorable conditions for a rapid increase in moose numbers. The moose population reached a peak during the early 1960's, then began a decline that has continued to the present time. Factors contributing to the decline have included loss of productive browse habitat as a result of effective fire suppression over the past two decades, a rapid increase in predator populations following cessation of control efforts in the mid 1950's, and a number of severe winters with deep accumulations of snow. Hunting contributed to the decline in some portions of the area prior to 1972 when antlerless moose were harvested.

Recent estimates based on 1974 and 1975 aerial surveys, where 6,394 moose were seen, place the Nelchina population at from 10,000 to 15,000 moose. Among moose observed, there were 16 bulls per 100 cows and 21 calves per 100 cows. Most bulls seen were young; large-antlered moose were uncommon.

About 600 moose have been harvested from the Nelchina area annually during recent years. Bull-only hunting seasons have been in effect since 1972. With normal calf survival this level of harvesting would be considered relatively light. Because calf survival is so low, however, the proportion of bulls to cows has been declining steadily for many

years. Before it was recognized that range conditions by themselves were not limiting calf survival, bull and cow seasons were in effect in this area, and part of the population decline in heavily hunted areas was due to hunting. Hunting under current restrictive seasons and bag limits has little long-term effect on the moose population's welfare so long as bull:cow ratios are sufficiently high to assure maximum and timely breeding. Bull:cow ratios have been declining, however, and it may be necessary in the near future to stop hunting.

Moose are generally most vulnerable to hunters after snowfall and least vulnerable when leaves are still on shrubs and trees. Transportation employed by hunters has varied with season lengths and regulations affecting aircraft-transported hunters. Most successful hunters used off-road vehicles in 1974, although aircraft and highway vehicles were also commonly used. Relatively few hunters used boats, horses, motorbikes, or snowmachines. Seventy-five percent of the successful hunters were Alaska residents. Hunter success has dropped from 30 to 40 percent in the 1960's to 20 to 30 percent since 1971. The majority of hunters have been recreational meat hunters.

PROBLEMS

* Establishment of the proposed Wrangell-St. Elias National Park will result in the loss of recreational hunting opportunity in an important moose hunting area east of the Copper River. The Department should enter into management agreements with the National Park Service to retain hunting opportunity in the area under mutually agreeable management objectives.

* Portions of the area will be selected under the terms of the Alaska Native Claims Settlement Act. Private landowners may prohibit public use of their lands for hunting. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Effective fire suppression has greatly reduced the acreage burned by wildfire in the Nelchina Basin during the past two decades. Successional vegetation changes are reducing browse productivity on existing moose winter ranges, thus reducing the potential number of moose that can be supported by the range. Controlled burns or other browse rehabilitation methods should be employed to rejuvenate selected moose winter ranges. Because much of the land in question is not owned or controlled by the State, the cooperation of land managing agencies is necessary for implementation of habitat management programs.

* Predation by wolves is presently considered a major factor responsible for very low moose calf survival rates and the resultant decline in moose numbers. Recruitment of yearlings to the population is not sufficient to offset losses of adults to natural mortality and hunting. Without aerial hunting harvests of wolves by trapping and recreational hunting are inadequate to reduce wolf numbers to the level where the predator-prey balance would stabilize the moose population or allow for its increase in the near future. While aerial wolf hunting by the public may be the most desirable legal solution, the controversial nature of the wolf and the emotional opposition to manipulation of wolf populations make the successful implementation of a controlled aerial hunting program difficult. Wolf control efforts by the Department are most effective in reducing numbers of wolves, but are very expensive and can be justified in terms of costs only in relatively small areas where the need to control is great and there are no other practical alternatives.

* Construction of the proposed Susitna River hydroelectric impoundments will inundate important moose winter ranges in the upper Susitna River drainage and will disrupt traditional moose movement patterns. The affected area extends far beyond the boundaries of the impoundments themselves because moose from many surrounding drainages move to winter in the area to be flooded. Mitigation in the form of extensive habitat improvement in areas adjacent to the impoundments must be provided to maintain existing moose populations in the area. In addition, water level control regimes should be stipulated that will reduce losses of moose to entrapment or falls through ice shelves in the winter.

IMPACTS

* The predominance of females in the population will maintain high production of calves.

* Heavy, well-distributed hunter harvests would keep the moose herds young, and large-antlered bulls would not be readily available.

* High hunter densities will continue to occur in accessible areas.

* Distribution of hunters will be influenced by hunting season adjustments for specific subareas.

* Commercial services will not be significantly affected.

* Predator populations may be reduced by increased public utilization, or in specific justifiable situations, by Department control efforts.

* Moose populations in some portions of the area may increase as a result of browse rehabilitation programs.

* Moose populations should increase if desirable predator-prey ratios are maintained.

27. TALKEETNA RIVER MOOSE MANAGEMENT PLAN

LOCATION

Those portions of Game Management Units 13 and 14 including the drainages of the Chickaloon River above its confluence with Boulder Creek; the Talkeetna River above its confluence with Iron Creek; all drainages into the north bank of the Talkeetna River downstream from its confluence with Iron Creek and all drainages into the south bank of the Susitna River, from its confluence with the Talkeetna River upstream to and including the drainage of Kosina Creek.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large-antlered moose.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number, and distribution of hunters, and methods of hunter transport, if necessary, to maintain desired harvest levels and to maintain aesthetic hunting conditions.

2. Maintain a post-hunting season population sex ratio of 35 bulls per 100 cows.

3. Harvest antlerless moose to maintain the population in balance with its habitat.

4. Encourage public viewing and photography of moose in a wilderness setting.

THE SPECIES

Approximately 1,000 moose occur in the Talkeetna River area. Aerial surveys in 1974 and 1975 located 535 moose, but not all the area was surveyed and not all moose present were seen. Ratios of 28 bulls per 100 cows and 16 calves per 100 cows were found for the area. Most bulls seen were large because calf survival has been low and relatively few young bulls enter the population each year. Little is known about past abundance of these moose. The number of moose seen on comparable portions of the Talkeetna River decreased between the 1974 and 1975 counts. It is possible that moose numbers in this area and in the adjacent Nelchina area are affected by similar factors. Calf survival may be too low to compensate for adult mortality. Hunting has never been a substantial mortality factor because of the area's remoteness.

Habitat quality has probably declined since no major recent forest fires have occurred here. However, much of the moose browse of this area is subalpine or riparian willow species and may change only with climatic changes. Lack of forage probably causes starvation of some moose during winters with deep snowfall, but this probably is not currently a major limiting factor to the moose in this area.

The harvest of moose is relatively light due mainly to the limited points of access available. Aircraft are the most important means of

transportation; off-road vehicle trails are limited. The hunting season has allowed harvests of bulls only in recent years. Harvests from this area for 1974 and 1975 were 47 moose each year. Hunter success was 44 percent among 107 hunters hunting moose in the area in 1975, and 71 percent of the successful hunters were Alaskan residents. Most hunter effort has probably been recreational meat hunting combined secondarily with quests for trophies. Assuming that the number of nonresident hunters are indicative of professional guiding activity, the 36 percent nonresidents among successful and unsuccessful hunters in this area as compared to the 7 percent nonresident hunters for all of the adjacent Nelchina Basin area indicates that guiding in this area is relatively important. Because of the inaccessibility of the area little use of these moose by nonhunters occurs.

PROBLEMS

* Loss of land to public hunting may occur as a result of the transferring of land from public to private ownership under terms of the Alaska Native Claims Settlement Act. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* The current bull:cow ratio of 28:100 is below the desired ratio of 35:100. However, most of the existing bulls are old and harvests are relatively low. Production of good calf crops for several years would substantially increase bull:cow ratios.

IMPACTS

* The type of hunting proposed under this management plan would not differ substantially from the current situation. Hunter numbers may be limited by permit when increased use of the area occurs.

* The moose population will increase when calf survival rates improve. As carrying capacity is approached, harvests of cows as well as bulls will be necessary to limit overall moose numbers and still maintain moderately high bull:cow ratios. Hunter harvest should increase.

* Large-antlered moose will continue to be available.

* Because of poor access, uneven distribution of harvests will be expected, but immigration of moose from lightly hunted areas will probably occur with a productive moose population.

* If a permit system were adopted, guides might have difficulty obtaining clients.

* Other uses of the area or use of other species in the area would not be changed substantially by this plan.

28. MATANUSKA GLACIER MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Units 13 and 14, all drainages flowing into the south bank of the Matanuska River east of the Wolverine Creek drainage to and including the East Fork of the Matanuska River.

MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control hunter numbers and distribution, if necessary, to maintain aesthetic hunting conditions.

2. Develop limited hunter access, if necessary, to distribute hunting pressure through the area.

3. Maintain a post-hunting season population sex ratio of 35 bulls per 100 cows.

4. Harvest antlerless moose to maintain the population in balance with its habitat.

THE SPECIES

The Matanuska Glacier area is largely inaccessible and supports generally poor moose habitat and relatively few moose. The dominant plant species in the area are spruce and alder. Some browse species are found in smaller drainages which join the Matanuska River. Little information about numbers of moose is available, but concentrations of 20 or more moose have been observed along the South Fork of the Matanuska River. Local residents report that 15 to 20 years ago more moose were found along Glacier Creek than is the case today.

Few hunters use the area, and the number of moose killed is low. In 1974 only 5 moose were known to have been taken in the area. Cow moose have seldom been taken. Guided hunts in the area are rare. The most likely attraction of the area for the few hunters who use it is the opportunity for a relatively secluded hunt.

Access is limited in the area. The Glacier Creek trail was used for many years by hunters, but a private development at the foot of the Matanuska Glacier has discouraged its use in recent years. The South Fork is accessible in late fall by walking, all-terrain vehicles, horses, and later by snowmachine. Access is poor or non-existent elsewhere. The Matanuska River is a formidable barrier much of the year, and several people have drowned trying to cross it.

PROBLEMS

* Scarcity of favorable moose habitat, particularly good winter range, results in low moose numbers in this area. Browse rehabilitation might be attempted in the area, but because of physiographic considerations there is some question that desired changes would result.

* Strip mining for coal is a future possibility. Loss in aesthetics could result from such development, and possibly loss of moose habitat. Regulations requiring replacement of overburden and other efforts to create browse after mining might lessen impacts and possibly improve moose habitat.

* Predation may be found to have some impact on moose populations. If the impact is substantial, some consideration may be given to facilitating more predator hunting. However, in an area where access and harvest of moose are limited, and where the primary management goal is to provide an opportunity to hunt under aesthetically pleasing conditions, even moderate predation levels may not be inconsistent with management.

* Access for hunters or other recreationists is limited. If access were improved, greater use could be made of the area. However, the potential for overuse of limited numbers of moose exists and control of use would be needed to maintain desired harvest levels and uncrowded hunting conditions.

* Some additional lands in the Matanuska Glacier area might become private lands under terms of the Alaska Native Claims Settlement Act. Public use could be limited if trespass is restricted. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Antlerless moose seasons may not be approved by the local Advisory Committee even though such seasons may become necessary for the welfare of the moose population. Careful analysis of the need for antlerless seasons should be made before they are proposed. A continued public information effort should be conducted to increase public understanding of the desirability of such hunts.

* Very limited information is presently available on moose in this area. Before substantial management changes are made, better information will have to be obtained.

IMPACTS

* Emphasis will be on a quality hunting experience. If access is improved, hunters may be less concentrated than at present.

* Hunters would be able to hunt for cow moose only under controlled permit conditions.

* Regulation of transport means may reduce the number of hunters using the area.

* Improved access would increase hunting pressure on other species, particularly sheep.

29. MATANUSKA VALLEY MOOSE MANAGEMENT PLAN

LOCATION

Game Management Unit 14A excluding the Chickaloon River drainage above Boulder Creek, the Palmer Hay Flats Moose Management Plan area, and the drainages flowing into the south side of the Matanuska River east of Wolverine Creek drainage.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of moose.

SECONDARY MANAGEMENT GOALS

To provide the greatest opportunity to participate in hunting moose.

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain minimal restrictions on methods and means of taking moose.
2. Harvest antlerless moose to maintain the population in balance with its habitat.
3. Maintain a post-hunting season population sex ratio of no less than 15 bulls per 100 cows.
4. Control hunter distribution, if necessary, to distribute the harvest through the area.
5. Increase the carrying capacity of the area for moose through habitat improvement.
6. Encourage public viewing and photography of moose.

THE SPECIES

Extensive land clearing and fires associated with settlement of the Matanuska Valley during the 1930's created much favorable moose habitat and resulted in a rapid increase in the moose population during the 1940's and 1950's. Subsequently, the population experienced large winter die-offs as a result of overpopulation. Large harvests of moose since the early 1960's have helped to check population growth, but some winter mortality still occurs. Estimates of population size are difficult because movements of moose into and out of the valley affect densities of animals present at different times of the year. Aerial moose composition surveys are generally conducted in November or December after snow has driven moose down into the valley and they are more visible. In most years since 1967 more than 2000 moose have been seen on aerial surveys; actual numbers of moose present, however, may be twice that observed.

Starvation during severe winters, particularly during past years of excessive moose populations, has been the most important mortality factor. Some moose are taken by wolves and black and brown bears, but predation probably has little effect on moose abundance in the area because predators are relatively scarce due to the large human population. Nonhunting human-related mortality is significant; in 1974, 33 moose were killed by autos, at least 7 by trains, 7 killed in defense of life

and property, and at least 49 killed illegally. Survival of calves until November-December has been good in recent years with more than 40 calves observed for every 100 cows. High levels of recruitment have supported sustained large hunter harvests.

The Matanuska Valley moose population has been one of the most intensively harvested populations in the state. More than 10,000 moose have been taken since statehood with annual harvests ranging from 164 to 1369. Antlerless moose hunts contributed to larger harvests prior to 1973. Since 1973 only antlered moose have been legally harvested. In most years from one thousand to two thousand persons have hunted in the valley. Season reductions in recent years and the lack of antlerless hunts have lowered hunting pressure somethat, but it remains intensive and its effect on the moose population, expecially in the absence of antlerless hunts, has been to lower the bull: cow ratio. Fifteen males were observed for every 100 females in 1975 surveys. Very few large antlered bulls have been available to hunters because most bulls are killed as young animals.

Nearly all hunters are Alaska residents except for personnel from the military bases near Anchorage. Guiding is limited because competition with local hunters is intense. Recreational hunting for meat has been the primary use of moose in the valley.

Access is good over much of the valley on a network of side roads and trails. Many lakes, gravel bars and maintained airstrips provide aircraft landing sites. Snowmachines were used in the past, but season timing in recent years has precluded their use due to lack of snow.

PROBLEMS

* Loss of habitat poses a major threat to moose in this area. Land cleared for agricultural purposes is no longer allowed to grow back to browse, and subdivisions and new roads are removing much important winter range. Gravel extraction and coal strip mining may alter habitat in some areas. Development associated with a new state capitol would affect additional large amounts of habitat. Existing browse on undeveloped land is growing beyond reach of moose or is being replaced by vegetation not used by moose. Rehabilitation of moose habitat on state lands in the valley will be necessary if a sizeable moose population is to be retained in the area. Extensive private property in the valley precludes the use of fire, but other more expensive mechanical methods of browse rehabilitation are available. Funds for a large scale rehabilitation project will require special legislative authorization.

* Much private land exists in the valley which is posted against trespassing by the public, and additional lands conveyed to private ownership under terms of the Alaska Native Claims Settlement Act may be closed to public use. Establishment of a proposed state park in the Talkeetna Mountains may result in future exclusion of hunting in that area. The Department will advocate retention of hunting in state parks and should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Many moose are illegally killed each year. Increased enforcement efforts by Department of Public Safety personnel and a more active enforcement role by the Department are required. Penalties for persons convicted of violations should be more severe.

* The loss of moose to accidents with vehicles will increase as the road network expands and traffic increases. Areas where collisions with moose frequently occur should be identified and posted to alert motorists to the hazard. Reduced speed limits may be necessary on some roads.

* Current expressed public attitudes opposing antlerless moose hunts have precluded the use of such harvests to manage moose population size in recent years. Because lack of winter range is becoming an increasingly critical problem in the valley, it is important that the moose population be maintained near the carrying capacity of the habitat. Bulls-only harvests are not sufficient to control moose population size. The Department should increase public awareness of the problem and urge public acceptance of antlerless moose hunts.

* Moose damage agricultural crops by feeding and trampling, and are sometimes destroyed by farmers in defense of property. Alternative means of preventing crop depredation such as fencing or use of scaring devices such as carbide guns should be encouraged.

IMPACTS

* The nature of use will continue to be primarily recreational hunting for meat. The area will contain few large-antlered moose.

* Hunter densities will remain high.

* If browse rehabilitation is initiated, increased browse production will help maintain current population levels of moose. Other species of wildlife which occupy successional vegetation types would also benefit, but some species dependent on forest habitat would be reduced.

30. TALKEETNA MOUNTAINS MOOSE MANAGEMENT PLAN

LOCATION

Game Management Unit 14B except for the drainages into the Talkeetna River upstream from the confluence of the Talkeetna River and Iron Creek.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage or provide improved hunter access for more complete hunter utilization of the area.

2. Control access and methods of hunter transport, if necessary, to distribute hunting pressure throughout the area.

3. Maintain a post-hunting season population sex ratio of no less than 20 bulls per 100 cows.

4. Increase the carrying capacity of the area for moose through habitat improvement.

5. Encourage public viewing and photography of moose in a wilderness setting.

THE SPECIES

Moose populations in the Talkeetna Mountains are slowly declining. The number of animals seen during aerial surveys has generally ranged from 1,000 to 2,000. Only 550 moose were seen in 1974, but time spent surveying was also reduced. Moose were evidently much more numerous in the 1950's. Hunting has had little effect on the moose population; fluctuations in numbers of moose in the Talkeetnas are probably due to weather and habitat conditions. Calf survival until early winter has generally been good, with 30 to 40 calves per 100 cows observed during November surveys. The incidence of twin calves is low; in the last four years, the twinning rate has ranged from 2 to 8 percent. Bull-cow ratios have declined considerably, due to hunter selectivity for males.

Much of the area is either above timberline or is heavily timbered with birch, aspen, and small spruce trees. Several of the larger river valleys contain important moose winter habitat. Moose usually leave the area above timberline when snow depths increase. Although there are old burns in the area, fires in the past 10 years have been quickly controlled, thus limiting natural browse rehabilitation.

The use of moose in this area is primarily for recreational meat hunting. However, the area is lightly used by hunters, primarily because of limited access. Moose are located high in the mountains and foothills in September and are extremely difficult for hunters to reach. Snow conditions normally do not force moose down near the road system until January or February when hunting seasons are usually closed. Most hunters using this area are Alaska residents, primarily from the Matanuska Valley and Anchorage. Some nonresidents also hunt the area, usually with the aid of a guide; however, guiding operations are limited in the area, due to its inacessiblity. Guides that operate there have a reasonably

high moose hunting success rate. Harvests in this area are much lower than the population could sustain. Although 312 moose were reported taken in 1971, the harvest averages close to 100 moose per year. Most moose harvested have been males, due to public resistance to antlerless moose hunts. Hunting season lengths have been reduced in recent years to a 20-day season in September, further lowering harvests. In 1974, 59 moose were harvested, 41 of which were males. Only 17 percent of 355 hunters were successful. Poor access limits hunter distribution to the vicinity of the Parks Highway and a few side roads, and to the Peters-Purches Creek Trail. The remainder of the area is virtually unhunted because few aircraft landing areas exist. Some winter observation of moose by highway travelers occurs in the area. Viewer success can be excellent in late winter-early spring, particularly when deep snows have forced moose into the lowlands.

PROBLEMS

* Loss of winter range is the most important factor jeopardizing the future status of this moose population. Naturally limited winter range has not been renewed by wild fire due to effective fire suppression, and loss of habitat to human development is increasing along the Parks Highway. Development associated with construction of a new state capitol in the lower Susitna Valley area could result in a major loss of winter range. A browse rehabilitation program, either with controlled burning or, preferably, through logging activity is needed to offset habitat loss and maintain moose populations in the area. An experimental forest operated by the Department of Natural Resources through its office of forestry may provide assistance in developing logging methods that would maximize benefits to moose while maintaining profitability of operations.

* Moose in the Talkeetna Mountains area can and should receive greater utilization by hunters to maintain the population within the carrying capacity of the winter range and at the same time provide more recreational opportunity. Lack of hunter access to areas occupied by moose during the hunting season precludes effective harvests. Some public access is excluded by private landowners, and acquisition of land by natives under terms of the Alaska Native Claims Settlement Act may result in exclusion of access in additional areas. The Department should obtain the cooperation of land managing agencies in constructing additional access trails for hunters, and it should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act. Late season hunts held after moose have moved into more accessible lowland areas would aid in achieving desired harvests. Antlerless moose hunts would be valuable in controlling population size and structure.

* An increase in illegal killing of moose and moose killed by highway vehicles and trains is expected as development and human activity increases in the lower Susitna Valley. Car and train kills have exceeded hunter harvests by as much as 100 percent in some years. Increased enforcement efforts and more severe penalties for violators will be necessary to curb poaching. Losses of moose to collisions with vehicles and trains may be abated to some extent by rehabilitation of winter ranges away from roads and by increased harvests of moose.

* Establishment of a proposed state park in the Talkeetna Mountains may result in future exclusion of hunting in that area. The Department will advocate retention of hunting in state parks and will encourage private landowners to allow public use of their lands for hunting.

* The capability for localized overharvests of moose by hunters using all-terrain vehicles has been evident in the southeastern portion of the area where the bull/cow ratio has been reduced to a low level by hunters using this form of transport. The effects of hunters using all-terrain vehicles should be monitored and appropriate controls implemented which retain the benefits of hunter dispersal provided by all-terrain vehicles, but which reduce adverse impacts on local subpopulations of moose.

IMPACTS

* Harvests of moose should increase and will eventually be dispersed over a larger area.

* Hunters may have the opportunity to take female moose under permit conditions.

* Motorized transport may be restricted to designated trails or corridors.

* Hunter densities will remain high in accessible areas.

* Winter losses of moose to starvation and to vehicle accidents will be reduced.

* Habitat manipulation will increase browse production and benefit other species which utilize open-canopy habitat. Forest dwelling species will experience a reduction in available habitat.

* Increased access will increase harvests on black and brown bears in the area.

31. PETERS-DUTCH HILLS MOOSE MANAGEMENT PLAN

LOCATION

Game Management Unit 16A.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of moose.

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the moose population at its most productive level.
2. Maintain a post-hunting season population sex ratio of 20 bulls per 100 cows.
3. Harvest antlerless moose to maintain the population in balance with its habitat.
4. Control methods of hunter transport, if necessary, to distribute hunting pressure through the area.
5. Encourage land use practices which improve moose habitat.

THE SPECIES

Moose populations have declined in the Peters-Dutch Hills region since the 1950's. With the decrease in population size, moose productivity has increased. Currently 15 percent of the herd consists of calves as opposed to 13 percent in 1955. Bull/cow ratios have steadily declined since the 1950's when 80 males/100 females were seen. Presently there are 18 to 30 males per 100 females. Hunter preference for bulls is the primary reason for the declining bull:cow ratio, although winter kill situations favor females also. The number of moose counted in surveys since the early 1970's has remained relatively constant, varying between 600 to 850 animals. Actual numbers of moose present are greater than the number seen on surveys.

Little is known of natural mortality in this area except that moose have sustained heavy losses during severe winters. Wolves are present in moderate numbers, and wolf-killed moose are commonly seen during winter above timberline as well as along river bottoms. Black and brown bears occur in the area, but their influence on calf survival is unknown.

Little is known about the condition of moose habitat in the area. Many moose frequent an old burn area in the western foothills where browse appears in good condition. In other areas such as along the Tokositna River bottoms, moose browse is often covered by deep snow in winter and is unavailable.

Hunting seasons historically were liberal (2 month, split seasons) until 1971, after which seasons became shorter and more restrictive until 1975 when a September 1 to 20, bulls-only season was allowed. Antlerless moose hunts were allowed through 1974, and harvests of cows were approximately one third those of bulls. Total annual kills usually ranged between 40 and 100 moose. In 1974, 110 moose were taken, 33 of which were cows.

Most hunting in the area is for recreational meat purposes by Anchorage and Palmer area residents. Some guided nonresidents also hunt the area, but guiding is not extensive. Land adjacent to the road system receives most of the hunting pressure, even though the terrain does not lend itself to foot travel. The Cache Creek drainage is heavily hunted by miners who utilize a road leading into that portion of the area. Many hunters utilize the services of air taxi operators to reach less accessible areas. Riverboat access from the Sustina River is also utilized. In the past, winter seasons allowed for greater accessibility by ski-equipped aircraft and snowmachines. Late season moose movements also brought more animals within walking distance of the road.

PROBLEMS

* The loss of habitat poses a threat to moose. An increase in land clearing for agriculture, construction of roads, homes and cabins associated with land development all remove moose habitat. If the state capitol is relocated in the lower Susitna Valley, land development is expected to increase with accelerated impacts on moose habitat. Gold mining is increasing between the Peters and Dutch Hills, coal deposits may eventually be mined, perhaps by strip mining, and logging activity is increasing. All of these activities would remove habitat for some time, but, if subsequently revegetated such areas would provide improved moose habitat. The Department should recommend measures to resource developers which minimize or mitigate long-term habitat loss. Size and spacing of timber cuts can be designed to enhance moose habitat.

* Revegetation of the Little Peters Hills burn area has been slow, and this area remains an important moose wintering area. When plant succession eventually reduces productivity of moose browse species, the carrying capacity will decline. Browse rehabilitation in adjacent areas before browse production is reduced in the Little Peters Hills burn area may prevent a decline in the moose population in future years.

* New roads will open up more area but posting of private lands will subsequently curtail hunting in some sections. The final land disposition provided for by the Alaska Native Claims Settlement Act may increase the amount of private land in the area. This land may be posted to trespassing. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* A proposed expansion of Mt. McKinley National Park into the region may result in the elimination of hunting in that portion of the area. A proposed expansion of Denali State Park poses a similar problem, but the flexibility for retaining hunting there is much better. The Department should work with the Division of Parks within the Department of Natural Resources in an attempt to retain hunting in that portion of Denali State Park.

* Accessible roadside areas are heavily harvested while large, more remote sections remain underharvested. More liberal hunting seasons in less accessible areas would encourage greater use there. Public use of airstrips on public lands should be encouraged, and if necessary, assured through court action. Designation of access corridors for all-terrain vehicles would retain their use while minimizing environmental degradation.

* Opposition to antlerless moose hunts can be expected when such seasons are proposed. Continued public information programs may reduce this opposition. Permit hunts for antlerless moose not only

would reduce concentrations of hunters, but could counteract some anti-hunting and anti-cow moose hunting sentiment among local residents and hunters which derives from hunter congestion-related problems.

IMPACTS

* Productivity of this moose population is expected to remain high.

* Harvests should be dispersed over a larger portion of the area and are expected to increase. When the population is near carrying capacity and recruitment exceeds mortality, hunters will have the opportunity to take cow moose, but will be required to obtain permits to do so.

* The opportunity to take large trophy moose will be reduced.

* Transportation methods may eventually be restricted so that all-terrain vehicles may only use designated trails or corridors.

* Hunter densities may be relatively high in more accessible areas.

* Roadside service establishments may see an increase in business during moose seasons.

* If habitat manipulation is initiated, increased browse production is expected. This in turn should prove beneficial to other species which utilize an open-canopy habitat, but will eliminate some habitat for forest dwelling species such as spruce grouse.

* Greater harvests of black and brown bears are expected as a result of increased contact with these species by moose hunters.

* Conflicts with miners are expected as hunters utilize air strips and areas adjacent to mining areas.

32. CHELATNA LAKE-YENLO HILLS MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 16 bounded by the Yentna River upstream from its confluence with the Kahiltna River to the East Fork of the Yentna River, up the East Fork of the Yentna River to Yentna Glacier, northeast along the Yentna Glacier to the Mt. McKinley Park boundary, east along the Park boundary to the Kahiltna Glacier, down the Kahiltna Glacier to the Kahiltna River, and down the Kahiltna River to the starting point.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large-antlered moose.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport to maintain desired harvest levels and to maintain aesthetic hunting conditions.

2. Encourage development of hunter access to distribute hunting pressure through the area.

3. Maintain a post-hunting season population sex ratio of 35 bulls per 100 cows.

4. Harvest antlerless moose to maintain the population in balance with its habitat.

5. Increase the carrying capacity of selected areas for moose through habitat improvement.

THE SPECIES

Moose are generally abundant in the Chelatna Lake-Yenlo Hills area, particularly during fall and early winter. The area receives substantial snowfall which is an added stimulus to annual movement of moose to lowlands during winter. Deep snow may also be responsible for recent substantial declines in the proportion of calves observed during aerial composition surveys. In Sunflower Basin calf:cow ratios declined from 34:100 in 1973 to 27:100 in 1974 and to 19:100 in 1975. The proportion of bulls, however, has remained higher than in many other areas, with up to 40 bulls per 100 cows observed.

Winter ranges appears to be in limited supply, and in places browse species have been over-utilized. In severe winters the lack of good browse causes significant starvation losses and may also contribute to poor calf production the following spring.

Moose harvests currently are not large. In 1974, about 60 moose were taken, including 25 females. Most hunters are probably Alaska residents, but several guides operate in the area, and nonresident hunting is probably substantial. Trophy hunting occurs, but most Alaska residents

probably seek recreation and meat. The area has produced large-antlered bulls, and should continue to do so. Hunting pressure has decreased due primarily to the no-hunting-same-day-airborne regulation. Gradual reductions in season lengths (to offset increased hunting effort resulting from restrictions in other areas) have also affected hunting pressure.

Access to the Chelatna-Yenlo Hills area is limited; aircraft are the preferred transportation, but boats, snow machines and all-terrain vehicles are also used. No roads and few trails exist. Under current regulations, access is sufficiently difficult to have held the harvest below what the area can sustain.

PROBLEMS

* Mining for gold or coal may temporarily remove some moose habitat from the area. If strip mining occurs stipulations requiring replacement of overburden should be imposed to reestablish productive moose browse.

* The Yenlo Hills is one of the sites proposed for a new state capitol. If this site is chosen, large tracts of moose habitat will be lost to urbanization. This loss would be irreversible, and the proximity of a large human population would necessitate a revision of this management plan.

* A continuation of low calf proportions in the population observed in recent years will significantly reduce moose numbers in the future. The Department should attempt to determine the cause of low calf proportions and should take remedial actions if such are possible.

* Winter mortality is a constant threat to moose in this area. During severe winters some moose will inevitably be lost, but this loss can be reduced by maintaining a population of moose smaller than the carrying capacity of the range.

* Claims by private individuals to aircraft landing strips developed on public lands reduce use of strips by the general public. The legal status of landing strips not located on patented land should be made available to hunters, and general public use of these sites should be encouraged. The Department will discourage development of additional private landing strips on public land.

* The final disposition of land provided for by the Alaska Native Claims Settlement Act may increase the amount of private land within the area. This land may be closed to public hunting. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* A proposed expansion of Mt. McKinley National Park may eliminate hunting in the northern portion of the area, and will concentrate hunters in remaining areas. Appropriate restrictions will be implemented to prevent crowded hunting conditions or overharvests of moose.

* Harvests limited only to bull moose have little impact on moose population size and are therefore ineffectual in maintaining the population near the carrying capacity of the habitat. In addition, bull-only harvests result in unbalanced sex ratios and will make desired bull:cow ratios difficult to attain. Some browse ranges within the Chelatna Lake-Yenlo Hills area have already been overbrowsed suggesting that the population is excessive on those ranges.

Antlerless moose harvests should be used to maintain the moose population at carrying capacity levels when natural mortality factors do not effect the necessary control on moose population size.

IMPACTS

* A sex ratio of 35 bulls per 100 cows will assure the availability of large-antlered bulls for hunters. Productivity of this population is expected to be high and calf survival should improve.

* Hunter densities will be low under controlled permit conditions. Not all hunters who wish to hunt in the area will be allowed to do so. Seasons may be lengthened to achieve desired harvests.

* Use of all-terrain vehicles will be restricted to designated trails or corridors.

* The unit will be a good area for nonconsumptive users to view and photograph large bulls.

* Range rehabilitation will improve moose habitat in the area. Rehabilitation would prove beneficial to species which utilize open habitat while habitat would be temporarily lost for forest-dwelling species.

* Permit requirements may increase the difficulty for guides in obtaining clients.

33. SKWENTNA MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 16B west of the Yentna Glacier, the East Fork of the Yentna River and the Yentna River.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage development of hunter access to distribute hunting pressure through the area.
2. Maintain a post-hunting season population sex ratio of no less than 20 bulls per 100 cows.
3. Harvest antlerless moose to maintain the population in balance with its habitat.
4. Encourage land use practices conducive to moose browse production.

THE SPECIES

Information from aerial composition surveys, past harvest data, and observations of winter kills all indicate that moose in the Skwenta area number into the thousands. Aerial composition surveys have alternated among sample areas from year to year, and numbers of moose seen have ranged from 300 to 1000 moose. Moose harvests prior to implementation of more restrictive regulations ranged from 600 to 1000 animals, yet moose remain relatively abundant. Winter-killed moose are regularly seen along Alexander Creek and the Susitna River, which suggests that the number of moose may exceed what the winter range can support. In severe winters such as 1971-72, several hundred moose are known to have died.

Productivity of moose in the Skwentna area has generally been good. In fall it is common to find 30 to 40 calves per 100 cows. However, severe winters may substantially impair productivity; in fall 1972, only 10 calves per 100 cows were observed, and yearlings were rare. Although production of calves is usually good, and in years when snow depths are moderate survival is also good, the occasional winter of very deep snow results in substantial mortality of calves, as well as of bulls and very old cows. The extent of predation is unknown, but currently it does not seem to be a serious problem.

The legal kill of moose in the Skwentna area has fluctuated over the years in response to hunter demand, hunting conditions in other areas, changes in hunting seasons, restrictions on transportation methods and means, and accessibility. For many years in the 1960's moose were abundant in other, more accessible areas, and hunting effort in the Skwentna area, which lacks easy access, remained relatively low, even though seasons and bag limits were liberal. As moose declined in other areas, hunting pressure increased in the Skwentna area. More hunters, better equipped with snowmachines and ski-equipped aircraft and unable to easily take moose elsewhere, rapidly developed techniques for killing large numbers of moose in the area. A commercialized aircraft transport system for hunting developed which led to large kills and reports of considerable waste in the early 1970's. Greater restrictions including the elimination of winter hunting seasons, the prohibition of hunting on the same day the hunter is airborne, and constraints on cow hunting all led to the current low harvests (250 moose in 1975).

Most hunters using the Skwentna area are Alaska residents. Fewer professional guides are active in the area than prior to enactment of the regulation prohibiting hunting on the same day the hunter is airborne. Trophy hunting occurs, and in past years a number of record-class moose trophies were taken in the area. In general, hunting is the most common use of moose in the Skwentna area. Airplanes continue to be the favored transportation method; boats are second in popularity.

The proportion of bulls in the population seems to be declining as a result of hunter selectivity, possibly augmented by the greater susceptibility of bulls to winter mortality. The combination of limited harvests, limited winter range, a high proportion of cows, and periodic severe winters may perpetuate substantial periodic winter-kills.

PROBLEMS

* Loss of habitat due to coal mining, oil and gas exploration and extraction, and logging may intensify the problem of limited winter habitat. However, subsequent regrowth may reduce the loss, particularly if coal mines were required to replace overburden after mining.

* Browse rehabilitation through controlled burns would be an effective means of increasing winter habitat. However, private property and oil and gas development may preclude use of fire. Mechanical clearing to stimulate browse growth may be too expensive. Cooperation of landowners should be sought in allowing small controlled burns for browse improvement.

* Winters of deep snow cause significant moose mortality. Loss of moose to winter mortality may be reduced by increased harvests which would help to keep moose numbers within the winter range carry capacity. Bull-only harvests are not sufficient to control moose population size. The Department should increase public awareness of the problem and urge public acceptance of antlerless moose hunts. Winter hunting seasons should be established if necessary to attain desired harvests.

* Hunting opportunity is limited because access is limited to a few airstrips, lakes, gravel bars and a small road system in the Beluga area. Development of additional access would be appropriate and could be most easily accomplished in conjunction with browse rehabiliation programs.

* A substantial increase in privately owned land in the Skwentna area may result from the Alaska Native Claims Settlement Act. Private landowners may prohibit public use of their lands for hunting. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* The proposed expansion of Mt. McKinley National Park may eliminate hunting in the northern part of the Skwentna area. The Department should seek cooperative management programs that would allow hunting to continue.

IMPACTS

* Productivity is expected to remain high and survival of calves should be improved if desired harvest levels are achieved.

* Easily accessible portions of the area will contain few trophy moose, but the less accessible parts of the unit should continue to yield large bulls.

* Moderately crowded hunting conditions may occur in more accessible areas, but if access is improved, distribution of hunters may become more dispersed . Other recreationists may also take advantage of improved access.

42. KACHEMAK BAY MOOSE MANAGEMENT PLAN

LOCATION

Game Management Unit 15(C) except the portion north of Kachemak Glacier and Creek, Bradley Lake and River, and a straight line from the mouth of Bradley River to Fox Creek; east of Fox Creek; north of a straight line from the outlet of Caribou Lake due west to Deep Creek; and east of Deep Creek from that point to its confluence with the north fork of Deep Creek, the north fork of Deep Creek to the refuge boundary, and a straight line from that point due north to Tustumena Lake.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

SECONDARY MANAGEMENT GOALS

To provide for an optimum harvest of moose.

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the moose population at its most productive level.
2. Restrict methods of transport, if necessary, to maintain desired harvest levels.
3. Maintain a post-hunting season population sex ratio of about 15 bulls per 100 cows.
4. Increase the carrying capacity of the area for moose through habitat improvement.
5. Encourage public viewing and photography of moose and enhance viewing facilities.

THE SPECIES

The Kachemak Bay moose population numbers approximately 2,500 animals. Moose appear to have been most abundant in the early 1960's and remained moderately numerous until 1973. Moose numbers have apparently declined since 1973. Residents of the area generally feel that moose numbers declined significantly between the mid 1960's and 1973 but survey data have not supported this; the number of moose observed annually on sex and age composition counts remained relatively constant between 1966 and 1973.

Calf mortality is the major factor limiting this population. Mortality from birth until late fall has ranged from 55-80 percent. Young calf mortality was greatest in the early 1960's and early 1970's and lowest from 1965 through 1968. Presently calf losses appear to be increasing steadily. Calf losses are believed to be range related but predators may also be a factor. Calf mortality from early winter through spring has varied according to the severity of the winter and particularly in relation to snow accumulation and the length of time it persists. Heavy losses of calves have occurred in three winters since 1970. Calf losses in these winters may have exceeded 80 percent.

Predation by black bears, brown bears, and wolves is also a factor in limiting the population. The effects of wolf predation are expected to become more significant with the expansion of the wolf population.

Habitat conditions are deteriorating slowly. Overbrowsing has killed many browse plants and suppressed others. The species composition of willow communities in some areas has been altered, with palatable species becoming less abundant and unpalatable species increasing. Critical winter range in the Homer area is rapidly being lost to human development and urbanization. Some browse ranges created by homesteading are now growing out of reach and are losing their value to moose.

Moose have been subjected to relatively heavy hunting pressure in this area since prior to statehood. The average annual harvest since 1963 has been about 400 moose and has been composed of about two-thirds bulls and one-third cows. Antlerless moose have been taken by permit only since 1968. Hunting seasons have been progressively shortened since statehood. Shorter seasons have been necessitated by increased hunting pressure and low calf survival. Harvests since 1972 have been well below the 15-year average. Hunting for bulls has resulted in a distorted sex ratio in favor of cows and a significant reduction in the average age of bulls. Most hunters utilizing this area are Kenai Peninsula residents although in recent years more Anchorage area residents have been hunting the area. The proportion of hunters from other areas is small. Very little guiding for moose occurs.

Moose hunting in this area is conducted primarily for recreation and meat. Most hunting is away from the road system and off-road vehicles are the most common transportation used. Nonconsumptive use occurs generally along the roadside and is incidental to other activities. Most viewing is in the winter.

PROBLEMS

* Critical winter range in the Homer area is being lost to development and range conditions are generally deteriorating. The Department should obtain the cooperation of the U. S. Fish and Wildlife Service and the U. S. Forest Service in rehabilitating existing range.

* Parts of the area have been selected by Alaska natives under terms of the Alaska Native Claims Settlement Act and public use of this land may be prohibited. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* The moose population should gradually increase with improved habitat, allowing for increased harvests and greater nonconsumptive use.

* Hunting seasons will continue to be in accord with moose resource capabilities while allowing maximum participation of hunters.

* Crowded hunting conditions can be expected to continue in accessible areas.

43. TUSTUMENA MOOSE MANAGEMENT PLAN

LOCATION

Game Management Unit 15B east and that portion of Unit 15C north of Kachemak Glacier, Kachemak Creek, Bradley Lake, Bradley River, a line from the mouth of Bradley River to Fox Creek, east of Fox Creek to its head at Caribou Lake, north of a straight line from the outlet of Caribou Lake due west to Deep Creek, east of Deep Creek from that point to its confluence with the north fork of Deep Creek, the North fork of Deep Creek to the refuge boundary, and a straight line due north from that point to Tustumena Lake.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large-antlered moose.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a post-hunting season population sex ratio of 40 to 50 bulls per 100 cows.

2. Control the number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

3. Harvest antlerless moose to maintain the moose population in balance with its habitat.

4. Increase the carrying capacity of selected areas for moose through habitat improvement.

5. Encourage public viewing and photography of moose in a wilderness setting.

THE SPECIES

The Tustumena moose population is estimated at 7,000 animals. The population peaked in the early 1960's and remained relatively stable or declined very slowly until the early 1970's. Since that time numbers have declined sharply. Calf mortality has been the major factor causing the decline. Mortality between birth and late fall has ranged from 60 to 90 percent. In the area north of Tustumena Lake mortality was highest in the period 1967-1970, and lowest in the early 1960's and 1972-1974. South of Tustumena Lake, mortality was lowest from 1962-1970 and has been high since 1971. Mortality was extremely high in 1974 and 1975 with less than 7 calves per 100 cows observed in late fall surveys. These losses are believed to be range-related but predators may also be a factor. Calf mortality from early winter through spring has varied with winter severity. In three winters since 1970 deep snows persisting into late spring have caused heavy calf losses estimated at about 80 percent of the fall calf population.

Predation by black bears, brown bears and wolves may also be limiting moose numbers. The high wolf population in the area south of Tustumena Lake may be directly related to the extremely low fall calf-cow ratios observed in that area in 1974 and 1975.

Habitat conditions have deteriorated due to overbrowsing and plant succession. Declining moose numbers have reduced pressure on the winter range but range rehabilitation will be necessary to restore the range to its former carrying capacity.

Hunting pressure has traditionally been light but has increased in the last several years. Horses provide the only practical means of hunting the area, and the number of people keeping horses has increased rapidly. Most hunters utilizing this area hunt primarily for recreation and meat, although a significant number hunt for trophies. Trophy bulls are available in this area in moderate numbers. Presently there are about 25 to 30 bulls per 100 cows.

Nonconsumptive uses in this area are limited by its remoteness. Some groups have hiked into the area solely for viewing and photography, but numbers have been small. Some viewing occurs on the periphery of the area by boaters and fishermen.

PROBLEMS

* The bull-cow ratio is lower than desired and large antlered bulls are not abundant. The harvest of bulls will be restricted to increase the bull-cow ratio and to allow bulls to attain a larger size.

* Hunting is concentrated in a few areas while large areas are not hunted. Concentrations of hunters reduce aesthetics of the hunting experience and result in localized overharvests of bulls. Hunters will be distributed by making permits specific to areas for a given time period.

* Winter range is being lost to spruce forest encroachment which reduces the carrying capacity of the area for moose. Selected portions of the area should be rehabilitated by fire or mechanical means.

IMPACTS

* The proportion of large bulls in the population will increase.

* Hunting will be by permit, with permits for bulls restricted in numbers in at least part of the area. In portions with poor access, it may not be necessary to limit permits. Antlerless hunting will be under a registration system. Antlerless seasons will be held separate from the bull seasons.

* Nonconsumptive uses will be enhanced by managing for large bulls in the population but will not otherwise be affected.

44. KENAI MOOSE RESEARCH CENTER MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 15A south of Coyote Lake and at the end of Swan Lake Road consisting of four one-square-mile fenced enclosures.

MANAGEMENT GOAL

To provide an opportunity for scientific and educational study of moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Determine interrelationships between moose physiology and productivity and the quality, composition and quantity of their range.
2. Determine moose food preferences and the effects of browsing by moose on the species composition and growth of plants.
3. Determine behavior-related causes of moose mortality throughout the year and evaluate the behavioral-physiological aspects of various forms of stress.
4. Test and evaluate techniques that are potentially useful for moose management.

THE SPECIES

The Kenai Moose Research Center is a cooperative venture of the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service at the Kenai National Moose Range. Construction began in 1965 and the facility was functional by 1968. Four populations of moose are maintained at desired densities and sex and age composition dependent upon research needs. There are 22 corral type traps and five vegetation exclosures at the facility and a 10 acre enclosure for retaining moose for special projects. Two log cabins provide living quarters for two permanently assigned personnel, temporary employees, students and guests.

Results of research projects as generally outlined in the objectives are published upon completion. Over 50 reports and articles in Department research reports, scientific technical journals, conference proceedings and in popular magazines have been published to date. Among the studies reported have been behavior and survival of orphaned and nonorphaned moose calves; the importance of non browse foods to moose on the Kenai Peninsula; the accuracy and precision of aerial moose censusing; immobilization of moose with drugs; monitoring moose mineral metabolism by means of hair element analysis; studies of moose blood and milk parameters; and evaluation of moose pellet group count methods.

PROBLEMS

None

IMPACTS

* No hunting is permitted within the four square mile area of the facility and discharge of firearms is not permitted along the outside fenceline.
* Researchers and visitors to the facility provide income to local businesses.
* Presence of the facility provides a medium for moose information exchange with other researchers for a more expedient application of research findings.

45. SKILAK MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 15 encompassed by the Pedersen-Kelly Lake access road, the Seven Lakes Trail to Engineer Lake, the Engineer Lake access road, the Skilak Loop Road west to the Sterling Highway, and the Sterling Highway back to the Pedersen-Kelly Lake access road.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round moose hunting closure.
2. Improve public access and viewing facilities.
3. Control the number and activities of visitors, if necessary, to reduce harassment of moose.
4. Increase the carrying capacity of the area for moose through habitat improvement.

THE SPECIES

The moose population in this area is estimated at about 75 moose during summer months and as many as 300 moose during winter. The major factor limiting moose numbers has been high calf mortality. Calf losses from birth until late fall have been rather constant at about 60 percent. Losses from early winter through spring have varied with winter severity. Winter calf mortality from 1971 through 1975 was about 80 percent. Moose numbers are well below late 1960's densities. Calf mortality has generally been range-related although predators, particularly black bears and recently, possibly wolves, may be a contributing factor. Winter range in this area has been deteriorating due to the advancement of plant succession and overbrowsing.

Large bulls are rare in this area. Past heavy hunting for bulls and low recruitment of yearlings have resulted in proportions of bulls of less than 10 per 100 cows. The area has been easily accessible from the Sterling Highway or the Skilak Loop Road. Past hunting in this area has been recreational with meat a prime objective.

Nonconsumptive use in the area has been high. Large numbers of people, including nonresident tourists, use the area in the summer and often spend time looking for moose. Dense second-growth timber causes viewing from the road to be difficult during the summer months and viewing success is poor.

PROBLEMS

* Dense second-growth vegetation makes viewing of moose extremely difficult; the potential of the area for viewing moose is not being realized. Enhancing viewing opportunity can be accomplished in cooperation with the Kenai National Moose Range by crushing some of the second-growth vegetation in the vicinity of Marsh Lake and constructing a trail to Marsh Lake for viewer use.

* Viewing activities may disturb moose feeding at Marsh Lake. If this occurs it will be necessary to regulate viewing activities to minimize the disturbance.

* The Department of Fish and Game lacks the authority to regulate nonhunting activities. Regulations governing the use of the area will need to be done in cooperation with National Moose Range authorities and administered by them.

IMPACTS

* Opportunities to observe moose will increase.

* Closure of the area to hunting should result in an increase in the number of bulls and provide mature bulls for viewing.

* Persons who have formerly hunted the area will no longer be able to do so.

* Visitor use may be restricted to prevent harassment of moose.

* Access will probably be restricted to certain trails.

* Other uses that conflict with viewing will be controlled.

46. KENAI PENINSULA MOOSE MANAGEMENT PLAN

LOCATION

Those portions of Game Management Units 7, 15A and 15B, not included within the Resurrection Pass, Skilak, and Tustumena Moose Management Plan areas.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

SECONDARY MANAGEMENT GOALS

To provide for an optimum harvest of moose.

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a post-hunting season population sex ratio of no less than 20 bulls per 100 cows.

2. Control methods of hunter transport to distribute hunting pressure through the area.

3. Use limited harvests of antlerless moose to maintain the moose population in balance with its habitat.

4. Encourage public viewing and photography of moose and enhance viewing facilities.

5. Increase the carrying capacity of the area for moose through habitat improvement.

THE SPECIES

The moose population of this management area is estimated at about 4,000 animals. The population may have numbered in excess of 6,000 animals during the late 1960's. Numbers declined sharply between 1971 and 1976.

The major limiting factor has been high calf mortality. Calf losses from birth until late fall have ranged from 50 to 70 percent. Summer calf mortality has been lowest in the northwestern lowland areas and highest on the eastern half of the Peninsula. Losses from early winter through spring were very high from 1971-1975, particularly in the northwestern corner, north of the Sterling Highway. Localized areas, notably Twenty Mile River and Placer River, have had good survival of calves from birth through the following spring.

The primary cause of calf mortality if believed to be related to range quality, but predation by black bears and wolves may be a contributing factor. Winter ranges have deteriorated due to the advancement of plant succession and overbrowsing. Dead and suppressed willows are in evidence on most wintering areas. The 1947 burn that produced the large moose population of the 1960's is well past the stage of high browse production and it is rapidly losing its value to moose. The much smaller 1969 burn is just beginning to produce forage.

Hunting pressure is very heavy in areas where road access is available. The annual harvest has varied from a high of about 1,400 in 1964 to a low of about 160 in 1975 with an average of about 720 moose per year. Cows have made up about 30 percent of the annual harvest. Large bulls are rare in this area but are occasionally taken. Most hunting in the area is conducted from the road system, although a significant number of hunters gain access by landing planes on lakes. Most hunters are Anchorage area and Kenai Peninsula residents.

Nonconsumptive use is high and usually incidental to traveling the road system. Some tourists actively seek moose during summer months and enjoy fair success in finding animals to view and photograph. Most viewing is done from automobiles.

PROBLEMS

* The capacity of the range to carry moose has diminished substantially during the last decade. To meet the public demand to provide moose for both consumptive and nonconsumptive uses it will be necessary to rehabilitate key winter ranges utilizing fire and mechanical means. Both the U.S. Fish and Wildlife Service and the U.S. Forest Service are undertaking range rehabilitation programs. The Department should cooperate in these programs and initiate similar programs on state lands.

* The bull/cow ratio is presently well below the desired level. It will be necessary to restrict the harvesting of bulls to bring the bull/cow ratio up to the desired level.

* Large areas north of the Sterling Highway in the northwest corner of the Kenai Peninsula are difficult to reach and restrictive Kenai Moose Range access regulations makes it difficult to achieve the desired harvest in some years. Greater flexibility in access regulations by the U.S. Fish & Wildlife Service would provide additional hunting opportunity.

IMPACTS

* Regulations will be designed to conserve a nucleus moose population while range rehabilitation and population manipulation is achieved. This may result in reduced hunting opportunity.

* Moose numbers should increase as moose winter ranges are rehabilitated, providing more animals for all users.

* Increased proportions of bulls in the population will improve the chances for nonconsumptive users to view and photograph bulls.

47. RESURRECTION PASS MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 7 that includes the drainages of Juneau, Little Indian, Big Indian and Resurrection Creeks, the Chickaloon River and the drainages into Turnagain Arm between Little Indian and Resurrection Creeks.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOALS

To provide an opportunity to hunt large-antlered moose.

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport to maintain aesthetic hunting conditions, and to maintain desired harvest levels.

2. Maintain a post-hunting season population sex ratio of no less than 30 bulls per 100 cows.

3. Harvest antlerless moose to maintain the moose population in balance with its habitat.

4. Increase the carrying capacity of the area for moose through habitat improvement.

5. Encourage public viewing and photography of moose in a wilderness setting.

THE SPECIES

The Resurrection Pass moose population is estimated at about 800 animals. The population appears to have remained relatively stable at this high level from the early 1960's through the early 1970's. Between 1971 and 1976, the population may have declined.

Calf mortality has been the major factor limiting this population. Mortality from birth until late fall has averaged about 70 percent. Mortality from early winter through spring has not been measured but is assumed to be similar to adjacent areas where losses were great between 1971 and 1976. The cause of calf mortality is believed to be related to deteriorating winter range. Losses through predation may also be a contributing factor in low calf survival. Black bears and wolves are abundant in the area and are known to be important predators on moose calves.

Habitat conditions in this area have been deteriorating. Encroachment of spruce forest is supressing important moose food species. Over-utilization of browse plants is evidenced throughout the area by dead and nearly dead plants. A portion of this herd winters in the lowlands to the east where deteriorating range conditions are also present.

Harvests of bulls and low yearling recruitment rates have depressed the bull/cow ratio to 10 to 15 bulls per 100 cows. Hunting has been primarily recreational for meat although some trophy hunting has occurred. Trophy bulls are available in the area in low numbers. Several guides have operated in this area but guiding activity appears to be declining. Hunters utilizing this area are primarily Kenai Peninsula and Anchorage area residents. A small percentage of the hunters are from other areas in Alaska or nonresidents. Lakes in the Juneau Creek drainage provide access by aircraft; hunting by horse is popular in the Resurrection, Big Indian, and Chickaloon River drainages. Use of motorized ground transportation during snowfree periods is prohibited by Forest Service regulations.

Nonconsumptive uses in this area are high. The area is bisected by the Juneau Creek-Resurrection Pass trail system and is used by thousands of hikers during the summer months. The viewing of wildlife, and particularly moose, is an important part of the hiking experience. Nonconsumptive users are primarily Anchorage area and Kenai Peninsula residents, although many nonresidents also frequent the area during summer.

PROBLEMS

* The present bull/cow ratio is much below the desired 30 bulls per 100 cows. Restrictive harvesting of bulls or a closure on bull hunting will be necessary to increase the bull/cow ratio to the desired level.

* Hunters tend to hunt certain accessible drainages and exert little pressure elsewhere. To attain an adequate distribution of the harvest and efficient use of the resource, it will be necessary to direct a number of hunters to certain drainages.

* Deteriorating range conditions are lowering the area's capacity to support moose. A comprehensive habitat rehabilitation program by the U.S. Forest Service will be encouraged. The Department should cooperate with the U.S. Forest Service in range programs as funds allow.

IMPACTS

* Habitat improvement programs should allow a gradual increase in moose numbers. Calf survival should improve, and more moose should be available for harvest and nonconsumptive use.

* Parts of the area will be restricted to hunting by permit. This will result in some reduction of hunting opportunity.

* An increased proportion of bulls will make large bulls available for trophy hunting and viewing.

* Longer hunting seasons will be possible because of the control of hunter numbers and distribution.

48. WEST CHUGACH MOOSE MANAGEMENT PLAN

LOCATION

Game Management Unit 14C and in Game Management Unit 7, the drainages of Glacier Creek and Twentymile River.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy moose.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage public viewing and photography of moose and enhance public viewing facilities.

2. Harvest moose within Chugach State Park at a time when a minimum amount of conflict would occur with people using the Park for purposes other than hunting.

3. Control the number and distribution of hunters, if necessary, to maintain aesthetic hunting conditions.

4. Control access and methods of hunter transport to distribute hunting pressure through the area.

5. Maintain an average post-hunting season population sex ratio of at least 25 bulls per 100 cows.

6. Increase the carrying capacity of the area for moose through habitat improvement on lands not included in Chugach State Park or Chugach National Forest.

THE SPECIES

Moose are found throughout the West Chugach Management Area below elevations of 5500 feet. During aerial surveys in fall, 1975, 580 moose were observed, indicating a total population of 800-1000 animals. Present moose abundance is significantly lower than during the mid-1950's through the early 1970's when 2000-3000 moose inhabited the area.

Mortality of moose is high and has been for many years. Starvation, poaching, road and train kills, and other accidents take a large number of moose each year. More moose die annually from these factors than are added to the population, consequently moose numbers are declining.

Moose habitat within the mountainous summer range is considered good. Extensive urbanization within the Anchorage lowlands and hillside area has eliminated large tracts of former prime winter range. Loss of winter habitat is a major factor in the decline of the population.

Moose have been heavily hunted in the area over the past 25-30 years. Prior to 1940 moose were infrequently found and therefore seldom hunted. At the end of World War II increased moose and human populations, coupled with improved access, resulted in a greater interest in moose hunting. Moose harvests increased during the 1950's and peaked during the early to mid-1960's. In 1965, more than 500 moose (50 percent cows) were

taken. An average of 120 moose (25 percent cows) were taken annually between 1966 and 1973. Only 54 moose were legally taken in 1974, and in 1975 only 43 were taken. The decreasing harvest is a function of the reduced moose population, more closed areas, shortened seasons, access restrictions, and bulls-only hunting. Hunter numbers have also decreased from a 1965 high of 800 to 900 to a 1975 low of 235.

Moose hunts by permit only have been held on Fort Richardson Military Reservation several times over the past 10 years. These hunts were an attempt to reduce the number of moose-auto collisions and to keep the Fort Richardson moose population in balance with its habitat. The hunt was popular with local residents but has not been held in recent years because of reduced moose abundance on the Base. Hunters applying for the Fort Richardson hunt, as well as those hunting during the regular season, were mainly residents of Anchorage and surrounding communities.

Viewing and photography are popular year-round uses of moose. Land in the vicinity of Fort Richardson and lower Eagle River offer the best opportunities for viewing moose. About 300 moose winter on Fort Richardson and vicinity and throughout the December-April period some moose are visible from the Glenn Highway where it passes through the base. Moose are also commonly seen in the Portage and Eklutna drainages.

Popular hunting access routes include the Knik River Road and Hunter Creek trail, the Eklutna Road, the Eagle River Road and trails, the Ship Creek trail, the Bird Creek trail, and the Twentymile River. Since the creation of the old West Chugach Management Area in 1968, hunting transportation off established roadways has been restricted to foot, boat, or horse travel only. Present Chugach State Park access restrictions are similar to those for the old management area and apply to all uses of the area.

PROBLEMS

* Future urbanization, road construction, and resource development (gravel pits) throughout the area will continue to eliminate critical winter browse habitat and create more physical hazards to the remaining moose population. Unless such losses are offset by habitat preservation or rehabilitation over areas of significant size, moose numbers will continue to decrease. Fort Richardson and Bureau of Land Management Lands east of the Glenn Highway provide the best opportunity for local habitat enhancement.

* Public access for hunting and viewing may be restricted on private lands. The Department should solicit the cooperation of private landowners to facilitate progressive management of moose. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* Moose numbers will be maintained at a level where they can be viewed or photographed at several locations.

* Anticipated harvest levels will not have a detrimental effect on the moose population size, productivity, or sex and age structure. If moose continue to decline, or if hunter pressure becomes excessive within the limited hunting areas, it may be necessary to control the numbers and distribution of hunters by allowing permit only hunting. If the population decline is not reversed, hunting may be discontinued.

* No season changes are foreseen prior to allowing hunting by permit only.

* No further restrictions on nonhunting use of the area or adverse effects on other species are anticipated as a result of this management.

49. PALMER HAY FLATS MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 14A, the area one-half mile on each side of the Glenn Highway from the Knik River on the south to the Alaska Railroad crossing on the north.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain no open hunting season for moose.
2. Encourage public viewing and photography of moose and enhance viewing facilities.
3. Control access and use of vehicles to minimize disturbance to moose.
4. Encourage land use practices that improve moose habitat.

THE SPECIES

Moose can usually be viewed from the Glenn Highway in late winter and early spring. The number of moose varies from year to year and may be related to the depth of snow in surrounding areas. As many as 200 moose have been seen. Some moose use the area for calving but few animals remain during the summer and fall. Most moose utilizing the area are cows because hunting in the Matanuska Valley has reduced the proportion of bulls in the population to low levels.

Harvest intensity in the proposed area was heavy in past years when seasons coincided with the appearance of moose on the flats. With the recent restricted seasons, only an occasional moose has been harvested in the area. Moose killed by vehicles and poaching probably account for more animals than are legally harvested.

PROBLEMS

* A number of moose are killed each year in collisions with vehicles. The Glenn Highway is elevated through the area and moose crossing it are not visible until they reach the shoulder of the road. Moose crossing signs have been installed but are ineffective in reducing accidents because vehicles travel at high speed. Additional losses occur when moose jump off highway bridges to escape from vehicles. Unnecessary loss of moose, human injury, and property damage might be reduced by posting lower speed limits in the area, and using roadside devices to shy moose away from the highway. Elevation of guard rails on the bridges would eliminate losses of moose which jump from the bridges.

* The lack of pull-outs along the highway creates serious safety problems for motorists because many people park on the shoulder to observe moose. The Department of Highways should be encouraged to construct roadside turnouts at strategic viewing locations.

* Illegal take of moose in the area is fairly common because of the access to and visibility of moose. Increased enforcement efforts are required to curb illegal killing of moose. More severe penalties should be imposed on convicted violators.

* Development within the area will result in a loss of important moose habitat, disturbance to moose, and will impair the natural appearance of the area. A borough-authorized road to a subdivision has affected some habitat in the area. The Department should seek an agreement with the Matanuska-Susitna Borough to limit further development activities within the area. The Department should continue to oppose construction of a powerline across the Palmer Hay Flats.

* All-terrain vehicles and snowmachines used within the area harass moose on critical winter range, destroy vegetation, and detract from the area's attractiveness. Motorized vehicles should be limited to one or two corridors crossing the area in locations not heavily utilized by moose. A snowmachine and dog sled race course which parallels the road should be situated outside of the viewing area.

IMPACTS

* Observation of moose by highway travelers will increase as viewing facilities are improved.

* Existing limited moose hunting opportunity in the area will be lost.

* Moose which utilize the area will continue to be subject to mortality factors including hunting in other portions of the Matanuska Valley.

* Snowmachine and dog sled racers may have to relocate their racing trail further from the road where access to broken equipment will be more limited.

51. PORTAGE GLACIER MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 7, the drainages into Portage Creek bounded on the west by the Anchorage-Seward Railroad and on the east by Placer Creek, Portage Lake, the mouth of Byron Creek, Glacier Creek and Byron Glacier.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round closure to moose hunting.

2. Encourage public viewing and photography of moose.

THE SPECIES

About 50 moose now occur in the 20 square mile Portage Glacier Area. Movements often take moose beyond the boundaries of the area where some bulls are taken by hunters. Consequently, large bulls are uncommon within the area but are still more numerous than in surrounding areas. Some loss of moose habitat has occurred due to construction of roads, campgrounds and parking lots. Large numbers of people utilizing the area may also have caused moose to avoid areas formerly inhabited.

Use of moose by visitors is primarily viewing and photography. Most moose are observed from the railroad, the road, parking lots, or campgrounds, and are commonly seen in the valley and on the surrounding hills. While the scenic values of the area are the primary attraction for people, the availability of wildlife for viewing adds to the visitors' experience. Human use of the Portage Glacier Area has almost doubled since the early 1970's. An estimated 286,000 people visited the area in 1975.

PROBLEMS

* Loss of moose habitat due to expanding facilities and disturbance will occur if human use continues to increase. Access and activities of visitors should be regulated to maintain viewable moose populations in the area.

IMPACTS

* Present wildlife use opportunities should continue with little change.

52. MARTIN RIVER VALLEY MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, the drainages west of Katalla flowing into the Gulf of Alaska to the west bank of the Copper River.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large antlered moose.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a post-hunting season population of 150-175 moose.
2. Maintain a post-hunting season population sex ratio of 30 bulls per 100 cows.
3. Harvest antlerless moose to maintain the desired population size and structure.
4. Control access and methods of transport, if necessary, to distribute hunting pressure through the area.

THE SPECIES

Moose were introduced to the west side of the Copper River Delta over a 10-year period, from 1949-1959. Some animals subsequently crossed the Copper River and became established in the Martin River Valley and the east side of the Copper River Delta. The new herd grew rapidly. It peaked in 1971 with a fall count of 261 moose. The winter of 1971-1972 was severe, resulting in a winter loss of roughly one-third of the herd. Considering the effects of a severe winter upon the 1971 herd, a post-season population of 150-175 moose is considered the most the range can reasonably sustain. In 1975, the moose population numbered about 130 animals.

Natural mortality occurs more frequently in the Martin River Valley area than on the western side of the Copper River Delta. The winters are more harsh and natural accidents, such as drownings, appear more common. Wolves and bears, especially brown bears, are the major predators. Brown bear predation on weak adults and newborn calves is common in spring. Wolves became established in this area once moose became numerous enough to provide a food source. Wolf predation is most noticeable during the winter months. The extent of bear and wolf predation is unknown but is suspected of retarding the moose population recovery from the severe 1971-1972 winter. Although no range studies have been made, high calf production and good over-winter survival in general indicate a healthy range. The area has not been significantly altered by humans. The Martin River Valley area is primarily on U. S. Forest Service land and is part of the "Copper Delta Game Management Area" established in 1962 by the U. S. Forest Service, the Alaska Department of Fish and Game, and the Alaska Department of Natural Resources to protect the habitat and give recognition to wildlife as the primary resource of the area.

This area opened to moose hunting in 1960,and with the exception of 1961, has had seasons each year. Prior to 1965, the harvest of bulls from the Martin River Valley was one or two animals; moose were more readily accessible on the western side of the Copper River Delta. By 1968, hunting pressure had increased and warranted separate regulations for each side of the Copper River. Harvests increased rapidly as the population grew. Fifteen moose were taken in 1968, 34 in 1969 and approximately 100 in 1970. The first antlerless season was held in 1969: seven cows were taken by 25 permit hunters. The 1970 regulations were the same but 26 cows were taken. In 1971 the regulations were modified to enable the Department to establish fall hunting regulations with a quota of males and/or females in the spring after winter survival and calf production were determined. This regulation eliminated the necessity of setting hunting regulations nearly a year in advance of the actual season. Following the severe winter of 1971-72, the moose harvest was curtailed considerably to allow the herd to recover. The 1973 and 1974 season were restricted to bulls only, and 20 per season. In 1975, 31 moose were taken, including a limited harvest of antlerless moose. During the past 11 years 383 moose have been taken.

The Martin River Valley produces fine trophy bulls. A Department study on moose antler growth indicated this area (lower Copper River) produces large antlers on young moose. Because of the small herd, the number of bulls with trophy-sized antlers produced each year is limited.

Much of the moose harvest in previous years involved hunters spotting from the air and directing other hunters on the ground directly to the animals. It is now illegal for persons to hunt the same day they have been in an airplane or to use aircraft to guide hunters. Current practices include hunters locating moose from the air in late afternoon or evening and hunting the following morning from airboats, river boats, or on foot. U. S. Forest Service regulations prohibit use of all-terrain vehicles. In general, hunter success is poor unless airboats are used.

Hunting in the area is managed by a registration/permit system. Hunters are required to report their kill, thus providing for season closures for either sex animal when the desired harvest is obtained. In 1975, 287 persons registered to hunt the area. Roughly 90 percent of the hunters were from Cordova. Meat has been their primary objective; recreation has been secondary. Guides rarely hunt the area because competition with local hunters is great for the trophy moose that are available.

Poor access to the area has discouraged the general public from utilizing this resource for recreation other than hunting. Once the Copper River highway is open, some viewing opportunity will be available. The highway fringes the western edge of the moose habitat. Poaching has not been a problem to date because the moose are not readily accessible.

PROBLEMS

* Commercial, agricultural, or industrial development of privately-owned land could lead to a loss of moose habitat. The Department should work with and seek cooperation from land owners to minimize adverse affects of development.

* Harvests are dominated by hunters utilizing airboats. Hunters with other means of access are at a competitive disadvantage. The Department should consider zoning the area by time or space for different methods of hunter transportation to allow greater participation in the harvest.

* Wolf predation could become a problem if wolves become abundant or if the moose population is reduced by another severe winter. Wolf management should emphasize the desirability of a varied fauna with appropriate use of all its elements.

IMPACTS

* Large-antlered moose will continue to be available to hunters.
* The population should remain highly productive.
* Annual harvests will reflect yearly variations in herd size and composition.
* Predator populations may be managed to reflect the impact of climatic factors on moose numbers.
* Land practices detrimental to moose habitat will be discouraged.

53. COPPER RIVER DELTA MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, the drainages into the Gulf of Alaska from Orca Inlet and Rude River east to the west bank of the Copper River.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of moose.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a post-hunting season population of 175-200 moose.
2. Harvest antlerless moose to maintain the desired moose population size and structure.
3. Control access, number and distribution of hunters, and methods of hunter transport, if necessary, to distribute hunting pressure through the area.
4. Encourage public viewing and photography of moose.

THE SPECIES

Moose on the Copper River Delta are the result of a transplant of 6 male and 14 female calves between 1949 and 1959. The transplant was an immediate success; the range was ideal and natural mortality was apparently low. The herd rapidly increased and dispersed throughout the Copper River Delta. The moose population peaked in 1971 with a fall population of 200 moose west of the Copper River. The winter of 1971-1972 was severe, resulting in a 15 to 20 percent winter loss, primarily of calves. The herd has been maintained at a fall population of 200 or less since 1971 to maintain a productive herd in balance with the range. At present, the herd is in excellent condition. A February 1976 count revealed 191 moose, 29 percent of which were calves.

Natural mortality takes a few animals each year. Brown bears are primary predators, especially on calves and weak adults in spring. Other predators, such as black bears, wolverines, and coyotes are of minor importance. Wolf predation has not been reported, but some wolves occasionally traverse the eastern edge of this area. The primary moose winter range is not frequented by wolves. Population size and composition are regulated by hunting.

Habitat studies have not been conducted on the Copper River Delta. Calf production and survival throughout the winter indicate this herd and the range to be in healthy condition. The 1964 earthquake uplifted the Delta approximately 6 feet. The uplift lowered the water table, and woody plants such as willows are spreading on the delta. The Copper River Delta is managed by the U. S. Forest Service. The portion of the Delta south of the Copper River Highway is part of the Copper River Delta Game Management Area. A cooperative agreement between the U. S. Forest Service, the Alaska Department of Fish and Game, and the Alaska Department of Natural Resources recognizes wildlife as the primary resource of the management area and is dedicated to maintaining the habitat in its present condition. Forest Service regulations prohibit wheeled all-terrain vehicle use in the management area.

In the fall of 1960, a limited harvest was initiated. Twenty-five bulls were taken by permit. The following year hunting was not allowed, but in 1962 hunters took another 25 bulls. Moose seasons have been held annually since. In 1968, the first 10 antlerless permits were issued. Fifteen antlerless permits were issued in 1969. In 1970, one moose of either sex was allowed with a total of 40 permits. Since 1971, moose hunting has been one moose by permit with conditions and number of permits annually described by Commissioner's announcement during a September 10 to 15 season. Hunting pressure has been restricted by the number of permits issued. Typically about 500 people have applied for the 20 to 60 permits available. This regulation has permitted the previous winter's survival and the spring calf production to be determined prior to establishing the fall quota of moose to be harvested. In years when the moose population fell below the desired level, antlerless hunts were not held (1973 and 1975). Hunter success has normally been 80 percent or better. During the past 15 seasons, 427 moose have been taken (15 to 46 per year), primarily by Cordova residents. Guides do not take moose from this small herd because the permittees are determined by a public drawing.

The Copper River Highway offers good access to the Delta for hunters. The Alagnik Road is heavily hunted. Hunters primarily travel by foot from cars along the road and with the aid of air boats. Air boats are ideal for the Delta because of the extensive marshland, ponds, creeks, and sloughs. All-terrain vehicles are not allowed on the Delta south of the highway by U. S. Forest Service Regulations. Few moose are taken north of the highway.

The Copper River Delta moose herd is enjoyed year-round by local citizens. Driving the Copper River Highway for a "Sunday drive" is a popular pastime. Looking for wildlife and observing large antlered bulls are especially rewarding.

PROBLEMS

* Development of private lands on the Copper River Delta would result in a major loss of moose habitat. Land selected in the Sheridan River drainage is critical winter range. Roughly 85 percent of the herd winters in this general area. The land selected is extensively used in late winter when deep snow covers the willow in the Alaganik Road area. Also, land selected between Mile 7 and 11 on the Copper River Highway area bisects the normal summer range west of the Cordova airport. If land is developed in this area, a loss of summer habitat would result and moose movements could be restricted. The Department should encourage cooperative management agreements with appropriate organizations and agencies to protect surface values.

* Illegal killing of moose occurs each year. Although the half dozen illegal kills each year have not seriously affected the population, they have reduced the number of animals available to hunters. Enforcement efforts should be increased in the area and more severe penalties for violators should be imposed.

IMPACTS

* Little change from the present management system should occur.

* The moose population should continue to be highly productive.

* Regulation of bull harvests should provide opportunity for viewing various age classes of moose, including large bulls.

54. TONSINA MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 13 bounded on the west by the Richardson Highway, on the north by the Edgerton Highway, on the east by the Copper River, and on the south by the north banks of the Tasnuna and Lowe Rivers.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters, and methods of hunter transport, if necessary, to distribute hunting pressure through the area.

2. Maintain a post-hunting season population sex ratio of no less than 15 bulls per 100 cows.

3. Discourage fire suppression on potential moose habitat.

THE SPECIES

Moose in this area were formerly plentiful, but high natural mortality, harvests by hunters using mechanized access, and low replacement levels reduced the population. Moose are now generally found in the upper portions of the drainages, usually out of reach of walk-in hunters.

Since regulations excluding use of mechanized vehicles and pack animals from August 5 to September 30 were implemented in 1974, sport hunting use of this area has been primarily by sheep hunters. Prior to establishment of the walk-in area, some moose hunters used all-terrain vehicles on the Bernard Creek Trail, Tonsina Trail and Tiger Mine Trail to reach hunting areas. Once hunters passed timberline, they were able to cover large areas easily with all-terrain vehicles. Hunters also used all-terrain vehicles to establish roads where possible in moose habitat and undoubtedly contributed significantly to the reduction of the moose population.

PROBLEMS

* Noncompliance with the no-mechanized vehicles regulation has occurred. The Department should initiate a more active public information program dealing with controlled use areas. The Department should also take a more active role in enforcement to aid the Division of Fish & Wildlife Protection.

* The eastern boundary of the Copper River makes hunters walk 6 to 8 miles on an established road before entering the area. The distance required to reach moose from the western boundary also precludes reasonable utilization by hunters. The Department should consider allowing access by mechanized vehicles on the Woods Canyon Road and on the Bernard Creek Trail only as far as Kimball Pass. Access to Kimball Pass would allow better utilization of the moose population, but still provide a walk-in sheep area.

IMPACTS

* Moose hunter density will remain at a low level unless transportation by mechanized vehicles on established trails is allowed.

55. KLUTINA MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 13D bounded on the south by the Game Management Unit 6 boundary; on the west by the Klutina Glacier and River, the eastern shore of Klutina Lake, St. Anne Creek and Lake, and a line due north from the outlet of St. Anne Lake to the Glenn Highway; on the north by the Glenn Highway; on the east by the Richardson Highway.

MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access and methods of hunter transport to maintain aesthetic hunting conditions.

2. Control hunter numbers and distribution, if necessary, to maintain desired harvest levels.

3. Maintain a post-hunting season population sex ratio of 25 bulls per 100 cows.

4. Discourage fire suppression on potential moose habitat.

THE SPECIES

Moose in this rugged area are sparsely distributed and occur near the heads of larger valleys during hunting season. Inventory counts of most of this area during 1974 and 1975 yielded 615 moose. However, not all of the area was surveyed and not all of the moose were seen. Numbers of moose seen have been declining at an annual rate of four percent per year since 1967. Calf:cow ratios have been declining at an annual rate of five percent per year since 1967. The calf:cow ratio found in this area during 1975 was seven calves per 100 cows, well below the level necessary to maintain moose numbers. Bull:cow ratios were relatively high at 38 bulls per 100 cows during 1975. Some large-antlered bulls are present.

Moose were scarce when miners first came into the area in the early 1900's. The moose population increased when favorable habitat was created by fire, and achieved high levels in the late 1950's and early 1960's in response to excellent habitat conditions, relatively mild winters, and intensive federal predator control. Since the mid-1960's the population has declined. Factors contributing to the decline have included loss of productive browse habitat as a result of effective fire suppression over the past two decades, a rapid increase in predator populations following cessation of control efforts in the mid-1950's , and a number of severe winters with deep accumulations of snow.

Most use of moose in the Klutina area has been for recreational and trophy hunting. Hunting pressure has been relatively light due to the uneven moose distribution and poor hunter access. In 1974 and 1975, 39 and 25 moose, respectively, were taken from this area. There is only one secondary road into the area (the Klutina Lake Road) and a few trails used by off-road vehicles (Squirrel Creek Trail and Rock Creek Trail). Aircraft have been the most used form of hunter transport in

recent years with six usable airstrips in the area. Listed in order of importance, boats, highway vehicles, off-road vehicles, and horses have also been used for transport. In 1974, the most recent year for which data are available, 39 percent of the hunters were successful. More than 80 percent were resident Alaskans. Two established guide operations are located at Manker Creek and High Lake. Other guides using the area have no permanent camps.

PROBLEMS

* Moose in this area are rapidly declining in numbers due primarily to poor summer calf survival. The probable cause of current poor calf survival is excessive wolf predation. The effects of predation should be closely monitored and appropriate adjustments in moose harvest levels should be made, including a hunting closure if necessary.

* Effective suppression of forest fires over the past two decades has resulted in reduced moose browse. Forest fires in this area should be allowed to burn to create new stands of deciduous browse.

* The terrain in this management area is well suited for hunting with pack animals, but additional airstrips and bulldozed trails are created each year. Present access is well spaced to preserve those qualities contributing to an aesthetic hunt. Areas adjacent to access points provide good conditions for walk-in hunters. This area should be designated primarily for foot or horseback hunters from designated access points, and the development of new trails and airstrips should be prohibited.

IMPACTS

* Use of mechanized ground vehicles by hunters will be limited to designated transportation corridors, and aircraft would be allowed only on designated airstrips and lakes. Designated corridors and lakes would be primarily those now in existence.

* The number of large bulls should increase as a result of transportation restrictions on mechanized vehicles.

* Use of pack animals by hunters should increase.

* Guide and hunter transport operations would be affected little by restrictions on mechanized transport except that increased mechanized access would not be developed.

* Use of the area by nonhunters would not be effected.

56. NORTHERN CHITINA MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 11, that portion of the Chitina Valley bounded on the south by the Chitina River, on the east by the Canadian border, on the north by the crest of the Wrangell Mountains, and on the west by Long Glacier and the Kotsina and Copper Rivers.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the moose population at the carrying capacity of its habitat.

2. Maintain a post-hunting season population sex ratio of no less than 10 bulls per 100 cows.

3. Discourage fire suppression in potential moose habitat.

THE SPECIES

Moose are sparsely distributed in this area. Reports from guides and local residents indicate that moose have declined markedly during the past ten years. Aerial moose composition surveys initiated in the central portion of this area in 1973 indicate low calf survival is the problem. Fall calf:cow ratios have averaged less than 10 calves per 100 cows for the past three years. Most guides and local residents report wolves are abundant and grizzly bears are common. No recent exceptionally deep snow accumulations have been recorded, and moose browse along the Chitina valley appears abundant and only lightly utilized.

Legal harvests from this area have been small. No moose were reported taken from this area in 1974 and only eight bulls were taken in 1975. Because harvests have been light and young bulls are scarce, many of the bulls seen and taken by hunters have been older, trophy-size animals. In past years, guided nonresidents transported by light aircraft took most of the legal harvest. With increased numbers of resident hunters resulting from the opening of the Chitina-McCarthy Road and with the decrease in moose numbers, several guides now take their clients elsewhere for moose, and harvests by nonresidents have dropped to a low level. Because of a large increase in unemployed or seasonally employed residents living in the Chitina-McCarthy vicinity, the unreported, out-of-season moose harvest probably substantially exceeds the legal harvest. Legal and illegal harvests have probably had no substantial part in the decline of the moose population.

PROBLEMS

* Moose in this area are rapidly declining in numbers due primarily to poor summer calf survival. The probable cause of current poor calf survival is excessive wolf predation. The effects of predation should be closely monitored and appropriate adjustments in moose harvest levels should be made, including a hunting closure if necessary.

* Effective fire suppression has greatly reduced the acreage burned by wildfire in the Chitina Valley. Although moose are not now limited by food, successional vegetation changes are reducing browse productivity on existing moose winter ranges, thus reducing the potential number of moose that can be supported by the range. Controlled burns or other browse rehabilitation methods should be employed to rejuvenate selected moose winter ranges. Because much of the land in question is not owned or controlled by the State, the cooperation of land managing agencies is necessary for implementation of habitat management programs.

* Hunting may be prohibited or limited directly or indirectly through restrictions on transportation methods on National Park or National Forest lands. In addition, manipulation of habitat or regulation of other species populations may not be in agreement with federal agency objectives. The Department should establish cooperative management agreements with federal agencies administering the area which would retain hunting in as much of the area as possible with as much flexibility for management as possible. Manipulation of habitat or wolf numbers on National Park Service lands will be unlikely.

* Noncompliance with game regulations by many of the valley's residents is believed to be a problem. The low income level and scattered distribution of the residents gives many of these people the need and opportunity to kill moose out-of-season. Increased enforcement efforts are needed in the area.

IMPACTS

* Moose numbers should increase with improvement of calf survival, and harvests will increase as either sex hunts maintain the population near carrying capacity levels. Unless calf survival improves, however, little increase will take place in the near future and legal moose harvests will probably remain low.

* No major changes in game regulations for hunters would occur.

* Nonconsumptive users would benefit by increased moose numbers for viewing and photography.

57. SOUTHERN CHITINA MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 11, that portion of the Chitina Valley bounded by the Copper River on the west, the Chitina River on the north, the Canadian border on the east, and the crest of the Chugach Mountains on the south.

MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions, and to maintain desired harvest levels.

2. Maintain a post-hunting season population sex ratio of 25 bulls per 100 cows.

THE SPECIES

Little is known about moose in this remote area. Two local guides that formerly hunted moose in the area indicated that moose were common during the early 1960's but are markedly fewer now. Moose composition counts have never been made in this area. Harvests have been very low, and most bull moose seen are relatively old; many of the bulls taken here by hunters have been trophy-size animals.

Use of these moose has been limited because of the area's remoteness. There are no roads, no villages, and no permanent residences in the area. Moose harvests during recent years have ranged from none to five moose and probably never exceeded ten moose since the gold mining era. Nonconsumptive use, other than that which is incidental to hunting or fishing is almost nonexistent. Access during summer is primarily limited to aircraft landing on unimproved airstrips. One guide keeps horses south of the Chitina River. The Chitina River can be crossed after freeze-up by snowmachines and tracked vehicles.

PROBLEMS

* Moose herds in this area are now reduced to a scattering of small pods and individuals. Poor calf survival is the major problem in adjacent southcentral Alaska areas, and it is probably the major problem here. Implementation of measures to improve moose calf survival will have to await broader public support.

IMPACTS

* Little change in existing patterns of use will occur in the near future.

58. BERING RIVER-ICY BAY MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, the drainages flowing into the Gulf of Alaska between Katalla and Icy Bay.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt moose under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to take large-antlered moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

2. Maintain a post-hunting season population sex ratio of 40-50 bulls per 100 cows.

3. Harvest antlerless moose to maintain the desired population size and structure.

THE SPECIES

Moose in the Bering River-Icy Bay area originated from descendants of the Copper River Delta moose transplant. Moose were transplanted to the Copper River Delta near Cordova in the 1950's. They increased rapidly and dispersed to the eastern side of the Copper River. Mountains between the Martin River Valley and Bering River retarded expansion to the east for a few years but by the late 1960's a small herd existed in the Bering River-Controller Bay flats. The Suckling Hills formed a natural boundary for this herd on the east, but did not prohibit them from extending their range toward Icy Bay. A few moose are now scattered along the coastal fringe between Suckling Hills and Icy Bay. Eventually two separate moose herds will probably exist in this area: 1) Bering River-Controller Bay and 2) Suckling Hills - Icy Bay. The Bering River-Controller Bay herd has increased in the past seven years from 19 moose in January, 1969 to at least 96 in January, 1976. Observations in the Suckling Hills - Icy Bay area have indicated about 20 moose occur in this area.

Natural mortality is suspected to be due primarily to predation by wolves and bears. In the past few years, wolves have become established along the Gulf Coast in conjunction with the moose herd. In the winter of 1975-76, five wolves were taken near Controller Bay and two were taken east of the Suckling Hills. Brown and black bears are numerous along the Gulf Coast. They prey primarily on newborn calves and weak adults.

The habitat along the Gulf Coast appears good. Judging by the rapid increase of moose around Bering River - Controller Bay, the area appears well suited for moose. Like the lower Copper River Delta, this area produces large antlered bulls at an early age, probably a reflection of excellent range.

Human use of this herd has been minimal. Hunting regulations for the Martin River Valley have applied to this area but, because of the remoteness and the small herd size, the harvest has been insignificant, perhaps five moose prior to 1975. To direct hunting pressure to the Bering River-Controller Bay herd, a separate moose quota was set for the 1975 season. Eight moose (five males and three females) were taken by one party of hunters that used seine boats to reach the area and then airboats for hunting. Hunting pressure will gradually increase as hunters learn where the animals are and how to hunt them. Aircraft will probably be the major mode of transportation east of the Suckling Hills; airboats and aircraft will be used west of the Suckling Hills. The equipment required to reach the area and the chances of success discourage meat hunters from utilizing this resource. Cordova residents will probably dominate the harvest in the Bering River - Controller Bay area but, because of remoteness, guided hunts will probably dominate east of the Suckling Hills.

PROBLEMS

* Oil and gas resource development along the Gulf Coast could result in a large increase in human population in the area with consequent increases in hunting pressure, alteration of habitat, and deterioration of aesthetic character of the area. The Department should recommend measures to minimize detrimental effects of development. Hunting pressure will be closely regulated to maintain uncrowded hunting conditions and acceptable harvest levels.

* Predation, primarily by wolves, may retard growth of the new moose herd east of the Suckling Hills. Liberal wolf hunting and trapping regulations should maintain a low but productive wolf population until the moose herd becomes well established.

IMPACTS

* A primitive hunting area that contains a good population of moose with a high percentage of large-antlered bulls will be maintained.

* Hunting opportunity will be limited by permit, thus every person who desires to hunt there may not be allowed to do so.

MOUNTAIN GOATS IN SOUTHCENTRAL ALASKA

Mountain goat (*Oreamnos americanus*) populations in Southcentral Alaska are distributed along the coastal mountains from Icy Bay to Cook Inlet and inland to the Wrangell and Talkeetna Mountains. Goats are most numerous along the coastal mountains where the climate is less severe and their range is not shared with sheep.

Population surveys conducted since 1959 indicate relatively stable populations until the early 1970's when severe winters caused area-wide declines. Overhunting, particularly on portions of the Kenai Peninsula, 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. The importance of mature coniferous forest to goats is not yet understood, but use of this habitat is well documented. Also, sightings of goats on saltwater beaches indicates movements of considerable distance through the forest zone.

Limited data suggest that mortality from winter weather conditions is the primary limiting factor on goat populations. In addition to limiting forage 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 domestic utilization by coastal natives for meat, cosmetics and ornamental purposes, and by early-settlement whites for domestic use and for the market. Mountain goats are now hunted primarily for recreational values and meat. The species is increasing in popularity as a big game animal in Southcentral Alaska, partly due to decreasing opportunities to hunt other species of big game.

Differences in hunter accessibility for various goat ranges have resulted in two different pictures of use in Southcentral Alaska. In the Chugach Mountains near Anchorage and on the Kenai Peninsula, roads and lakes have provided relatively easy access to goat populations for many local hunters. In addition, since goat ranges often overlap Dall sheep ranges in these mountains, concurrent sheep hunting seasons have served to increase hunting pressure on goats. Goats are often taken by unsuccessful sheep hunters. Since 1972, approximately 60 percent of the statewide harvest has occurred in the Southcentral region, 55 percent of which has come from the Kenai Peninsula. Some goat populations have declined under heavy hunting pressure. Necessary reductions in season lengths and bag limits have accompanied increased utilization near metropolitan centers.

In contrast, the relatively inaccessible goat populations of Prince William Sound have experienced only slight increases in hunting pressure. Seasons and bag limits remain liberal; however, some reductions in season lengths may be necessary in the future.

Aesthetic values of mountain goats have in recent years received increased recognition. Opportunities for viewing and photographing goats are available at three recently established mountain goat observation areas:

the Goat Mountain and the Heney Range goat observation areas near Cordova and the Exit Glacier area near Seward. In addition, nonconsumptive use occurs throughout the goat's range in Southcentral Alaska.

PROBLEMS

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

* Clearcut logging adjacent to goat winter range is increasing annually. Many of the areas scheduled for logging have been identified or 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 physical 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 over-harvest in some localized areas while 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.

2. UPPER COOK INLET GOAT MANAGEMENT PLAN

LOCATION

Game Management Units 14A, 14B, and 13E.

MANAGEMENT GOAL

To provide an opportunity to hunt mountain goats under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

2. Maintain harvests below the annual increments of the mountain goat population.

THE SPECIES

Goat populations in the Upper Cook Inlet area are generally low. A sex and age composition survey conducted in June 1974 north of the Matanuska River revealed 28 goats (23 adults, 5 kids). It is doubtful that goats in this area reached high numbers in the past as Upper Cook Inlet appears to be on the very periphery of the range of this species. In these peripheral areas even elimination of use may not result in a large increase in numbers.

Little is known about natural mortality in this area, although goats occasionally are killed by snow or rockslides, or falls, and it is possible that wolves take some goats. No information is available on weather influences, but winters are severe in the area and the lack of winter range may be the major limiting factor.

The mountain goat is sought as a trophy animal; both males and females are taken as they both have similar horn development and most hunters cannot distinguish between sexes. This area is not noted for its trophy goat horns although the potential may exist.

Liberal hunting seasons have changed little since statehood. Currently a fall season of two to three months is in effect. There is usually a good deal of hunting interest (50 hunters in 1972, 47 in 1973 and 36 in 1974), but the extreme ruggedness of the goat range and poor weather conditions limit the harvest. Although little is known regarding goat movements, they have been observed moving long distances over tops of mountain ranges, thus making them unavailable in certain subunits at various times of the year. This movement often coincides with hunting periods. Since 1973, when harvest records first became available, an average of only 3 goats per year have been taken. Goat hunters occasionally report crippling or unrecovered kill losses when the goats fall into inaccessible areas. The number of animals lost in this manner is unknown, but this loss appears to be higher than occurs in other big game hunting.

Nearly all goat hunting is recreational, with the meat consumed by the hunters and their families. Although some nonresident guided hunts have been conducted in the area, most hunters are believed to be residents.

PROBLEMS

* The apparent low goat population in this area suggests that some unknown factor is limiting goat numbers. Research should be initiated to determine goat population size, distribution and movements.

* The final settlement of the Alaska Native Claims Settlement Act may cause access to some goat populations in the area to become even more restricted if private land between roads and goat range is posted to trespassing. The Department should solicit the cooperation of private landowners to facilitate progressive management of goat populations. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Some goats are known to have been harvested from this area by sheep hunters before the goat season has opened. An increased effort by the Department to inform the public concerning regulation changes might reduce illegal kills.

IMPACTS

* Goat populations may increase slowly. In some areas this recovery is expected to take many years.

* Goat hunter use will be reduced. Some portions of the area will be closed to goat hunting for a period of years.

* Only limited numbers of goat hunters will be allowed by permit; they will find uncrowded hunting conditions.

* Access restrictions will limit methods of transport to some goat hunting areas unless public easements across private lands are reserved.

3. WEST CHUGACH GOAT MANAGEMENT PLAN

LOCATION

Game Management Unit 14C, and in Game Management Unit 7, the drainages of Glacier Creek and Twentymile River.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy mountain goats.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt mountain goats under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit mountain goat hunting in Chugach State Park.

2. Encourage public viewing and photography of mountain goats in a wilderness setting.

3. Control access, number and distribution of hunters and methods of hunter transport outside Chugach State Park to maintain aesthetic hunting conditions and desired harvest levels.

THE SPECIES

Mountain goats are fairly abundant within several drainages in the area and are rare or absent in others. During the last extensive aerial survey conducted in 1972, 183 goats were observed in the area, with 144 of those seen in the Hunter Creek-Lake George drainages. A recent limited survey conducted in August 1975 found goat concentrations in the vicinity of Lake George similar to 1972 levels. No surveys in the Chugach National Forest portion of the area have been conducted since 1970. During that year 45 goats were seen in the upper Penguin Creek-Glacier Creek drainages. In a 1969 survey of Portage Creek, the Twentymile River and the eastern side of Glacier Creek 101 goats were observed. Population size is difficult to estimate from aerial surveys because it is doubtful that more than 50-60 percent of all goats present are seen. Present goat numbers within the entire West Chugach management area are unknown, but are felt to be slightly reduced from 1972 levels and substantially reduced from levels of 10 to 20 years ago. Habitat conditions within drainages where major goat concentrations occur are thought to be good. These drainages include Hunter Creek, the entire Lake George area, Glacier Creek, and Twentymile River. Fair habitat exists in the drainages of Eklutna River, Eagle River and Bird Creek. Elsewhere habitat is poor to nonexistent. No observations of natural mortality have been documented in the area, although goats are known to die in spring snow avalanches within the precipitous habitat they occupy. Severity of winter weather is probably the major factor controlling population levels.

Mountain goats have been hunted in the area for many years. Hunter use during the 1950's and 1960's was fairly heavy, but it has been light during the early 1970's. Actual harvest levels prior to 1972 are unknown, but since then an average of 8 goats have been harvested annually. The number of hunters has declined from an average of 44 per year in 1972 and 1973 to 17 in 1974 and 19 in 1975. Since 1972 nearly all hunters have been local residents.

Seasons from statehood through the early 1970's ran from August 10 through November or December depending on the year and the location. The bag limit was usually 2 goats per year. Since the mid-1970's, in areas remaining open to goat hunting, seasons have been substantially reduced and the bag limit lowered to one. Further restrictions were imposed for 1976 by allowing goat hunting by permit only. Since 1973, goat hunting has been prohibited in Chugach State Park. Goats are not abundant within the Park. Present harvest levels are not felt to be detrimental to population productivity, sex ratios or availability of animals. In past years hunting pressure may have contributed to the reduction of goat numbers in the drainages of Bird Creek and Eklutna and Eagle Rivers. Hunting access is primarily via the Hunter Creek Trail, the Girdwood Road and adjoining trails and the Twentymile River.

Other uses of goats within the area include viewing and photography. Opportunities to see goats are best during May and June. Presently there are no accessible viewing areas where goats can be readily viewed. Small numbers of goats may be seen in the upper Eklutna Valley, upper Eagle River, Bird Creek, Crow Creek and Twentymile River. Viewing opportunities decrease as summer advances and goats retreat to more inaccessible habitat. Numerous goats may be observed from aircraft in the Lake George area during spring and summer. Viewing access routes include the Eklutna Road, the Eagle River Road and trail, the Bird Creek roads and trails, and the Crow Creek road. Access to locations inhabited by goats is far more difficult in winter than during late spring and summer.

Hunting and viewing use are both subject to restrictions on methods of transportation, which prevent use of motorized vehicles off established roadways except boats on Eklutna Lake and Twentymile River.

PROBLEMS

* Over the past several decades goat populations have declined within several drainages in the area, namely Eklutna, Eagle River and possibly Bird Creek. The causes for the declines are unknown, although overhunting, increased human disturbance, urbanization, population movements, competition with sheep and cyclic population fluctuations are possible reasons. As with many wildlife population declines, hunting pressure is often singled out as the primary factor, mainly because it is far less subtle than other possible factors. Recent aerial surveys of goat ranges to the immediate south of the West Chugach Management Area, as well as in southeastern Alaska, have shown large declines in certain goat populations that have received only very slight hunting pressure. Population shifts and substantial goat movements have also been noted. Likewise, it is felt that goats are less tolerant of human encroachment than other big game species occupying similar ranges. The Anchorage area is also very near the northwest fringe of mountain goat distribution in North America; consequently goats at this location are far more likely to experience severe population fluctuations than those in prime ranges.

* Present hunting use is primarily limited by the inaccessibility of those areas open to hunting. Future Eklutna Native land selections in portions of the Knik and Hunter Creek drainages may further exclude public hunting. The Department should solicit the cooperation of private landowners to facilitate progressive management of goat populations. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* Provided there are no major goat population decreases or increases, management advocates the continuation of goat hunting by permit only.

* No substantial changes in goat population size or sex and age structure are expected.

* Hunter use under the permit system should not decrease, provided goat populations remain stable. Season lengths and opening dates may change.

* Nonhunter use of goats will increase.

* No effects on other species or other uses of the area are anticipated under this management.

4. PORTAGE GLACIER GOAT MANAGEMENT PLAN

LOCATION

In Game Management Unit 7, the drainages into Portage Creek bounded on the west by the Anchorage-Seward Railroad and on the east by Placer Creek, Portage Lake, the mouth of Byron Creek, Glacier Creek and Byron Glacier.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy mountain goats.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round closure to mountain goat hunting.

2. Encourage public viewing and photography of mountain goats.

THE SPECIES

An estimated maximum of 10 mountain goats now occupy the mountainous slopes of the Portage Glacier area. A scarcity of suitable habitat and deep and persistent snow cover probably limit mountain goat numbers. Black bears and coyotes are common, and brown bears and wolves are occasionally seen in the area, but these animals probably do not significantly affect the goat population. The mountain goat habitat of Portage Glacier is inaccessible to most visitors, and it has not been significantly altered by human activity.

Viewing is the major human use of goats in the area. Most goat viewing takes place from the valley bottom, although an unknown number of people also hike the mountain sides to view the animals at closer range.

PROBLEMS

* None

IMPACTS

* Present wildlife use opportunities should continue with little change.

6. EXIT GLACIER GOAT MANAGEMENT PLAN

LOCATION

In Game Management Unit 7, the Exit Glacier closed area.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy mountain goats.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the area closed to the taking of mountain goats until the goat population exceeds the carrying capacity of its habitat.

2. Encourage public observation of mountain goats and enhance viewing facilities.

3. Restrict access for viewers and photographers, if necessary, to minimize disturbance to mountain goats.

4. Discourage land use practices that adversely affect mountain goat habitat.

5. Maintain the mountain goat population in balance with the carrying capacity of its habitat, by harvests if necessary.

THE SPECIES

Mountain goats occur throughout the area but are most conspicuous at Exit Glacier which is the terminus of the Resurrection River road. This area contains approximately 35 goats. The population has been stable for the last several years. Limited data suggest that winter weather conditions are the primary factors limiting goat abundance. Excessive snow accumulations contribute to mortality through avalanches and accidental falls, in addition to limiting forage availability.

The closed area was established in 1973 because of its close proximity to Seward and the scheduled completion of a road up Resurrection River which would have provided excessive hunter access. Completion of the project with a bridge crossing the River would provide excellent opportunities for nonconsumptive use. However, the bridge has not yet been constructed and little use has occurred.

PROBLEMS

* Delayed construction of the Resurrection Bridge has kept nonconsumptive use in the area at a minimum. The Department should encourage completion of the bridge.

* Limited funds and personnel may hamper development of viewing facilities. The Department should seek additional funds to accomplish management objectives.

* Once the Resurrection Bridge is constructed, human use of the area is expected to sharply increase and human activities may disturb goats to the extent that they abandon viewing areas. Regulation of user activities may be necessary to maintain viewing opportunity in the area.

IMPACTS

* No changes in the goat population are expected.
* Excellent goat viewing opportunity will be maintained.
* Human activities beyond the road will be restricted by permits.
* Interest and appreciation for mountain goats will be stimulated.

7. KENAI PENINSULA GOAT MANAGEMENT PLAN

LOCATION

Game Management Units 7 and 15 except for that portion of the Kenai National Moose Range lying north of the Kenai River, and the Exit Glacier and Tustumena Goat Management Plan areas.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting mountain goats.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of mountain goats.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the goat population at the carrying capacity of its habitat.

2. Control access, distribution of hunters and methods of hunter transport to maintain desired harvest levels and to distribute hunters throughout the area.

3. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Mountain goats occur throughout the mountainous portions of the Kenai Peninsula area. Routine aerial surveys were initiated in 1968. At that time the total goat population was estimated at 2,000 animals. Surveys conducted since 1968 have indicated a downward trend in goat numbers, particularly where goat and Dall sheep distributions overlap. Goat habitat requirements are poorly understood, but area-wide population fluctuations are thought to be habitat related, particularly as affected by winter snow conditions. Goats on ranges occupied by sheep may be subject to competition for forage with sheep.

Since at least 1971 the eastern portion of the Kenai Peninsula has been the most intensively hunted goat area in the state. Goat hunting seasons and bag limits were liberal prior to 1971, generally August 10 to December 31 with a two goat limit. In 1971 the bag limit was lowered to one goat over most of Game Management Unit 7 in response to increasing hunting pressure. Goat harvest reports, initiated in 1972, provided the first accurate harvest data. These reports indicated that 425 hunters harvested 199 goats during the 1972 season, with most of the harvest occurring in Unit 7. That harvest was considered to be at or slightly above the sustained yield level. In 1973 hunters and harvest increased to 645 and 225, respectively. During the 1974 season all but four coastal areas were closed to the taking of goats after August 31. The early closure reduced the harvest in Game Management Unit 7 to 64 goats, while in the remaining area with a five-month season, 173 hunters harvested 75 goats. Evidence indicated that a significant portion of the Unit 7 goat harvest was being taken by unsuccessful sheep hunters. Consequently, the 1975 goat hunting season in most of Unit 7 was shortened to begin at the conclusion of the sheep hunting season. In addition, the bag limit for the entire area was lowered to one goat. The shortened Unit 7 season resulted in 183 hunters harvesting 64 goats. The harvest for the remaining portions of the Kenai Peninsula was 44 goats. The sex ratio of the harvest from 1972 through 1975 was almost equally divided, with males comprising 56 percent of the total harvest. Approximately

one-half of the hunting pressure in the area currently is from Anchorage hunters. Kenai Peninsula residents comprise about 40 percent of the hunters while non-Alaskan residents constitute the remainder. Nearly all hunts are recreational in nature. Most hunting occurs during the first two months of the season when weather conditions are most favorable. Hunts after that period are often hampered by inclement weather and, for the most part, do not appeal to the average hunter. Hunters generally expend three to five days per hunt. Along the coastline hunters utilize boats and aircraft to reach hunting areas. For inland areas, automobiles are the primary transport mode.

Areas with relatively easy hunter access, particularly those adjacent to roads or lakes suitable for float plane landings, receive most of the hunting pressure. Other areas with relatively difficult access receive little or no hunting pressure. Overall current harvest levels are well within sustained yield levels. However, overharvests are occurring in areas where access is relatively easy. Since goats often utilize both the same summer and winter range the current harvest pattern can potentially eliminate small herds.

Potential for nonconsumptive uses has been unlimited but actual use has been light. Some viewing occurs adjacent to roads and along certain established trails. Viewing and photography also occur incidental to the hunting of other species.

PROBLEMS

* Clearcut logging and other land use developments may eliminate important segments of winter habitat and result in lower goat populations and fewer hunting opportunities. The Department should initiate research programs to determine the importance of forest habitats to goat populations, and should discourage land use practices that are detrimental to goat winter ranges.

* Access provided by logging roads and other such developments may concentrate hunting effort, resulting in local overharvests. When such situations occur the Department will propose harvest restrictions to the Alaska Board of Game.

* Increases in wolf populations may reduce the numbers of goats available to hunters. The Department will advocate wolf management designed to minimize conflicts while retaining representative populations of all species.

* Access to some hunting areas may be lost due to selection of lands under terms of the Alaska Native Claims Settlement Act. The Department should solicit the cooperation of private landowners to facilitate progressive management of goat populations. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* Goat populations will continue to fluctuate in response to the severity of winters. Localized overharvest adjacent to roads and lakes will be reduced and these populations are expected to increase. No changes in population sex and age structure are anticipated.

* No restrictions on hunter participation or methods of transport are anticipated for the immediate future. Hunter distribution will be controlled by registration hunts. Areas with easy access will have short hunting seasons while those with difficult access can be expected to have longer seasons. Eventually, restrictions on hunter participation in specified areas may become necessary.

* Nonconsumptive uses will increase. No restrictions on such use are anticipated.

8. TUSTUMENA GOAT MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 15 within the Kenai National Moose Range south of Skilak Glacier, River and Lake.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt mountain goats under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of mountain goats.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport to maintain aesthetic hunting conditions.

2. Limit harvests of mountain goats to facilitate a population increase to habitat carrying capacity levels; thereafter harvest the annual increment.

3. Encourage public viewing of mountain goats in a wilderness setting.

THE SPECIES

Mountain goats occur throughout the mountainous portions of the Tustumena area. They are most abundant in areas influenced by coastal weather and least abundant in inland areas. The estimated goat population in 1968 was 350, the last time surveys were conducted over the entire area. Surveys over similar habitat in adjacent areas have indicated a general population decline, and the Tustumena area may also have suffered a decline. Goats and Dall sheep occupy the same range throughout the area. Goat populations are highest south of Tustumena Glacier where sheep populations are low. More than 90 percent of the goats surveyed in the area were located south of the glacier. North of Tustumena Glacier sheep populations are high but goat populations are low. Reasons for the differences in species density are not known, but forage competition and behavorial differences between the species are suspected to be probable factors.

Liberal hunting seasons and bag limits for goats have existed for a number of years. Seasons have generally been five months long, opening on August 10 and closing on December 31. A two-goat bag limit was in effect until the 1974 season when it was lowered to one in an effort to reduce total harvest and to upgrade the image of the species as a game animal.

Harvest report data have been available since 1972. Based upon an approximate 70 percent return of reports, an average annual kill of 20 goats through 1975 is indicated. Females comprised approximately one-half of the annual harvest. Most hunting occurs during the first two months of the season. The Dall sheep hunting season runs concurrently with the goat season for the first month. Reported hunter success has averaged about 50 percent, but this figure is misleading as many goats are taken incidental to sheep hunting. In many cases sheep hunters take goats when the opportunity arises but do not report having hunted goats unless successful.

Nearly all of the harvest occurs adjacent to lakes and rivers that provide access by boat or float plane. Other portions of the area receive little hunting pressure. Overall the area is being harvested near the sustained yield level. Overharvesting is occurring adjacent to major access points such as Sheep Creek, Fox River and Tustumena Glacier. All hunting is of a recreational nature and nearly all bagged goats are considered trophies. Approximately 50 percent of the hunters reside in Anchorage while non-Alaska residents comprise about 10 percent. The remainder of the hunting pressure is from Kenai Peninsula residents. The average goat hunt lasts three to five days.

Opportunities for nonconsumptive uses are not restricted, but such use has been low due to difficult access. Most viewing activities on the Kenai Peninsula occur on areas which are closed to hunting and are adjacent to highways. Since the Tustumena Area does not contain such observation areas, the little viewing that does occur is done incidental to hunting and hiking.

PROBLEMS

* Determination of allowable harvest levels is difficult because little information is available on goat habitat carrying capacity. Conservative harvest levels are recommended until more definitive information on goat-range relationships is acquired.

* Increases in wolf populations may reduce the number of goats available to hunters. The Department will advocate wolf management designed to minimize conflicts while retaining representative populations of all species.

IMPACTS

* Goat populations are expected to fluctuate according to the severity of winters. Populations on areas which were being overharvested are expected to increase. No substantial changes in population structure are anticipated.

* Restrictions on numbers of hunters in different portions of the area will be imposed and thus not all hunters who want to participate will be allowed to do so. Some goat hunters who traditionally utilize the area may no longer be able to do so regularly.

* No restrictions on hunter access, in addition to those already in effect on the Kenai National Moose Range, are expected.

* Commercial air charter operators can expect a decrease in demand for their services as a result of restriction on numbers of hunters.

* Opportunities for nonconsumptive activities will continue to be unlimited; however, use will be low due to difficult access.

* All other uses which have traditionally occurred on the area will continue. No conflicts are anticipated.

10. PRINCE WILLIAM SOUND GOAT MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 6 west of the Copper River.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting mountain goats.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control hunter distribution if necessary to distribute hunting pressure through the area.

2. Discourage land use practices that adversely affect mountain goat habitat.

THE SPECIES

Mountain goat abundance in the Prince William Sound area is variable. Goats are not found on any of the Prince William Sound islands with the possible exception of Bainbridge Island. They occur in small scattered groups along the north and western mainland. From Valdez Arm to the Copper River they are abundant. Past records of goat abundance in the area are sketchy but indicate that the northern portion of the Sound may have had much larger goat populations than exist today. Goat habitat in the area has not been altered by man to any significant degree. The quality of the range is apparently good along the eastern side of the Sound, judging by the number of goats present. Goats there have long been reported as abundant.

Natural mortality results primarily from severe winters. Winter snows, which limit access to the available food supply, are probably the major regulating factor on goat distribution and abundance. Wolverines, coyotes, and brown and black bears are potential predators but their effect is thought to be minor. Disease or parasites are not known to be a problem.

Until recent years, mountain goats were not hunted to a significant extent for either meat or sport. Harvest data was poor until the inception of a harvest report program in 1972. According to 1973 and 1974 harvest data, 150-200 hunters have taken 65-90 goats per year from this area annually. Hunting during the first half of the season accounts for more than 70 percent of the harvest. Only about 7 percent of the hunters took 2 goats when a two-goat bag limit was in effect. Alaskan residents normally take about 65 percent of the harvest.

From 1968 through 1975 a liberal hunting season (August 1 - January 31) and bag limit (2 goats) was in effect. The 1976 season was reduced by one month and the bag limit was reduced to one goat in anticipation of increasing hunting pressure in the area.

At present, goats are taken primarily for sport with the meat a secondary benefit. Although a few guides operate in the Prince William Sound area, their clients take few goats. Trophy goats are available in the area, especially in the more inaccessible areas. Aircraft and boats are commonly used for transportation by hunters in Prince William Sound.

Although there have been fluctuations in the goat populations within the area adverse effects of hunting have not been demonstrated. Goats are still plentiful along the eastern portion of Prince William Sound where the majority of hunting occurs. Hunting is generally confined to the alpine ridges that are closest to salt water. Goats that remain inland are very inaccessible unless a lake offers floatplane landing access.

PROBLEMS

* The TransAlaska natural gas pipeline, if approved, will provide access to goat habitat and could result in excessive harvests near the corridor. If access is developed the Department should closely monitor the harvest and adjust the season length to maintain harvests at allowable levels.

* Native land selections along the eastern side of Prince William Sound to the Copper River under the terms of the Alaska Native Claims Settlement Act may result in the exclusion of public access for hunting. The Department should solicit the cooperation of private landowners to facilitate progressive management of goat populations. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Logging on goat winter ranges may reduce forage and cover availability and interfere with seasonal movements over traditional routes. Forest areas used by goats for wintering or migration should be identified, and logging activities conducted in a manner that minimizes adverse impacts on goat populations.

IMPACTS

* Management of the goat resource within this area will continue to allow reasonable use of the resource.

* It may be necessary to regulate hunter distribution to avoid local overharvests.

11. WRANGELL-CHUGACH GOAT MANAGEMENT PLAN

LOCATION

Game Management Units 11 and 13D, and that portion of Game Management Unit 12 lying south of the Nabesna River and the Alaska Highway.

MANAGEMENT GOAL

To provide an opportunity to hunt mountain goats under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters, and methods of hunter transport, if necessary, to maintain aesthetic hunting conditions and to maintain desired harvest levels.

2. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Mountain goat density in the Wrangell-Chugach area is sparse in comparison to coastal goat densities. Insufficient data are available to estimate population size and no information is available on goat range relationships in this area. Winter snow conditions are probably the most important factor controlling population levels. In some years losses to predation may be substantial. Wolves are the most important predators on goats in the area.

Most goats killed by hunters in the area are taken as alternate or additional game by sheep hunters. During the years 1972-1975, an average of 61 goats were killed each year, the majority of which came from the southern Wrangell Mountains. Hunting pressure in the popular McCarthy area was considered excessive and in 1974 the bag limit was reduced from two goats to one, and the season opening was delayed from August 10 to September 1. These restrictions reduced the harvest in the southern Wrangell Mountains to 17, a 61 percent reduction from the 1972-1974 average.

Access to most of the area is by aircraft. Lakes and unimproved strips or river gravel bars provide landing sites. Opening of the McCarthy Road following construction of the Chitina bridge across the Copper River in 1973 has increased hunting pressure by road-based hunters in the McCarthy area.

PROBLEMS

* Most of the prime goat habitat in the upper Chitina Valley is included in the proposed Wrangell-St. Elias National Park. Park management may preclude goat hunting. The Department should advocate retention of hunting in legislation which establishes the park.

IMPACTS

* Little man-caused change in goat population levels or sex and age structure will occur.

* Increased restrictions on goat hunters are not anticipated in the near future. Limitations on the number of sheep hunters will maintain aesthetic hunting conditions in the area.

12. GOAT MOUNTAIN GOAT MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, that area bounded on the north by Miles Lake and Miles Glacier, on the south and east by Martin River and Martin River Glacier and on the west by the Copper River.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy mountain goats.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the area closed to the taking of mountain goats until the goat population exceeds the carrying capacity of the habitat.

2. Encourage public viewing and photography of mountain goats and enhance viewing facilities.

3. Discourage land use practices that adversely affect mountain goat habitat.

4. Maintain the mountain goat population in balance with the carrying capacity of the habitat, by harvest if necessary.

THE SPECIES

Mountain goats are fairly abundant within the Goat Mountain area. Their primary range is along the windblown ridges overlooking the Copper River Highway. During the summer months they may be found throughout the area, and during the winter the southern most ridges are preferred habitat. Population data are not available.

Winter severity is probably the major natural mortality factor. Some predation by wolves has occurred since a resident wolf population became established in the early 1970's, but the effect on the goat population is unknown.

In the past this goat population was utilized by both hunters and viewers. As many as 40 goats were often visible from the highway. Hunting was sporadic since the termination of the Copper River and Northwestern Railroad in 1938. Construction of the Copper River Highway occasionally opened up the area to hunters and viewers using highway vehicles. When access via the Copper River Highway was available hunters had good success along the bluffs overlooking the Copper River. An occasional guide has hunted this area but harvests from the area have been small. Hunting was terminated in 1975 when the area was classified as a Goat Observation Area. To date, the primary use of this goat herd has been by local residents of Cordova.

Construction of the Copper River Highway to Miles Lake will be completed in several years, making the area readily available to viewers. Eventually the Copper River Highway will connect to the Richardson Highway and a considerable increase in public use of the viewing area can be expected. The proposed Bering River road, if constructed, would parallel the southern mountainous fringe, providing additional viewing opportunities.

PROBLEMS

* Accessibility of goats along the highway may result in illegal kills. Adequate enforcement of regulations should be maintained and the Department should post signs along the Copper River Highway advising the public of the purpose of the closed area.

* Developed parking and viewing areas along the Copper River Highway are lacking. The Department should determine which areas are best suited for parking and viewing and encourage their inclusion in the Department of Highways construction plans for the highway.

IMPACTS

* Current restrictions prohibiting hunting will remain in effect, insuring the availability of goats for public viewing and photography.

* If the goat herd should increase beyond the carrying capacity of the range, limited hunting by permit will be allowed.

13. HENEY GOAT MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, the entire Heney Range, bounded on the north by the Copper River Highway, on the east by Eyak River and on the west by Orca Inlet.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy mountain goats.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Provide protection to mountain goats that occasionally utilize the area and allow a resident herd to become established.

2. Maintain the area closed to the taking of mountain goats until the population exceeds the carrying capacity of the habitat.

3. Encourage public viewing and photography of mountain goats.

THE SPECIES

Reports from "old timers" indicate that a fair number of mountain goats once inhabited this small mountain range. Evidently the goat population was killed off after the nearby town of Cordova was established. In recent years, an occasional goat or group of goats have wandered onto the range but are either killed or return to their original range. In 1976 the Heney Range was closed to goat hunting in hopes of establishing a resident population of goats for viewing.

PROBLEMS

* Human disturbance to any goats that wander onto the Heney Range may prevent establishment of a resident herd. The Department should encourage public viewing from a distance, namely the Copper River Highway, until a resident goat population becomes established.

IMPACTS

* Viewing and photographing goats in this area will be poor for many years due to the scarcity of goats.

* Loss of hunting opportunity in the area will be insignificant.

14. COPPER RIVER-ICY BAY GOAT MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, that area bounded on the west by the Copper River and on the north by the crest of the Chugach Mountains extending to Icy Cape.

MANAGEMENT GOAL

To provide an opportunity to hunt mountain goats under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to distribute hunting pressure through the area and to maintain aesthetic hunting conditions.

2. Maintain harvests below annual increments to ensure a large proportion of mature goats in the population.

3. Discourage land use practices that adversely affect mountain goat habitat or the wild character of the area.

THE SPECIES

Mountain goats are abundant throughout the Copper River-Icy Bay area. They are found wherever suitable habitat exists. Past records of goat abundance in the area are scarce but all reports indicate large goat populations which receive light hunting pressure. The habitat, judging by the abundance of goats, is in excellent condition, and it has not been disturbed by man to any significant degree.

Winter severity probably is the major population controlling factor in most areas. Predators have played a relatively minor role, but in recent years the establishment of a resident wolf population may be resulting in mortality in some areas. Other predators include black and brown bears, coyotes, wolverines and eagles.

Goats in this area are primarily sought for their recreational and/or trophy value. Most hunting is done via access by aircraft, and guided hunts are common. The area offers quality hunting conditions because of its wilderness nature coupled with large numbers of goats. Little information is available on goat harvests prior to the inception of a harvest report program in 1972. According to the 1973-1974 harvest data 35-50 goats are taken annually with more than 70 percent of the harvest occurring during the first three months of the season. Hunter success is approximately 65 percent. Weather and inaccessability of the area have restricted hunter effort and resultant harvests. Prior to 1976, hunting seasons (4-6 months) and bag limits (2 goats) were liberal. The 1976 season was reduced by one month (January) and bag limits were set at one goat in anticipation of increased hunting pressure in the area. The current harvest level is not adversely affecting the area's goat population. Goats on the north end of the Ragged Mountains and on the ridge overlooking the logging camp at Icy Bay are receiving considerable hunting pressure but the harvest has not been detrimental.

PROBLEMS

* Development of the area's resources (timber at Redwood Bay and Icy Bay, coal at the Bering River and oil along the Gulf coast) will detract from the wild character of the area and the quality of the hunting experience. The Department should participate in land use planning and should work with land management agencies to minimize adverse effects of development activities.

IMPACTS

* Goat populations will continue to be regulated by natural mortality, principally winter weather.

* A permit system controlling the numbers and distribution of hunters will be implemented when hunter crowding occurs. Such conditions are not expected in the near future.

DEER IN SOUTHCENTRAL ALASKA

Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) are found in varying abundance along the Gulf of Alaska from the Copper River west to Whidbey Bay (Cape Fairfield), including Prince William Sound. Greatest deer densities occur on Hawkins, Hinchinbrook and Montague Islands. Latouche, Green, Knight (eastern side) and Naked Islands also are good deer areas but are secondary in importance. The mainland is marginal deer habitat with the exception of the Gravina Point to Rude River area which contains a moderate deer density. The northern and western portion of Prince William Sound is very marginal deer habitat.

Deer are not indigenous to the Prince William Sound area. Eight deer were transplanted from the Sitka area to Hawkins and Hinchinbrook islands in 1916. An additional 16 deer were transplanted from 1917 through 1923. This was the initial big game transplant in the state and has proven to be one of the most successful. The deer increased and dispersed throughout Prince William Sound and along the mainland where suitable habitat existed.

Deer populations in Prince William Sound have fluctuated considerably. This is a natural phenomenon of most species at the northern limit of their range. Deer in Prince William Sound represent an extension of their natural northern distribution. From the original transplants, the deer population grew rapidly until it reached a peak level about 1945. Range deterioration probably commenced in the early 1940's, and by 1950 the range had been severely damaged.

Since the mid-1940's, the deer population has had several drastic population fluctuations. Major die-offs were reported in the late 1940's, mid-1950's, late 1960's and early 1970's. The deer herd has been fairly low in recent years but has shown signs of a gradual increase. Deer population fluctuations are regulated by winter severity, principally depth and duration of snow.

During different seasons of the year deer utilize most habitat types where food is available. Their home range is usually small, but they do make vertical migrations from the beach to alpine areas as a result of snow depth which regulates the availability of food. During much of the year, low-growing forbs are the most important plant species used. These are particularly abundant in alpine habitat during summer. During winter deer continue to utilize forbs under forest cover, but when about six inches of snow covers these species, deer begin using woody plants with blueberry being the most important species. When snow depth under timber cover exceeds 13 inches, deer are forced to move onto beaches where kelp and other beach vegetation constitute the bulk of their diet. If forced to remain on the beaches for an extended period, winter mortality begins.

Deer in Prince William Sound are dependent on climax forest vegetation rather than sub-climax habitats as is their normal relationship in the "lower 48". Deer need the shelter and forage available in climax forest in the critical days of winter. Standing trees in climax forests intercept much of the snow while dead trees produce numerous scattered small openings which provide food for deer. Clear-cut logging has had minor effects upon deer habitat in Prince William Sound. Most logging has occurred in areas of minor importance to deer and has been in relatively small blocks.

Prince William Sound deer have relatively few natural enemies. Wolves and coyotes are not present on the islands where the bulk of the deer occur. Coyote are present in fair numbers on the eastern Prince William Sound mainland, and coupled with range limitations, probably regulate

deer abundance. Bears are the only natural predators that occur on some of the islands, but bear predation is usually of minor importance. Bears feed primarily on winter-killed carcasses in the spring. Deer in Prince William Sound are remarkably free of disease or parasites.

Deer hunting commenced in 1935 for bucks. Antlerless deer, except fawns, became legal in 1953; fawns were allowed in 1960. Since the inception of deer hunting, deer have gradually become an important meat source for local hunters. Even today, most hunters take deer for the meat as well as sport. Although the number of local hunters probably has not increased noticeably in the past 10-15 years, the influx of Anchorage and Fairbanks hunters is gradually increasing. Hunter success in Prince William Sound is variable from year to year. Usually more than half the hunters take at least one deer. The annual kill is normally between 500-1500 animals.

Harvests, including either-sex hunts, have never had a significant impact on Prince William Sound deer populations. Seasons and bag limits for bucks and does has varied throughout the years, but since 1964, the present liberal season and bag limits have remained the same regardless of natural population fluctuations. With favorable weather conditions, deer populations increase in spite of hunting pressure. If critical winter ranges are protected, deer populations should be adequate for public use in the forseeable future.

PROBLEMS

* Clear-cut logging of large areas in Southcentral Alaska is detrimental to deer populations because it results in longterm losses of deer winter range. Smaller clear cut units or alternative cutting methods which produce favorable deer habitat should be employed. Recognition of wildlife values in land use management is necessary. Since most deer habitat in Southcentral 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.

5. PRINCE WILLIAM SOUND DEER MANAGEMENT PLAN

LOCATION

Game Management Unit 6, Prince William Sound.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting deer.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain either-sex deer hunting seasons.

2. Encourage timber harvest and regeneration practices that improve deer habitat.

THE SPECIES

In Prince William Sound deer are primarily found on the larger islands: Hawkins, Hinchinbrook, Montague, Latouche, Green, Knight Island (eastern side) and the Naked Island group. Smaller populations also exist on the coast between Gravina Point and Rude River. The northern and western portion of Prince William Sound's mainland is very marginal habitat.

In 1916, eight deer taken near Sitka were transplanted to Hawkins and Hinchinbrook Islands. From 1917 to 1923 sixteen more deer were added to supplement the original transplant. The virgin habitat was ideal. Deer increased rapidly and dispersed throughout Prince William Sound and along the mainland where suitable habitat existed. By 1945 the population had peaked, and by 1950 range damage was severe and the carrying capacity of the winter range was drastically reduced. Extreme population fluctuations are common with most species at the limits of their range, and Prince William Sound deer are no exception. Major die-offs were recorded in the late 1940's, mid 1950's, late 1960's and early 1970's. Winter snow depth and duration regulate survival of Prince William Sound deer. Since the early 1970's the deer population has remained fairly low but it is showing a gradual increase.

Disease or parasites have not been a problem. The major deer areas, namely the larger islands in Prince William Sound, are basically predator-free.

Bears are the only natural predators on the islands and bear predation is of minor importance since they are hibernating during most of the critical winter months. On the mainland, coyotes and habitat limitations probably regulate deer abundance along the eastern side of Prince William Sound to the Copper River.

Deer habitat has not been adversely affected by man in this area. Logging has been in small blocks and not in prime deer habitat. The major loss of deer habitat in the critical winter beach fringe has been caused by deer themselves. In many places the browse species along the beach fringe have been permanently damaged. The range's carrying capacity has been greatly reduced since the deer population originally peaked in the mid-40's. Presently the winter range along the beach fringe will support a relatively small deer herd. Only when a series of mild winters occur and the deer are not forced to utilize the beach fringe for any significant duration, does the Prince William Sound herd build up in abundance.

A bucks-only hunting season was initiated in 1935. Antlerless deer, except fawns, became legal in 1953 and fawn hunting was legalized in 1960. Season lengths and bag limits for bucks and does varied considerably prior to Statehood. Since 1964, the present liberal season and bag limit has remained the same.

Hunter success is quite variable and is primarily affected by weather. If the weather during the season is mild with little snow, the harvest is fairly small. But if early snows occur and the deer are forced onto the lowlands, the harvest increases. If the deer are confined to the beach fringe because of exceptionally deep snow, they are very vulnerable to boat hunters.

There appear to be two basic types of deer hunting: (1) hunting in alpine areas early in the season prior to deep snow, and (2) hunting after snow has concentrated the deer on the lowlands. The alpine hunter is the avid hunter who hunts for the sport and for the meat. The late season-deep snow hunter is more interested in the meat than sport, and may not hunt if snow doesn't push the deer to low elevations. Hawkins Island receives the majority of the early season hunting. Once snow moves the deer into the lower elevations, hunting pressure shifts to Hinchinbrook and Montague Islands. The other major deer islands are also normally hunted at this time but to a lesser extent. Local residents who tend to be more meat than sport oriented probably account for most of the harvest. They commonly utilize commercial fishing boats for hunting or else fly into one of several U. S. Forest Service Cabins. Anchorage and Fairbanks hunters are primarily sport oriented.

At present, good harvest data are not available. Hunter compliance with the deer hunter report card is poor and does not reflect the magnitude of the harvest. The harvest normally ranges from 500-1500 deer per year. Most hunters who go afield average slightly more than one deer and 3 or 4 days effort per deer. Hunter success is normally better than 50 percent.

Hunting of deer in Prince William Sound is not detrimental to the population. The winter range is of extremely low quality, and deer are capable of overutilizing this range, particularly during heavy snow years. Harvesting deer helps contain the population in balance with the range.

PROBLEMS

* When tankers commence hauling oil from the Trans-Alaska pipeline terminal in Valdez, the possibility of oil spills will exist. If an oil spill were to cover the kelp and other vegetation on a critical deer beach during the winter months, considerable deer mortality could occur. Unfortunately, once oil reaches the beach it would be nearly impossible to clean up. The Department should designate key deer wintering beaches so that they can be protected if possible or cleaned on a priority basis.

* With the recent selection of timber lands in Prince William Sound under the Alaska Native Claims Settlement Act, clear-cut logging could become a problem on critical winter range. The Department should encourage private land owners to preserve critical winter range and should recommend timber practices that are not detrimental to wildlife.

* The Trans-Alaska natural gas pipeline terminal at Gravina Point, if approved, will be located on the most important mainland deer wintering area. The Department should suggest actions that would minimize the adverse effects to deer from development and maintenance of the installation.

* When deer populations are at low levels public pressures may demand reduction in seasons and bag limits. The Department should make available information regarding deer population dynamics and the benefical effects of harvest. As hunting pressure increases efforts should be made to distribute hunters throughout the area.

IMPACTS

* Deer populations will continue to fluctuate in response to weather conditions.

* Little change in present patterns of use will occur in the near future.

FURBEARERS IN SOUTHCENTRAL ALASKA

Almost all species of furbearers* common to Alaska occur in the Southcentral Region. The most noticeable exception is the arctic or white fox. Beaver, otter, mink and muskrat are the most prominent species in riparian and aquatic habitats. Wolverine, lynx, marten, weasels, squirrels and marmots are common to the upland and alpine habitats. The red fox is common in lowland and upland areas.

Population levels and trends of carnivorous furbearers are often closely tied to relatively few prey species or even to a single prey species. Lynx abundance can often be predicted from snowshoe hare population trends. In those portions of the Southcentral Region drained by the Copper River and the Susitna River the snowshoe hare and lynx abundance cycle runs about nine years from peak population to the following peak population. Lynx and hare populations also show great fluctuations in abundance on the Kenai Peninsula but they do not seem to be synchronous with the cycles of the interior of the state. Densities of marten, red foxes, weasels and coyotes appear to be dependent upon densities of small rodents, although red fox and coyote abundance also appears related to snowshoe hare population levels. Coyotes are more abundant on the Kenai Peninsula than elsewhere in the state. Some areas also seem to be capable of sustaining high land otter populations, particularly along the coast from Cordova to Valdez.

The herbivorous furbearers do not appear capable of seriously damaging their food supply. Although beavers are capable of over-utilizing their immediate food supply, this rarely results in major population fluctuations because the effect is not simultaneous over large areas. At any given time a substantial percentage of the beaver population in any drainage is emigrating into new habitat as occupied habitat becomes less productive. Muskrat population fluctuations, though not well understood in Alaska, are related to productiveness of their habitat. Deep freezing may be a major factor reducing muskrat populations. Beaver, muskrats, squirrels, and marmots are subject to significant levels of predation by other furbearers.

Furbearer habitat in this area is extremely diverse, ranging from mature spruce forests and fire-dominated habitats in the inland portion to coastal rain forests in the southern portion. The frequency, intensity, and acreage burned by wildfire has varied greatly in the past, but considering that over half of the State's human population lives within this area, it is unlikely that wildfire will be a dominant influence in the future. Because of the relatively high human population much furbearer habitat has already been irreversibly altered by development activities. This trend towards habitat change will probably continue.

Human consumptive use of furbearer populations throughout the Southcentral Region is highly variable and generally depends on the abundance and current market value of the various species. In some locations trapping effort is expended on beaver and wolverine regardless of market conditions. Beaver are sought for food as well as fur, and beaver trapping is a traditional spring activity in some areas. Wolverines are in high demand for local use as parka ruffs. Beavers are generally more heavily trapped than other furbearer species. Lynx have been heavily trapped in past years because of their relatively high market value. Wolverine also have a high market value but are less vulnerable to trapping than lynx.

Long established traditions, market conditions, and trapping regulations have limited the use of furbearers to the season from October to May when pelts are prime. Consumptive use of red squirrels, ground squirrels and marmots occur at other seasons because these species are used for food and because ground squirrels and marmots hibernate during the winter.

* A list of furbearer species considered in these plans follows this regional account.

A diminishing percentage of the fur harvest is being taken by the traditional wilderness trapper who derives a substantial proportion of his annual income from trapping. Trapping is becoming more recreational in nature and now radiates from population centers. Trapping pressure in remote watersheds for the smaller furbearing species will continue to decrease unless fur prices rise dramatically.

Nonconsumptive use of furbearers occurs near population centers and along the road and trail systems. The most commonly observed and photographed furbearers are beavers, red squirrels and ground squirrels. Red squirrels abound throughout most of the Interior and provide almost unlimited viewing opportunity in campgrounds, waysides and other recreational sites. Ground squirrels are also numerous in some recreational areas. Beavers are available for viewing on fishing streams and at road stream crossings. Most other furbearers are nocturnal or secretive in nature and provide limited viewing opportunities.

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 promote efficient and humane trapping methods to ensure the opportunity to participate in trapping.

* Beavers chronically cause problems by blocking road culverts with dams or by flooding or cutting down trees on private property. Blockage of some streams by beaver dams also presents barriers to migrating fish which may affect their survival or reduce salmon escapements. The Department should encourage trapping of beaver in areas where damage to public and private property is chronic, and where streams important to spawning salmon or other species of fish are blocked. The Department should also encourage appropriate design and construction considerations in public and private road building projects.

* Unharvested furbearer populations are a significant economic loss to the area. Efforts to properly utilize all furbearer populations could provide substantial economic benefits.

* Development activities are occurring at a rapid rate in Southcentral Alaska. It is impossible to predict long term trends in furbearer populations or their utilization by humans. Development activities should be monitored to prevent unnecessary destruction or loss of furbearer habitat.

LIST OF FURBEARERS IN SOUTHCENTRAL ALASKA

	Common Name	Scientific Name
Canids	Coyote	*Canis latrans*
	Red Fox	*Vulpes vulpes*
Felids	Lynx	*Lynx canadensis*

LIST OF FURBEARERS IN SOUTHCENTRAL ALASKA

	Common Name	Scientific Name
Mustelids	Mink	*Mustela vison*
	Sea Otter	*Enhydra lutris*
	Land Otter	*Lutra canadensis*
	Marten	*Martes americana*
	Wolverine	*Gulo gulo*
	Weasel	*Mustela rixosa*
		Mustela ermina
Rodentia	Beaver	*Castor canadensis*
	Muskrat	*Ondatra zibethicus*
	Snowshoe Hare	*Lepus americanus*
	Marmot	*Marmota caligata*
	Red Squirrel	*Tamiasciurus hudsonicus*
	Ground Squirrel	*Citellus parryii*
	Flying Squirrel	*Glaucomys volans*

1. GREATER ALASKA FURBEARER MANAGEMENT PLAN

LOCATION

Entire state except Game Management Units 7, 14 and 15 and national parks or other areas closed to all hunting and trapping.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of furbearers.

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting and trapping furbearers.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Promote efficient and humane trapping methods.
2. Maintain trapping seasons and bag limits during periods of pelt primeness, consistent with population levels.
3. Maintain hunting seasons on selected furbearer species, with seasons not necessarily limited to the period of pelt primeness and with restrictive bag limits.
4. Maintain restrictive trapping seasons and bag limits on beaver based upon current beaver population levels.
5. Encourage proper preparation and handling of furbearer pelts to maximize fur values.
6. Close areas well suited for viewing and photography of furbearers to hunting and trapping or otherwise restrict use, if necessary.
7. Discourage land use practices that adversely affect furbearer habitat.

THE SPECIES

The species of furbearers addressed in this plan include wolverine, marten, mink, beaver, muskrat, lynx, land otter, coyote, red and arctic foxes, short-tailed and least weasels, arctic ground squirrel, red squirrel, marmot and raccoon. The wolf has been treated separately.

Many of these species have wide distribution in the state; consequently most are represented to some extent any given area. The arctic slope, the Aleutian Islands, and 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 past introductions from fur farming or from efforts to establish harvestable populations. Each individual species may vary in abundance according to habitat preferences and availability of food. There is little information available on numbers, distribution, or utilization of the various species. Much of what is known is acquired from fur export reports, some field observations and reports from trappers.

Furbearer population levels and trends depend primarily on the abundance of food. Most species such as wolverine, otter and beaver rely on a

variety of prey species or on a relatively stable vegetative food source are less subject to fluctuations than those furbearers such as lynx and arctic fox 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. Wolverine, muskrat, and beaver are the species most used in the domestic manufacture of garments, but almost all species are utilized 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.

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 that of wolverines in tundra regions to tracking by snowmachine has resulted in depressed populations of these species in some areas. In most areas of the state and for most species harvests are regulated 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.

Snowmachines 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 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 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. Wolverine have catholic food habits; 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 are used domestically for parkas, ruffs and garment trim and 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 snowmachines or with the aid of aircraft predominates.

Use of wolverine varies between areas. In Western and Arctic Alaska, most 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 a few kept for domestic use.

Regulations and remote wilderness 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 for garments provides 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.

Marten 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 populations are lower south and west of Interior Alaska; marten in Western and Southeastern Alaska are less abundant than in past years.

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 range over an area greater than one square mile, except during the breeding season or in mountainous terrain where marten may undertake seasonal altitudinal movements due to changing food availability. Microtine rodents constitute the main source of food for marten although a variety of prey is utilized, depending on availability. The red squirrel is a minor item in their diet. Berries may be an important food in late summer and fall.

Past marten harvests have fluctuated widely, 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 from $30 to $40 per pelt in 1973. Current prices of $40-50 are incentive for continuing 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 as garment trim and on slippers.

Mink are common throughout the state except for the Kodiak Archipelago, the Aleutian Islands, the off-shore 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.

In 1976, mink population levels were variable over most of Alaska excluding Southeastern. Mink in northern Interior areas and in Northwestern Alaska were relatively abundant and increasing. Over most of the remainder of the state, mink were moderately abundant, having declined somewhat from high levels in the mid-1960's. Populations were low in some parts of the central Interior such as the Tanana River drainage.

Factors controlling mink population levels are not well known. Food availability is probably the major factor. 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 producer. Delta mink 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 where climatic conditions are less of a deterrent to trapping than to the north. 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 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 in Southeastern Alaska are now abundant only 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 general 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 and 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 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 is a reflection of 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 they attain high densities.

Beavers are unique in the degree to which their presence modifies 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, dams often create serious barriers to spawning anadromous fish.

Beginning with 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 and are now at moderate to high levels in many 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. A declining salmon industry in that area has resulted in increased trapping effort. Harvests in Interior and Southcentral Alaska are relatively small; poor prices, low limits on take 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 discourages 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 inhabitants. Because beaver are easily overtrapped, concentrated trapping near villages and along road systems results 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 is also 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 on 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 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. 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 into limited forage areas or emigrate. 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 many 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. Unhunted 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 was among the first four in total value. Low prices combined with increased employment and availability of welfare are responsible for current greatly reduced harvest 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 is much less than that of the more conspicuous beavers.

Lynx occur throughout Alaska except on the Aleutian Islands, the islands Lynx are relatively uncommon along the northern Gulf Coast and in Southeastern of the Bering Sea and some of the islands of Prince William Sound and Southeastern Alaska. The lynx is primarily an inhabitant of the northern boreal forest where it feeds largely on snowshoe hares. It occassionally occurs on the tundra beyond treeline, and in starvation years it ventures

far out onto the tundra in search of arctic hares, lemmings, and ptarmigan. Lynx are relatively uncommon along the northern Gulf Coast and in Southeastern Alaska, being present on the larger river systems where they have emigrated from interior populations.

Population estimates are not available but lynx were very abundant over much of their range in Alaska from about 1971 to 1974. Currently lynx are present in low numbers and are still declining. Like snowshoe hares, lynx populations fluctuate greatly 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 is 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 recent 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 edible and is occasionally used for human and dog food.

Land otters 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 disease are not normally important mortality factors. Flooding in the spring sometimes drowns young otters in dens.

Land otters are probably utilized more 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 locally. 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 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, and are rare north of the Brooks Range. While 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 are catholic in their food habits. 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 compete 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 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. Fluctuations of snowshoe hare and rodent populations will cause the fox populations to fluctuate also. Fox populations in Interior areas of the state are currently declining due to low hare numbers. 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.

Red foxes are one of the more important furbearers in the state. In the last two to three 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, 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 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 Island 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.

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 show that mean litter size varied 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. Since 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 between 1912 and 1963, (derived from the number of furs exported) was 4,072 white fox pelts. Between 1968 and 1974 the annual harvest averaged 2,369 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, 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, have a similar range except that they are not found in Southeastern Alaska south of Glacier Bay, 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 earthworms. 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 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 are found over most of Alaska where white spruce are present. These squirrels are abundant in the Interior, especially along river bottoms with abundant stands of white spruce. They are highly dependent on white 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 are worth about 50¢ to $1.50 each 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 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 are present throughout most of the mountainous regions of Alaska, but are generally absent from the lower 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.

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 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 have been released by private individuals in Southeastern Alaska in the past, and a small population has become established. Only occassional sightings are reported.

PROBLEMS

* Pressure to ban leg-hold traps has come about as a result of public awareness of the inhuman 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 promote efficient and humane trapping methods to ensure the 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 hare and microtine rodents. Establishment of hardwood species along waterways after coniferous vegetation is burned is also a 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 energies are not expended unnecessarily in the control of wildfire.

  Oil pollution has not affected habitat on a significant scale but it has the potential of 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. Large scale water impoundments and clearcut logging affect large areas and important habitats for some species. 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 that possible may be considered which minimize detrimental effects to furbearers.

* The generally underharvested fur populations in the northern portion of Alaska are a significant economic loss to the state. Many furbearer populations are capable of much larger harvests than they are now sustaining. Some species of furbearers are not harvested because there is no traditional use of a particular species. 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), but the high market conditions which would stimulate an overharvest are not likely to 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 progressive management of furbearers. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* As land available for public trapping diminishes, competition for available areas will increase, resulting in increased conflicts between trappers as well as heavy pressure 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 higher intensities of trapping pressure or for assessment of the consequences of habitat alteration. The Department should seek adequate funding and attempt to develop needed inventory techniques.

* 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* is carried by the foxes on St. Lawrence Island and Trichinosis is also carried by several species of furbearers. Trapping and hunting of both red and white fox should be encouraged in areas which have a potential to produce high fox populations which are prone to rabies outbreaks. Hygenic 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. To prevent Trichinosis proper handling and cooking of all furbearer meat to be consumed by humans and domestic animals should be encouraged.

* 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 is chronic, 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 design and construction considerations in public and private road building projects.

* Red squirrels cause more damage to human property than any other furbearer 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.

IMPACTS

* Furbearer population levels will continue to fluctuate, primarily in response to prey availability and quality of habitat.

* Abundant trapping opportunities for local residents will continue to be available. Some trapper congestion and competition may occur in easily accessible areas.

* Increased harvests of available furbearer populations, improved handling, and improved marketing in the Interior and northern areas of the state could increase the economic value of the fur harvest 50 percent above the present economic value, or about $500,000.

* It may be necessary to close the beaver trapping season entirely in areas of overharvest or effectively enforce a very restricted season. This would eliminate or reduce the present harvest level by 50 percent depending upon the degree of restriction imposed. Within three to five years the harvest could be increased, compensating for the loss of harvest in years of severe restriction or total closure.

* A total closure on wolverine may be initiated in large areas of Northwestern and Arctic Alaska until populations increase to the point where they can sustain larger harvests. Future harvests would be conducted under conditions which are more rigidly controlled than at present.

* Sealing requirements for beaver and wolverine will continue and harvest reports or sealing requirements for additional species will probably be implemented.

* Loss of trapping opportunity in areas established exclusively for nonconsumptive use will be insignificant.

* Dissemination of information to prevent beaver and squirrel damage could result in a considerable savings to the public.

* Beaver populations in urban areas will be reduced below the carrying capacity of the habitat to prevent property damage.

* Knowledge of furbearer population status, habitat requirements, and utilization will increase.

* Coordination of development activity with various conservation agencies would minimize the adverse impacts of development on furbearer habitat.

* No loss of nonconsumptive use opportunity will occur, nor will proposed management adversely affect existing habitat, other species in the area or other recreational uses of the land.

3. COOK INLET FURBEARER MANAGEMENT PLAN

LOCATION

Game Management Units 7, 14 and 15.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting and trapping furbearers.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of furbearers.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain hunting seasons on selected furbearer species, with seasons not necessarily limited to the period of pelt primeness and with restrictive bag limits.

2. Maintain trapping seasons and bag limits consistent with population levels during periods of pelt primeness.

3. Control trapping seasons and bag limits, methods and means of taking and methods of trapper transport, if necessary, to distribute trapping effort and to maintain the harvest at desired levels.

4. Maintain restrictive trapping seasons and bag limits on beaver based upon current beaver population levels.

5. Encourage proper preparation and handling of furbearer pelts to maximize fur values.

6. Promote efficient and humane trapping methods.

7. Areas well suited for viewing and photography of furbearers may be closed to hunting and trapping or otherwise restricted.

8. Discourage land use practices that adversely affect furbearer habitat.

THE SPECIES

Furbearers in the Cook Inlet area include beaver, wolverine, lynx, coyote, red fox, marten, mink, weasel, muskrat, land otter, red squirrel and marmot. The wolf has been treated separately. Furbearers vary in abundance between species according to habitat preferences, and the abundance of food. There is little information available on numbers and distribution of furbearers or on the factors which affect abundance and distribution. In general furbearer population fluctuations are closely tied to those of their prey species. Those furbearers who rely on several prey species or on a relatively stable food source such as vegetation are less subject to fluctuations than those dependent on one or a few prey species. Furbearer habitat in the Cook Inlet area remains relatively unaffected by the presence of man, with some exceptions. Forest fires on the Kenai Peninsula and urban and agricultural development have altered some areas.

Recreational trapping by residents of Anchorage and other Cook Inlet communities is the primary use of furbearers in the area. Some commercial

trapping occurs but most of the area does not support furbearer populations conducive to profitable commercial utilization. Nevertheless, commercial aspects are usually present in some degree as most trappers sell their catch and trapping effort is stimulated by high market values for pelts. Some pelts are tanned and kept for personal use such as wolverine and coyote.

Furbearer trapping seasons and bag limits have remained relatively unchanged since statehood. Seasons have generally been timed to coincide with the period of pelt primeness. Liberal seasons and bag limits have had little effect on most species of furbearers except for small localized areas of overharvest associated with ease of access. Although the Cook Inlet area has well developed roads and trails in comparison to the remainder of the state, large tracts of land remain relatively inaccessible and trapping pressure is light. Furbearer population fluctuations occur in spite of, rather than as a result of, trapping in most cases.

Snow machines are the most commonly used transport for trapping in the area although highway vehicles are used for roadside trapping and aircraft for more remote sites. Mink, muskrat and beaver are more intensively trapped near roads and trails, whereas trapping of lynx, wolverine and land otter requires the mobility of snow machines and aircraft.

Except for beavers, red squirrels and marmots, nonconsumptive uses of furbearers such as viewing and photography are practically nonexistent. Furbearers as a group are difficult to observe due to their nocturnal or secretive habits and their relatively sparse distribution. Some muskrats and mink are observed incidental to other activities such as hunting, fishing, and canoeing.

Beaver occur throughout the Cook Inlet plan area but are most abundant on the eastern portion of the Kenai Peninsula and in the drainages of the Talkeetna Mountains. Moderate to low populations occur on lakes and streams on the western Kenai Peninsula; however, populations there appear to be increasing in the area north of Tustumena Lake. In the Anchorage area beavers are common in the drainages of the Twentymile River and Portage Creek and on lands within the military bases.

Good beaver habitat is present throughout the area but is limited in mountainous terrain. Loss of habitat has occurred in the lower Matanuska Valley with agricultural development of the land, and on the Kenai Peninsula where a considerable amount of beaver habitat was lost to the 1969 forest fire.

Use of beavers by trappers in the Cook Inlet area has increasingly become a recreational activity as human populations and access have increased in the area. Trapping pressure has been light to moderate in most areas, depending on the abundance of beaver and fur prices. For the area as a whole harvests of beaver have been below the sustained yield level. While the majority of beaver colonies are untrapped because they are relatively inaccessible, those that are readily accessible from the road system are often overutilized.

Over the past decade harvests on the Kenai have ranged between 46 and 259 per year. Within the lower Matanuska Valley and southwestern Talkeetna Mountains an average of about 130 beavers has been taken annually, although the take has fluctuated widely in numbers.

Observation and photography of beavers is popular wherever beavers are accessible to viewing. Thousands of people view beavers at the Portage area annually. Colonies in the Hatcher Pass area also provide considerable viewing, and additional sites include Fort Richardson and the Eagle River Drainage. Many people also view beaver incidental to other activities such as fishing, hiking, hunting and canoeing.

Wolverines are fairly abundant in the mountainous sections of the area, and along the outer Kenai Peninsula gulf coast, but are relatively scarce over lowland portions of the area. Annual harvests have averaged about 60 wolverines for the past 5 years although the take has fluctuated widely between years. Trapping has not appeared to be a limiting factor on wolverine populations. Hunting and trapping of wolverine have been prohibited within Chugach State Park since 1973.

Lynx occur throughout the area, but are most common adjacent to the mountains or in the major mountain drainages. They are occasional to rare along the gulf coast. In 1975 populations were at moderate to low levels following the decline of the snowshoe hare population. Habitat alterations which benefit hares also favor lynx. The 1947 burn area harbors some of the best lynx populations on the Kenai Peninsula.

Although high fur prices have stimulated trapping effort for lynx, harvests have remained at moderate levels. At the peak of the lynx cycle in 1974, the harvest on the Kenai Peninsula did not exceed 350. Harvests from the Knik, Eklutna, and Eagle River drainages are thought not to exceed 10-15 per year. In the lower Matanuska Valley area and the southwestern Talkeetna Mountains average annual harvests probably don't exceed 200-300 lynx.

Coyotes are abundant throughout the area. They are versatile in their habitat requirements and adapt well to areas with high human populations. Because coyotes utilize a variety of prey species and scavenge on carrion they are less subject to the population fluctuations suffered by some other furbearers. Coyotes are taken in low numbers by trappers because they are difficult to trap and because their fur is of relatively low value. Hunters take some coyotes by utilizing predator calls, and this sport appears to be increasing in popularity. The effects of hunting and trapping on coyote populations is negligible. The annual harvest is estimated to be less than 200 coyotes.

Red Foxes occur in mountainous sections of the Cook Inlet area in relatively low numbers except for the southwestern Talkeetna Mountains where they are moderately abundant. Few foxes are taken by trappers.

Marten occur in low to moderate numbers, primarily in the forested areas of the eastern Kenai Peninsula, from Kenai Lake to Seward, and in the southwestern Talkeetna Mtns. Utilization of marten by trappers is very low, probably not exceeding 20-30 per year.

Mink are common in many lowland areas, with the highest densities along the gulf coast. Populations are subject to wide fluctuations that are a function of prey availability, such fluctuations being more pronounced in inland areas. Harvests of mink are strongly affected by the market value of pelts. Generally, harvest levels are low because large areas of mink habitat are untrapped. Intensive trapping in accessible areas has temporarily depressed mink populations in some localized sites, but has had little long-term effect on populations.

Weasels including short-tailed and least weasels occur throughout the area. The short-tailed weasel is common while least weasels are uncommon. Weasels are abundant in lowland areas where mice and shrews are common. They are often observed in residential areas. Very little harvesting of weasels occurs as their pelts have traditionally been of little value. Most that are taken are accidentally trapped in sets for other species, particularly mink.

Muskrats are common in the lower Matanuska Valley and in the lowlands between Anchorage and the Knik River, but are relatively uncommon on the Kenai Peninsula. Harvests of muskrats are low except for small areas trapped near Anchorage and in the Matanuska Valley. Harvests have had little effect on muskrat populations.

Land Otters are abundant along the east side of Kachemak Bay and along the gulf coast. They also occur in lower numbers along inland lakes and streams on the remainder of the Kenai Peninsula and in the southwestern Talkeetna Mountain drainages. Other populations appear to fluctuate less than most other carnivorous furbearers because they rely on a relatively stable fish prey base. Harvests of land otter in the Cook Inlet area probably does not exceed 50-60 per year. Harvests are well below sustained yield levels and large areas are virtually untrapped. However, past harvests on streams flowing into Cook Inlet south of the Kasilof River may be responsible for reduced numbers there.

Red Squirrels and Marmots are common in the area wherever suitable habitat occurs. Red squirrels occur in spruce forests while marmots are most abundant in alpine areas. Except for large areas of squirrel habitat lost in the 1947 and 1969 forest fires on the Kenai Peninsula, these species have been unaffected by man's presence. Although a few people hunt squirrels for sport and food, the primary use of squirrels and marmots is nonconsumptive. Squirrels are commonly observed in campgrounds and residential areas and marmots are conspicuous to hikers or other visitors to alpine areas.

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 promote efficient and humane trapping methods to ensure the opportunity to participate in trapping.

* Continuing urban development, expansion of agriculture, and the probable construction of a new capitol, will eliminate lowland habitat utilized by mink, beaver, land otter and muskrat. Buffers to extensive land development such as Chugach State Park, and publicly and privately maintained greenbelts and natural areas will help preserve some existing habitat. The Department will identify important habitat areas and request habitat protection measures from the appropriate land management agencies.

* Some private lands are currently posted against public trespass, and conveyance of land into private ownership under terms of the Alaska Native Claims Settlement Act may restrict public access for hunting and trapping in additional large tracts. The Department should solicit the cooperation of private landowners to facilitate progressive management of furbearers. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* 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.

* Snow machine use restrictions within many areas of Chugach State Park limit winter access to many backcountry trapping and hunting sites. The Department should advocate restriction of snow machine use only when it is incompatible with other uses of the Park.

* Beavers 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 presents barriers to movements

of spawning anadromous fish. The Department should encourage public trapping of beavers in areas where damage to public and private property is chronic, and where important salmon spawning streams are blocked. The Department should also encourage appropriate design and construction considerations in public and private road building projects.

* Due to manpower and funding restrictions, data on population status and harvest levels of some furbearer species cannot be gathered. In some cases no methodology exists for the routine censusing of furbearers. The Department should seek adequate funding and attempt to develop needed inventory techniques.

IMPACTS

* Abundant trapping opportunities for local residents will continue to be available. Some trapper congestion and competition may occur in easily accessible areas. Control of trapper distribution by use of permits in areas where trapper congestion is excessive will alleviate conflicts between trappers but may limit the freedom of individual trappers to trap wherever they want.

* Localized overharvests of some species may occur adjacent to road systems. Some restrictions on seasons and bag limits may be necessary.

* No loss of nonconsumptive use opportunity will occur, nor will proposed management adversely affect existing habitat, other species in the area or other recreational uses of the land.

SMALL GAME IN SOUTHCENTRAL ALASKA

GROUSE AND PTARMIGAN

Spruce grouse (*Canachites canadensis*), ruffed grouse (*Bonasa umbellus*) and sharp-tailed grouse (*Pedioecetes phasianellus*) and rock ptarmigan (*Lagopus mutus*), willow ptarmigan (*L. lagopus*) and white-tailed ptarmigan (*L. leucurus*), all members of the family Tetraonidae, are the gallinaceous birds inhabiting the Southcentral Region. Within this region rock, willow and white-tailed ptarmigan and spruce grouse are found wherever suitable habitat occurs. Sharp-tailed grouse inhabit the basin bounded by the Talkeetna Mountains, the Alaska Range and the Wrangell Mountains southward along the Copper River drainage to the Chitina area. Ruffed grouse are restricted to the upper portions of the Copper River drainage.

Although there is considerable overlap in geographical distribution of the various tetraonid species, each displays a marked preference for certain habitat types. Spruce grouse are found most commonly in white spruce-birch communities and black spruce associations. Ruffed grouse inhabit upland aspen and birch communities and riparian willow stands. Sharp-tailed grouse occupy a variety of habitat types including subalpine brushlands, sparsely timbered black spruce bogs, mature birch woodlands, regenerating hardwood forests and open fields.

In Southcentral Alaska, breeding habitats of the three species of ptarmigan are separated altitudinally, although some overlapping occurs. Willow ptarmigan breed close to timberline, often partially within the fringe of coniferous woodland, and also along stream courses in riparian shrub communities, generally between elevations of 2,000 and 2,800 feet. Rock ptarmigan breed from timberline to approximately 3,500 feet in habitat ranging from brushy stands of dwarf birch less than four feet tall to areas above the limit of upright, woody vegetation. White-tailed ptarmigan breed at elevations of 3,500 to 5,000 feet. They occupy rough terrain where vegetation forms a low, sparse cover interrupted by boulder fields, talus slopes, ledges and glaciers.

Unlike forest grouse, ptarmigan move downward in October to their winter ranges. Among rock and willow ptarmigan the sexes segregate during this seasonal habitat shift. Male rock and willow ptarmigan remain near the breeding grounds throughout winter, while the females move up to 100 miles to brushy subalpine or timbered winter range. The birds funnel through river valleys and low mountain passes during this fall movement and again when returning to their breeding grounds in March. In some years flocks numbering in the hundreds of birds move through Isabel Pass, and there are probably similar seasonal concentration areas for birds in other areas. The degree of sexual segregation among white-tailed ptarmigan is not known.

The tetraonids have evolved so that each major vegetative type in Alaska provides habitat for one or more species at some period of the year. Disturbances such as burning, timber removal and agriculture produce vegetative changes that decrease the habitat quality for certain species while favoring others. Spruce grouse and ptarmigan tend to occupy mature or climax habitats. The forests of the western Kenai Peninsula provide some of the best spruce grouse habitat in Alaska. Ruffed and sharp-tailed grouse thrive in disturbed communities, and in the Southcentral region 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 grouse habitat for these species involves a regime of repeated burning. Recent trends in fire control, particularly in the vicinity of human population centers, may be resulting in a decline in the amount of habitat for these species.

Inland populations of the various Alaskan tetraonids 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. During the last 15 years Southcentral grouse populations were high during the periods 1960-62 and 1968-69. Low grouse densities occurred in 1964-66 and again in the early to mid 1970's. Similarly, ptarmigan were abundant in 1961-63 and 1968-70, and scarce in 1964-66 and in the early to mid 1970's.

Due to lack of knowledge regarding the factors governing population fluctuations, management programs aimed at stabilizing tetraonid densities from year to year are not feasible at present. Habitat management has not been attempted in Alaska, but ruffed and sharp-tailed grouse populations would probably respond to habitat manipulation. Higher densities of these species could probably be attained in some years through intensive habitat manipulation although it is doubtful if "cyclic" lows could be prevented. If increased densities of self-sustaining populations of ruffed or sharp-tailed grouse are desired, the intensive habitat management approach is definitely preferred over the usually unsuccessful techniques involving captive breeding, stocking and transplanting.

Gallinaceous birds are important prey for avian and mammalian predators. The number of grouse and ptarmigan taken by predators not only varies according to their abundance, but also with predator densities and availability of buffer species such as snowshoe hares. Even in years when grouse and ptarmigan sustain relatively heavy losses to predators, their long-term population trends are not significantly altered. Therefore, the use of these species as prey is compatible with the various human uses.

Grouse and ptarmigan have received only light to moderate harvest by sportsmen and "subsistence" hunters in the Southcentral region. Although bird populations can probably withstand repeated fall harvests amounting to 40 percent of the fall population, hunting pressure and harvest will probably continue to fluctuate with tetraonid abundance. Most hunters are Alaskan residents, and the distribution of hunting pressure is primarily restricted to access routes and areas in close proximity to human population centers. Most grouse hunting occurs from early September through October. Ptarmigan hunting follows the same pattern during autumn but, a moderate amount of hunting also occurs during March and April. Although some individuals may hunt specifically for grouse and ptarmigan, a significant amount of the harvest occurs incidental to big game hunting. Past harvests have had little if any influence on overall abundance, but interest in grouse and ptarmigan hunting is expected to increase along with accelerated human population growth. This increased hunting pressure will probably continue to be exerted in relatively localized, traditional hunting areas. Like hunting, nonconsumptive uses such as observation and photography have been light in the past, but an increase should also be expected. For the most part consumptive and nonconsumptive uses are presently compatible. This situation is expected to continue where grouse are involved, but there is a possibility of future conflicts between nonconsumptive users and spring ptarmigan hunters.

HARES

The snowshoe or varying hare (*Lepus americanus*) is the only hare occurring in Southcentral Alaska, being common throughout the area wherever suitable habitat occurs. The highest hare densities are found around the upper Cook Inlet area, in the Matanuska Valley and Knik River drainages, around Glennallen and Talkeetna, and on the Kenai Peninsula around Soldotna. In 1976 hares were present in low numbers throughout most of the region, but there were some localized pockets with moderate numbers. Densities are influenced by cyclic fluctuations in population levels

averaging 10 years between peaks. In the Southcentral Region snowshoe hare populations were high around 1971-73. Fluctuations are fairly synchronous throughout the area, but tend to peak first in the more northern part. These cyclic fluctuations seem to be most extreme in the central portions of the snowshoe's range. Interior Alaska has historically experienced the greatest extremes in hare density. During population peaks, densities may average 1500 or more per square mile.

The abundance of hares in local areas may vary greatly, and even in periods of low population levels local areas of abundance will occur in optimum habitat. As populations increase hares spread into less desirable habitat, and when populations decline, they disappear from these areas first. The decline may be abrupt, or it may be gradual and occur over a period of 3 to 4 years.

Snowshoe hares occupy a variety of habitats, although certain types seem to be preferred and will support a higher density of hares. Hares can be found in subalpine areas, brush lands, white spruce-birch communities and scrubby black spruce stands. The more open aspen and birch communities with brushy understories of willow, alder, highbush cranberry and wild rose, and streamside areas with willows seem to be optimum habitat for snowshoe hares.

Habitat disturbances such as wildfire and clearing of timber usually benefit the snowshoe hare, since regrowth of herbaceous and woody species provides cover and food. However increased fire control is decreasing prime habitat for hares. Climax communities of dense spruce do not provide suitable brushy understory for snowshoe hares.

In years of high snowshoe 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.

The snowshoe hare is an extremely important prey species for several predators. Lynx depend almost entirely on snowshoe hares for food, and populations of lynx fluctuate with hare populations, with high and low points in lynx populations following those of hares by about one year. In years of low hare numbers, few if any lynx kittens are raised. Both red foxes and wolves also depend to a great extent on hares. Raptors such as the great horned owl and the goshawk utilize hares as a major part of their diet, and their numbers are influenced by snowshoe hare populations.

The cyclic nature of snowshoe hare populations makes management programs designed to stabilize hare populations difficult. Too many factors are involved in these population cycles for man to have much effect other than by modifying the habitat. Hunting pressure on hares increases as populations increase and hares become more available, but as hare populations decline and they become harder to find, there is correspondingly less interest in hunting them, and hunting then has little effect on the natural population cycle. Also, hunting pressure is concentrated along roads and trails and around human population centers; over vast areas the animals are not hunted by man.

When snowshoe hares are abundant, the harvest by sport hunters may be fairly high in very localized areas. Most hunters are residents. Most hunting occurs in the fall, but hare hunting is popular all winter long when snowshoe hare populations are high. On mild winter days, many people enjoy going out for a few hours to hunt hares as a form of winter recreation, combining it with skiing, snow machining, or snowshoeing. Hares are used as human and dog food, and as bait for traps. The hides are fragile, but are sometimes used for mittens and blankets.

PROBLEMS

* Hunting pressure upon the upland game bird resource in the Southcentral region is expected to increase. The most critical aspect of increased pressure is that exerted in the spring on ptarmigan populations. Areas of concern are those where roads or trails permit easy access during the spring to areas where ptarmigan migrations concentrate birds or to ptarmigan breeding habitat, such as Isabel Pass and Thompson Pass on the Richardson Highway, Turnagain Pass on the Seward Highway, Hatcher Pass on the Fishhook Loop Road, Broad and Windy Pass on the Fairbanks-Anchorage Highway, much of the area along the Denali Highway and in the Cooper Landing-Trail Lake areas of the eastern Kenai Peninsula. Local spring harvests have little impact on populations over major geographical areas, and, due to the mobility of birds in the fall, probably have little influence on hunter success the following autumn in these areas. Nevertheless, marked increases in spring hunting pressure in these areas could greatly reduce local populations the subsequent summer, and, if repeated annually, could virtually eliminate nonconsumptive use of the resource at these localities. Therefore, programs to identify areas of high hunter use will be needed in the future. Once identified, hunting pressure and success, particularly in the case of spring ptarmigan hunting, should be closely monitored.

* Ruffed and sharp-tailed grouse distribution is spotty in Southcentral, and existing habitat is possibly being lost through intensive fire control. The possibility of habitat manipulations aimed at maintaining habitat for these species should be considered in the future.

* With increased human populations in the Southcentral area there will be increased hunting pressure on all species, including hares. Snowshoe hares will become more important to the hunter as opportunities to hunt larger game species become more limited. The effects of hunting on local populations of hares should be evaluated and regulated if necessary. Hunting pressure should be distributed so as to avoid heavy hunting congestion in a few small, popular hunting areas.

* During times of abundance, snowshoe hares are often regarded with little respect by the hunter, and sometimes hunters shoot more than they intend to use, wasting game simply because it is readily available. Emphasis on use of the hare as a human food and of its place as an ecologically important game animal may help to avoid this problem. Hunter education is needed in this area.

1. ALASKA SMALL GAME MANAGEMENT PLAN

LOCATION

Entire state except national parks or other areas which are closed to all hunting.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting small game.

SECONDARY MANAGEMENT GOALS

To provide for an optimum harvest of small game.

To provide an opportunity to view, photograph and enjoy small game.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Achieve greater utilization of the small game resource by encouraging wider distribution of hunting pressure and identifying species that are lightly utilized.

2. Encourage public viewing and photography of small game.

3. Regulate or eliminate hunting seasons to minimize disturbance in areas especially suited for viewing or photographing small game.

4. Discourage land use practices that adversely affect small game habitat.

THE SPECIES

Small game species addressed in this management plan are blue, spruce, ruffed and sharp-tailed grouse; willow, rock and white-tailed ptarmigan; and snowshoe, arctic and European hares. Small game populations fluctuate considerably in successive 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. In most instances, a complete cycle lasts 8 to 12 years. Populations of the various species appear to fluctuate in phase over most of Alaska, although local pockets of animals may remain at high numbers while populations are declining elsewhere. Coastal populations seem to exhibit less drastic oscillations than populations in the interior. Blue grouse, found only in Southeastern Alaska spruce-hemlock forests, occur in relatively stable numbers. The three species of ptarmigan in coastal parts of their range exhibit erratic, rather than cyclic, population fluctuations. Grouse and ptarmigan populations in Interior and parts of Southcentral Alaska were high during 1960 to 1962-63 and again in 1968 to 1970. Hare populations followed a similar pattern, including less drastic, more erratic fluctuations in numbers in coastal areas.

Factors causing the oscillations in small game numbers are not well understood, although weather, food, predation and diseases probably all play a role, with different factors varying in significance during different stages of the cycle. The general synchrony of small game population fluctuations suggests that some major extrinsic factor, perhaps weather, is the cause for population cycles. Natural mortality

rates for all small game species are very high, perhaps reaching 80 percent in some years. Severe winters and wet, cold springs which adversely impact nesting success and chick survival may be the main sources of grouse and ptarmigan mortality. Snowshoe hare abundance may be related to available food supplies as well as weather.

Small game habitat has been little affected by human activity over most of the state, although some habitat has been lost or altered by urbanization and agriculture near Anchorage and in the Matanuska-Susitna Valley and by extensive logging in Southeastern Alaska. Logging activities and fires may enhance habitat for hares and ruffed and sharp-tailed grouse, while reducing suitable habitat for spruce and blue grouse and willow ptarmigan. Rock and especially white-tailed ptarmigan breed at higher elevations than willow ptarmigan, and their habitat has probably been little altered by human activity.

Recreational hunting by Alaskan residents is the primary use of small game with most harvested animals retained for domestic consumption. Most small game hunting occurs along established road systems close to human population centers, although some hunters employ snowmachines in winter and boats in summer and fall to reach more distant areas. A few hunting parties travel by plane to remote regions specifically to hunt small game. Most 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 small game abundance and accessibility. The high natural mortality and fecundity rates of small game populations preclude hunting as a significant limiting factor. Small game hunting seasons and bag limits have changed little since statehood. The only significant change was a shortening of seasons and summer closures to small game hunting in Chugach State Park near Anchorage.

Nonconsumptive uses of small game vary significantly between areas. Most viewing and photography occurs adjacent to major human population centers, such as in Chugach State Park near Anchorage, along the roads, trails and footpaths in Chugach National Forest and the National Moose Range on the Kenai Peninsula, and the Twelvemile and Eagle Summits on the Steese Highway. 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. Although most nonconsumptive users are Alaska residents, nonresidents also enjoy small game, particularly in Interior Alaska along roads leading to and near Mt. McKinley National Park.

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 the Alaska Range and mountainous areas to the south including the Cook Inlet area, the Kenai Peninsula, the coast of Prince William Sound and the Gulf of Alaska, and Southeastern Alaska. Rock and willow ptarmigan make extensive altitudinal migrations in spring and fall, while white-tailed ptarmigan generally remain at higher elevations throughout the year. Willow ptarmigan occur in willow-grown flats and foothills near timberline during summer and fall and move to lower riparian areas in winter. Rock ptarmigan breed above timberline to about 3500 feet, and white-tailed ptarmigan occur as high as 5000 feet. Comparatively little ptarmigan habitat has been altered or destroyed in Alaska, although greater efficiency in fire suppression may be having an impact on willow and rock ptarmigan wintering areas.

Willow ptarmigan are the most frequently encountered gamebird because they are most abundant and they winter at lower elevations. The magnitude of harvest is unknown, but hunting effort varies considerably from year to year depending on bird abundance. Some of the most popular recreational

ptarmigan hunting areas include the Copper River Delta, lands adjacent to the headwaters of the Little Susitna River, the Isabel Pass area, Eagle and Twelvemile Summits on the Steese Highway, Mt. Fairplay and, on Kodiak Island, the Upper Station Lakes and Tugidak Island. In Southeastern Alaska, the most used ptarmigan hunting areas are near Haines, Juneau, Ketchikan, and along beach and river systems from Yakutat to the Alsek River. Ptarmigan hunting is most intensive in late winter after snow depths at high elevations have forced birds to move down. Ptarmigan are an important year-round source of food for rural residents in much of northern, western and interior Alaska and are taken whenever available. The extent of domestic utilization by local residents is dependent on cyclical ptarmigan abundance; when birds are scarce relatively little effort is expended to procure them. Observation and photography of ptarmigan occurs year-round and are popular whenever and wherever the birds are accessible. Many people also view ptarmigan incidentally to other outdoor activities.

Grouse are less abundant and less conspicuous than ptarmigan, although spruce 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 approximates the drainage of the Yukon River, although these species also occur in areas south of the Alaska Range. Ruffed grouse are present in Southeastern Alaska. Ruffed grouse have an affinity for hardwood trees and replace spruce grouse where aspen and birch stands occur in the predominantly spruce forests. The sharp-tailed grouse prefers transitional habitats between forests and tundra or grasslands. Spruce grouse are the most widespread and numerous of Alaskan grouse, present in spruce-birch and spruce-hemlock forests over most of the state. Little information is available on abundance, except on a comparative basis. Whereas ruffed and sharp-tailed grouse probably benefited from widespread wildfires that occurred earlier in the century, spruce grouse have probably benefited from forest fire prevention now provided by federal and state agencies.

Most grouse hunting is by Alaska residents for recreation and domestic use. The magnitude of harvest is unknown. Hunting effort declines substantially when grouse populations decline. Grouse are typically hunted along road systems in fall and early spring when the birds are gathering grit. Spruce grouse have been relatively common along the Steese Highway between Mile 120 and 148, near Manley Hot Springs, between Ester and Nenana on the Nenana Road near Fairbanks, along the Alaska and Taylor Highways near Fortymile, near Glennallen, and on many secondary roads on the Kenai Peninsula.

In Southeastern Alaska spruce and ruffed grouse occur in such low numbers that they are usually taken by hunters only incidental to quests for other species, usually big game. Blue grouse, however, are subject to intensive local hunting from mid-April to mid-May when "hooters" (territorial males) are conspicuous; most of the blue grouse harvest consists of males. Most grouse hunting occurs adjacent to major road systems.

Grouse viewing and photography are primarily by Alaska local residents, although an increasing number of nonresidents, usually summer tourists, are important nonconsumptive users in state and national parks and along major road systems. Comparatively few people seek grouse specifically for viewing and photography, but they are clearly important adjuncts to some outdoor activities such as hiking, camping, fishing etc.

Hares are probably the most important small game in Alaska. Three species occur in the state. Snowshoe hares and arctic hares are indigenous species. European hares are introduced. Native 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 population oscillations. Hare population fluctuations have been documented since the late 1800's in Alaska. Hares were abundant in Interior Alaska in 1885, probably during the mid-1890's, in 1905, from 1913 to 1915, in 1924, in 1935, from 1946 to 1947, in 1954, in 1963, and finally around 1970. Hare numbers were again at low levels by the mid-1970's. Less is known of arctic hares, but their numbers seem to show a similar pattern. European hares have been established by the release of domestic hares on a number of islands including Umnak and Hog in the Aleutians, and Middleton Island in Prince William Sound. The Middleton Island transplant of three females and one male in 1954 increased to at least 6000 by 1960 and the population is currently at about that level, although drastic fluctuations in numbers have occurred over the last 15 years. The Alaska Game Commission authorized a transplant of snowshoe hares to Kodiak and Afognak Islands in 1934. The transplant was successful, and snowshoes were subsequently released on Woody and Long Islands and later on Popof Island in the Shumagin group. Most hare habitat has probably been little altered by human activity, although improved efficiency in fire suppression and prevention by state and federal agencies may have reduced some hare habitat. Habitat requirements of hares appear flexible but most often consist of streamside willows, dwarf birches, and brush thickets. Hares are widespread during population highs. Urban sprawl and livestock grazing are probably having adverse local impacts on hare numbers in some areas.

Snowshoe hares are probably the most popular small game species in Alaska. Most use is recreational hunting for food. Most hares are harvested by local residents although nonresidents take hares incidentally to quests for big game. Areas adjacent to roads and waterways are most heavily hunted. Access to hunting areas is often by walking, but more hunters are employing boats, all-terrain vehicles and snowmachines to reach distant areas. A few hunting parties travel by plane to remote regions exclusively to hunt hares. Hunting effort varies with population fluctuations, being intense when hares are abundant and limited when they are scarce. Snowshoe hares are less common in Southeastern Alaska and provide a limited amount of recreational hunting near Juneau, Haines, and Skagway. Villagers in remote areas make extensive domestic use of hares. Most hare hunting occurs in fall and winter. Hares are also popular with nonconsumptive users, particularly near urban areas. Although many people wishing to view hares often blame hunting for low numbers during years of hare scarcity, the high reproductive and natural mortality rates make the impact of losses due to hunting insignificant.

PROBLEMS

* Much of the small game habitat bordering the state's highway system has been selected by Alaskan natives under terms of the Alaska Natives Claims Settlement Act. Once title to public lands is conveyed to private ownership, public use of such lands may be prohibited. The Department should solicit the cooperation of private landowners to facilitate progressive management of small game. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act. The Department should also maintain close liaison with native corporations and make recommendations on land use practices which benefit wildlife.

* The proposed inclusion of land, about 80 million acres, into Federally-administered parks, wildlife refuges, wild and scenic rivers, and national forests under the terms of the Alaska Native Claims Settlement Act will affect public use and state management of small game in

these areas. Hunting may be prohibited, limited or otherwise these areas. Hunting may be prohibited, limited or otherwise affected. If these areas are established by Congress, the Department should solicit cooperation of the respective land management agencies 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 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 additional routes of access.

* Due to manpower and funding restrictions, data on population status and harvest levels of small game are not gathered. In some cases, no methodology exists for the routine censusing of small game. The Department should seek adequate funding to develop needed inventory techniques.

* 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. Three areas of potential conflicts are the Eagle and Twelvemile summits on the Steese Highway north of Fairbanks, the Mt. Fairplay area on the Taylor Highway, and the Donelly Dome - Paxson area along the Richardson Highway. 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.

IMPACTS

* Small game populations will continue to fluctuate with or without hunting.

* Some hunter congestion and competition may occur in easily accessible areas.

* Restrictions on hunters may be imposed in areas of high nonconsumptive use of small game.

* Distribution of hunting pressure and harvest may be improved.

* No loss of nonconsumptive use will occur, nor will proposed management adversely affect existing habitat, other species in the area, or other recreational uses of the land.

WATERFOWL IN SOUTHCENTRAL ALASKA

Southcentral Alaska annually supports millions of migratory waterfowl* enroute to or from the great delta, coastal plain and river valley breeding grounds of western, interior and arctic Alaska. Very large fall and spring migrant populations occur on coastal salt marshes in Cook Inlet, Kachemak Bay, Prince William Sound, Copper River Delta and Controller Bay. Although the majority of birds utilize Southcentral habitats only for resting and feeding during migration, approximately 140,000 ducks and 30,000 geese breed within the region. Additionally, some ducks remain through the winter in coastal areas; large wintering duck populations occur in Kachemak Bay and Prince William Sound, while other birds are scattered wherever there is open water.

Breeding habitat within Southcentral Alaska is limited by the mountainous character of much of the region. There are three major production areas within the region: the Nelchina Basin, the Copper River Delta and the Kenai-Susitna Basin. About 94,000 ducks utilize the Nelchina Basin each year for breeding. Of these 20,000 are "dabbling" ducks and 74,000 are "divers" and nongame ducks. Breeding bird densities are about 24 ducks per square mile over the 3,900 square miles of habitat. The area annually produces about 94,000 young ducks for the fall flight. Substantial numbers of nesting and nonbreeding trumpeter swans also occur in the basin.

The Copper River Delta in Prince William Sound has a production area covering only 308 square miles but has the highest breeding duck densities in Southcentral Alaska (63 per square mile). About 15,000 dabblers and 4,500 divers and nongame ducks annually produce an estimated 18,000 young ducks for the fall flight. The Delta also provides nesting habitat for the world population of dusky Canada geese. Between 19,000 and 37,000 geese have flown south annually to wintering areas in Oregon and Washington during 1970-1975. The breeding population was estimated at 26,000 in 1975. In addition, an estimated summer population of 2,500 Canada geese can be found in Prince William Sound and about 300 birds also winter there. The subspecific classification of these geese is unknown. Their geographic proximity to the Copper River Delta suggests they are dusky, but behaviorial characteristics suggest they are Vancouver geese like those in Southeast Alaska. Surveys of trumpeter swans from Cordova eastward indicate the coastal population has probably reached carrying capacity. Little change in the total population occurred from 1968 to 1975. The trumpeter swan population in this area averages 750 to 800 birds in the fall flight.

The Kenai-Susitna Basin area contains approximately 2,500 square miles of nesting habitat where about 26,000 dabbling ducks and 13,000 divers and nongame ducks produce about 37,000 young ducks for the fall migration. Coastal sedge-marsh habitat in Cook Inlet apparently has a breeding duck density of about 60 ducks per square mile, or roughly five times the density of surrounding upland habitat, demonstrating the greater importance of coastal marshes to breeding ducks. An estimated population of 2,000 lesser Canada geese has become established in Cook Inlet since the 1964 earthquake. The population is believed to be rapidly growing. The wintering area for these geese is the same as that for dusky Canadas. About 1,000 white-fronted geese are known to summer in fresh water marshes in lower Cook Inlet, across from Kenai. More than 600 trumpeter swans are utilizing upland habitats in the Kenai-Susitna Basin. The swan population between Cook Inlet and the Alaska Range has increased in recent years.

* A list of waterfowl species considered in these plans follows this regional account.

By far the most important waterfowl habitat in this region is associated with the coast. Migrating birds utilize near-coastal and tideline areas heavily for feeding and resting. These areas are ice-free in the spring and fall, thus allowing birds to arrive in Alaska before inland breeding areas are open and to remain in Alaska during the fall after inland production areas freeze. Coastal salt marshes above high tide are also important production areas as indicated by breeding bird densities.

The 1964 earthquake markedly changed some coastal habitat; the Copper Delta raised about six feet. The initial effect has been a large increase in flood-free nesting habitat, but long-term effects may include habitat loss through plant succession on uplifted areas. Coastal lands around Cook Inlet generally lowered one to three feet in 1964; this appears to be reducing habitat on the Chickaloon and Susitna Flats by tidal gut erosion into upland ponds. However, additional habitat in upland areas that are now under tidal influence may be created. Evidently, the habitat change in Cook Inlet was favorable for lesser Canada geese as few geese nested around the Inlet before 1964.

New waterfowl nesting habitat in upland areas is created by river channeling processes, retreating glaciers, and beaver pond formation. Trumpeter swans especially favor the new habitat as soon as emergent vegetation becomes established in ponds.

In Southcentral Alaska waterfowl are utilized primarily for recreational hunting and viewing. Although hunting seasons are adequate, the opportunity to hunt is limited by the early freeze-up of many of Southcentral's waterfowl areas. Except in Kachemak Bay and Prince William Sound (where little hunting occurs), hunters are generally limited to about 50 days of hunting before freeze-up. Thousands of ducks and geese are produced in Southcentral Alaska in addition to those that hunters harvest.

About one-half of Alaska's waterfowl sport hunters live in the Southcentral area. Also, the area accounts for about one-half of the State's total average duck harvest and hunter use days, and about one-fifth of the goose harvest. About 80 percent of the ducks harvested are pintail, mallard, widgeon, green-winged teal and shoveler. Over 90 percent of the geese harvested are various subspecies of Canada geese. The only species of duck or goose harvested in sufficient magnitude to be of biological concern is the dusky Canada goose. The locations of major hunting activity and waterfowl harvest are: Susitna Flats, Palmer Hay Flats, Copper River Delta, Potter Marsh, Kachemak Bay, Eagle River Flats, Portage area, Chickaloon Flats, Goose Bay, Trading Bay and Redoubt Bay.

Much of the hunting effort occurs in areas accessible only by airplane or boat. However, in the Anchorage vicinity several hunting locations are reached by automobile. About 5 percent of all waterfowl hunters travel out of the Southcentral area to take most of their ducks, while an estimated 15 percent travel out of the area to harvest most of their geese. Cold Bay, Pilot Point, and the Copper River Delta are the most visited goose hunting areas.

Nonconsumptive use of waterfowl is greater in Southcentral than in any other area in Alaska. The heaviest use areas near Anchorage include Potter Marsh, Portage, Eklutna and the Palmer Hay Flats. Kachemak Bay, the road from Cordova across the upper Copper River Delta, and Prince William Sound also provide many people with opportunities to observe, study, and photograph birds. Travelers on the State ferry in Prince William Sound have excellent bird viewing.

Both hunting pressure and nonconsumptive use is expected to increase in proportion to the increase in human population. The average number of

hunter days during the past four seasons have been 23,400. By 1980, an anticipated 35,000 days of hunting will occur annually in the Southcentral Region. Nonconsumptive use is expected to increase also, perhaps at a greater rate than hunting effort, particularly in the Anchorage area.

PROBLEMS

* Pollution of coastal tidelands and estuaries by oil or oil industry-related contaminants poses a serious threat to the welfare of waterfowl using Southcentral Alaska for nesting or resting areas. Massive Outer Continental Shelf (OCS) oil development and tanker traffic through Prince William Sound and along the coast could devastate coastal waterfowl habitat. Baseline quantitive and qualitative data on coastal bird habitats, bird numbers and relationships between birds and habitat are needed before oil impacts occur to provide rational recommendations for future OCS lease areas, recommendations for future oil spill cleanup facilities and to document the effect of estuary contamination for mitigation purposes. Ongoing federally funded state and federal OCS bird studies are designed to identify and quantify the effects of these problems.

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

* 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 unless measures are initiated to enhance habitat, increase access and control user numbers.

LIST OF WATERFOWL SPECIES IN ALASKA

	Common Name	Scientific Name
Dabbling Ducks	Aleutian Common Teal	*Anas crecca nimia*
	American Widgeon	*Mareca americana*
	Baikal Teal	*Anas formosa*
	Black Duck	*Anas rubripes*
	Blue-Winged Teal	*Anas discors*
	Chinese Spot Bill	*Anas poecilorhyncha zonorhyncha*
	Cinnamon Teal	*Anas cyanoptera*
	European Widgeon	*Mareca penelope*
	European Common Teal	*Anas crecca crecca*
	Falcated Teal	*Anas falcata*
	Gadwall	*Anas strepera*
	Garganey	*Anas querquedula*
	Green-Winged Teal	*Anas crecca carolinensis*
	Mallard	*Anas platyrhynchos*
	Pintail	*Anas acuta*
	Wood Duck	*Aix sponsa*

LIST OF WATERFOWL SPECIES IN ALASKA

	Common Name	Scientific Name
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*
	American Common Scoter	*Oidemia nigra*
	Harlequin	*Histrionicus histrionicus*
	Hooded Merganser	*Lophodytes cucullatus*
	King Eider	*Somateria spectabilis*
	Old Squaw	*Clangula hyemalis*
	Pacific Common Eider	*Somateria molissima*
	Red-Breasted Merganser	*Mergus serrator*
	Smew	*Mergus albellus*
	Spectacled Eider	*Lampronetta fischeri*
	Steller's Eider	*Polysticta stelleri*
	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*
	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*

2. SOUTHERN ALASKA WATERFOWL MANAGEMENT PLAN

LOCATION

Game Management Units 1-17, 19 and 20 except the areas included in the Izembek, Port Moller, Port Heiden, Cinder River, Pilot Point, Egegik, Naknek River, Minchumina, Fairbanks, Potter Point, Jim-Swan Lakes, Chickaloon Flats, Kenai and Kasilof Flats, Fox River Flats, Controller Bay, Copper River Delta, and Mendenhall Wetlands Waterfowl Management Plan areas.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting waterfowl.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain waterfowl hunting seasons and bag limits that reflect climatic conditions.

2. Control waterfowl hunting seasons and bag limits, methods and means of taking, and methods of hunter transport, if necessary, to distribute hunting pressure.

3. Control hunter access and methods of transport, if necessary, to minimize disturbance or harassment of waterfowl.

4. Obtain, maintain and improve hunter access to waterfowl hunting areas.

5. Encourage viewing and photography of waterfowl.

6. Discourage human activities that disturb or harass waterfowl during critical nesting or migration periods.

7. Enhance waterfowl habitat in high use areas to increase utilization of habitat by waterfowl, and discourage land use practices that are detrimental to waterfowl habitat.

THE SPECIES

Southern Alaska annually provides resting and feeding habitat for millions of waterfowl enroute to or from Northern Alaskan, Canadian or Russian breeding grounds. Spectacular concentrations of migrating ducks, geese and swans occur in areas such as southern Bristol Bay, Cook Inlet, and Prince William Sound. Although breeding populations in the Southern Alaska area are not nearly as large as those to the north, over one-fourth of the fall duck flight and over 10 percent of the fall goose flight from Alaska originates from the area. About 900,000 ducks, 90,000 geese, 11,000 whistling swans, and 2000 trumpeter swans nest in such areas as lower Bristol Bay, Yukon Flats, Minto Flats, the Tanana and Kuskokwim Rivers, the Susitna and Nelchina basins, and the Copper River Delta. Southeastern Alaska has no large areas suitable for nesting waterfowl; however, approximately 60,000 Vancouver Canada geese are year-round residents and about 110,000 ducks nest there in the many tideflat and stream delta areas. Essentially all of Alaska's wintering waterfowl occur in Southern Alaska. Coastal areas from the south side of the Alaska Peninsula south to Southeastern Alaska are used by wintering birds with Kachemak Bay, Prince William Sound and the many bays and inlets of Southeastern Alaska being particularly important as wintering areas. Southeastern Alaska alone supports an estimated 2,000,000 wintering waterfowl.

Recreational waterfowl hunting is the dominant use over most of the area. Although freeze-up limits the time waterfowl are available in interior areas, hunters in some coastal areas are able to hunt for a major portion of the season. Hunters in Southeastern Alaska, Kodiak and Aleutian Islands make use of the full 107 day hunting season. Over 93 percent of Alaska's recreational duck harvest, 88 percent of the goose harvest, and about 95 percent of the total sport hunter days occur in the Southern Alaska area.

The following list of areas are specific locations within the Southern Alaska area where use by waterfowl and/or use of waterfowl is important. These areas are not discussed in other management plans, but are places where control of human use or habitat protection is desirable. For each area the applicability of management guidelines is indicated.

AREA	Management Guideline No.						
	1	2	3	4	5	6	7
Southeastern Alaska							
Behm Canal	X			X		X	X
Berner's Bay	X			X		X	X
Brown's Cove	X			X		X	X
Chickamin R. Flats	X			X		X	X
Chilkat River	X			X	X	X	X
Marten R. Flats	X			X		X	X
Smeaton Bay	X			X		X	X
Sandborn Canal	X			X		X	X
Traitor's Cove	X			X		X	X
Unuk R. Flats	X			X		X	X
Walker Cove	X			X		X	X
Wilson R. Flats	X			X		X	X
Farragut Bay	X			X		X	X
Big Salt Lake	X			X		X	X
Calder Bay	X			X		X	X
Exchange Cove	X			X		X	X
Fish Egg Island Area	X					X	X
McFarland Island Area	X					X	X
Mud Bay	X			X		X	X
Portage Bay	X			X		X	X
Portillo Channel	X			X		X	X
Port Real Marina	X			X		X	X
Port Refugio	X			X		X	X
Red Bay	X			X		X	X
Salmon Bay	X			X		X	X
Sarkar Lakes	X			X	X	X	X
Sea Otter Sound	X			X		X	X
Shinaku Inlet	X			X		X	X
Staney Creek	X			X		X	X
Suemez Island Area	X			X		X	X
Sweet Briar Lake	X			X	X	X	X
Trocadero Bay	X			X		X	X
Bay of Pillars	X			X		X	X
Blind Slough	X			X		X	X
Colorado Creek	X			X		X	X
Kadake Bay	X			X		X	X
Petersburg Creek	X				X	X	X
Port Camden	X			X			
Rowan Bay	X			X		X	X
Saginaw Bay	X			X		X	X
Tebenkof Bay	X			X		X	X
Security Bay	X			X		X	X
Three Mile Arm	X			X		X	X
Totem Bay	X			X		X	X
Wrangell Narrows	X			X	X	X	X

AREA	Management Guideline No.						
	1	2	3	4	5	6	7
Zimovia Strait	X			X		X	X
Chaik Bay	X			X		X	X
Gambier Bay	X			X		X	X
Hood Bay	X			X		X	X
Favorite Bay	X			X		X	X
Fish Bay	X			X		X	X
Hoohah Sound	X			X		X	X
Kadashan Bay	X			X		X	X
Mitchell Bay	X			X	X	X	X
Neka Sound	X			X		X	X
Pybus Bay	X			X		X	X
Youngs Bay	X			X		X	X
Eagle R. Flats	X			X	X	X	X
Stikine River Delta	X	X	X	X		X	X
Rocky Pass	X			X	X	X	X
Duncan Canal	X			X		X	X
Gustavus Flats	X			X		X	X
St. James Bay	X			X		X	X
Arrons Creek	X			X		X	X
Bradfield River Flats	X			X		X	X
Northern Gulf Coast							
Yakutat SE thru Dry Bay	X			X		X	X
Prince William Sound	X			X		X	X
Portage Flats	X		X	X	X	X	X
Pt. Campbell-Woronzof Flats	X			X	X	X	X
Palmer-Hay Flats Refuge	X	X	X	X	X	X	X
Matanuska Valley	X		X	X	X	X	X
Goose Bay Refuge	X		X	X		X	X
Susitna Flats	X		X	X		X	X
Trading Bay	X		X	X		X	X
Redoubt Bay	X		X	X		X	X
Kodiak-Afognak Islands	X		X	X	X	X	X
Interior							
Nelchina Basin	X			X		X	X
Copper River Valley	X				X	X	X
Delta Management Area	X	X	X	X	X	X	X
Tetlin-Northway				X	X	X	X
Minto Flats	X			X		X	X

Some of the areas listed have exceptionally large concentrations of waterfowl during some or all periods of the year and are considered especially sensitive and important from the standpoint of maintaining undisturbed habitat. These areas include the Stikine River Delta, Rocky Pass, Duncan Canal, Yakutat southeast through Dry Bay, Prince William Sound, Palmer Hay Flats Refuge, Susitna Flats, Trading Bay, Redoubt Bay, Kodiak-Afognak Island, and Minto Flats.

The majority of areas listed receive relatively light use by hunters at present, primarily because of their inaccessibility to population centers. Heaviest hunter use occurs in areas near population centers where a short flight or boat trip or access via the road system puts hunting locations within the physical and financial reach of many urban hunters. The Stikine River Delta, Portage Flats, Palmer Hay Flats, Susitna Flats, Minto, and the Delta Management area all receive high hunter use which may in some cases require more intensive management to better distribute and regulate hunter use.

Most of the nonconsumptive use of waterfowl in Alaska occurs in Southern Alaska at relatively few locations which lend themselves to public viewing due to their proximity to human populations or their good access. These are the Chilkat River, Wrangell Narrows, Gastineau Channel, Eagle River Flats (Juneau), Portage Flats, Palmer-Hay Flats Refuge, and the Matanuska Valley.

Limited domestic utilization by local residents occurs primarily around villages in the lower Bristol Bay area and in some interior areas such as Tetlin and Minto.

PROBLEMS

* Pollution of coastal tidelands and estuaries and other pelagic areas by oil or oil industry-related contaminants poses a serious threat to waterfowl and waterfowl habitat in all coastal areas of Southern Alaska. Spills from massive Outer Continental Shelf (OCS) oil development, onshore support facilities, and tanker traffic along the coast could devastate coastal waterfowl habitats and result in the loss of hundreds of thousands of waterfowl if all possible precations are not taken. Baseline quantitative and qualitative data on coastal bird habitats are needed before oil impacts occur to provide rational recommendations for future OCS lease areas, recommendations for future oil spill cleanup facilities and to document the effect of estuary contamination for mitigation measures. Ongoing federally funded OCS bird projects by the Department and the U.S. Fish and Wildlife Service are designed to identify and quantify the effects of these potential problems.

* Construction of dams could eliminate important waterfowl habitat in interior Alaska. For example, a dam at Rampart would eliminate habitat for over 2 million ducks and geese. Dams on other streams would be less devastating but could result in significant losses, depending on the area. The Department must work closely with the U.S. Fish and Wildlife Service and other resource management agencies to insure that waterfowl resources are adequately considered in review of dam proposals and that all feasible mitigation measures are assured if dams are constructed. In some cases, such as Rampart Dam, the Department should oppose construction on the basis of wildlife damage.

* Timber cutting adjacent to sedge-tideland habitats and log storage near these areas may adversely affect waterfowl and waterfowl habitat. An apparent decrease in waterfowl food production results from bark decomposition in log storage areas. Waterfowl losses have also occurred from pulp mill effluents. Baseline quantitative and qualitative data on coastal bird habitats and bird numbers, and relationships between them are needed to provide rational recommendations to the U.S. Forest Service and logging companies to insure minimum habitat damage.

* Local encroachment on waterfowl habitat is probable through highway and airport construction, industrial and urban development, upland oil and gas exploration and subsequent development. Key waterfowl and human use areas must be given adequate protection through land use regulations, safeguards in development, or mitigation measures.

* The black brant population has been declining for about 15 years. A substantial increase in the harvest of brant is not desirable in the forseeable future. As hunting pressure increases in Southwestern Alaska, restrictions on brant harvests may be necessary.

* New native landowners and other private landowners will probably impose varying degrees of trespass restrictions on hunters. The

Minto Flats, Delta area, Yukon Flats, and Tetlin area will be the most affected. The Department should solicit the cooperation of private landowners to facilitate progressive management of waterfowl. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act. The State should secure ownership of as much of the best waterfowl land and access to it 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. To prevent corresponding increases in user conflicts, crowding and reduced success, measures must be initiated to enhance habitat, increase access and control user numbers.

* Except for hunting areas in Southeastern Alaska and some lightly hunted coastal areas in Prince William Sound and Kachemak Bay, freezeup limits hunters to 50 days or less of hunting out of a possible 107 day season. Liberalized duck bag limits should be allowed to partially offset reductions in hunting opportunity imposed by climate.

* Ingestion of lead shot by waterfowl in a few areas may be causing substantial loss of birds from lead poisoning. Efforts must continue to identify these areas, measure the impact, and take corrective action if necessary.

IMPACTS

* Appropriate waterfowl seasons and bag limits will be maintained on all areas.

* All listed areas are recognized as important waterfowl use and/or human use areas; future development resulting in habitat alteration may be curtailed in recognition of the waterfowl values.

* Control of use will generally be greater in high use areas rather than low use areas. However, in all cases the minimum controls possible will be applied to achieve the desired balance between the resource and different user groups.

7. JIM-SWAN LAKE WATERFOWL MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 14A within 1/4 mile of Jim Lake and Swan Lake.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy waterfowl.

SECONDARY MANAGEMENT GOAL

To provide an opportunity for scientific and educational study of waterfowl.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a year-round waterfowl hunting closure.
2. Encourage public viewing and photography of waterfowl and enhance viewing facilities.
3. Obtain, maintain and improve public access to waterfowl viewing areas.
4. Encourage scientific and educational studies of waterfowl.
5. Discourage human activities that disturb or harass waterfowl during critical nesting or migration periods.
6. Encourage land use practices that are beneficial to waterfowl habitat.

THE SPECIES

Breeding duck densities are apparently high based upon a 1975 survey indicating 141 ducks per square mile in the general area of Jim and Swan Lakes. Possibly 500 or more ducks, producing a like number of young, are present on the actual management area each summer. One or two pairs of trumpeter swans also nest in the Jim-Swan Lake area.

During spring and fall migration periods large numbers of ducks and swans use the two lakes. During the fall peak trumpeter swan concentrations of over 500 birds have been observed. During some years small numbers of molting-nonbreeding trumpeter swans are present throughout the summer.

Waterfowl use in this area is presently limited by poor access. Only a crude 4-wheel drive trail exists into the area which is impassable during wet periods. A few waterfowl hunters also get to the area by boat, but the trip is long and difficult. Little nonconsumptive waterfowl use is made at the present. The few waterfowl hunters who use the area are from the Palmer or Anchorage areas.

PROBLEMS

* Waterfowl interpretive information is not available on the site. The Department should place interpretive signs at primary viewing locations to aid viewers.

* Although some of the area is state owned, the majority of the management area is owned by the Matanuska Susitna Borough. Land uses could be allowed by the Borough which would conflict with opportunities to observe waterfowl. Both state and borough dedication of this land for wildlife oriented purposes is necessary.

* Many big game hunters and salmon fishermen use areas around and beyond these lakes. Development of an access road would increase use of the area and could result in disturbance of waterfowl. Limitations on use of the area by people hunting other species may be necessary.

IMPACTS

* Public nonconsumptive use will increase greatly when road access to the area is developed.

* Closing this area to waterfowl hunting and restricting other human uses except viewing or other compatible uses would allow high waterfowl use on the area in the future. An excellent viewing area would also serve as an "outdoor classroom" for local schools, other institutions and the interested public.

* Public consumptive use of sheep, moose, bear and salmon will increase greatly when road access is developed.

8. POTTER POINT WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 14C, the inter-tidal area bounded on the north by Pt. Woronzof, on the south by Potter Creek, and including the Potter Point State Game Refuge.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy waterfowl.

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting waterfowl.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit waterfowl hunting in a portion of the area.

2. Encourage public viewing and photography of waterfowl and improve public viewing facilities.

3. Obtain, maintain and improve hunter access to waterfowl hunting areas.

4. Control waterfowl hunting seasons and bag limits, methods and means of taking, and methods of hunter transport, if necessary, to distribute hunting pressure and minimize disturbance to waterfowl.

5. Discourage human activities that disturb or harass waterfowl during critical nesting or migration periods.

6. Create new or enhance existing waterfowl habitat in high use areas to increase utilization of habitat by waterfowl, and discourage land use practices that are detrimental to waterfowl habitat.

THE SPECIES

The Potter Refuge contains about 1,990 acres of uplands and 1,750 acres below mean high tide. An estimated 500 ducks breed in this area and the total fall flight of young and adult birds is about 1,000. Over 95% of the birds are dabblers. Lesser Canada geese also nest on the refuge and the average total fall flight is estimated at 300 adults and young. Their wintering area is in Oregon's Willamette Valley.

Peak migrant populations occur from about April 25 - May 12 in the spring and September 10 - October 5 in the fall. Total waterfowl numbers during these periods are estimated at: ducks - 30,000 spring and 20,000 fall; geese - 10,000 spring and 4,000 fall; swans (both species) - 1,000 spring and 200 fall. Waterfowl use during the winter is insignificant.

The 1964 earthquake lowered the area some 2 feet and a loss of nesting habitat resulted. A series of ponds and berms created in 1973 as mitigation for a sewer line put through part of the refuge significantly improved habitat and increased nesting and migrant waterfowl use.

Because of the area's proximity to Anchorage hunting pressure is heavy. During the four seasons 1971-1974, average hunter days on the area were 855, while harvests averaged 1,050 ducks and 90 geese. Hunting pressure is very heavy the first two weekends of the season and tapers off after that. Very high tides are also a popular time to hunt as the tides move ducks closer to shore and hunter success is improved.

There are four main access points to the hunting area. One access route is through state owned land, and the other three are through either city, private or federal land. Access to the area which is closed to hunting, on the north side of the Seward Highway, is good. However, the construction of one or two pull-offs, and habitat improvement near the road would facilitate viewing.

Numbers of viewers, photographers and other nonconsumptive users on the area are not known, but these users far exceed waterfowl hunters. Probably over 10,000 people each year purposely visit Potter Marsh to view birds. Viewers concentrate along the Seward Highway adjacent to the closed area, but use occurs throughout the area. Other uses which occur on the area include: hiking, nature study, berry picking, canoeing, cross-country skiing, snowmachining, picnicking and horse riding.

PROBLEMS

* About 749 acres of private land exist within the refuge. This land could be closed to public access or uses of lands could be made which are incompatible with waterfowl management objectives. Efforts to obtain money for purchase of this land should be continued.

* As more houses are built along the bluff overlooking the tidal flats increasing public antagonism towards waterfowl hunters will result. Possible solutions include: a hunter-oriented public relations program to stress the need for hunter safety; effective enforcement to preclude all shooting (except at the rifle range) except during the waterfowl season, and then only with shotgun; and closing the area to hunting several days each week.

* Viewing opportunities are restricted and a traffic safety problem exists during peak bird use periods along the Seward Highway. Several pull-offs should be constructed to facilitate viewing and ease the traffic problem. Public use along the highway could be reduced by artifically baiting other areas for waterfowl in the spring and thus concentrating viewers at those areas.

* After the opening day hunting success markedly decreases except during periods of high tides. Upland ponds could be constructed to entice ducks off the tideline to increase hunter success.

IMPACTS

* Public access routes to state lands would be assured.

* Increased viewing opportunities would be created and enhanced.

* Conflicts between landowners and hunters would be reduced.

* Hunting success would increase.

9. CHICKALOON FLATS WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 15, the inter-tidal area and upland marsh in Turnagain Arm between Bedlam Creek and Burnt Island.

MANAGEMENT GOAL

To provide an opportunity to hunt waterfowl under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control number and distribution of hunters if overcrowding of hunters reduces or threatens the aesthetic appeal of the area.

2. Control aircraft and airboat use in the area, if necessary, to maintain aesthetic hunting conditions and to reduce disturbance of waterfowl.

3. Obtain, maintain and improve hunter access to waterfowl hunting areas.

4. Encourage viewing and photography of waterfowl.

5. Discourage human activities that disturb or harass waterfowl during critical nesting or migration periods.

6. Enhance waterfowl habitat in high use areas to increase utilization of habitat by waterfowl, and discourage land use practices that are detrimental to waterfowl habitat.

THE SPECIES

Large numbers of geese and ducks use the Chickaloon Flats area during spring and fall migration periods. Swan use is light and occurs primarily during the spring. Concentrations of over 10,000 geese and 15,000 ducks are common during both seasons. During the fall migration when Portage Pass becomes clouded in for several days, a "piling up" of waterfowl may occur with up to 100,000 birds accumulating on the Flats. Lesser Canada geese nest on the flats but probably less than 25 young are produced annually. Up to 175 molting adult geese have been observed in July and August. The birds are believed to winter in Oregon's Willamette Valley. Trumpeter swans nest on the area, but probably less than three nesting pairs use the flats each year. In 1975 a breeding duck survey was conducted and an estimated 1,500 dabbling ducks were observed nesting on 39 square miles of waterfowl habitat. These 1,500 nesting birds produce about 1,500 young for the fall flight.

The 1964 earthquake lowered the flats about three feet. Consequently the amount of land covered by tides has increased, resulting in a decrease of nesting habitat. Tide gut erosion has drained some upland ponds.

Average yearly hunter harvest and hunting activity on the flats for the four seasons 1971-1974 are calculated to be: hunter days - 950; duck harvest - 1,700; goose harvest - 590. Hunter activity on the area is limited mainly by a lack of good access. A gas pipeline access trail

exists on the south side of the area, but it is strictly 4-wheel drive access. The only other means of access is by plane. Plane access is limited to float planes except during a period of low tide when wheel planes can land on the upper, drier parts of the flats. There are no public cabins on the flats but a U.S. Fish and Wildlife Service cabin is heavily used by hunters. A Department of Fish and Game cabin is located about one mile from the nearest waterfowl hunting, but the walk from the cabin is long and difficult. However, some waterfowl hunter use of this cabin occurs. One other cabin exists on the east side of the area, but this is a privately owned pipeline maintenance cabin. Nonconsumptive use of waterfowl is very limited due to the difficulty and expense of getting to the area.

PROBLEMS

* Increasing low level aircraft traffic hazes geese and probably moves them from the area prematurely during the fall. The aesthetics of hunting are also decreased somewhat from such activity. Minimum aircraft elevation restrictions - except when landing - may be necessary in the future.

* Public use of the area is limited by the lack of overnight facilities. The cooperative efforts of the U.S. Fish and Wildlife Service and the Department should provide two additional cabins for hunters.

* Tide gut erosion is eliminating some upland ponds. Corrective measures may be necessary to arrest such erosion if large ponds which receive heavy waterfowl use are in danger.

IMPACTS

* Aircraft may be restricted over the area to altitudes above 2,500 feet except over designated landing areas. Waterfowl harassment of birds would be minimal and geese would probably stay on the area longer. Hunting aesthetics would improve.

* Additional overnight facilities would allow increased public use.

10. FOX RIVER FLATS WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management 15, the inter-tidal area in upper Kachemak Bay between Martin River and Fox Creek.

MANAGEMENT GOAL

To provide an opportunity to hunt waterfowl under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control number and distribution of hunters if overcrowding of hunters reduces or threatens the aesthetic appeal of the area.

2. Control aircraft and airboat use in the area to maintain aesthetic hunting conditions and to reduce disturbance of waterfowl.

3. Obtain, maintain and improve hunter access to waterfowl hunting areas.

4. Discourage human activities that disturb or harass waterfowl during critical nesting or migration periods.

5. Enhance waterfowl habitat to increase its utilization by waterfowl, and discourage land use practices that are detrimental to waterfowl habitat.

THE SPECIES

Substantial numbers of waterfowl utilize this area during spring and fall migration periods. Although exact populations are unknown, total spring and fall use probably exceeds 100,000 ducks, 25,000 geese and 500 swans. From 1,000 to 3,000 mallards and possibly 10,000 divers and nongame ducks also winter in Kachemak Bay. These birds heavily utilize Fox River Flats until the area becomes ice covered, usually late in the winter. Much of the upland sedge flats is without ponds or permanent water. Except at high tides most of the birds remain on the exposed mud flats near tideline. Duck nesting occurs but probably in low densities.

Hunting intensity on the flats is moderate because access is limited to boat, airplane, and all-terrain vehicles. During the four seasons 1971-1974 approximately 1250 ducks and 175 geese were harvested annually, and about 500 hunter-use days per year occurred in Kachemak Bay. Most hunters come from Homer, but a substantial number also reside in the Kenai, Soldotna and Anchorage areas. Hunters usually spend only one day hunting on the area due to a lack of overnight facilities. Some hunters who operate from large boats remain for several days. Nonconsumptive use of waterfowl is very light due to the area's relative inaccessibility.

PROBLEMS

* The number of hunters using airboats to hunt the flats is increasing. Low level aircraft traffic is also increasing. Both of these factors appear to be hazing birds from the area, thus lowering

hunting success and detracting from the aesthetics of hunting. Airboat use and low level aircraft traffic except for landing during part or all of the season will be curtailed.

* Much of the upland sedge flats is without ponds or permanent water. The creation of permanent water areas would draw more birds to the area, disperse hunters over a larger area, thus providing better hunting.

IMPACTS

* The construction of several overnight cabins would allow overnight hunting for some people and would encourage greater use of the area.

* The creation of additional permanent water areas would increase nesting by ducks, draw more birds from the tideline, distribute hunters over a larger area and increase hunter success.

* Elimination of airboats will reduce access for some hunters but will result in more aesthetic hunting conditions and increased hunter success.

11. KENAI AND KASILOF FLATS WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 15, the inter-tidal area of the Kenai and Kasilof Rivers.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting waterfowl.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy waterfowl.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control waterfowl hunting seasons and bag limits, methods and means of taking, and methods of hunter transport, if necessary, to distribute hunting pressure.

2. Obtain, maintain and improve public access to waterfowl areas.

3. Encourage public viewing and photography of waterfowl and enhance viewing facilities.

4. Discourage human activities that disturb or harass waterfowl during critical nesting or migration periods.

5. Enhance waterfowl habitat in high use areas to increase utilization of habitat by waterfowl, and discourage land use practices that are detrimental to waterfowl habitat.

THE SPECIES

Each spring these areas are the first waterfowl habitats to become ice-free on the west side of the Kenai Peninsula. Consequently, large numbers of ducks, and particularly geese, congregate for several weeks on the relatively small amount of habitat. Lesser numbers of birds use these areas during the fall. Some duck nesting also occurs and cranes have been reported to nest on the Kenai Flats. Both of these areas are readily accessible for public viewing and hunting. Over 5,000 geese (mostly snow geese) have been observed on the Kenai Flats in the spring.

Hunting pressure on both areas is usually fairly light; but in 1969, an estimated 600 hunter days were spent on the Kenai Flats. Virtually all hunters on these areas are local residents. These areas provide the only good hunting area close to Kenai and Kasilof. Probably more use of these areas is made by viewers and photographers than by hunters, although such use occurs primarily in the spring. Most viewers are also from the local area.

PROBLEMS

* The Kenai Flats are owned by the City of Kenai and the State and are zoned for industrial use; future conflicts between wildlife-oriented human activities and industrial development are probable. Rezoning of the land is necessary and reclassification for recreational

purposes is desirable. To accomplish this, public support for the proposed rezoning is necessary.

* Public parking facilities and interpretive signs for viewers are lacking. Construction of such facilities and selective feeding of waterfowl during the spring would enhance viewing opportunities.

IMPACTS

* Valuable spring migration use areas for feeding and nesting waterfowl would be protected.

* Public waterfowl viewing opportunities and appreciation for waterfowl would be increased and enhanced.

* Constraints on developmental activities which would alter waterfowl habitat would limit industrial uses of the area.

20. COPPER RIVER DELTA WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, the tidal lands and uplands at the mouth of the Copper River, bounded on the west by the Heney Range Mountains, on the north by the Chugach Mountains and on the east by Katalla.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting waterfowl.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy waterfowl.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control waterfowl hunting seasons and bag limits, methods and means of taking, and methods of hunter transport, if necessary, to distribute hunting pressure.

2. Obtain, maintain and improve hunter access to waterfowl hunting areas.

3. Control hunter access and methods of transport, if necessary, to minimize disturbance or harassment of waterfowl.

4. Encourage public viewing and photography of waterfowl.

5. Enhance waterfowl habitat in high use areas to increase utilization of habitat by waterfowl, and discourage land use practices that disturb or harass waterfowl during critical nesting or migration periods.

6. Encourage scientific research studies of waterfowl.

THE SPECIES

The world's population of dusky Canada geese breeds on the Copper River Delta. In 1975 the fall flight was about 31,000 geese. During the past five years the fall population has fluctuated between 19,000 and 37,000 birds. Production has varied between 11 and 51 percent young in the population during this period. Annual productivity is mainly dependent on weather conditions in late April and May. Predation is also high in some years but this may be a function of weather conditions. This species population has stabilized and is gradually increasing. Prime nesting habitat (forb-grass plant communities) has increased since the 1964 earthquake; however, natural plant succession in the long term may restrict nesting habitat of dusky geese. A cooperative management agreement for the subspecies between Alaska, Oregon and the U.S.F.W.S. was signed in 1973.

The 1974-75 two-year average breeding duck population on 308 square miles of habitat has been 19,450 birds, or 63 ducks per square mile. Pre-1964 populations averaged 27,600 ducks per year. Major decreases in divers have occurred since 1964, probably because of lowered pond fertility and vegetation changes. Dabblers now comprise 76 percent and divers 24

percent of the population. The total fall flight, after production, is estimated to be just over 33,000 ducks. Over 50 pairs of trumpeter swans annually nest on the delta. The total fall flight, after production of young and including nonbreeding swans is over 400 birds each year. This population has stabilized and is apparently at carrying capacity.

Migrant waterfowl populations during the spring and fall are large. Spring totals are estimated to be ducks - 200,000-500,000, geese - 100,000-125,000, whistling swans - 5,000-15,000, trumpeter swans - 2,500; fall totals are: ducks - 300,000-600,000, geese - 75,000-130,000, whistling swans - 20,000-30,000, trumpeter swans - 3,000.

Hunters on the Copper River Delta take about 10 percent of the total annual dusky goose harvest; the majority of the harvest occurs in Oregon. The four year average goose harvest on the Delta for all species is 875 birds per year. Duck harvest has averaged 4,550 birds each year since 1971. Mallards and pintails are the predominant birds in the bag. Local duck production far exceeds annual hunter take. An early flight of white-fronted geese through the area and good duck hunting early in the season dictate a continued Sept. 1 opening. Freeze-up and cessation of hunting usually occurs by October 25.

Hunter days of activity have averaged 2,750 since 1971. Most hunters are local Cordova residents, but a growing number of people travel from Anchorage and elsewhere to hunt on the Delta. A major means of public access is from the road system out of Cordova. Many people hunt from the road or launch boats to reach much of the Delta. Other hunters fly into more remote areas. U.S. Forest Service regulations prohibit use of motorized vehicles in the area before adequate protective snow cover is present, except by special permit. Public use of U.S. Forest Service cabins and other private cabins on the delta is heavy throughout the season.

Since 1951 various waterfowl and habitat research studies have been conducted. The unique wildlife and habitat relationships on the Delta are conducive to future research of various types. Viewing and photography of waterfowl on the Delta are also growing in popularity. The road system allows for excellent public viewing opportunities.

PROBLEMS

* Outer Continental Shelf oil drilling and tanker traffic will pose potential serious problems for waterfowl on the Delta. Oil spills could devastate habitat and kill tens of thousands of birds. Close coordination between the Coast Guard and agencies in the Department of Interior must be maintained to insure the strictest possible controls for oil spill prevention and cleanup.

* Oil drilling lease applications have been made to the U.S. Forest Service for on-shore work on the Delta. Drilling on the uplands or on state-owned tidelands could adversely affect dusky geese, trumpeter swans, migrant waterfowl populations and the esthetic appeal of the area. The Department does not favor on-shore or near-shore drilling here. The cooperative management agreement with the U.S. Forest Service must be maintained and data necessary to support a position on restricted development must be continually collected.

* Excessive disturbance during nesting and migration periods will adversely affect waterfowl populations; increasing human activity on the Delta during the summer - whether the result of oil related activity or other mineral exploration, scientific studies or viewing - must be closely monitored in cooperation with the U. S. Forest Service. Control of such activity may be necessary.

* The 1964 earthquake dramatically changed habitat on the Delta. A decrease of nesting diving ducks, and decreased use of the area by all ducks during the fall has occurred. Recent research has demonstrated that pond draw-down and/or pond fertilization will increase duck use. In cooperation with the U.S. Forest Service these management techniques should be encouraged in areas of high human use to improve hunting success and encourage more duck nesting.

* Long term vegetation changes may decrease goose nesting habitat and reduce the dusky goose population. Periodic monitoring of habitat is necessary and future artificial brush control may be desirable.

IMPACTS

* Implementation of the dusky goose management plan will insure that the population is not overharvested and that hunting seasons are set in accord with population levels and current year's production of young.

* Strict oil drilling and oil transport regulations - within the limits of state jurisdiction - will help insure the protection of waterfowl using the area.

* A policy of no onshore or near-shore drilling will preclude extraction of oil, but will insure the welfare of the Delta's waterfowl populations.

* Habitat enhancement would increase duck use and consequently hunting success.

* No changes would occur in established U.S. Forest Service regulations affecting motorized hunter transport.

21. CONTROLLER BAY WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 6, the Controller Bay Flats inland to the north, including Bering Lake and the Bering River, bounded on the east by the Suckling Hills and on the west by Katalla.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to hunt waterfowl under aesthetically pleasing conditions.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy waterfowl.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters and methods of user transport, if necessary, to maintain asthetic hunting conditions and to preserve existing habitat.

2. Encourage public viewing and photography of waterfowl.

3. Discourage human activities that disturb or harass waterfowl during critical nesting or migration periods.

4. Discourage land use practices that are harmful to waterfowl habitat.

THE SPECIES

Although a few dusky Canada geese are probably produced in the area and some duck nesting occurs, the area is best noted as a trumpeter swan production and molting area. Numbers of nesting and molting swans at least equal those on the Copper River Delta (50 nesting pairs and over 350 total swans). The swan population has apparently stabilized.

Intertidal lands are concentration areas for large numbers of waterfowl and shorebirds during spring and fall migrations. Peak waterfowl populations each season are in excess of 50,000 birds and total waterfowl use probably exceeds 250,000 birds in the spring and 350,000 in the fall.

Hunting pressure is very light due to long distances from population centers. In addition, no overnight cabins are available. Access is solely by aircraft except in the winter when all-terrain vehicles can reach the area. Salt water access by boat is also possible. The few hunters using the area originate mainly from Cordova.

PROBLEMS

* The extraction of large coal deposits in and just outside the area poses a threat to trumpeter swans which are intolerant of disturbance. The Department should support the U.S. Forest Service plan to identify this area as a trumpeter swan management area.

* Outer Countinental Shelf oil development and increased aircraft traffic pose threats to birds using coastal areas. Critical habitat designation should be obtained for state-owned tidelands in this area.

- Due to the remote location of the area and the lack of overnight public use cabins hunter use is limited. The Department should urge the U.S. Forest Service to construct one or two cabins in good hunting locations.

IMPACTS

- Coal extraction probably could occur but only under stringent controls which would insure waterfowl resource protection.

- Cabin construction would provide for more public use on the area.

MARINE MAMMALS IN SOUTHCENTRAL ALASKA

Southcentral Alaska coastal waters provide habitat for a number of marine mammal species* including harbor seals, sea lions, sea otters, whales, dolphins and porpoises. Although there are some specific habitat preferences, the several species are generally widely distributed and abundant, reflecting the high productivity of the Alaska coastal marine environment. Several species affect and are affected by man's utilization of marine fishery resources. Some species have at times supported substantial commercial or domestic human utilization. In the case of sea otters, populations severely depleted by excessive exploitation have, under protective management, recovered to moderate and still increasing levels. On the other hand, use of harbor seals and sea lions has had relatively minor impacts on stock status; populations of these species are near or have reached the carrying capacity of the habitat. Since 1972, consumptive use of all marine mammals has been limited to Alaskan natives under a moratorium on use established by the Marine Mammal Protection Act. Little use of marine mammals now occurs in Southcentral Alaska.

Harbor Seals

Harbor seals are abundant in nearshore waters usually less than 30 fathoms in depth. Unlike other species, harbor seals are at home in turbid water as well as in clear water. At times they may move up rivers for considerable distances. In excess of 55,000 seals are estimated to occur in Prince William Sound and on the south side of the Kenai Peninsula.

Harbor seals are primarily fish eaters, although marine invertebrate species are also taken. They compete with fishermen for certain species of commercially valuable fish. Depredation on gill-netted salmon has occurred, most notably in the salmon fishery at the mouth of the Copper River.

Population size is controlled primarily by availability of food. Predation by killer whales and sharks accounts for some losses. Abandonment of pups is relatively common, particularly when seals in pupping areas are disturbed by man. Loss of pups also occurs due to malnutrition or drowning. The presence of pesticide and mercury accumulations in harbor seals has been demonstrated but the effects of these contaminants are unknown.

Coastal residents have used harbor seals for food and clothing. During the early to mid-1960's, temporary high prices for seal skins effected a dramatic increase in commercial harvests which subsequently tapered off as the value of pelts declined. Only limited use of harbor seals by coastal natives has occurred since passage of the Marine Mammal Protection Act in 1972.

Sea Lions

Sea lions are abundant along the Southcentral coast with at least 19,000 animals known to be associated with about 30 different rookeries and hauling-out sites. The largest rookeries are located on Outer Island, on several of the Chiswell Islands, and along the west side of the Kenai Peninsula, where about 10,000 sea lions can be found during the breeding season. Rookeries and haul-out areas of lesser importance occur in Prince William Sound. Movements and interchange of sea lions between areas occurs during the fall when many animals leave the exposed breeding areas and move to more protected waters, and again in the spring when they return to the breeding rookeries. No changes in sea lion population

* A list of marine mammal species considered by these plans follows this regional account.

size have been detected in recent years and populations in Southcentral Alaska are probably near the carrying capacity of their habitat.

Sea lion habitat can be found nearly anywhere along the coastline although only traditional haul-out areas are used regularly. The best habitat appears to be remote islands with extensive shallow water and rocky bottoms productive of sea life. Clear waters are preferred with most feeding occurring at depths less than 50 fathoms. Since they are primarily fish eaters, sea lions often concentrate in areas where fish are abundant, such as large herring and pollock schooling areas and spawning grounds, and salmon staging areas. Sea lions probably travel long distances to follow and feed on their prey.

Little change has occurred to sea lion habitat that has not been associated with man. The most significant impact has been by man's utilization of food species vital to sea lions. Several of the species important to sea lions have become commercially valuable and are fished extensively both by United States and foreign fishing fleets. Some alteration of habitat has resulted from the development of coastal communities. Continued development and pollution associated with exploration, extraction, and transportation of oil resources have the potential for serious adverse impacts on sea lions.

Sea lion populations are limited by a variety of factors including availability of food, losses of pups due to adverse weather during pupping and to abandonment, malnutrition, drowning, and losses to predation by killer whales and sharks.

Historically, sea lions were harvested by aboriginal natives for a variety of uses including meat, skin covering for boats, and garments. Prior to passage of the Marine Mammal Act in 1972, commercial harvests of sea lions were directed toward control of fisheries depredations and use of pup skins for the foreign garment trade.

Sea Otter

The sea otter population in Southcentral Alaska is centered primarily around Hinchinbrook entrance in Prince William Sound. In recent years this population, estimated at about 5,000 otters, has expanded its range into the Sound, particularly around Knight Island and Port Gravina. A second population became established on the southern side of the Kenai Peninsula in the late 1960's and now numbers at least 1,500 otters. This group is also increasing and spreading to Kachemak Bay and Lower Cook Inlet. Both populations should continue to grow although deep water limits the available suitable habitat for expansion.

Sea otters, limited to waters shallower than 30 to 40 fathoms in their foraging activities, exert a profound effect on many littoral species of invertebrates and possibly on certain species of bottom fish. Sea urchins and mollusks are preferred food and population size and structure of these and other food species may be significantly altered by sea otter feeding pressure. In some Southwestern Alaska sea otter populations, numbers of otters have reached or exceeded carrying capacity and many hundreds of otters have died from starvation. In all areas of high sea otter densities, starvation may be the primary natural mortality factor, particularly on subadults in late winter. Predation may account for some losses of sea otters. Although otters harbor several species of parasites found in other marine mammals, mortality due to parasites is not thought to be significant.

Heavy human exploitation, responsible for reducing sea otter populations to small remnants during the period 1742 to 1911, was eliminated by the Fur Seal Treaty of 1911 and by subsequent Federal and State management regulations. Resultant recoveries of Alaskan sea otter populations

enabled numerous transplants to be made to other historic Pacific sea otter habitats within and outside of Alaska. From 1965 to 1971 over 100 sea otters were captured in Prince William Sound and transplanted to other areas.

Whales Dolphins and Porpoises

More than a dozen species of whales can be found in waters off Alaska, varying in abundance from common to rare. Some species such as the blue and Sei whales extend only into the north Pacific, others including the gray, minke, fin, humpback, and killer whales occur in the Chukchi and Bering Seas as well as in the Gulf of Alaska. Most species move far south in winter and occur off Alaska only in summer, while others remain in Arctic waters year-round. The Belukha whale occurs only in small numbers south of the Bering Sea. Similarly, the bowhead whale is found primarily in Chukchi and Bering Sea waters, and the Narwhal is an Arctic Ocean resident.

A number of the larger whales now under complete protection were over exploited by whalers during the 19th and early 20th centuries. The black right whale has shown slight increases since it was driven almost to extinction. The bowhead, gray, blue and humpback whales have remained stable or shown slight increases in populations since they were afforded complete protection. Commercial utilization continues on several species with no apparent detrimental effects. Among these, the sperm whale is the most important industry species. Sei and fin whales are valuable baleen whales. Some domestic use of whales occurs along Alaska's coast. Alaskan natives annually take from 1 to 37 bowheads, and in some years may take from 1 to 3 gray whales. Belukha whales are an important source of muktuk, oil, and meat for residents of the Bering Sea and Arctic Ocean coasts. Only a few Belugas are harvested in Bristol Bay.

Because most species of whales feed on plankton, krill or ocean fishes not currently of interest to man, few conflicts with man occur. Beluga whales feed on several species of fish utilized by man and their predation on salmon smolt in particular may impact significantly on depressed salmon populations in some areas such as in Bristol Bay. Killer whales are known to take salmon and herring and thus compete directly with fishermen. In addition killer whales damage fishing gear and interfere with long line fisheries.

Pacific whitesided dolphins and Dall and harbor porpoises occur in Alaskan waters, and are abundant in inshore waters during winter. These mammals feed on several species of commercially valuable fish such as herring, cod, flounder, and sardines. Porpoises are sometimes caught accidentally in fishermen's nets. Approximately 20,000 Dall porpoises are lost each year to the Japanese high seas salmon gillnet fishery.

Whales, dolphins and porpoises in Alaska are protected by one or more federal laws and by international treaties and laws. These include the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, the International Whaling Convention signed in 1946, and the International Convention of Trade in Endangered Species of Wild Fauna and Flora.

Other Pinnipeds

Rare sightings of elephant seals, California sea lions and walruses have been made in Southcentral Alaska. These are probably accidental strays resulting from increasing populations of those species in other areas. Fur seals occur offshore seasonally but sightings near shore are limited to a few subadults.

PROBLEMS

* The problem of environmental contaminants and their adverse impacts on the marine ecosystem is a major one for all species of marine mammals and is certain to grow more critical as resource development progresses in the north. Of most immediate concern is the threat posed by pollution resulting from the exploitation, extraction and transportation of oil and natural gas. Marine mammal populations may be seriously impacted by reduction of primary productivity of marine food webs, by direct losses of invertebrate and vertebrate food species, by direct ingestion of toxic chemicals and by loss of insulative quality of fur. Other contaminants have entered the northern marine ecosystem primarily from sources outside of Alaska. Significant accumulations of several pesticide residues and of mercury have been detected in several species of marine mammals, although the effects of these contaminants on marine mammal or on humans who consume them are unknown. All resource development and utilization with the potential for contamination of the marine ecosystem must be carefully regulated to minimize introduction of pollutants and consequent effects on marine food systems. Use of pesticides and industrial waste processing in Alaska similarly must be closely controlled.

* Several species of marine mammals compete with man for fisheries resources. To date, such competition has taken the form of depredations on netted fish or has resulted in the destruction of some fishing gear. Conflicts between fishermen and marine mammals are likely to increase as human utilization of fisheries intensifies. Reduction of fish stocks is certain to impact populations of marine mammals which are approaching or have achieved carrying capacity levels. Development of new or expanded fisheries will affect some species not now impacted. The reverse is also true. Levels of human utilization of fisheries may be limited by intensive use of fish stocks by marine mammals. Since affected species of marine mammals are limited to shallow waters in their foraging activities, much potential conflict may be eliminated by zoning certain commercial fishing activities to deeper waters. In some situations, conflicts may necessitate reduction of some marine mammal populations in specified areas.

* Human activity including movement of people, operation of equipment or harassment by low-flying aircraft can result in desertion of traditional haul-out areas. Of particular importance is disturbance during critical pupping periods which can result in abandonment of pups. Areas of importance to marine mammals for hauling out or pupping need to be identified by regulations which will minimize disturbance by humans.

* The Marine Mammal Protection Act of 1972 established a moratorium on all consumptive use of marine mammals except for traditional uses by Alaskan Natives. It also removed management authority for marine mammals from the State of Alaska. The Act in effect eliminated some rational, beneficial human uses of marine mammals. Marine mammals have the capability to support significant, beneficial, sustained use. All species utilized by United States Nationals and managed by the State of Alaska prior to 1972 existed as healthy, productive stocks. In April of 1976 walrus management was returned to the State. This sets an important precedent for the return of other marine mammals to State management. The State should continue to press for return of management authority for those species which it has the capability to manage.

LIST OF MARINE MAMMAL SPECIES IN SOUTHCENTRAL ALASKA

	Common Name	Scientific Name
Seals	Elephant Seal	*Mirounga leonina*
	Harbor Seal	*Phoca vitulina*
	Northern Fur Seal	*Callorhinus ursinus*
Whales	Belukha Whale	*Delphinapterus leucas*
	Blue Whale	*Balaenoptera musculus*
	Finback Whale	*Balaenoptera physalus*
	Gray Whale	*Eschrichtius gibbosus*
	Humpback Whale	*Megaptera novaeangliae*
	Killer Whale	*Orainus orca*
	Minke Whale	*Balaenoptera acutorostrata*
	Pacific Blackfish (Pacific Pilot Whale)	*Globicephala melaena*
	Sei Whale	*Balaenoptera borealis*
Porpoises	Dall Porpoise	*Phocoenoides dalli*
	Harbor Porpoise	*Phocoena phocoena*
	Pacific Whitesided Dolphin	*Lagenorhynchus obliquidens*
Other Marine Mammals	Sea Otter	*Enhydra lutris*
	Steller Sea Lion	*Eumetopias jubata*

6A. SOUTHERN ALASKA SEA OTTER MANAGEMENT PLAN

LOCATION

Alaska coastal waters in Game Management Units 1, 2, 3, 4, 5, 6, 7, 14, 15 and 16.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sea otters.

SECONDARY MANAGEMENT GOAL

To provide an opportunity for the scientific and educational study of sea otters.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Allow and assist the population to repopulate most of its former range.

2. Encourage increased participation in viewing, photographing and enjoying sea otters.

3. Encourage scientific and educational studies of sea otters and their role in marine communities.

4. Protect sea otter populations from adverse effects of resource development activity.

THE SPECIES

Sea otters were once abundant throughout Southeastern Alaska, Prince William Sound, along the outer Kenai Peninsula coast and in lower Cook Inlet. It is not likely that significant numbers occurred in upper Cook Inlet. By 1911 commercial hunting had eliminated sea otters from much of this range. One or more small populations persisted around the outer islands of Prince William Sound. These populations have grown steadily since 1911 and have expanded their range northward along the islands and mainland of both sides of Prince William Sound, eastward toward Yakutat and westward along the Kenai Peninsula. In the mid-1960's a group perhaps from the Barren Islands migrated to the southwestern tip of the Kenai Peninsula and merged with animals migrating from Prince William Sound.

While there were occasional unconfirmed reports of individual animals, no established population occurred in Southeastern Alaska until 1965. Between 1965 and 1969, a total of 402 sea otters were transplanted to several locations between Cape Spencer and Dixon Entrance and ten were released in Yakutat Bay. Sea otters now occupy most areas of former sea otter habitat in the region, but expansion into northern Prince William Sound, along the Gulf of Alaska coast toward Yakutat and into lower Cook Inlet is still occurring. Populations around the outer islands of Price William Sound are probably near carrying capacity; here, there was a marked increase in the incidence of beach-dead juveniles accompanied by

rapid range expansion into adjacent unpopulated habitat in the 1960's. This usually is an indication that food availability has become a limiting factor. Other recently repopulated areas such as Sheep and Gravina Bays may support densities well above carrying capacity even though nutritionally related mortality appears to remain low. Sea otter numbers east of the Copper River, in parts of northern Prince William Sound and in lower Cook Inlet remain below carrying capacity. The populations should reach aboriginal levels in all areas of Prince William Sound and around the outer Kenai Peninsula in the next few years. Repopulation of the area east of Kayak Island and lower Cook Inlet will take somewhat longer and this population should continue to expand eastward into Game Management Unit 5 and perhaps to the Alaska Peninsula. Present estimates of sea otter numbers are 4,000 to 6,000 in Prince William Sound and 1,500 to 2,000 along the Kenai Peninsula.

At the present time, an estimated 600 to 800 sea otters inhabit the Alexander Archipelago. Established and rapidly growing populations exist at Yakobi Island, Khaz Bay, Coronation Island and the Maurelle Islands. Smaller concentrations of uncertain status have been located in the Necker and Barrier Islands. Scattered individuals are reported from other areas. Little is known about the status of sea otters in Game Management Unit 5 but small numbers are occasionally seen at several locations between Icy Bay and Dry Bay.

Present sea otter populations in Southeastern appear far below carrying capacity and the observed pup-adult ratios and rates of population increase indicate that high productivity and low mortality. Barring any unexpected mortality factors or habitat alteration, the existing population nuclei should increase rapidly and expand their range into most areas of former sea otter habitat.

After 1911 federal laws prohibited the taking of sea otters except by Eskimos, Indians and Aleuts using aboriginal methods and means. In 1959 management authority passed to the State and all public harvest was prohibited. The Marine Mammal Protection Act of 1972 returned management authority to the federal government and removed all restrictions on the taking of marine mammals by natives. Throughout this period the only recorded take of sea otters has been 184 removed from the vicinity of Hinchinbrook and Montague Islands during transplants. A few were taken for scientific purposes and some were shot illegally. Legal native take, accidental entanglement in fishing gear, and oil pollution may have removed small numbers from the population. Recently some Alaska Native organizations have discussed the possibility of starting a sea otter hunting industry, but few or none have been taken to date.

By the early 1960's sea otter numbers in Southcentral Alaska had increased to a level where public viewing and photography became a regular use. Opportunities for observation have been steadily increasing as sea otters expand their range and recreational boating increases. Since 1970 Resurrection Bay has provided more opportunity for the general public to view sea otters than any other part of Alaska even though that area contains relatively poor sea otter habitat and supports only modest densities. Kachemak Bay should provide excellent viewing opportunities in a few years and increasing numbers of recreational boaters are traveling to areas of high sea otter densities throughout Prince William Sound and portions of the Kenai Peninsula. While many people travel to this area for other purposes, the opportunity to see sea otters often becomes a significant part of their experience.

The opportunity to view and photograph sea otters in Southeastern has existed since August 1965, but relatively few individuals were able to locate them. By 1970 several populations had grown to the point where it was always possible to find moderate numbers. The Department began publicizing the locations of concentrations and requested sightings

from the public. In recent years, public interest has increased and a few people now travel by boat to the area specifically to view and photograph sea otters. This use should steadily increase as the populations expand their range into more accessible areas.

Limited scientific studies on the impact of sea otter predation on invertebrate populations have been conducted. The precise knowledge of the history of sea otter populations creates an ideal opportunity to monitor changes in the marine community as sea otters enter the system.

PROBLEMS

* Activities associated with oil and gas exploration, extraction, transportation, refinement and other industrial activities may result in direct mortality of sea otters or alter sea otter habitat. Many of these activities will be concentrated in areas of greatest public access to sea otter habitat while others will occur near areas supporting the highest sea otter densities. Nucleus populations in Southeastern Alaska are particularly vulnerable. The Department should identify areas of critical sea otter habitat and areas of high recreational opportunity and should encourage studies of the habitat requirements of sea otters and elements in their food chain. The Department should encourage regulation of industrial activities to minimize impacts on sea otters and on sea otter viewing opportunities.

* Public access to sea otter concentrations is limited. Most viewing activities will be concentrated in areas of low sea otter density near communities. The Department should promote public awareness of sea otter viewing opportunities in more remote areas.

* The Marine Mammal Protection Act of 1972 permits Eskimos, Indians and Aleuts to harvest marine mammals without restriction on numbers or season of take. Native corporations have considered starting a sea otter hunting industry. The Act does not permit the federal government to restrict Native take but would permit the Alaska Board of Game to pass such restrictions if management authority were returned to the State of Alaska. The Department should continue to press for return of sea otter management authority and reinstate regulations controlling the take of sea otters by all individuals.

* Sea otters are capable of altering the abundance and age structure of certain commercially valuable invertebrates. This may lead to competition with man for a limited resource. If such conflicts occur, the Department should encourage studies of the total impact of sea otters and should present several management options and the consequences of each option to the public.

IMPACTS

* The population should continue to expand until all areas of former sea otter habitat support aboriginal densities. Juvenile mortality will increase and some animals will emigrate to other regions as food becomes limiting.

* Viewing and photography opportunities should increase as areas nearer population centers are repopulated.

* Predation by sea otters should alter the numbers and age structure of some species of invertebrates, particularly sea urchins and mollusks. There may be an increase in size of kelp beds as invertebrate grazers are removed.

7A. SOUTHERN ALASKA HARBOR SEAL MANAGEMENT PLAN

LOCATION

Alaska coastal waters in Game Management Units 1-10 and 14-17 except Glacier Bay and Katmai National Monuments, and the Juneau, Resurrection Bay, Kachemak Bay and Iliamna Lake Harbor Seal Management Plan areas.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of harbor seals.

SECONDARY MANAGEMENT GOALS

To provide the greatest opportunity to participate in hunting harbor seals.

To provide an opportunity to view, photograph and enjoy harbor seals.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Allow harvesting for recreational and commercial purposes.
2. Commercial hunting may be regulated through time and space zoning to minimize conflicts with other uses.
3. Maintain the harbor seal population at an optimum level.
4. Encourage public participation in viewing and photographing harbor seals.
5. Protect harbor seals from adverse effects of resource development, except where severe conflicts with fisheries warrant manipulation of seal numbers in local areas.

THE SPECIES

Land breeding harbor seals are common along the entire coast from Dixon Entrance to the southern Bering Sea. During periods when seasonal pack ice occurs in the southern Bering Sea they intermingle with ice breeding harbor seals but are genetically isolated by differences in breeding season.

Along rocky coasts seals tend to be scattered, although up to 300 might be seen hauled out in certain prime areas. Larger concentrations frequently occur in glacial fjords, estuaries or near extensive shallow areas where thousands may haul out on glacial ice or sandy beaches at one time. Examples of such haul-out areas are Icy Bay, Glacier Bay, the Copper River, Tugidak Island, Port Moller and Port Heiden. Seals frequently ascend major rivers where seasonal concentrations of food species occur.

It is difficult to accurately assess seal numbers since an unknown and highly variable percentage of the population is in the water at any given time. A conservative estimate based on aerial surveys and harvest records is 270,000 in Alaskan waters. The population as a whole appears to have been near carrying capacity for many years, and no major population changes have been documented. However, densities have been reduced by man in a few areas. An extensive predator control program greatly

reduced seal numbers in the Copper River in the 1950's. Commercial harvesting in the mid 1960's reduced densities in portions of Southeastern and Southcentral Alaska, Kodiak Island and Bristol Bay. When hunting pressure diminished in the late 1960's seal numbers increased and are again near carrying capacity in most areas.

There is no documented evidence that human activities are influencing seal numbers at the present time, although limited effects may occur near towns or areas of concentrated industrial activity. Increasing fishing pressure on bottom fish, projected Outer Continental Shelf oil and gas development and other industrial activities increase the potential for significant impacts on seal numbers in the future.

Seals have always been used by coastal residents for domestic purposes including clothing and food. Some were taken in conjunction with fisheries conflicts and a bounty was paid for seal scalps for many years. Small numbers were used for commercial garments and souvenirs and for trap bait. In 1963 Alaskan seal skins entered the European fur market. High prices were paid for raw seal skins, stimulating a great deal of interest in harvesting the animals. The estimated yearly harvest in Alaskan waters climbed from about 6,000 to 10,000 harbor seals prior to 1963, to over 50,000 seals in 1965. The market price of seal hides then dropped, resulting in a significant decline in hunting pressure. The seal harvest in 1966 dropped to 25,000-30,000 and continued to decline each year thereafter. By the late 1960's the annual harvest in the area was 8,000 to 12,000 seals. Pelt prices again rose to a relatively high level in the early 1970's, but this failed to stimulate a significant increase in harvest. This may have been due to the fact that many potential commercial seal hunters had learned that successful commercial seal hunting requires skill, effort and in some cases a significant cash outlay.

After 1966 hunting pressure was considerably below what the population could support. No significant harvest occurred over vast areas of southern Alaska. Heavy hunting pressure, primarily directed at pups, was limited to a few areas of high seal density. The harvest was controlled by manipulating seasons and, when necessary, closing areas by field announcement.

The Marine Mammal Protection Act of 1972 (MMPA) effectively terminated commercial hunting. While Eskimos, Indians and Aleuts were allowed to harvest seals without restriction on numbers or season, they could not sell them to fur dealers. Nonnatives were prohibited from taking seals for any purpose. The initial effect of the MMPA was to reduce the harvest of seals to a very low level. Several native groups have discussed organizing a seal harvesting industry. This creates the potential for a greatly increased harvest and perhaps overharvest in some areas.

Viewing and photography of seals has increased in recent years. Seal behavior is such that few individuals deliberately seek this species for observation relative to some other marine mammals; however, the presence of undisturbed seals contributes significantly to the enjoyment of many individuals engaged in other pursuits. Seals have become accustomed to humans in Glacier Bay National Monument and are readily observed and photographed there.

PROBLEMS

* Activities associated with oil and gas exploration, extraction, transportation, refinement and other industrial activities may result in direct mortality of seals or alter seal habitat. Refined and crude petroleum, heavy metal and pesticide pollution may kill seals directly, particularly pups. Additionally it may cause reproductive failure or affect seals indirectly through the food chain. Excessive disturbance can cause abandonment of hauling

areas. Several scheduled Outer Continental Shelf oil and gas lease areas are situated near major seal hauling and feeding areas. The Department should identify areas of critical seal habitat and areas of high recreational opportunity and should encourage studies of the habitat requirements of seals and elements in their food chain. The Department should request regulation of industrial activities to minimize impacts on seals.

* Foreign fishing fleets may compete with seals for certain fish stocks. Excessive fishing may lower seal carrying capacity. The Department should encourage population studies of major seal food species and request that those stocks be managed to maintain the seal population.

* Seals are vulnerable to overharvest in localized areas. Harvesting activities can disrupt certain seal activities causing higher mortality or interfering with viewing and photography opportunities. The Department should regulate harvesting activities through time and space zoning to minimize adverse impacts on seals and on viewing and photography opportunities.

* Public access to seal concentrations is limited. Most viewing activities will be concentrated in areas of low seal density near towns connected to the road systems. The Department should promote public awareness of seal viewing opportunities in more remote areas.

* The Marine Mammal Protection Act of 1972 permits Eskimos, Indians and Aleuts to harvest marine mammals without restriction on numbers or season or take. The Act does not permit the federal government to restrict native take but would permit the Alaska Board of Game to pass such restrictions if management authority were returned to the State of Alaska. The Act also restricts commercial uses by all individuals, which results in loss of revenue and inefficient use of harvested animals. The Act has made it impossible to effectively resolve fisheries conflicts. The Department should continue to press for return of seal management authority and reinstate regulations controlling the take of seals by all individuals.

* Conflicts with domestic fishing activities may develop in localized areas when seals damage fishing gear or fish caught in the gear. The Department may allow intensive harvesting of seals in specific areas where significant conflicts have been clearly demonstrated.

IMPACTS

* An industry associated with the harvest of seals, processing of hides, and manufacture and sale of seal skin products would be reestablished, providing income to a substantial number of individuals. Waste of commercially valuable parts of seals would be reduced.

* Portions of the seal population could be reduced to a level somewhat below carrying capacity. This could result in increased productivity and survival of young.

* Individuals of all races would be able to harvest seals for recreation and personal use.

* Localized conflicts with fisheries could be minimized without wasting a valuable resource or endangering the population.

* The potential for excessive unregulated harvest would be removed.

* Viewing and photographic opportunities would be preserved.

7B. ALASKA SEA LION MANAGEMENT PLAN

LOCATION

Alaska coastal waters in Game Management Units 1-10, 15, 18, and 22 except Glacier Bay and Katmai National Monuments, and the Juneau, Resurrection Bay, and Chiniak Bay Sea Lion Management Plan areas.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of sea lions.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sea lions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Allow a harvest of sea lions for commercial and domestic purposes.
2. Maintain the sea lion population at an optimum level.
3. Higher harvest may be allowed in localized areas in response to specific conflicts with fisheries.
4. Commercial harvest may be regulated through time and space zoning to minimize conflicts with viewing and photography.
5. Protect sea lions from adverse effects of resource development activity.

THE SPECIES

The Alaska population of Steller or northern sea lions is estimated to exceed 200,000. Approximately 10,000 occur in the Southeastern Region, 19,000 in the Southcentral Region, and 185,000 in the Southwestern Region. An unknown number range into the seasonal pack ice of the Bering Sea. These estimates are based primarily on counts of animals on hauling grounds and rookeries. A large part of the sea lion population is hauled out at any given time although many may be at sea. Reproductively active animals concentrate at rookeries in summer for pupping and breeding. These rookeries are usually large, often containing over 10,000 animals, and tend to be on remote islands exposed to the open sea. Limited pupping and breeding activity occurs at some hauling areas. Hauling areas are primarily used by reproductively inactive animals in summer and by all animals in winter.

Use of rookeries and hauling areas varies seasonally. Some, particularly those in more protected waters, may be used only in winter, others are used all year, although the numbers of sea lions hauling out may vary seasonally. Some areas may be used only rarely, perhaps only when food species concentrate in the vicinity. Significant shifts in concentrations of animals in the water also occur. These movements are poorly understood but probably are related to the distribution of food species. Movement between areas appears common.

Shifts between areas may give the appearance of overall population changes, however surveys over the last 20 years indicate no major change in population size or in distribution of sea lions other than an increase in numbers on the high seas associated with foreign fishing fleets. The population appears to be near carrying capacity in all parts of its range. Natural mortality, particularly of pups and subadults, appears to be the main population regulatory mechanism although lowered productivity

has been suggested. Harvest of pups may have exerted a slight influence on sea lion numbers in localized areas of the Kodiak Archipelago between 1963 and 1972, but no change has been observed.

No known habitat changes significant to sea lions have occurred. The present population probably exceeds the level at the time white man arrived, since historical evidence indicated that aboriginal hunting maintained the sea lion population at a reduced level.

At present the influence of human activites is probably minor. However, projected increases in activities related to the oil, logging and other industries, projected growth of coastal communities, and the current high levels of foreigh fishing for sea lion food species increase the chances that sea lions will be affected in the future.

Sea lion populations in Alaska have been subjected to hunting pressure of varying intensities for many centuries. Remains of sea lions in middens indicate the coastal dwelling natives utilized the resource to a high degree. Historical records indicate that hunting pressure prior to the early 1900's was so intensive that the sea lion populations in much of Alaska were reduced to low levels. Hunting pressure apparently declined sometime after the turn of the 19th century, because natives were no longer dependent upon them for subsistence and white man turned to more economically attractive materials. As a result sea lions greatly increased in numbers.

In more recent times sea lions have been hunted for a variety of reasons. Prior to passage of the Marine Mammal Protection Act of 1972 (MMPA) fishermen annually killed an unknown but relatively small number of sea lions in the course of domestic commercial fishing operations. A small number (probably less than 100) were taken for crab or shrimp bait. In 1959 a total of 630 were taken from several areas of Game Management Units 8 and 9 in a study of potential commercial uses of sea lions. Between 1963 and 1972 harvests of pups for pelts were conducted at several rookeries in Game Management Units 8, 9 and 10. The total harvest included 14,180 from Marmot Island; 16,753 from Sugarloaf Island; 8,632 from Akutan Island; 638 from Atkins Island; 574 from Round Island; 3,773 from Ugamak Island and 628 from Jude Island.

The MMPA removed all restrictions on harvest of marine mammals by Eskimos, Indians and Aleuts but prohibited all others from taking them. This effectively stopped the commercial harvest, however, an undetermined number have been taken either legally or illegally in the course of domestic fishing operations. Incidental harvest in conjunction with foreign fishing fleets appears to have increased in recent years. Some estimates place the annual take at over 10,000. Permits were issued for the taking of a few hundred sea lions for scientific purposes.

Viewing and photography of sea lions has increased in recent years. Recreational boaters and fishermen often visit hauling areas near coastal communities and a small number of tourists and professional photographers travel to more remote rookeries each year. A few individuals derive a portion of their annual income guiding and transporting photographers seeking sea lion.

Experience prior to 1972 demonstrated that commercial harvest and viewing of sea lions can be compatible if properly regulated.

PROBLEMS

* Activities associated with oil and gas exploration, extraction, transportation, refinement and other industrial activities may alter sea lion habitat or result in direct mortality of sea lions, especially small pups. Refined and crude petroleum, heavy metal and pesticide pollution may kill sea lions directly, particularly pups. Additionally it may cause reproductive failure or affect sea lions indirectly through the food chain. Excessive disturbance can

cause abandonment of rookeries and hauling areas. Several scheduled Outer Continental Shelf oil and gas lease areas are situated near major rookeries and hauling areas. The Department should identify areas of critical sea lion habitat, and should encourage studies of the habitat requirements of sea lions and elements in their food chain. The Department should request regulation of industrial activities to minimize impacts on sea lions.

* Foreign fishing fleets may compete with sea lions for certain fish stocks. Excessive fishing may lower sea lion carrying capacity. The Department should encourage population studies of major sea lion food species and request that these stocks be managed to maintain the sea lion population.

* Sea lions are vulnerable to overharvest in localized areas. Harvesting activities can disrupt certain sea lion activities causing higher mortality or interfering with viewing and photography opportunities. The Department should regulate harvesting activities through time and space zoning to minimize adverse impacts on sea lions and on viewing and photography opportunities.

* Public access to sea lion concentrations is limited. Most viewing activities will be concentrated in areas of lower sea lion density near towns connected to the road system. The Department should promote public awareness of sea lion viewing opportunities in more remote areas.

* The Marine Mammal Protection Act of 1972 permits Eskimos, Indians and Aleuts to harvest marine mammals without restriction on numbers or season of take. The Act does not permit the federal government to restrict native take but would permit the Alaska Board of Game to pass such restrictions if management authority were returned to the State of Alaska. The Act also restricts commercial uses by all individuals, which results in loss of revenue and inefficient use of harvested animals. It has made it impossible to effectively resolve fisheries conflicts. The Department should continue to press for return of sea lion management authority and reinstate regulations controlling the take of sea lions by all individuals.

* Conflicts with domestic fishing activities may develop in localized areas when sea lions damage fishing gear or fish caught in the gear. The Department may allow liberal harvesting of sea lions in specific areas where significant conflicts have been clearly demonstrated.

* Disturbance can cause abandonment of hauling areas by sea lions. This could be particularly important around rookeries during the pupping and breeding seasons. Human visitation or activities on or near rookeries should be controlled to minimize disturbance during critical periods.

IMPACTS

* If sufficient interest in commercial harvest of sea lions develops, portions of the sea lion population could be reduced to a level somewhat below carrying capacity. This could result in increased productivity and survival of young.

* Establishment of a sea lion harvesting industry will create economic opportunities for coastal residents.

* Localized conflicts with fisheries can be minimized without wasting a valuable resource or endangering the sea lion population.

* Sea lion viewing opportunities will be preserved.

9. COOK INLET BELUKHA MANAGEMENT PLAN

LOCATION

Those portions of Game Management Units 9 and 14-16 in Cook Inlet including adjacent bays and rivers.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy belukha whales.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Restrict the harvest of belukhas in Cook Inlet to less than 10 animals per year, to be taken for human food only.

2. Discourage human activity that might cause abandonment of belukha feeding areas.

3. Encourage consideration of the food requirements of belukha whales in fisheries management in Cook Inlet.

THE SPECIES

An estimated 500 belukha whales inhabit the waters of Cook Inlet. This is apparently a geographically discrete population separated from the larger Bering-Chukchi-Beaufort Seas population by many miles of habitat unsuitable for belukhas. Information on the seasonal distribution of this population is limited. Most of the population appears to spend the summer in northern Cook Inlet in the vicinity of the Susitna River. Many ascend the river on high tides to feed on schooling fish. In fall they tend to move south as far as Kachemak Bay. Estuaries tend to be the primary feeding areas. Groups of belukhas are periodically seen around the Kenai, Kasilof and Fox Rivers. Less information is available on the distribution of belukhas on the west side of Cook Inlet but many estuaries there are probably important feeding areas. Groups of belukhas are seen in Kamishak Bay in winter. The occurrence of concentrations of schooling fish in shallow waters and to some extent the distribution of ice probably regulate belukha movements in Cook Inlet. Few extensive areas of suitable belukha habitat appear to exist in adjacent areas outside of Cook Inlet. A few estuaries might be suitable for seasonal use but are removed from potential wintering areas. Infrequent sightings of belukhas outside of Cook Inlet have been made and no significant range expansion is expected. The present population appears stable and is presumed to be near carrying capacity.

Little harvest of belukhas has occurred in recent times. A commercial harvesting industry in the 1930's failed after 100 were taken. Since that time only small numbers have been taken for food or in response to fisheries conflicts. Viewing of belukhas has probably been the most significant use although many people are unaware of the available opportunities.

PROBLEMS

* The public is generally unaware of the existence of belukhas in Cook Inlet or of opportunities to view belukhas. The Department should promote public awareness of belukha viewing opportunities.

* Activities associated with resource development, industry and concentrated human settlement may result in direct mortality of belukhas or alter their habitat. The Department should identify areas of critical belukha habitat and areas of high recreational opportunity and should encourage studies of the habitat requirements of belukhas and elements of their food chain. The Department should encourage regulation of human activities to minimize impacts on these whales.

* Conflicts between belukhas and commercial fisheries have been identified in other areas. Such conflicts appear minor in Cook Inlet. If significant conflicts are demonstrated the Department should use nonlethal methods (such as underwater sound transmissions) to minimize conflicts.

IMPACTS

* The proposed management should maintain the belukha population near present levels.

* Viewing and photographic opportunities should remain similar to those in the past but more individuals may make use of the opportunities.

10. KACHEMAK BAY HARBOR SEAL MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 15 in Kachemak Bay inside a line extending from Dangerous Cape to Anchor Point.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy harbor seals.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit hunting for harbor seals in Kachemak Bay.

2. Encourage consideration of the food requirements of seals in fisheries management in Kachemak Bay.

3. Discourage human activity that might cause abandonment of seal hauling and feeding areas in Kachemak Bay.

THE SPECIES

Seals are moderately abundant along the south side of Kachemak Bay. No quantitative information is available on seal numbers and changes in numbers. There may have been some reduction in numbers in the mid 1960's due to heavy commercial hunting pressure, however, densities appear to be approaching carrying capacity at the present time. No data are available indicating that human activities are influencing seals in Kachemak Bay, but extensive human use of coves along the south side of the bay may have reduced seal use of some areas.

No harvest data specific to Kachemak Bay are available. Most of the intensive commercial hunting of the mid-1960's was directed at nearby areas supporting higher seal densities. Some seals were taken within the bay for sport, hides and food, and in response to fisheries conflicts until passage of the Marine Mammal Protection Act of 1972. Kachemak Bay has become one of the most accessible areas of marine mammal habitat to people from Alaska's population centers. This access provides seal viewing opportunities greater than those in areas supporting higher seal densities. The opportunity to view seals, sea lions, sea otters and whales contributes significantly to the enjoyment of many individuals engaged in other activities such as recreational boating and fishing.

PROBLEMS

* Activities associated with resource development, industry and concentrated human settlement may alter seal habitat or result in direct mortality of seals. Since seals and many of their food species are highly mobile, effects in one area may influence seal densities in other areas. Refined and crude petroleum, heavy metal and pesticide pollution may kill seals directly, particularly pups. Additionally it may cause reproductive failure or affect seals indirectly through the food chain. The Department should identify areas of critical seal habitat and areas of high recreational opportunity and should encourage studies of the habitat requirements of seals and elements of their food chain. The Department should encourage regulation of human activities to minimize impacts on seals and seal viewing opportunities.

* Foreign and domestic fishing fleets may compete with seals for certain fish stocks. Excessive fishing may lower seal carrying capacity of the habitat. The Department should encourage population studies of major seal food species and request that those stocks be managed in a manner that will maintain the seal population.

* The Marine Mammal Protection Act of 1972 permits Eskimos, Indians and Aleuts to harvest marine mammals without restriction on numbers or season of take. The act does not permit the federal government to restrict native take but would permit the Alaska Board of Game to pass such restrictions if management authority were returned to the State of Alaska. The Department should continue to press for return of seal management authority and reinstate regulations controlling the take of seals by all individuals.

IMPACTS

* Harvest of seals within Kachemak Bay would no longer be allowed.

* The proposed management would have no significant impact on the seal population or on the allowable harvest of seals outside of Kachemak Bay.

* Viewing and photographic opportunities should remain similar to those in the past, unless disturbance or habitat changes beyond the Department's control take place.

11A. RESURRECTION BAY HARBOR SEAL MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 7 in Resurrection Bay inside of a line extending from Aialik Cape to Cape Resurrection including Barwell Island.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy harbor seals.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit hunting for harbor seals on Resurrection Bay.
2. Encourage consideration of the food requirements of seals in fisheries management in Resurrection Bay.
3. Discourage human activities that might cause abandonment of seal hauling and feeding areas within Resurrection Bay.

THE SPECIES

Moderate densities of harbor seals inhabit Resurrection Bay. No quantitative data are available on seal densities or changes in densities within the bay. Seal numbers appeared near carrying capacity along most of the Kenai Peninsula until the mid 1960's when commercial hunting reduced densities in some areas. The population appears to have largely recovered from this brief period of high exploitation. No data are available to indicate that human activities are influencing seals in Resurrection Bay; however, human activity around the town of Seward may have reduced seal use of portions of the area.

No harvest data specific to Resurrection Bay are available. Most of the intensive commercial harvest during the mid 1960's was in adjacent bays containing higher densities. However, it can be assumed that a relatively high harvest in response to fisheries conflicts also occurred, for sport, hides and food occurred. Some commercial hunting did continue within Resurrection Bay until passage of the Marine Mammal Protection Act of 1972.

Seward has become an important center for recreational boating and sport fishing. Resurrection Bay has become one of the most accessible areas of marine mammal habitat to people from Alaska's population centers. This access provides seal viewing opportunities greater than those in areas supporting higher seal densities. The opportunity to view seals, sea lions, sea otters and whales contributes significantly to the enjoyment of many individuals engaged in other activities within the bay.

PROBLEMS

* Activities associated with resource development, industry and concentrated human settlement may alter seal habitat or result in direct mortality of seals. Since seals and many of their food species are highly mobile, effects in one area may influence seal densities in other areas. Refined and crude petroleum, heavy metal and pesticide pollution may kill seals directly, particularly pups.

Additionally it may cause reproductive failure or affect seals indirectly through the food chain. The Department should identify areas of critical seal habitat and areas of high recreational opportunity and should encourage studies of the habitat requirements of seals and elements of their food chain. The Department should encourage regulation of human activities to minimize impacts on seals and seal viewing opportunities.

* Foreign and domestic fishing fleets may compete with seals for certain fish stocks. Excessive fishing may lower seal carrying capacity. The Department should encourage population studies of major seal food species and request that those stocks be managed in a manner that will maintain the seal population.

* The Marine Mammal Protection Act of 1972 permits Eskimos, Indians, and Aleuts to harvest marine mammals without restriction on numbers or season of take. The Act does not permit the federal government to restrict native take but would permit the Alaska Board of Game to pass such restrictions if management authority were returned to the State of Alaska. The Department should continue to press for return of seal management authority and reinstate regulations controlling the take of seals by all individuals.

IMPACTS

* Harvests of seals within Resurrection Bay would no longer be allowed.

* The proposed management would have no significant impact on the seal population or on the allowable harvest of seals outside of Resurrection Bay.

* Viewing and photographic opportunities should remain similar to those in the past, unless disturbance or habitat changes beyond the Department's control take place.

11B. RESURRECTION BAY SEA LION MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 7 in Resurrection Bay inside of a line extending from Aialik Cape to Cape Resurrection including Barwell Island.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sea lions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit hunting for sea lions in Resurrection Bay.

2. Discourage human activity that might cause abandonment of the Rugged, Hive, and Barwell Islands hauling areas.

3. Encourage consideration of the food requirements of sea lions in fisheries management in Resurrection Bay.

THE SPECIES

Resurrection Bay is used seasonally by sea lions. Quantitative data are limited but it appears that several thousand may feed in the bay and several hundred may haul out on Hive, Rugged and Barwell Islands at various times during the winter and spring, while lesser numbers may occur there in summer. Sea lion abundance in Resurrection Bay may be influenced by a number of factors occurring in other areas such as concentration of prey species or breeding activity.

No information is available on historic changes in sea lion occurrence in the bay, however the population appears to have remained near carrying capacity in recent years. There is no documented evidence that human activities have influenced sea lion numbers in Resurrection Bay, but human development in the vicinity of Seward may have altered some sea lion habitat. Large numbers of sea lions have been observed feeding in the upper bay which indicates that habitat degradation has not become a serious problem. The projected growth of Seward, associated with the Outer Continental Shelf Oil and Gas leasing program, could adversely affect sea lion use of Resurrection Bay in the future; however, these impacts need not occur in Resurrection Bay itself. Changes in the sea lion population outside of Resurrection Bay may influence sea lion abundance in the bay.

Little information is available on harvest of sea lions in Resurrection Bay. Small numbers may have been taken for domestic purposes, for bait or animal food, or shot because of fisheries conflicts. No commercial harvest has ever been conducted in the bay.

Recreational hunting and fishing are popular activities in Resurrection Bay. While the peak boating period does not coincide with the peak of sea lion abundance, good public access creates some of the best opportunities for Alaska's urban population to see sea lions and other marine mammals.

PROBLEMS

* Activities associated with oil and gas exploration, extraction, transportation, refinement and other industrial activities may alter sea lion habitat or result in direct mortality of sea lions, especially small pups. Refined and crude petroleum, heavy metal and pesticide pollution may kill sea lions directly, particularly pups. Additionally it may cause reproductive failure or affect sea lions indirectly through the food chain. Excessive disturbance can cause abandonment of rookeries and hauling areas. Several scheduled Outer Continental Shelf oil and gas lease areas are situated near major rookeries and hauling areas. The Department should identify areas of critical sea lion habitat, and should encourage studies of the habitat requirements of sea lions and elements in their food chain. The Department should request regulation of industrial activities to minimize impacts on sea lions.

* Foreign fishing fleets may compete with sea lions for certain fish stocks. Excessive fishing may lower sea lion carrying capacity. The Department should encourage population studies of major sea lion food species and request that these stocks be managed in a manner that will maintain the sea lion population.

* The Marine Mammal Protection Act of 1972 permits Eskimos, Indians and Aleuts to havest marine mammals without restriction on numbers or season of take. The Act does not permit the federal government to restrict native take but would permit the Alaska Board of Game to pass such restrictions if management authority were returned to the State of Alaska. The Department should continue to press for return of sea lion management authority and reinstate regulations controlling the take of sea lions by all individuals.

* While harvesting of sea lions is generally compatible with viewing and photography, the disturbance associated with harvesting could cause conflicts at small hauling areas. The Department should restrict harvest of sea lions in Resurrection Bay to avoid conflicts.

* Disturbance can cause abandonment of hauling areas by sea lions. This could be particularly important around rookeries during the pupping and breeding seasons. Human visitation or activities on or near rookeries should be controlled to minimize disturbance during critical periods.

IMPACTS

* The proposed management would have no significant impact on the sea lion population as a whole or on the allowable harvest of sea lions outside of Resurrection Bay.

* Viewing and photographic opportunities should remain similar to those in the past, unless disturbance or habitat changes beyond the Department's control take place.

LAND AND SHORE BIRDS

Alaska, despite its large size, has a comparitively 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 habitats. 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.

Southcentral Alaska shares many nongame bird species with Southeastern Alaska but is somewhat less diverse, perhaps because the climate in Southcentral is not as subject to maritime infulences. Most bird use in the area is seasonal, with 60 to 70 species recorded as resident breeders. About 25 species are winter residents, including 20 that reside year-round in the region. Common summer birds typical of upland spruce-birch forests and associated shrub thickets include yellow, Wilson's and myrtle warblers; golden-crowned, Lincoln's, Savannah, white-crowned and fox sparrows; and robins and thrushes. Alpine tundra in the interior and at higher elevations along the coast support longspurs, horned larks, upland and golden plovers, gray-crowned rosy finches and savannah sparrows. Three species of swallows, kingfishers, dippers, sandpipers and other shorebirds, and loons and grebes nest and feed in association with the thousands of ponds, lakes, marshes and streams found in Southcentral Alaska. The most common permanent residents are ravens, gray jays, redpolls and woodpeckers.

In addition to the resident species, millions of migrants pass through the region and adjacent waters in spring and fall moving to and from Arctic and Western Alaska breeding areas. Many thousands of birds utilize the Copper and Susitna River systems as northward extensions of the Pacific Flyway. During May, thrushes, warblers and sparrows are especially abundant and occur in such numbers during migration that they are common in a wide variety of habitats, from alpine to seacoasts. The Northern Gulf of Alaska and Prince William Sound is a staging area for tremendous numbers of migrating waterbirds. Densities in excess of 250,000 shorebirds per square mile were counted in the tidal flats of the Copper River Delta in May, 1964.

The major human uses of nongame birds in Southcentral Alaska are viewing and photography, often in association with other recreational pursuits. Birdwatching is growing in popularity and there is an increasing membership in organizations devoted primarily to such interests in the Anchorage area. The number of people erecting winter bird feeders and bird houses also seems to be on the rise. Observation and photography of birds takes place primarily along established roads and trails and near or within major communities of the area. In addition to direct use, practically all outdoor activities are enhanced by the sight and song of small nongame birds. Scientific study of birds has provided much fascinating and valuable information, for lay people as well as scientists, on animal migrations, ecological relationships and evolutionary mechanisms.

SEABIRDS

The Southcentral coastal and marine environments provide a diversity of habitats which support a variety of seabird species. The numerous

islands and fjord lands of the southern and eastern coasts of the Kenai Peninsula and similar areas of Prince William Sound contain the major nesting colonies of seabirds in this region. 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, members of the family Laridae, 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 non-breeding populations of murres probably number in the hundreds of thousands, while several million shearwaters use outer continental shelf waters in summer months. An occassional endangered short-tailed albatross appears in offshore waters in the summer.

Nesting habitat requirements vary between species, ranging from burrow nests in fine loam soil to rock ledges on sea cliffs. Burrow nesters include auklets and puffins of the alcid family. Nesting by these species is limited to areas of suitable soil conditions, generally on less steep slopes and flat ground. Such nest site locations, being readily accessible, predispose these species to potential disturbance and predation. Therefore, burrow nesting colonies have developed on areas, such as islands, not subject to these factors. However, various human activities have introduced predators to some islands in the region and reduction or elimination of burrow nesting species on these islands has resulted. Other species such as the guillemot are crevice and hole nesters while the common murre and several species of cormorant are conspicuous inhabitants of precipitous cliffs. Many of the gulls and several alcids utilize a variety of nesting sites from gravel beaches to bare rock.

The bulk of seabirds rely on the ocean for sustenance. Food items range from euphasids, fish larvae and other plankton to squids, smelt, capelin, cod, blennies, and immature salmonids. Gulls are scavengers and also prey on eggs and nestlings of other seabirds and on small mammals. In many 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 seabirds in Southcentral Alaska have not been subjected to extensive consumptive use. Current nonconsumptive use by viewers and photographers appears to be on the increase as Alaska's human population grows and access improves. Ultimately seabirds may provide valuable data as biological indicators of marine habitat degradation.

RAPTORS

Raptors* which occur in Southcentral Alaska include the bald and golden eagles, osprey, red-tailed, Harlan's, rough-legged and Swainson's hawks, marsh hawk, goshawk, sharp-shinned hawk, peregrine falcon, merlin, kestrel, and the great-horned, great-grey, snowy, hawk, boreal and short-eared owls. Except for goshawks and gyrfalcons, and some eagles the diurnal birds of prey are only summer residents of Southcentral Alaska. With two exceptions, the owls are residents in the region throughout the year. The snowy owl infrequently winters in the region.

* A list of raptor species considered in these plans follows this regional account.

while the short-eared owl is a summer resident of this region. 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 Southcentral 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 seriously low at this time in Southcentral Alaska. Important bald eagle nesting populations occur in Prince William Sound with smaller concentrations found on several of the major river systems of the region. 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 the region 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 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 and short-eared owl are the only consistent ground-nesters in the Southcentral Region. Both of these species select open areas for nesting, but unlike marsh hawks, nesting short-eared owls occur in tundra and forested habitats. 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 Southcentral 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 in Southcentral Alaska varies seasonally and encompasses a wide array of species including birds, mammals, fish and insects. The abundance and distribution of these prey species 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 residues 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 goshawks and kestrels 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. There has been a slight increase in interest during the last five years. The number of permits issued in 1974 was less than 30, but the demand for birds to be used for falconry is expected to increase.

SMALL MAMMALS

About 16 species of small mammals*** are found in Southcentral Alaska. The house mouse and rat are both introduced species associated with human habitations. A relatively large percentage of the indigenous species including the common shrew, dusky shrew, brown lemming, red-backed vole, tundra vole and meadow jumping mouse are distributed throughout the region. The northern bog lemming and the little brown bat have extensive though not complete distributions in this area. Water, arctic and pygmy shrews are found in the region, but their ranges are restricted. The Alaska vole and meadow vole also occur in Southcentral Alaska. The meadow vole occupies a wide range of habitats while the Alaska vole is limited to tundra areas above timberline. Other species include the silver-haired bat and the collared pika. Ranges of these species are restricted, the former being found only in some areas of Prince William Sound. The collared pika is found in mountain habitats.

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

Due to 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.

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. Decreased populations 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.

*** A list of small mammal species considered in these plans follows this regional account.

* Pollution of coastal tidelands and estuaries by oil or oil industry-related contaminants poses a serious threat to the welfare of seabirds using Southcentral Alaska for nesting, resting or feeding. Massive Outer Continental Shelf oil development and tanker traffic through Prince William Sound and along the coast could devastate seabird habitat if all possible precautions are not taken. Baseline quantitive and qualitative data on coastal sea habitats and colony location, size and composition are needed to properly interpret population fluctuations and the implications of oil impacts. These data are prerequisite to providing rational recommendations for future OCS lease areas, recommendations for future oil spill cleanup facilities, and to document the effect of estuary contamination.

* Seabirds 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.

* 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 seasons 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.

LIST OF RAPTOR SPECIES IN SOUTHCENTRAL ALASKA

	Common Name	Scientific Name
Eagles	Bald Eagle	*Haliaeetus leucocephalus*
	Golden Eagle	*Aquila chrysaetos*
	Osprey	*Pandion haliaetus*
Hawks	Goshawk	*Accipiter gentilis*
	Sharp-shinned Hawk	*Accipiter striatus*
	Redtailed Hawk	*Buteo jamaicensus*
	Swainson's Hawk	*Buteo swainsoni*
	Rough-legged 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*
	Long-eared Owl	*Asio otus*
	Short-eared Owl	*Asio flammeus*
	Boreal Owl	*Aegolius funereus*

LIST OF SMALL MAMMALS IN SOUTHCENTRAL ALASKA

	Common Name	Scientific Name
Shrews	Common Shrew	*Sorex cinereus*
	Tundra Shrew	*Sorex tundrensis*
	Dusky Shrew	*Sorex obscurus*
	Northern Water Shrew	*Sorex palustris*
	Pygmy Shrew	*Microsorex hoyi*
Bats	Little Brown Bat	*Myotis lucifugus*
Pikas	Pika	*Ochotona collaris*
Rodents	Bog Lemming	*Synaptomys borealis*
	Brown Lemming	*Lemmus trimucronatus*
	Red-backed Vole	*Clethrionomys rutilis*
	Meadow Vole	*Microtus pennsylvanicus*
	Long-tailed Vole	*Microtus longicaudis*
	Tundra Vole	*Microtus oeconomus*
	Alaska Vole	*Microtus miurus*
	House Mouse	*Mus musculus*
	Meadow Jumping Mouse	*Zapus hudsonius*
	Rat	*Rattus norvegicus*
	Porcupine	*Erethizon dorsatum*

1a. ALASKA RAPTOR MANAGEMENT PLAN

LOCATION

The entire state of Alaska.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy raptors.

SECONDARY MANAGEMENT GOAL

To provide an opportunity for scientific and educational study of raptors.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Protect raptor populations from unnatural disturbance and harassment.
2. Discourage resource utilization that may adversely impact raptor nesting, roosting and feeding areas.
3. Develop public appreciation of raptor importance in the ecosystem.
4. Encourage viewing and photography of raptors.
5. Promote scientific studies of raptors.
6. Provide for limited utilization of selected raptor species for falconry.

THE SPECIES

About 22 species of hawks, falcons, eagles and owls occur regularly within the state. Detailed population data for raptors are lacking. Accurate censuses of raptors are difficult because of the secretive behavior of many species, and the wide distribution but low density of most species.

International concern has resulted from the worldwide decline of the endangered peregrine falcon. Alaska and northern Canada provide the last extensive nesting populations of peregrines in North America. Population estimates for Alaska range from 115 to more than 300 nesting pairs. However, much of the potential nesting habitat has not been surveyed and the population may be even larger.

Kestrels, marsh hawks and short-eared owls are seasonally among the most abundant raptors. Conspicuous species such as rough-legged and Swainson's hawks, and great-horned owls are probably most commonly observed. Southcentral Alaska supports the greatest variety of species due to the diversity of habitats present in the region.

While raptor habitat throughout Alaska has remained relatively stable, populations have fluctuated annually, largely in response to other environmental factors. Local habitat changes have occurred in areas of urban development, agriculture, or transportation corridors and have, in addition to disturbance associated with human activity in such areas, reduced local raptor populations, particularly nesting populations.

Viewing, photography and enrichment of wilderness experience are significant, but unmeasurable uses of the raptor resource. With increased human

population growth in Alaska these uses will increase. Use of raptors for falconry has not been a common practice in Alaska, although a few individuals do practice the sport. Alaskan peregrine falcons and gyrfalcons have been taken for use by falconers in other parts of the world; however, with protection under the Endangered Species Act and the Migratory Bird Treaty Act, protection or closely controlled utilization of raptors in Alaska was effected. Currently, use of goshawks is allowed under the terms of a permit. At least one species of raptor, the snowy owl, is utilized for domestic consumption by residents of Northwestern and Arctic Alaska.

PROBLEMS

* Disturbances at nest sites during critical stages of the nesting season such as egg laying, incubation and early brooding stages, have probably been the major cause of direct, human induced reproductive failure. In view of increased human activity throughout the state, critical habitat, particularly that associated with nesting raptors, must be preserved if raptor populations are to be maintained in the future. Identification of important raptor habitats and quantitative population information are required for meaningful management decisions. Multi-agency collaboration would be the most effective approach.

* Of special concern is the accumulation of pesticide residues in raptors and their prey. Although pesticides are used to a very limited extent in Alaska, raptors are subjected to contamination from contaminated prey that migrates into Alaska and from contaminated prey consumed in southern wintering areas. Over a period of time these residues concentrate within raptor tissues and eventually reach levels sufficient to reduce reproductive success. Decrease in eggshell thickness, a symptom of such contamination, has been documented for peregrine falcons nesting in Arctic Alaska. National and international efforts to reduce environmental burdens of implicated chemical contaminants must be encouraged.

* Indiscriminate shooting of raptors occurs near human population centers. Public attitudes toward raptors must be improved by increasing public awareness of the value of raptors.

IMPACTS

* Increased interest in raptors by nonconsumptive users may necessitate strict controls governing the season, duration and types of activities during periods of use. This may be especially true when photography or viewing of nesting raptors is involved.

* Falconry will continue to be allowed on selected species under provisions of a closely controlled permit program. The delineation or management of critical habitat for raptors may alter managment of other wildlife species and restrict or inhibit resource development in selected areas.

* Critical nesting habitat will be protected through specific land classification procedures.

1B. ALASKA BALD EAGLE MANAGEMENT PLAN

LOCATION

Entire state of Alaska.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy bald eagles.

SECONDARY MANAGEMENT GOAL

To provide an opportunity for scientific and educational study of bald eagles.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage public awareness of bald eagle ecology.
2. Discourage resource utilization that may adversely impact bald eagle nesting, roosting and feeding areas.
3. Protect bald eagles from unnatural disturbance and harassment.
4. Identify areas best suited for viewing, photography and scientific study of eagles and encourage their wise use.
5. Discourage viewing and photography during critical nesting periods.

THE SPECIES

The highly productive coastal zone areas of Southeastern Alaska, the Gulf of Alaska, and the southwestern coast to the Aleutian Islands support the largest populations of bald eagles in North America. Eagles are also found along major inland drainages of Western and Southcentral Alaska, although not in the densities present in coastal areas. Numbers of eagles within the state vary seasonally. Summer populations exceed 50,000 birds, but migrations reduce the total substantially by winter. Spawning cycles of several fish, primarily salmon and herring, cause spectacular concentrations of eagles in some coastal streams and spawning grounds. Noteworthy concentration areas include the lower drainages of the Chilkat and Stikine rivers, and coastal shorelines near Klawock and Craig.

Nesting pairs are distributed throughout the species' range. Surveys in Southeastern Alaska have revealed at least 1,709 eagle nests with less than 50 percent of the habitat surveyed. Additional nesting concentrations occur in Prince William Sound, the Kodiak Archipelago and along some Aleutian Island sea cliff habitat.

In the past, persecution of eagles by commercial fishermen was predicated on the belief that eagles had significant adverse impacts on the salmon fishery. At one time bounties on eagles were offered to provide incentive for their reduction. Since 1953 the bald eagle has received complete protection under law, and populations in Alaska have remained healthy. Nonconsumptive uses include viewing and photography, especially at feeding concentration sites. In addition, scientific studies of eagles in Alaska provide ecological bases of comparison for evaluating status and trends of endangered bald eagle populations in other parts of the country.

PROBLEMS

* With increasing recreational viewing and photography of eagles, greater disturbance and harassment can be expected. Nonconsumptive use that is not detrimental to bald eagles should be encouraged, but at the same time measures should be taken to limit numbers and activities of users during critical nesting periods.

* Pollution of coastal tidelands and estuaries by oil or oil industry-related contaminants poses a critical threat to bald eagles and their habitat. Massive Outer Continental Shelf oil development and tanker traffic in Prince William Sound, Bristol Bay and the Aleutian Islands could devastate coastal habitat in the state if all possible precautions are not taken. Baseline quantitative and qualitative data on coastal bird habitats are needed before oil impacts are made in order to provide rational recommendations for future oil spill cleanup procedures and to document the effects of estuary contamination for mitigation measures. Continued efforts by the State, U.S. Forest Service and U.S. Fish and Wildlife Service will identify and quantify the effects of these potential problems.

* Although bald eagles are protected by law, many are killed by ignorant or misinformed people. The Department should encourage greater public understanding and appreciation of the values of eagles. Strict enforcement of existing protective laws by federal and state agencies should be maintained.

* Logging of forests on private lands, not subject to Forest Service requirements protecting eagle nest trees in national forests, may result in the loss of nesting habitat in some areas. Private logging interests should be encouraged to safeguard eagle nest trees on private lands. The Department should cooperate with federal agencies in identifying existing eagle nest sites.

* Alaskan bald eagles, like other raptors, are susceptible to chemical contamination of the environment. Those eagles which migrate south for the winter are subject to greater contamination than birds resident within Alaska. Although present levels of contaminants are probably low in Alaskan birds, increased use of pesticides or herbicides in the state could have serious detrimental effects on eagles. Future use of such chemicals in Alaska should be closely controlled.

IMPACTS

* Delineation and management of critical eagle habitat areas may restrict resource development activities within such areas.

* Controls on numbers and activities of nonconsumptive users will become necessary to protect eagles in some areas as user numbers increase.

16. ALASKA SEABIRDS MANAGEMENT PLAN

LOCATION

Entire state of Alaska

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy seabirds.

SECONDARY MANAGEMENT GOAL

To provide an opportunity for scientific and educational study of seabirds.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage public viewing and photography of seabirds.
2. Encourage scientific and educational studies of seabird ecology.
3. Discourage resource utilization practices and human activities that adversely impact seabird nesting, roosting and feeding habitat.
4. Develop public awareness of seabird ecology.
5. Protect seabirds from unnatural disturbance and harassment, particularly at colonies during critical nesting periods.
6. Allow utilization of seabirds for traditional domestic use.

THE SPECIES

Over 40 species of seabirds migrate through, breed on, or visit Alaska's coastline and adjacent waters. Approximately 24 species are known to breed in Alaska, usually in colonies ranging from a few hundred to a million or more birds. Most of the large colonies are located on islands in the Bering Sea or in the Aleutian Islands, but sizeable colonies are located wherever precipitous sea cliffs occur along the mainland coast from Cape Lisburne to Southeastern Alaska. The most abundant nesting species are murres, murrelets, gulls, kittiwakes, fulmars, and petrels. Several species of auklets, puffins, and cormorants, though not as numerous as some other species, are widely distributed. Seabird populations in Southwestern and Southcentral Alaska exhibit greater species diversity than those found in the remainder of Alaska because of greater diversity of favorable habitats.

In addition to millions of nesting seabirds, many millions more utilize pelagic waters off Alaska as summer feeding grounds. Of these, slender-billed and sooty shearwaters are the most numerous.

Seabirds migrate south as winter approaches and populations in Alaskan waters become much reduced from those of summer. Many birds, however, overwinter in ice-free waters, and substantial numbers are found in and south of the Aleutian Islands.

Historically, seabirds have provided food and clothing to coastal native people in the state. Traditional use of seabird eggs and adult birds, principally auklets, puffins and murres, has been greatest along the Northwestern and Western Alaska coast. Limited domestic use of seabirds

occurred in Southeastern and Southcentral Alaska. Consumptive utilization has decreased in the past 10 to 20 years as coastal residents have adopted a cash economy.

Nonconsumptive use is now becoming the dominant use of seabirds. As the potential impact of energy resource development on these species has become apparent, scientific surveys of Alaskan seabirds are being conducted throughout the state. Studies of seabird distribution, population sizes, and habitat requirements should increase knowledge about these species. Seabirds may eventually serve as biological indicators of the health of marine environments.

Viewing and photography are becoming major activities at seabird nesting colonies in the more accessible waters of the state. The more conspicuous colonial nesters such as gulls, murres, and kittiwakes support the most use, but less numerous or more secretive species such as puffins, cormorants, auklets, and murrelets are receiving increased attention. Fortunately, many seabird colonies are protected from habitat alteration or undue disturbance by their inclusion in the National Wildlife Refuge System. These areas receive additional protection under the state's refuge and sanctuary system.

PROBLEMS

* Pollution by petroleum related contaminants poses a serious threat to seabirds using Alaska's coastline and marine waters for nesting, feeding or resting. Outer Continental Shelf (OCS) oil development and tanker traffic could result in large oil spills or chronic pollution which would devastate seabird habitat and kill millions of seabirds. Baseline quantitative and qualitative data on coastal seabird habitats and colony location, size and composition are needed to properly interpret population fluctuations and impacts of oil development. These data are necessary to provide rational recommendations for future OCS lease areas, recommendations for future oil spill cleanup facilities and to document the effect of estuary contamination. Stringent controls on oil development and associated human activities will be necessary to minimize environmental hazards.

* Commercial fishing is an unknown factor with potentially adverse consequences for seabirds. Some seabirds prey on commercially-valuable fishery stocks, and conflict and competition between seabirds and commercial fishermen may become intense. Excessive exploitation by foreign fishing fleets may have reduced the range of at least one species (ancient murrelet). Japanese gillnet fisheries have directly caused seabird losses as high as 10,000 birds per day from birds being entangled in nets. Local seabird populations may be unable to sustain such losses indefinitely. The 200-mile foreign fishery limit recently passed by Congress should substantially reduce seabird loss, especially during the breeding season.

* Seabirds are susceptible to disturbances that lead to nest abandonment and nestling or egg loss. Nonconsumptive use of seabirds will continue to increase with a corresponding increase in disturbance. Reduced reproductive success and a decline in colony sizes, especially near urban centers, may result unless measures are taken to protect habitat and to control numbers and activities of human visitors.

* Introduction of furbearers and rats on Alaska islands has resulted in the elimination or serious reduction of seabirds nesting on those islands. Future proposals for introductions of any exotic animals to any islands must be carefully evaluated for possible consequences to indigenous wildlife.

* In some areas, ocean floor mining, coastal dredging, or gravel removal may alter coastline habitat or alter productivity of near shore waters through siltation, adversely affecting seabirds and other marine life. Mining and dredging or gravel removal activities should be regulated to minimize adverse impacts on the marine ecosystem.

IMPACTS

* Some limitations on access, periods of use, and activities of visitors to seabird colonies will be required to reduce disturbance to colonies subject to frequent human visitation.

* Traditional consumptive domestic use will continue but is expected to decrease as lifestyles change.

* Expansion of biological knowledge of seabird species will provide an additional monitoring tool for interpreting man's impact upon the marine environment. Such capabilities may dictate changes in the patterns of use of other resources.

* Increased demands for nonconsumptive use may foster development of interpretive and user transport services.

MT. MCKINLEY NATIONAL PARK WILDLIFE MANAGEMENT PLAN

LOCATION

Mt. McKinley National Park is located in the central Alaska Range about 180 miles north of Anchorage and 140 miles southwest of Fairbanks. The Park occupies portions of Game Management Units 13E, 16B, 19 and 20C.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy wildlife.

SECONDARY MANAGEMENT GOAL

To provide an opportunity for scientific and educational study of wildlife.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Cooperate with the National Park Service in its management of Mt. McKinley National Park according to established National Park Service management objectives including but not limited to:

   * Preserving the natural ecological relationships essential for perpetuation of viable populations of indigenous wildlife.
   * Interpreting the varied ecological features and processes of the park.
   * Providing for maximum appropriate public use and enjoyment of the aesthetic and ecological resources of the park consistent with the preservation of primary resource values.
   * Providing opportunities for nonmanipulative baseline research on essentially undisturbed subarctic ecosystems.

THE SPECIES

The park contains a relatively high diversity and abundance of wildlife species of Interior Alaska. These include Dall sheep, caribou, moose, black and grizzly bears, lynx, foxes, marten, wolverine, beaver, wolves, snowshoe hares, muskrats, ptarmigan, ground squirrels, pikas, marmots, loons and numerous waterfowl, including trumpeter swans.

Dall sheep in Mt. McKinley Park have a recorded history of population fluctuations. The park population experienced drastic reductions in 1929 and 1932 as a result of unusually severe winters. Since then the population appears to have fluctuated about an average of 1,000 sheep.

The McKinley caribou herd ranges primarily on the north side of the Alaska Range in the vicinity of McKinley Park. The herd declined from about 20,000 to 30,000 in 1941 to approximately 10,000 by the early 1960's. Since 1966 a rapid decline has occurred and currently 1,000 to 1,500 caribou remain. The reasons for these declines are not known.

Moose were considered scarce in Mt. McKinley Park in the early 1920's. Moose populations gradually increased for the next 40 years, reaching greatest abundance in the early 1960's. Moose numbers have since gradually declined, but reasons for the decline are not known. A National Park urvey in Mt. McKinley Park in 1975 indicated a minimum of 641 moose.

Mt. McKinley National Park was established in 1917. The Alaska Railroad made travel to the Park possible during the early 1920's. In 1922 only seven persons visited the Park. By 1956, 5,300 visitors logged, with most arriving by the Alaska Railroad and small aircraft. In 1957 the Denali Highway was opened making it possible to drive to the park, and 10,700 visitors were recorded. The Parks Highway was completed during 1971, greatly increasing park accessibility. Tourist activity occurs primarily during May through September.

Hiking, fishing, viewing and photographing wildlife and scenery are the primary human uses of the park. Although it is illegal to hunt within the park, a small but unknown amount of poaching occurs.

PROBLEMS

* Natural fluctuations of park wildlife populations may reduce opportunities for public use. One example is the caribou population which is present in the park in greatly reduced numbers although it has been largely unaffected by consumptive utilization. Moose populations apparently are also declining within the park. While such fluctuations are "natural" and therefore desirable within the park, they do affect public use of the park.

* Conflicts with brown bears in campgrounds and occasional bear attacks on park visitors occur. A greater public awareness of brown bear behavior and attention to proper food storage and garbage disposal is required to minimize bear-human confrontations. Consideration of human welfare is essential to the continued beneficial use of the park.

IMPACTS

* Management of wildlife within Mt. McKinley Park is under the jurisdiction of the National Park Service. This plan only recognizes those uses compatible with National Park Service management and does not suggest changes from established uses.

* Increased research on park populations of wildlife will not only benefit park objectives, but also provide valuable comparative data for hunted populations elsewhere.

EKLUTNA LAKE WILDLIFE MANAGEMENT PLAN

LOCATION

In Game Management Unit 14C, the drainages into the Eklutna River and Eklutna Lake within Chugach State Park except for Thunderbird Creek and those drainages flowing into the East Fork of the Eklutna River upstream from the bridge above Eklutna Lake.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy wildlife.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage public viewing and photography of wildlife and enhance viewing facilities.

2. Maintain a year-round hunting closure in the area except for hunting of snowshoe hares.

3. Allow hunting of snowshoe hares at such periods of the year when conflicts with other uses of the area would not occur.

4. Protect wildlife from unnatural disturbance and harassment.

THE SPECIES

Moose, Dall sheep, black bear, mountain goat, brown bear, wolf, wolverine, coyote, fox, ptarmigan, grouse, snowshoe hare, lynx, and several other furbearers and unclassified game occur in the Eklutna area. Species population estimates are known only for moose, sheep and mountain goat. Approximately 150 moose, 150-200 sheep and 10-20 goats are presently found in the area. Small game, especially snowshoe hare during the high points in their population cycles, are very abundant. All other species are uncommon to rare excepting black bear and coyote which are commonly observed in the area.

Little is known of natural mortality factors of the various species although several reports of "winter killed" moose and predation of sheep by wolves have been received. Habitat conditions are excellent for sheep and hare and fair to good for other species. Very little habitat loss has occurred within the area. Several old homestead sites exist; however, these have enhanced habitat for such species as moose and snowshoe hare.

Prior to 1973, the area was open to hunting and trapping. Sheep and moose were the most popularly hunted big game species with an average of 10-12 of each species being harvested annually. Black bears, brown bears and mountain goats were also taken, but in small numbers. Small game hunting, especially for hare and grouse, was extremely popular. Trapping for wolverine, lynx, coyote, and other furbearers also occurred.

Since 1973 when the area was closed to all hunting and trapping the primary use has been viewing and photography of wildlife. Access for viewers is provided by the Eklutna road which extends over 20 miles up the valley. Many sheep and an occasional mountain goat can be seen from the road from late spring through early autumn. Moose can be seen throughout the year and black bears are occasionally observed during the summer and fall. Coyotes are frequently seen as are several small game species. Other species are rarely seen.

Motorized access within the area is permitted only on the Eklutna Road and by motorized boat on Eklutna Lake. Snowmachine use is also permitted on and in the vicinity of Eklutna Lake.

PROBLEMS

* Public use of lands within the Eklutna river drainage may be reduced when natives receive title to lands from those selected under terms of the Alaska Native Claims Settlement Act. Approximately 35 square miles of land within the Eklutna Lake Area have been selected. All private landowners should be encouraged to allow public use of wildlife on their lands.

* Opposition to establishing a hunting season for snowshoe hares by people who feel that no consumptive use is appropriate in a park regardless of its compatibility with other uses may prevent promulgation of enabling regulations. The viewpoints of all persons who use the area or have an interest in the area should be considered in determining whether any consumptive use is to be allowed.

* Potentially harmful bear human encounters in the area have occurred in the past and will increase as human use of the area increases. Poor food storage or garbage disposal practices in back country campsites or campgrounds and picnic areas cause many of the encounters. Proper garbage disposal and food storage practices, and prohibition from feeding "tame" bears should be encouraged to reduce the necessity of eliminating or removing "nuisance" bears.

IMPACTS

* Continuing emphasis will be placed on viewing and photography of wildlife, although hunting for snowshoe hare could become an additional major use, particularly in winter.

* No further restrictions on access or on other recreational uses of the area are anticipated.

* The moose population may exceed the carrying capacity of the Eklutna range, resulting in increased winter mortality and a reduced population size.

* Bear-human encounters will increase and also, therefore, the likelihood for serious human injury.