ALASKA WILDLIFE MANAGEMENT PLANS

SOUTHWESTERN 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, 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 bureacracies, 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 Southwestern 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 SOUTHWESTERN ALASKA

In Southwestern Alaska black bear (*Ursus americanus*) populations are low and limited primarily to the lower Cook Inlet drainages, the Lake Clark area, and the upper Mulchatna River and Chilikadrotna River drainages. Although the southern limit of distribution is Katmai National Monument and the Naknek River, black bears may be expanding their range southward.

In spring black bears are frequently found in moist lowland areas and on the beach fringe where early growing, green vegetation is available. During the summer and fall spawning salmon are eaten whenever available. Berries are an important food item in late summer and fall, and bears move into alpine and subalpine areas where berries are plentiful.

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; some orphans as young as five months of age have survived without maternal care.

Black bears in Southwestern Alaska are used primarily for domestic utilization of meat and skins by local residents. Some recreational hunting of black bears occurs, usually incidental to hunts for other big game species. Despite traditionally liberal hunting seasons and bag limits, the harvest of this species remains relatively small. However, greater interest in black bears as game animals has been evident in recent years, particularly as opportunities to hunt other species in other areas of the state have become more limited, and recreational harvests have increased.

The harvest of male bears is greatest in spring because they leave the den before females and because females accompanied by cubs are protected by regulation. The proportion of females in the fall harvest increases in comparison to the spring harvest due to a greater availability of sows that have become separated from grown cubs.

The harvest by hunters other than local residents occurs primarily in fall when hunting seasons for other big game species are open, but there has been some spring hunting in the Cook Inlet area. Harvests by local residents probably is equally distributed between spring and fall.

1. INTERIOR-WESTERN ALASKA BLACK BEAR MANAGEMENT PLAN

LOCATION

Game Management Units 9, 12 and 17-26 except for the Prospect, Minto-Murphy Dome and Upper Birch-Preacher-Beaver Creeks Black Bear Management Plan areas.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of black bears.

EXAMPLES OF MANAGEMENT GUIDELINES

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

2. Regulate season timing, methods and means of taking and bag limits to provide for local use.

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

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

THE SPECIES

Black bears are widely distributed in the boreal forest and forest-tundra fringe habitats of interior and western Alaska. Although bear densities are relatively low in comparison to south coastal Alaska, the Interior-Western area includes the most extensive contiguous black bear habitat in the state. Black bears are largely absent north of the Brooks Range, on the Seward Peninsula, the Yukon-Kuskokwim Delta, and the Alaska Peninsula south of the Naknek River. However, populations appear to be expanding their range south on the Alaska Peninsula and west on the Seward Peninsula. Black bear numbers may be declining on the lower and middle reaches of the Kuskokwim and Yukon River drainages but are at relatively high levels or increasing in the upper Yukon and Tanana drainages and in the Northwestern portion of the range. Five thousand to 6,000 black bears are estimated to occur in the Interior-Western area. However, because bears are very difficult to enumerate no systematic censuses have been conducted. Representative lowland river bottom areas where bear densities are greatest include the upper Kuskokwim, Yukon, and Tanana Rivers, the Kobuk and Selawik drainages in the northwest, and the upper Mulchatna, Chilikadrotna, and lower Cook Inlet drainages.

Human use of black bears differs over the large geographic area in Interior-Western Alaska. Domestic utilization by local residents is the dominant use over most of the area. Most bears taken by local domestic users are taken for food and to a lesser extent for skins. Bears are taken when available throughout the year. Bears are shot by waterfowl and muskrat hunters in the spring. In the fall bears are shot by berry pickers. In the summer bears are killed when they appear at fish camps or fish wheels. Many of these bears are shot and abandoned, since some

bush residents consider black bears nuisance animals. Domestic use appears to be declining and is currently light to moderate over the area. Aside from bears shot on an opportunistic basis, relatively little hunting is directed specifically at black bears. Boats are the chief means of transport for bush residents who do hunt black bears.

Recreational hunting for black bears frequently occurs near human population centers. Resident sport hunters are active along road and trail systems, although many utilize aircraft, all terrain vehicles, or riverboats to reach less accessible locations. The black bear is usually relegated to a lower status than given other big game species. Interest in black bear hunting is increasing, perhaps due in part to increasing hunting restrictions on other big game species. Some guides, have focused increased attention on black bears as sport animals in the foothills of the Alaska Range and in the Lake Clark Pass and Cook Inlet areas.

Recreational and domestic harvests over the Interior-Western area have had little influence on black bear populations. Accurate harvest information is difficult to obtain because skin or skull sealing is not required in much of the area. However, total harvest for the entire area probably does not exceed 400 bears. Many areas have the potential to support much larger harvests. Despite liberal hunting seasons and bag limits since statehood harvests have remained low. Industrial and urban development have resulted in increased bear-human interactions and an increase in the number of bears destroyed in defense of life and property.

Nonconsumptive use of black bears is restricted to bear populations immediately adjacent to urban population centers. Except where they gather to exploit locally abundant sources of food, black bears in the Interior-Western region are too sparsely distributed to provide for significant levels of nonconsumptive use.

PROBLEMS

* 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 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.

* The proposed additions of land into federally administered parks, wildlife refuges, wild and scenic rivers and national monuments under terms of ANCSA encompass substantial portions of black bear range and will affect state management of black bears in these areas. 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.

* Continuing agricultural, industrial, energy and mineral resource development, along with urban and suburban expansion, will result in a loss of black bear habitat and cause an increase in bear depredations, with attendant increases in the destruction of animals in defense of life and property. The Department will identify important habitat areas and request habitat protection measures of the appropriate land management agencies. The Department will also insist on compliance with state regulations on sanitation and garbage disposal in remote camps.

* Due to manpower and funding restrictions, data on population status and harvest levels of black bears have been limited. As harvest levels and interest in black bears increase, the Department should expand the current limited sealing requirement to a greater area of the region.

IMPACTS

* Black bear populations will sustain greater harvests than in the past, and hunting effort and spatial distribution of the harvest may become more concentrated as a result of the Alaska Native Claims Settlement Act. More restrictions on access, seasons and bag limits may have to be imposed in local areas if overharvest occurs.

* Since many bears are taken incidentally to hunting for other species, management and regulations relating to these other species will impact the black bear harvest. It may become necessary to restrict black bear hunting in some areas to avoid conflicts with management priorities for other big game species.

BROWN BEARS IN SOUTHWESTERN ALASKA

Brown bears (*Ursus arctos*) occur throughout Southwestern Alaska except on the islands west of Unimak in the Aleutian Chain. This region supports the largest populations of brown bears in the state, and although precise data on abundance is lacking, there is a general understanding of the species' status. Brown bears are probably as abundant in this region now as they have ever been. Coastal areas support larger populations than Interior regions, possibly due to the abundant supply of fish and other foods that are available to bears over a longer period of the year.

Brown bears were once classified into a large number of species and subspecies, but the 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 and Afognak Islands, however, are considered a reproductively isolated population with distinctive cranial features and are classified as *U. a. middendorffi*. Other reproductively isolated populations may exist; however, at this time there are insufficient data to determine if they deserve subspecific designation.

All habitat types are utilized by brown bears, but grass communities appear to be most important. The highest densities of bears occur in lush grassland areas such as those on Kodiak Island and the Alaska Peninsula. Where bears occur in forested areas, substantial meadows, muskegs, sedge flats, or other grassy areas are present. Grasslands appear especially critical for bears during 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. Bears also feed on a variety of animals such as dead seals, walrus, whales and other marine mammals which wash ashore on coastal beaches. Spring bear predation on moose and caribou also appears significant. During summer and fall salmon and berries constitute the major food items. 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 uses of brown bears predominate in Southwestern Alaska although subsistence utilization continues to some extent. Sport hunting is the primary use with the Alaska Peninsula and Kodiak Island

being preeminent as hunting areas. After the early 1940's, trophy hunting of brown bears rapidly gained in popularity, especially on Kodiak Island. Hunting on the Alaska Peninsula was quite limited until the early 1960's. As hunting pressure increased, regulations affecting season lengths and methods of transport 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 Southwestern Alaska has been about 50 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.

Nonconsumptive use has increased in recent years. A prime attraction in Katmai National Monument is its undisturbed brown bear population. Viewing and photography opportunities at unique bear concentration areas such as at the McNeil River State Game Sanctuary attract larger numbers of people each year. Growing national interest in brown bears is certain to increase the demand for nonconsumptive use opportunities.

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 bear 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, and 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.

14. KVICHAK-NUSHAGAK-TOGIAK BROWN BEAR MANAGEMENT PLAN

LOCATION

Game Management Unit 17 and that portion of Game Management Unit 9 lying north of Katmai National Monument and the drainage of the Naknek River, but excluding McNeil River State Game Sanctuary.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a highly productive brown bear population.
2. Design brown bear hunting seasons to maintain a large proportion of males in the harvest.
3. Maintain a hunting season length of at least ten days.
4. Control access, number and distribution of hunters and methods of hunter transport to distribute hunting pressure through the area and to maintain desired harvest levels.
5. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

This area has a relatively large brown bear population that has experienced only light to moderate hunting pressure. The greatest densities of bears occur along the Cook Inlet watershed and the Lake Iliamna area. Lower densities of bears occur in the Nushagak, Wood and Togiak River systems. Populations appear stable, but data on population sizes, composition and reproductive success are lacking. Brown bears den throughout this area, and areas of den concentrations have been located in the northern Aleutian Range.

Hunting is primarily by nonresidents (67 percent of reported harvest) but the percentage is not as large as elsewhere on the Alaska Peninsula. Harvest levels since 1961 have averaged 42 bears annually, with about two-thirds of the harvest occurring in the fall. Fall hunts are most popular because of the concurrent opportunity for hunters to take other big game species. In the past five years the harvest level has increased to average 70 bears annually. The greater harvest is the result of increased hunting effort by residents and nonresidents. Most of the increase has occurred in Game Management Unit 17 with hunting pressure shifting into that unit in response to more restrictive regulations in Unit 9.

This area has a large, established guide industry, particularly for sport fishing. Approximately 32 sport fish lodges provide service to visiting fishermen during the summer and early fall. Associated with

sport fishing, there has been increased guiding of hunters for big game. In addition to brown bear, moose, caribou, Dall sheep and black bear can also be hunted. Much of the harvest of bears by Alaskan residents is incidental to other big game hunting. Hunter transportation to and within the area is primarily by light aircraft with hunting conducted on foot. Roads within this area are limited. Use of all-terrain vehicles for hunting occurs infrequently. The area retains high hunting aesthetics because of its basically unaltered wilderness nature.

Local residents have little interest in hunting brown bears for sport. Occasionally bears are taken for domestic use, particularly in the Togiak, Wood River, and Nushagak systems. In the Iliamna watershed bears were regularly taken by local residents in the past, but interest is now low.

The area is essentially wilderness. The impact of oil exploration work and hard mineral development has been minimal. It is probable that both resources shall be developed in the future and will have an impact on brown bear management.

PROBLEMS

* Oil and mineral exploratory work or development may seriously alter the wilderness nature of the area, increase access, or prove detrimental to brown bear habitat. Efforts will be made to discourage development in critical habitat and to modify development in other areas to minimize adverse effects.

* Land in private ownership, controlled by the National Park Service, the U.S. Fish and Wildlife Service, or the State Park system may be closed to hunting, thereby concentrating hunting on remaining public land. Concentrations of hunters would adversely affect hunting aesthetics or cause local over-harvest of bear populations. Hunting regulations will be modified to retain high hunting aesthetics and to prevent over-harvest. The Department should seek cooperation from federal agencies to allow hunting on lands placed in parks or refuges and 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.

* Segments of the hunting public may willfully ignore hunting regulations to insure high hunter success. Over-harvest of bears may result and management objectives may become difficult to maintain. Regulations governing hunting should be vigorously enforced.

* Restrictions on the use of aircraft for transportation may result in a proliferation of all-terrain vehicles that would adversely affect hunting aesthetics. Regulations restricting all-terrain vehicles for hunting may be implemented as necessary.

* Hunting for other game species may not be compatible with proposed management. Seasons will be established to minimize conflicts with the hunting of other species, and methods of hunting of other species will be regulated to concur with brown bear management objectives.

* The reindeer industry, if reestablished, may lose livestock to brown bear predation. Control of brown bears may be requested by the herders, and non-herding losses of "nuisance" bears could endanger management objectives. Close herding of reindeer to minimize losses by predation will be encouraged. Specific problem animals may be removed by herders under the "defense of life and property" regulation. However, low levels of brown bear predation

must be considered an acceptable operation hazard by the reindeer industry.

* The area may be connected to the main state road system by road construction and/or marine highway system additions. The influx of hunters resulting from improved access would drastically alter the present hunting patterns. Management plans will be reevaluated and regulations altered in response to changing hunting pressure.

IMPACTS

* A stable brown bear population with older age class individuals shall be maintained. Harvest levels may increase slightly.

* Recreational opportunity to harvest bears shall be maintained consistent with desired harvest levels and characteristics.

* The area shall retain high hunting aesthetics.

* Resource development activities that are detrimental to brown bears will be limited.

* Hunting regulations on other game species may be modified to conform to brown bear management objectives.

* Restrictions or prohibitions on use of aircraft and all-terrain vehicles for brown bear hunting are probable.

15. NAKNEK-KING SALMON BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, all drainages into the Naknek River west of the boundary of Katmai National Monument.

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 low but secure brown bear population.
2. Encourage sport hunter harvest of brown bears to reduce bear-human confrontations.
3. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

During the summer months, this area has a high density of brown bears. As many as 40 individual bears have been in and around the communities of Naknek, South Naknek and King Salmon during a single season. Originally, few bears were present, but salmon remains from canneries attracted and held roaming brown bears in the area. The number of bears capitalizing upon this artificial source of food gradually increased to the high density that now exists.

Most bears within this area occupy winter dens within Katmai National Monument. After spring emergence, bears gradually enter the area with the greatest influx occurring in July and August. All ages of bears are present, from single males to sows accompanied by cubs. Numbers then decline as bears leave to fish the salmon spawning areas of the Naknek River and Lake system. While in the area, nuisance bears may damage smoke houses, meat houses or homes. A local man was severely mauled by a brown bear in the summer of 1973.

The present bear population appears to be high, but relatively stable. Local residents regularly kill bears illegally or under the provisions of the "defense of life and property" regulation. The known nuisance kill averages 3 to 5 bears annually, but this figure is minimal as many illegal kills are never located. The legal sport harvest has been only 1 or 2 bears annually. Legal sport hunting is almost entirely by local residents. Little guiding occurs and few other Alaskans hunt here. Local residents do not value brown bears as game animals. Losses to the bear population from these sources are compensated for by reproduction or by immigration of young bears from adjoining areas. Katmai National Monument directly adjoins this area. Brown bear production within the Monument boundaries will provide a continuing flow of bears into the area. Brown bears will always be present. Bears immobilized and marked in the Naknek-King Salmon area have been observed at Brooks Camp within the Monument.

PROBLEMS

* With additional urbanization resulting from oil development and gradual community growth due to an expanding economy, the potential for adverse bear-human interactions will increase. Efforts will be made to encourage the communities to stop attracting bears by cleaning up garbage and disposing of salmon remains in other ways. Liberal sport hunting seasons will lower brown bear populations to minimize conflicts. Specific problem animals may be disposed of under the "defense of life and property" regulations. Efforts will be made to inform the public about bear behavior to help minimize problems.

* Additions to Katmai National Monument and land transferred to private ownership may be closed to public hunting. Increased protection would allow bear numbers to increase with concomittent increases in problems within the communities. Efforts will be made to allow hunting to take place on National Park Service lands in close proximity to the communities of Naknek, South Naknek and King Salmon. 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.

* Harvest levels of brown bears may reduce bear populations within a portion of Katmai National Monument. Liberal seasons will be maintained only in those areas adjacent to the communities in order to minimize the impact on the remainder of the Monument.

* The illegal harvest of bears may exceed the maximum desired harvest. A vigorous enforcement program shall be maintained to insure a minimum level of illegal harvest.

IMPACTS

* The incidence of adverse bear-human interactions will be reduced.

* An opportunity for recreational bear harvest shall be maintained.

* The total number of bears utilizing Katmai National Monument will be somewhat reduced. Losses should not have a significant impact on bear observation opportunities in areas of high visitor use, such as Brooks Camp. Only near the communities of Naknek, South Naknek, and King Salmon will the opportunities for observation be significantly reduced.

17. CENTRAL ALASKA PENINSULA BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, that portion of the Alaska Peninsula draining into the Bering Sea southwest of the Naknek River drainage and Katmai National Monument to and including Reindeer Creek on the south, and those drainages into the Pacific Ocean from Katmai National Monument on the north to Cape Igvak on the south.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a highly productive brown bear population.
2. Design brown bear hunting seasons to maintain a large proportion of males in the harvest.
3. Maintain a hunting season of at least ten days.
4. Control access, number and distribution of hunters and methods of hunter transport to maintain desired harvest levels, and to maintain aesthetic hunting conditions.
5. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

A high-density brown bear population now occurs in this area. The population is dominated by younger age class animals and biased towards females because of past sport harvest. Older age animals still occur in the harvest. Productivity appears high, and sows with large litters are frequently observed. Data on population size and composition are lacking, but indications are that numbers are relatively stable or increasing slightly. An interchange of bears across the Aleutian Range to the Pacific drainages occurs regularly. Some movements also occur between this area and Bering Sea drainages to its north and south. Bears den throughout the area, but dens most commonly occur in the lower elevations of the Aleutian Range.

The area has been hunted heavily for a number of years. Harvest records indicate a minimum of 700 brown bears have been taken since 1961. The majority of the kill has been by guided nonresidents (78 percent) and has occurred during the fall season (525 bears). Harvest levels increased until the mid-1960's and then declined slightly to current levels of about 50 bears annually.

A large guide industry operates in the area with 15 permanent guide camps established. Resident hunters from other areas of the state also frequently hunt the area. The presence of both moose and caribou makes

multi-species hunts possible and serves to attract hunters. Because of the populatity of multi-species hunts, fall has been the most popular hunting period, accounting for three-quarters of the reported bear harvest.

Residents of the villages of Egegik, Pilot Point, Ugashik and Port Heiden have little interest in sport hunting bears. Domestic use of the species is nonexistent. Occasionally a nuisance brown bear is killed within the villages.

The area has been altered little by man's activities. Oil exploration crews have drilled test holes and constructed large landing strips in four locations. Seismic tests have been conducted with the aid of all-terrain vehicles in the past, although recent work has been with helicopters or with all-terrain vehicles on frozen tundra in winter. Marks from past vehicle use are readily visible from the air but less evident on the ground.

Transportation within the area is primarily by light aircraft with hunting then conducted on foot. All-terrain vehicles and 4-wheel drive vehicles are used by a few guides for transportation. Air charter services located in King Salmon provide transportation for many hunters.

PROBLEMS

* Oil and mineral exploration or development may seriously alter the wilderness nature of the area, improve access, and prove detrimental to brown bear habitat. Efforts will be made to discourage development in critical habitat and to modify development in other areas to minimize adverse impacts. Restrictive regulations governing hunting may be applied to adjust harvest levels or characteristics.

* Land in private ownership or controlled by the National Park Service may be closed to hunting, thereby concentrating hunting on remaining public land. Concentrations of hunters would adversely affect hunting aesthetics or cause local over-harvest of bear populations. Hunting regulations will be modified to retain high aesthetics and to prevent over-harvest. The Department should seek cooperation from federal agencies to permit hunting on National Park Service lands and 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.

* Segments of the hunting public may willfully ignore hunting regulations to insure high hunter success. Over-harvest may occur as a result and management objectives would be impossible to maintain. Regulations governing hunting will be vigorously enforced.

* Restrictions on the use of aircraft for transportation may result in a proliferation of all-terrain vehicles which would adversely affect hunting aesthetics. Regulations restricting all-terrain vehicles for hunting purposes may be implemented.

* Hunting for other game species may not be compatible with proposed brown bear management. Seasons may be established to minimize conflicts with hunting of other species, and methods of hunting for other species may be regulated to concur with brown bear management objectives.

IMPACTS

* A highly productive population of brown bears shall be maintained. The population shall be biased in favor of females and few older bears will be present.

* An opportunity for sport hunting of brown bears shall be retained over the widest possible area.

* Numbers of hunters will not be restricted unless necessary to maintain desired harvest levels or prevent crowding of hunters.

* Hunting regulations for other game species may be adjusted to conform to brown bear management objectives.

* Restrictions or prohibitions on use of aircraft and all terrain vehicles for brown bear hunting are probable.

* Resource development activities that are detrimental to brown bears will be limited.

18. PACIFIC-MESHIK BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, all drainages into the Pacific Ocean from Cape Igvak on the north to Cape Kumlium on the south and all drainages into Port Heiden Bay.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large brown bears.

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Design brown bear hunting seasons to maintain a large proportion of males in the harvest.

2. Maintain a hunting season length of at least ten days.

3. Control access, number and distribution of hunters and methods of hunter transport to maintain desired harvest levels and to maintain aesthetic hunting conditions.

4. Oppose land use practices that will adversely affect the wild character of the area.

THE SPECIES

Brown bears are now abundant within this area but the population does not necessarily remain discrete within the boundaries of this area. Bears move across drainages and over the Aleutian Range into and from other areas. Data on population size, composition, and areas of use are minimal. At this time the population generally appears young and highly productive, although some older age individuals are present.

Sport hunting has become increasingly important in the area. Harvest over the past five years has averaged about 30 bears annually, about five bears per year more than the 15-year average. Approximately 60 percent of the harvest occurs in the fall when moose and caribou are also available. Most bears are taken by guided nonresidents. Six permanent guide camps have been established in the area, but most guiding still occurs from temporary camps.

Brown bear habitat has been altered little by man. Large landing strips associated with oil or mineral exploratory work were constructed near the Meshik River and at Wide Bay. The use of tracked vehicles for hunting has been limited to the Meshik Valley, but such vehicles have been used throughout much of the southern area for oil exploratory efforts. Vehicle tracks remain readily visible from the air for several years but are less evident on the ground.

The Pacific watersheds of the proposed area have received light hunting pressure because weather frequently makes travel to, from, and within the area difficult and, until recently, other lightly harvested game populations were more available. The Meshik River drainages have also

had limited hunting because access, including aircraft, is limited. Floatplane landings are possible in some areas. The river, although shallow, can be floated by raft. Other aircraft access is restricted to wheel landings on inter-tidal beaches, pumice patches, gravel bars, or abandoned mining strips. Tracked vehicles may not be utilized for hunting in the Alaska Peninsula Management Area which composes a large portion of the proposed management area. The basic wilderness nature of the area supplements high hunting aesthetics.

Most hunting is recreational. Only occasionally do residents of local villages harvest bears for domestic use. Because of the sparce human population, few bears are killed in "defense of life and property" situations.

PROBLEMS

* Oil and mineral exploration or development may seriously alter the wilderness nature of the area, improve access, and prove detrimental to brown bear habitat. Efforts will be made to discourage development in areas of critical habitat and to modify any development in other areas to minimize adverse effects on brown bears.

* Land in private ownership or under control of the National Park Service may be closed to hunting, thereby concentrating hunting on remaining public land. Concentrations of hunters would adversely affect hunting aesthetics and cause local over-harvest of bear populations. Hunting regulations will be modified to retain high hunting aesthetics and to prevent over-harvest. The Department should seek cooperation from federal agencies to permit hunting on National Park Service lands and 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.

* Increased hunting pressure may reduce numbers of large bears available to hunters or result in skewed sex ratios or excessive harvests. Harvests will be monitored and, if necessary, season dates, harvest levels, or methods of transport manipulated to minimize conflicts between areas, and to restrict or destribute hunters.

* Hunting for other game species may not be compatible with proposed management. Seasons will be established to minimize conflicts with use of other species and the methods of hunting other species will be regulated to concur with brown bear management objectives.

* Restrictions on the use of aircraft may result in a proliferation of all-terrain vehicles which would adversely affect hunting aesthetics. Regulations restricting all-terrain vehicles for hunting may be implemented.

* Segments of the hunting public may willfully ignore hunting regulations to insure high hunter success. Over-harvest of bears may result and management objectives would become impossible to maintain. Regulations governing hunting will be vigorously enforced.

IMPACTS

* A reduced level of harvest may ensue until the average age of bears reaches a desired maximum.

* A relatively stable brown bear population with older age class individuals will be maintained.

* Not all hunters may be able to participate during any given season.

* Restrictions or prohibitions on use of aircraft and all-terrain vehicles for brown bear hunting are probable.

* Resource development activities that are detrimental to brown bears will be limited.

* Hunting regulations on other game species may be modified to conform to brown bear management objectives.

19. LOWER ALASKA PENINSULA BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, that portion of the Alaska Peninsula lying north and east of a line between the heads of Port Moller Bay and American Bay and to the south and west of, but not including, the drainages of the Meshik and Anlakchak Rivers and Kujulik Bay.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a highly productive brown bear population.
2. Maintain a hunting season length of at least ten days.
3. Design brown bear hunting seasons to maintain a large proportion of males in the harvest.
4. Control access, number and distribution of hunters and methods of hunter transport to maintain the harvest at desired levels and to maintain aesthetic hunting conditions.
5. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

This area has a high abundance of brown bears. The population may be the most productive of any population in Alaska. Data are not available on total bear numbers, but Department research conducted in the Chignik-Black Lake area suggests females out-number males by as much as five to one with few old males present. The average age of bears in the harvest is less than six years.

The heaviest brown bear hunting pressure on the Alaska Peninsula occurs in this area. Over the past 10 years, it has produced about 60 bears annually, with about 53 percent of the harvest in the fall. Most of the brown bear harvest is by guided nonresidents who make up 76 percent of successful hunters. Permanent guide camps have been established at seven locations, with additional temporary camps constructed seasonally. Hunting effort by resident hunters has been increasing in recent years. The presence of moose and caribou have been important in attracting hunters. Combination hunts for bears with one or both of these other species are popular with both all hunters. Hunting regulations for moose and caribou thereby affect hunting pressure on the brown bear population.

The Chignik residents occasionally have problems with nuisance brown bears. "Defense of life and property" kills have averaged about one bear annually. Illegal killing of bears remains a problem but is less serious than in past years.

Transportation within the area is primarily by light aircraft with hunting occurring on foot. Two all-terrain vehicles have been introduced by guides. Boats are used for transportation in the Chignik River system and along the Pacific shoreline.

The area remains essentially wilderness in spite of numerous oil exploratory efforts in recent years. All-terrain vehicle trails, readily visible from the air but less evident on the ground, mark areas of extensive seismic work. Test holes were drilled and a large landing strip was constructed in one location. There is a high probability that future oil and mineral development will occur in the area.

PROBLEMS

* Oil and mineral exploratory efforts and development may seriously alter the wilderness nature of the area, improve access, and prove detrimental to brown bear habitat. Efforts will be made to discourage development in critical bear habitat and to modify any development elsewhere in the area to minimize adverse impacts to brown bears.

* Land in private ownership may be closed to hunting, thereby concentrating hunting on remaining public land. Concentrations of hunters that would adversely affect hunting aesthetics or cause local over-harvest of bear populations could develop. Hunting regulations may be modified to retain high hunting aesthetics and to prevent over-harvest. 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.

* Restrictions on the use of aircraft may result in a proliferation of all-terrain vehicles that would adversely affect hunting aesthetics. Regulations restricting all-terrain vehicles for hunting purposes may be implemented.

* Hunting for other game species may not be compatible with proposed brown bear management. Seasons may be established to minimize conflicts with the hunting of other species, and methods of hunting for other species may be regulated to concur with brown bear management objectives.

* Segments of the hunting public may willfully ignore hunting regulations to insure high hunter success. Over-harvest may result and management objectives would become impossible to maintain. Regulations governing hunting will be vigorously enforced.

IMPACTS

* A young, highly productive brown bear population will be maintained with few old age males present.

* Hunting opportunity shall be maintained by allowing spring and fall hunting seasons.

* An opportunity to hunt brown bears in aesthetically pleasing conditions will be maintained.

* Sport hunting shall be retained over the widest possible area.

* Resource development activities that are detrimental to brown bears may be limited.

20. SOUTHWESTERN ALASKA PENINSULA BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, that portion of the Alaska Peninsula south and west of a line drawn from the head of Port Moller Bay on the Bering Sea side to the head of American Bay on the Pacific side, except that area included in the Cold Bay Brown Bear Management Plan.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to take large brown bears.

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Design brown bear hunting seasons to maintain a large proportion of males in the harvest.

2. Maintain a hunting season length of at least ten days.

3. Control hunter numbers and distribution, if necessary, to distribute hunting pressure through the area and to maintain desired harvest levels.

4. Control methods of hunter transport to maintain aesthetic hunting conditions.

5. Oppose land use practices that adversely impact the wild character of the area.

THE SPECIES

This area supports a high density of brown bears including old age individuals. The sex and age composition of the population has not been altered by hunting to the degree that it has elsewhere on the Alaska Peninsula. Reproductive success appears good, but specific data on population size and composition are lacking.

The area has been altered little by man's activities but oil exploratory efforts have had local impacts, with test holes drilled and large landing strips constructed at five locations. Three communities, Nelson Lagoon, King Cove, and Cold Bay, exist within the immediate area. Residents of Nelson Lagoon frequently travel the beaches as far as Izembek National Wildlife Range in four-wheel drive vehicles or other all-terrain vehicles. The Wildlife Range is managed by the U. S. Fish and Wildlife Service which restricts travel to foot or by boat.

Little bear hunting is done by local residents, but the area is popular with Alaskan residents from other areas of the state. Harvest levels are comparatively low. About 66 percent of the harvest since 1961 has been by nonresidents, a lower percentage than any other area on the Alaska Peninsula. Four guides have established permanent hunting camps in the area.

Since 1961, the harvest has averaged 31 bears annually, but it has increased in the past five years to an average of 46 bears. In 1975, 83

bears were harvested. Most of the brown bear harvest (51 bears) occurred in the spring of 1975 when the more heavily hunted central portion of the Alaska Peninsula was closed. The level of the spring harvest has exceeded the fall harvest in this area. Since the area lacks a huntable moose population, it does not attract hunters interested in the multi-species big game hunts that have resulted in high fall brown bear harvests in other areas. The reported spring harvest has been 56 percent of the total kill since 1961. In the past five years this trend has reversed, with more bears being taken in the fall (58 percent). Hunters in this area are primarily interested in brown bears, but the bear-caribou combination is becoming an increasingly attractive hunt as a result of restrictive big game seasons elsewhere in Alaska. The brown bear population appears capable of sustaining the average harvest level of the past five years while maintaining the desired harvest characteristics. However, continued harvests at 1975 season levels could prove excessive for proposed management.

Most transportation is by light aircraft with hunting then occurring on foot. No all-terrain vehicles except motor bikes have been used by guides within the area. Residents of Nelson Lagoon utilize four-wheel drive vehicles to hunt caribou but have little interest in brown bears. Occasionally, brown bears are killed at Nelson Lagoon and King Cove when they become a potential danger to the communities.

PROBLEMS

* Oil and mineral exploratory work or development may seriously alter the wilderness nature of the area, improve access, and prove detrimental to brown bear habitat. Efforts will be made to discourage development in critical habitat and to modify development in other areas to minimize adverse impact. Restrictive regulations governing hunting may be applied to adjust harvest levels or sex and age composition of the bear population.

* Land in private ownership or controlled by the National Refuge system may be closed to hunting, thereby concentrating hunting on remaining public land. Concentrations of hunters would adversely affect hunting aesthetics or cause local overharvest of bear populations. Hunting regulations will be modified to retain high hunting aesthetics and to prevent overharvest. The Department should seek cooperation from federal agencies to allow public hunting on Refuge lands and 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.

* Increased hunting pressure may result in younger animals, skewed sex ratios and excessive harvest levels. Seasons may be shortened, seasons dates adjusted, access restricted, or permits employed to restrict and distribute hunters.

* Restrictions on the use of aircraft for transportation may result in a proliferation of all-terrain vehicles that would adversely affect hunting aesthetics. Regulations restricting all-terrain vehicles for hunting may be implemented.

* Hunting for other game species may not be compatible with proposed management. Seasons will be established so as to minimize conflicts with use of other species, and the methods of hunting other species will be regulated to concur with brown bear management objectives.

* Segments of the hunting public will willfully ignore hunting regulations to insure high hunter success. Overharvest of bears may result and management objectives become impossible to maintain. Regulations governing hunting will be vigorously enforced.

IMPACTS

* A stable brown bear population with numerous older individuals shall be maintained.

* A recreational opportunity to harvest bears shall be maintained consistent with desired harvest levels and sex and age composition.

* Not all hunters may be able to participate during any season.

* The area shall retain high hunting aesthetics.

* Resource development activities that are detrimental to brown bears will be limited.

* Restrictions or prohibitions on use of aircraft and all-terrain vehicles for brown bear hunting are probable.

* Hunting regulations for other game species may be modified to conform to brown bear management objectives.

21. COLD BAY BROWN BEAR MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 9 bounded by a line starting at Blaine Point in Izembek Lagoon, then due south to Kinzarof Lagoon, then along the mean high tide line west and south to the mouth of Thin Point Lagoon, then along a line west to Frosty Peak, then along a line northwest to Izembek Lagoon, then along the mean high tide line north and east to the point of origin.

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 low but secure brown bear population.

2. Encourage sport hunter harvest of brown bears to reduce bear-human confrontations.

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

THE SPECIES

The Cold Bay area supports a high density of brown bears, although there is little information available on total bear numbers, sex and age structure of the population and natural mortality factors. Brown bears occur in or travel through the area in all seasons except winter, with greatest use occurring in summer when the bears gather in the local streams to feed on spawning salmon. Brown bears den on nearby Frosty Peak. Though data are lacking, the bear population may contain a relatively high proportion of older, larger males since the area was closed to brown bear recreational hunting between 1968 and 1974. Apart from buildings and roads associated with the village of Cold Bay, Izembek National Wildlife Range, and abandoned military installations, humans have made little impact on brown bear habitat.

The Cold Bay area was closed to brown bear hunting between 1968 and 1974. Sport hunting resumed in 1975 with a spring and fall season. About six bears are killed annually, with more than 80 percent of the harvest being taken by Alaska residents. One guide occasionally brings clients to hunt in the area. Hunter access over the area is generally unrestricted except within Izembek National Wildlife Range where restrictions on motorized vehicles limit access to walking except on established roads.

Little change is expected in land ownership. Should oil development take place in the lower Alaska Peninsula, the Cold Bay Airport would probably become an important logistic center.

PROBLEMS

* The village of Cold Bay has been plagued with nuisance brown bears because of its proximity to brown bear habitat and, in particular, the presence of several salmon spawning streams. At least 10 bears have been killed in defense of life and property since 1970. A photographer was killed by a brown bear near Cold Bay in 1974. The Department should make every effort to inform the public of bear behavior in order to minimize future problems. In addition, the Department should encourage an acceptance of brown bears as an integral part of life in the area. Where possible, sport hunting will be directed at problem animals.

* With increased urbanization, the potential for adverse bear-human interactions will increase. Where possible, developments will be directed away from areas of prime bear use. Increased numbers of sport hunters associated with community growth should help maintain a lower bear population and further minimize problems.

IMPACTS

* Hunting seasons will reduce the frequency of adverse bear-human interactions, and a lower, but stable, brown bear population will be maintained.

22. UNIMAK ISLAND BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 10, Unimak Island.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

To provide an opportunity to take large brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

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

2. Design brown bear hunting seasons to maintain a large proportion of males in the harvest.

3. Oppose land use practices that will adversely impact the wilderness character of the area.

SPECIES

Brown bears are abundant on Unimak Island. Old age animals are present, and the population has been little affected by hunting. Specific data on population numbers, composition, and reproductive success are lacking, but the population appears stable. Most denning occurs on the slopes of the Island's volcanos. Bears feed in streams when spawning salmon are present. In addition, caribou, beach carrion, rodents and berries are available food sources.

The Island is wilderness except for limited areas around False Pass and the U. S. Coast Guard stations at Cape Sarichef and Scotch Cape. Hunting aesthetics on the island are high with the landscape unaffected by man; the few hunters present result in little competition for animals. Unimak is part of the Aleutian Island Refuge system, and brown bear hunting is regulated by a permit system presently administered by the U. S. Fish and Wildlife Service. The number of permits issued has been low, and this has been the major factor in maintaining a low harvest level. In recent years, the hunter kill has ranged between 2 and 5 bears with the harvest almost entirely by Alaskan residents. The small number of bears in the harvest precludes meaningful conclusions concerning the age structure or sex of bears in the population.

Access for persons other than local residents is difficult and expensive. Local air charters have not been regularly available, and small boats for recreational use are unavailable. The U. S. Fish and Wildlife Service restricts brown bear hunters transported by aircraft to landings in areas below mean high tide and to water surfaces. These restrictions have discouraged persons from using the area.

There is little local interest in sport hunting for brown bears. Most hunting is by trophy and recreational hunters from other areas of the state. Domestic use of bears is nonexistent. Because of the sparse human population, the number of illegal kills or "defense of life and

property" kills are also low. Natural mortality factors have the greatest impact on the island's brown bear population.

PROBLEMS

* Oil and mineral exploration and development may seriously alter the Island's wilderness nature, improve access, and prove detrimental to brown bear habitat. Efforts will be made to discourage development in areas of critical habitat and to modify development in other areas to minimize adverse effects.

* The existing permit system regulating brown bear hunting may be discarded by the U. S. Fish and Wildlife Service, possibly resulting in excessive harvests or in crowding of hunters. Additional restrictions may be placed on bear hunting by the Department to maintain hunting quality and to insure availability of large male bears in the harvest.

* Segments of the hunting public may willfully ignore hunting regulations to insure high hunter success. Over-harvest may result, and management objectives become impossible to maintain. Regulations governing hunting will be vigorously enforced.

IMPACTS

* A stable brown bear population with older age individuals will be maintained.

* An opportunity to hunt large brown bears under aesthetically pleasing conditions will be maintained.

* Permits, time zoning, or restrictions on methods and means of hunting shall be applied.

* Resource development activities which are detrimental to brown bears may be limited.

23. MC NEIL RIVER BROWN BEAR MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 9 described as the McNeil River State Game Sanctuary.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

To provide an opportunity for scientific and educational study of brown bears.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage participation in viewing and photography of brown bears by a broader spectrum of the public.
2. Regulate the number and activities of visitors to the area to minimize adverse bear-human interactions.
3. Control access of visitors and methods of transport to minimize disturbance and harassment of brown bears.
4. Maintain minimal development of visitor facilities.
5. Encourage scientific and educational studies that are compatible with public viewing opportunities.
6. Maintain an adequate salmon escapement within the McNeil River system to support high populations of bears and a viable salmon population.
7. Disallow developments not compatible with primary management objectives or that would substantially alter the wilderness nature of the area.

THE SPECIES

The July and August concentration of brown bears at McNeil River has gained worldwide fame. Prior to statehood, bear hunting was banned in this area to protect the unique concentration. Following statehood, the ban remained and the area became a state game sanctuary. Since 1973, a permit system which regulated human activity and densities within the sanctuary during the period of brown bear concentration has been in effect.

The number of bears present has varied between 75-90 in recent years. Reports from the late 1950's indicate that greater numbers of bears were present at that time. All ages of bears use the area and are highly visible for recreational observation, photography, or scientific study. The population of bears spends only part of each year within the sanctuary boundaries. At least seven McNeil River bears have been taken outside the sanctuary by sport hunters.

Between 1963 and 1972 the Department of Fish and Game collected data on the life history of McNeil River brown bears. This program included

immobilization and marking of animals. The program terminated, but tagged bears remain in the population. These markings are being lost naturally and bears are returning to a pristine appearance. From 1970 to 1975, Utah State University graduate students conducted research on brown bear behavior.

Prior to 1970, public use of the sanctuary during the period of concentrated bear use was limited. In recent years, use has greatly increased and in 1975 reached 385 man days during July and August. The permit system now regulating human use of the sanctuary was developed in response to increased public use. Requests have been received to develop the area for a larger volume of daily visitors, but have been discouraged as incompatible with maintaining a high concentration of brown bears. Present use is primarily by non-Alaskans and professional or semi-professional photographers.

PROBLEMS

* Visitor use may prove incompatible with maintaining a high concentration of bears, or human activities may harass bears from the area. Department personnel stationed in the sanctuary will police public use to prevent abuses. The effectiveness of the permit system will be annually evaluated and adjustments in the number of permits or authorized public activities made to achieve desired management.

* Bears will be killed by visitors in "defense of life" but such actions should not be common. Injury or loss of human life may occur because of the close proximity of bears to humans within the sanctuary. The permit system and activities of Department personnel should regulate public use to make adverse bear-human interactions rare. Every effort should be made to prevent such an occurrence, but the danger should be accepted by the public as a normal hazard of entering the sanctuary.

* Alaskan residents are making minimal use of the sanctuary, with the greatest use occurring from nonresidents and foreign nationals. The presence of the McNeil River bear concentration and the state management program should be better publicized within the state to encourage a greater amount of use by Alaskans. However, the maximum level of public use will not be allowed to exceed the limits of the permit system.

* Because McNeil River brown bears are dependent upon habitat outside the boundaries of the sanctuary, incompatible land use in these areas may reduce the numbers of bears present. Management shall encourage uses of adjoining lands that are compatible with maintaining a high concentration of brown bears within the sanctuary.

* Sport hunting outside the sanctuary or loss of bears to "defense of life" may significantly reduce the McNeil River bear population. Little illegal hunting is expected within the sanctuary as few bears are in the area during the time when hides are of good quality. Hunting levels outside the sanctuary will be carefully monitored and restrictions imposed if necessary. Public use in the summer shall be regulated to minimize any loss of bears. Any illegal harvest of bears will be vigorously prosecuted.

IMPACTS

* Visitor use shall continue to be regulated under terms of a permit. Permits will restrict both the number and activities of persons present, with recreational viewing having priority over scientific studies or commercial film ventures.

* The sanctuary will be managed as a wilderness with few developments to facilitate visitor use.

* Transportation within the area shall be by foot. Aircraft landing will be allowed on water surfaces, or in the inter-tidal beach areas, but low level flights in the vicinity of the falls or any concentration of bears will be discouraged.

* Developments not compatible with proposed management or which would substantially alter the wilderness nature of the sanctuary will not be allowed.

* A high concentration of visible brown bears shall be maintained at McNeil River falls for recreational viewing, photography, or approved scientific study.

* The wilderness nature of the sanctuary shall remain unaltered.

28. AFOGNAK-SHUYAK BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, Shuyak Island, Ban Island, Marmot Island and Afognak Island northwest and east of the Southern Afognak-Raspberry Island Brown Bear Management Plan area.

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 brown bear hunters to maintain the harvest at desired levels and to maintain uncrowded hunting conditions.

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

3. Encourage scientific and educational studies of brown bears.

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

THE SPECIES

The Afognak-Shuyak area is relatively remote and largely uninhabited. Recognizing the scenic and wilderness qualities of the area, the U.S. Forest Service has recommended that 55,000 acres in the Red Peak-Ban Island areas be designated a Scenic Area. Another 5,300 acre parcel has been designated the Paramanof Research Natural Area.

The brown bear population is estimated at 200 to 300 animals for the entire Afognak-Raspberry-Shuyak Islands group. Although information on movements is lacking, it is suspected that there is considerable interchange of bears between management areas. Heavily forested Shuyak Island has few productive spawning streams and a low bear density. The northwestern part of the area contains dense Sitka spruce forest at lower elevations, grading into grass-brushlands and finally extensive rugged alpine areas above 1500 feet elevation. Eastern Izhut Bay and Tonki Peninsula are slightly more accessible but contain equally rugged terrain. East of Izhut Bay, spruce forest becomes less dense giving way to large expanses of open alpine and steep, brushy hillsides.

The Paramanof Bay drainage is one of the most popular hunting locations due to many open hillsides and valleys with good conditions for spotting bears. Tonki Peninsula is also popular although less accessible due to its limited anchorages and exposure to storms.

Resident hunters are the primary users of the area. However, three guiding operations have recently used the Paramanof Bay area. Hunting pressure and harvest are relatively light because the area is not very accessible by small boat. Float and amphibious aircraft are the primary means of transportation into the area. Access to the interior of the area is limited to a few lakes. No maintained trails exist although scattered elk and bear trails provide limited access. Annual sport harvests average about six bears.

PROBLEMS

* The eastern portion of the management area, including parts of the Seal Bay and Izhut Bay drainages, are scheduled for logging in the next ten years. Future sales are planned by the U.S. Forest Service for the northwestern part of Afognak Island. Some of the timber land has been selected by Native village corporations which can be expected to introduce logging. The impact of logging operations will detract from the aesthetics of bear hunting. Defense of life and property kills can be expected to increase and the quality of bear habitat may be initally reduced by clearcut logging. The Department should enlist the cooperation of the U.S. Forest Service and private landowners in protecting critical brown bear habitat and to carry out cutting plans in a manner least detrimental to bear habitat.

* Much of the management area has been selected by Native village corporations. Should the corporations close their lands to trespass, a serious loss of hunting opportunity would occur. 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 relatively limited number of access points serve to concentrate hunters and reduce aesthetic hunting opportunities. Even distribution of hunting pressure will be difficult to achieve. The Department should enlist the cooperation of the U.S. Forest Service and village corporations in developing foot trails, floatplane landing docks, and recreational cabins in selected areas.

* There are many potential competing uses of the management area, both commercial and recreational, which may affect the quality of hunting. Commercial fishing, sport fishing and hunting for other game species may conflict with the aesthetics of bear hunting. Hunting seasons for other species may have to be restricted in some portions of the area to maintain aesthetically pleasing brown bear hunting.

IMPACTS

* Optimum productivity of the bear population will be maintained and large trophy bears will be available.

* Uncrowded, aesthetically pleasing hunting conditions will be available for a limited number of hunters each year.

* Limitations on deer and elk hunting to maintain aesthically pleasing bear hunting conditions will reduce hunting opportunity and harvest of these species.

* Permit hunting will be implemented to maintain even distribution of hunting pressure. This will reduce the number of hunters allowed to participate.

29. PORTAGE LAKE BROWN BEAR MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 8 on Afognak Island which includes Portage Lake from the outlet of Upper Portage Lake to one-half mile below the fish pass on Portage River, including a strip 1.5 miles wide along both sides of Portage Lake, along Portage River and along the outlet of Upper Portage Lake.

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.
2. Allow hunter harvest at a time when not in conflict with viewing and photographic opportunities.
3. Regulate number and activities of visitors to the area to protect brown bears from human disturbance and harassment.
4. Encourage maintenance of adequate salmon escapement within the area to support a high population of brown bears and viable salmon populations.

THE SPECIES

The Portage Lake drainage, Afognak Island's best red salmon producing system, is also one of the best areas to view brown bears. Bears concentrate in red salmon spawning areas from mid-July to late August. Bears then disperse to some extent, but continue to frequent the area, feeding on pink and silver salmon until October. Although heavy timber limits viewing opportunity, bears can often be seen where streams meander through meadows and openings in the canopy.

A recently constructed timber haul road crosses one of the major spawning streams near the best viewing area on Portage Lake. Traffic on this road may reduce bear feeding activity within the drainage. Sport fishermen frequent the area from June through September and the U.S. Forest Service maintains a recreational cabin on the lake.

Hunting pressure is presently light in the drainage, with only occasional bears taken. Illegal harvest may increase with improved access provided by the road.

PROBLEMS

* Logging activities and truck traffic will detract from aesthetics and may reduce the availability of bears in viewing areas. Seasonal restrictions on logging activity during the period when bears are most actively feeding should be requested from the U.S. Forest Service.

* Access created by the logging road will increase sport fishing activity and other recreational use in bear feeding areas and such use will conflict with bear observation and photography. Bear feeding areas should be closed to fishing during prime viewing times.

* Bear-human encounters will become more frequent as more recreational use occurs. Defense of life and property kills will occur more often and opportunity for viewing will be diminished. The Department should provide information to recreational users on bear behavior and avoidance, and restrict use of bear viewing areas with a permit system.

* The area has been selected by native village corporations who may close these lands to trespass should they obtain ownership. 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.

IMPACTS

* Opportunity to view and photograph brown bears will continue to be available through restrictions on number of users. Permits may be required for viewing and photography of bears.

* Some restrictions on sport fishing activity will be necessary to maintain undisturbed bear viewing conditions.

* Some time zone restrictions may be imposed on use of the logging road.

30. SOUTH AFOGNAK-RASPBERRY ISLAND BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, Raspberry Island and adjacent small islands, except Whale Island; Afognak Island south and east of the Malina Bay drainages including drainages into Raspberry Straits and Marmot Bay west of the head of Saposa Bay and bounded on the east by the Gretchen Lake, Laura Lake, Pauls Lake drainages and bounded on the north by a line from Shields Point to Delphin Point, not including drainages into Delphin Bay. The Portage Lake Management Plan area is excluded.

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 desired bear population size and structure.

2. Improve hunter access within the area and control methods of hunter transport, if necessary, to distribute hunting pressure through the area.

3. Encourage scientific and educational studies of brown bear ecology.

4. Discourage land use practices that adversely affect brown bear habitat.

THE SPECIES

Estimates of the bear population in the Afognak-Raspberry-Shuyak Islands complex are difficult to make due to the difficulty of observing bears in dense forest growth. Bear densities appear to be much less in the Afognak group than on Kodiak Island. Based on past harvest, observation of salmon stream concentrations, hunter reports and general observations, it is estimated that the bear population is 200-300 animals.

Spruce habitat is generally thought to support lower bear densities than areas with higher vegetative diversity. Salmon are proportionately much less abundant in the Afognak group than on Kodiak. Sitka spruce vegetation is gradually invading the western side of Afognak where large areas of open grass-brushlands now exist. As spruce invades, vegetative diversity is lessened and presumably habitat is less suitable for brown bears. The rate of spruce invasion is relatively slow and no detectable short term effects on the bear population can be expected. A few scattered seasonal and permanent residences are scattered through the management area, but few changes in the near-wilderness environment have occurred. Limited logging activity has occurred since the 1940's, but it was not until 1975 that large scale logging began in the Kazakof and Perenosa Bay areas. Currently a logging road transects Afognak Island from Kazakof to Discoverer Bay. Although ultimately clearcuts may provide improved vegetative diversity, it remains to be seen if increasing forage will offset the disturbance of bear activities and defense of life and property mortality which generally accompany logging activity.

Dense spruce forest over much of the Afognak group makes it difficult to observe and stalk bears. Late spring breakup and frequent inclement weather are additional handicaps to hunters. Hunting pressure has been

relatively light in the past with sport harvest averaging about 12 bears annually, about half of which are taken from this area. Raspberry Straits, Malina Lakes, Portage Lake, and Afognak Lake areas are popular hunting spots. Local hunters use small commercial fishing boats or skiffs for hunting this area. Numerous protected anchorages are present. Charter and private aircraft are used to reach inland lakes.

As has occurred in the remainder of the Kodiak area, seasons have been gradually curtailed to keep harvest at allowable levels. Afognak's seasons remain open slightly longer in spring and are open nearly three weeks earlier in fall than in the Southwestern Kodiak Island Management area. Relatively low hunter success will permit some increase in numbers of hunters without much increase in the harvest.

Residents do most of the bear hunting in this management area, although recently an increasing number of guides have begun to take nonresidents to Afognak as competition for hunting areas around the state increase. Afognak has a local reputation for large trophy bears, although only occasionally is an unusually large bear taken.

PROBLEMS

* Most of the land in this management area has been selected by Native village corporations. Should the corporations choose to close this land to trespass, a serious loss of hunting opportunity would occur. 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.

* Development of the logging industry on village corporation lands is imminent. Regulations governing timber harvest on private lands are minimal and brown bear habitat quality can be expected to diminish without proper consideration in cutting plans. The Department should enlist the cooperation of village corporations to consider effects of road construction and cutting procedures on bear populations and to protect critical bear habitat. The Department should support legislation governing forestry practices on private lands.

* Development of a cant mill for processing Afognak Island timber and associated sewage and wood fiber could be a detriment to salmon populations upon which brown bear feed. Increasing bear-human encounters will result in added mortality to brown bears near the community. The Department should encourage consideration of alternate locations for the mill and community.

IMPACTS

* As harvests increase, some reduction in the availability of large male bears may occur.

* Maximum productivity of the bear population will be maintained.

* Season length may have to be reduced if allowable harvest levels are approached.

* A relatively large number of hunters will have an opportunity to hunt brown bears although chance of taking an animal will be low. Crowded hunting conditions may occur in localized areas.

* Brown bear habitat quality will be maintained or improved to the extent that the Department can influence land use practices competitive with bear habitat quality.

* Modification of timber harvesting procedures to maintain or improve quality of brown bear habitat may increase cost of logging operations.

31. NORTHEASTERN KODIAK ISLAND BROWN BEAR MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 8 on Kodiak Island east of Rough Creek in Ugak Bay and east of the divide between Kizhuyak Bay and Sharatin Bay including all drainages into Chiniak Bay.

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.
2. Design brown bear hunting seasons to maintain desired bear population size and structure.
3. Encourage sport harvest of bears to reduce conflicts with domestic livestock and human safety.
4. Increase public awareness of brown bear behavior to reduce adverse bear-human interactions.

THE SPECIES

Chronic conflicts with human activities have resulted in a lowered density of brown bears in this management area. This area supports most of the industrial, agricultural and urban development of Kodiak Island. Much of the coastal portion is accessible by road. Conflict with the cattle industry has been primarily responsible for present management which encourages maximum bear harvest. Cattle were first introduced to Kodiak in 1794 by Russian settlers, and it is safe to assume that the battle with brown bears began immediately. Predation by bears was well documented by a Department study in 1964-65. Thirty-three cattle were verified to have been killed by bears during a 14-month study. This represented less than three percent of the actual cattle population, excluding calves.

Bears were systematically hunted, trapped and poisoned by ranchers with frequent assistance from the Federal government prior to statehood. The Department continued to assist with a bear control program and liberal hunting seasons were maintained. Sport hunting has not been successful in alleviating the predation problem. Fencing was seriously considered as a possible solution to ingress by bears. During the early 1960's, an aerial shooting program was conducted by the Department, but was soon dropped due to intensive public pressure against it. The Department continued to control suspected predator bears until 1970. Alaska law permits the killing of any game animal in defense of life or property, and ranchers continue to take bears on their grazing leases, although few report the kills as is required by regulation. Presently six ranches are in active operation and periodic bear predation continues.

Current annual harvest from all sources probably does not exceed 15 bears. During the three-year period 1963-1965, a total of 83 bears were killed, an average of about 28 per year. Forty-two bears were killed in 1963, 35 of them by the Department on cattle leases. The 1965 bear population in this area was estimated at 48 bears. There is little doubt that the intensive bear control activities during the 1960's drastically reduced the bear population in this area. The current average population probably does not exceed 75 animals.

No major habitat changes have occurred since the 1960's and increasing frequency of bear sightings suggests that the bear population is increasing somewhat despite heavy hunting pressure. Resident hunters do most of the hunting and less than five percent are successful. Two bear guiding operations consistently hunt the area.

PROBLEMS

* Increasing development and human occupancy will result in some unavoidable attrition of bear habitat quality. The Department should encourage the development of land use plans which provide maximum protection for critical brown bear habitat.

* Most of the management area has been selected by Native village corporations under terms of the Alaska Native Claims Settlement Act. Should the corporate landowners close their lands to trespass, a serious loss of hunting opportunity would occur. 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.

* Sport hunting opportunity will be diminished by the continuing kill of bears in defense of life and property. The Department should direct sport hunting effort onto ranches and other areas where bear-human conflicts are frequent. Additional effort should be directed toward educating the public in avoiding encounters with bears and in appreciating brown bears as a natural component of the environment.

* Maintenance of long hunting seasons encourages out-of-season harvest in adjacent management areas. The Department should assist the Division of Fish and Wildlife Protection in intensified enforcement efforts to prevent illegal harvest.

IMPACTS

* The brown bear population will be maintained but at a level below the carrying capacity of the habitat.

* Sport hunting opportunity will be maximized, but chances of encountering bears will be low.

* Opportunity for observation or photography of brown bears will be negligible.

* Depredations on cattle and other conflicts with humans will be minimized.

32. SOUTHWESTERN KODIAK ISLAND BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, all drainages into the eastern side of Kizhuyak Bay and all of Kodiak Island south and west of the Rough Creek drainage, including Uganik, Whale, Amook and Sitkalidak Islands. The Karluk Lake drainage is not included.

MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

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

2. Design brown bear hunting seasons to maintain a large proportion of male bears in the harvest.

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

4. Discourage land use practices that adversely affect the wilderness nature of the area.

THE SPECIES

Brown bear density on Kodiak Island is at least as high as in any area of comparable size in Alaska. Bears are distributed throughout the management unit except on some of the smaller offshore islands. The bear population may exceed 2,000 animals. No recent population declines have been documented although some local residents maintain that a higher population was present in the past. There has been a decline in the proportion of large adult males through selective trophy hunting. The average hide and skull size of males harvested has declined during the past 20 years, although it now appears to have stabilized. Annual aerial surveys do not indicate a decline in productivity or survival of offspring.

Information on sources of natural mortality in Kodiak bear populations is scanty. Predation on cubs by adult males is commonly thought to be a source of mortality. Selective hunting for males as occurs on Kodiak may favor survival of young to some extent. Mortality related to periodic food shortages may be important. Persistent late spring snow retards plant growth and probably limits foraging success by bears at a time when their body reserves are lowest. Bears which entered dens in poor fall condition would be especially susceptible to malnutrition in late spring.

The habitat in this management area is little changed from prehistoric times. The coastal dwelling native population in the eighteenth century was approximately three times larger than the present human population on Kodiak Island. Five small villages are located in the management area. The Kodiak National Wildlife Refuge occupies more than three fourths of the area. This refuge, administered by the U.S. Fish and Wildlife Service, was established in 1941 to preserve the natural habitat of the Kodiak brown bear.

Relative to other ranges around the world, Kodiak's habitat supports an extremely high density of brown bears. Scores of streams containing from one

to four species of spawning salmon occur throughout the island. Luxuriant plant growth provides abundant green forage, roots and berries. Carrion and tidal organisms are available in coastal tideland areas. Alpine habitats are utilized heavily during early summer by bears foraging primarily on sedges. An excellent diversity of food sources is available and periodic movements by bears in response to seasonal availability of the various food sources are well documented. Salmon runs on Kodiak have decreased to approximately one-third of levels recorded in the early 1900's. The extent to which this reduction has affected the bear population is unknown, although there is little doubt that salmon is an important food resource for bears.

Prior to 1925, commercial hunting for brown bears was common on Kodiak Island, but regulations have become increasingly restrictive since that period. Progressively shorter seasons have been set to keep the harvest within allowable levels. Increasingly intensive hunting pressure in the early 1960's resulted in excessive harvest in popular hunting areas while adjacent areas went largely unharvested. In 1968, the U.S. Fish and Wildlife Service initiated a system on the Kodiak National Wildlife Refuge assigning hunters specific hunting areas. This system improved the distribution of harvest and lessened the extent of crowded hunting conditions. Increasingly restrictive regulations on brown bear hunting in other areas of the state and the closure of polar bear hunting by the Marine Mammal Protection Act generated a substantial rise in hunting pressure and harvest on Kodiak Island in 1973. The Department implemented a new permit system for this management area in 1976. A limited number of permits for each of 26 hunting units are now awarded by lottery for both fall and spring seasons.

Annual harvests have fluctuated considerably depending on weather conditions during the hunting season as well as changing hunting pressure from year to year. The average annual harvest for this management area was about 115 animals during the 1961-1975 period. Males generally comprise at least 60 percent of the annual harvest. Wounding loss, defense of life and property kills and illegal harvest are estimated at 10-15 percent of the sport kill. Nonresident hunters account for about 40 percent of the hunting effort. Hunting success of nonresidents, who are required to hunt with a guide, averages approximately 70 percent compared to 30 percent for residents. Approximately two-thirds of the annual harvest is taken during the spring season. Most guides conduct hunts from permanent camps along the coastline using skiffs for transportation within the hunting area. Resident hunters, who usually have tent camps and lack boats, are restricted to hunting within a relatively small area surrounding their camps.

Brown bear guiding is an important, although seasonal, local industry. Although nonresidents comprise less than half the hunters, their take is nearly two-thirds of the annual harvest.

PROBLEMS

* Much of the coastal land and land surrounding lakes and rivers has been selected by Native village corporations under terms of the Alaska Native Claims Settlement Act. Should corporate landowners close their lands to trespass, a serious loss of hunting opportunity would occur. Such action would also restrict access to public lands in the interior of the Island. The Department should solicit the cooperation of private landowners to facilitate progessive management of brown bears. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Land use activities competitive with bear habitat maintenance is a probable occurrence. On private lands livestock and reindeer herding industries may be introduced in which case brown bears would be systematically eliminated as predators. Development of fishing lodges, recreational cabins, industrial facilities, and permanent human settlements will

result in gradual attrition of bear habitat. A hydroelectric dam is under consideration in the Terror Lake area and construction of a generating plant is scheduled for Kizhuyak Bay, both of which would permanently alter the quality of bear habitat. The State Highway Department has long range plans for a road around the Island to link remote villages. All these activities will alter habitat quality and increase the frequency of bear/human encounters. Expansion of the petroleum industry to the Kodiak area, including offshore exploration and development, construction of onshore support facilities, and attendant growth of the human population appears imminent. Oil spills could damage salmon rearing areas and induce direct mortality to salmon. Increasing development of onshore facilities and increasing human population would encroach on bear habitat. The Department should participate at the planning level and subsequent stages of all land-use activities to minimize potentially harmful effects on brown bear habitat.

* There are many potential competing uses of the management area, both commercial and recreational, which may affect quality of bear observation and hunting. Commercial fishing, sport fishing, hunting for other game species, recreational boating, cannery operations, and commercial and sport flying may conflict with the aesthetics of bear-related recreational activities. The Department should initiate zoning of various recreational activities to minimize conflicts and contact commercial interests in an attempt to minimize conflicts with bear hunters.

* Federal management objectives for the Kodiak National Wildlife Refuge may conflict with the Department's management objectives. The Department should maintain open channels of communication with the U.S. Fish and Wildlife Service and attempt to reach mutually acceptable compromises on issues of concern.

* Enforcement of hunting regulations is difficult at present levels of manpower and budgets. The Department should increase efforts to assist the Department of Public Safety in enforcement matters. Additional personnel and operating funds should be made available by the State Legislature.

IMPACTS

* Limitations on access, number and distribution of hunters, and methods of hunter transport needed to promote aesthetics in brown bear hunting will limit the freedom of hunters pursuing species other than brown bear. Consequently the harvest of these species will be reduced to a level below that which could be sustained.

* Maximum productivity of the bear population will be achieved by maintaining seasons favoring harvest of males. Large adult males will constitute a relatively small proportion of the bear population, and hunters who seek record book bears will have a relatively low probability of success.

* Overall hunter success will continue to be relatively high if desired characteristics of the harvest can be maintained.

* As hunting pressure increases, the individual hunter's chances to hunt will be reduced.

* Brown bear habitat quality will be maintained in most areas if the Department's recommendations on land use receive serious consideration.

* Cost of construction and maintenance of land based industrial and residential developments may be increased if the Department's recommendations on land use are adopted.

33. KARLUK LAKE BROWN BEAR MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, all drainages into Karluk Lake above the lake outlet including Moraine Creek.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOALS

To provide an opportunity for the scientific and educational study of brown bears.

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Regulate numbers and activities of visitors to the area to minimize disturbance and harassment of brown bears.

2. Encourage scientific and educational studies of brown bears.

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

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

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

THE SPECIES

Brown bears of the Karluk drainage have been the focus of a long-term study by the U.S. Fish and Wildlife Service. Containing some 96 square miles, the area is located in the interior of southwestern Kodiak Island within the Kodiak National Wildlife Refuge. The U.S. Fish and Wildlife Service has estimated the area's population at 160 bears, the highest recorded population density for an area of comparable size in the world.

Historically, the Karluk system has been the major red salmon producer on Kodiak Island. When red salmon begin arriving in good numbers during July, bears congregate along the numerous inlet streams and the lakeshore to feed on spawning fish. Although peak feeding activity occurs in July, some bears may pursue salmon until the late fall denning period. Concentrations as high as 10 bears per square mile have been recorded in the O'Malley drainage. The Karluk red salmon declined significantly over the last 50 years. The extent that this has influenced bear populations is unknown, but summer bear density was probably much higher when salmon were more abundant.

Karluk Lake has long enjoyed a reputation among hunters, naturalists and photographers for its excellent bear populations. It is the most popular hunting area on Kodiak Island. The average annual kill during 1954-1962 was 18 bears, a harvest which was considered within allowable limits. The harvest reached about 30 annually by 1966, an excessive level which

prompted a fall season closure of Karluk and several other drainages in 1967. Annual harvests averaged 11 bears during the 1968-1975 period. One hundred ninety-four hunters obtained bear hunting permits during this period, an average of 24 per year. Under the present permit system, about 15 hunters are allowed to hunt each year, and they annually harvest about 10 bears. Charter aircraft provide access to the lake, and small skiffs and rafts are used for transportation within the hunting area.

Both the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game maintain research facilities on Camp Island which are used primarily during summer and early fall. One bear guide maintains a hunting camp near the upper end of the lake. A public recreational cabin, administered by the U.S. Fish and Wildlife Service, is located at the lake outlet.

Naturalists, photographers and tourists who want to view Kodiak brown bears frequent Karluk Lake during the summer. Although no accurate records of such visits are available, an estimated 15 to 25 parties annually visit the area for wildlife-related recreation. Several documentary wildlife movies have been made wholly or in part at Karluk Lake. Both professional and amateur photographers visit the area concentrating on red salmon, bald eagle, and brown bear photography.

PROBLEMS

* Lands bordering approximately the northern one-half of the management area have been selected by Native village corporations. Should these corporations decide to close their lands to trespass, proportionately more intensive use of the remaining available public land areas would be made. 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.

* Development of corporation lands could conflict with maintenance of bear habitat. Construction and occupancy of permanent facilities would increase conflicts with brown bears and reduce the opportunity for observing brown bears in a wilderness environment. The Department should encourage village corporations to consider alternate locations for recreational developments and to locate any permanent facilities in least critical areas of bear habitat.

* Construction and manning of additional research facilities for salmon rehabilitation projects by the Department may decrease the opportunity for bear observation if additional disturbance occurs. The Department should avoid construction during peak bear feeding times and minimize disturbance of prime bear viewing areas.

* Frequency of bear-human encounters will increase with increasing use of the area by photographers and naturalists. The Department should provide instruction to all users on safety precautions and techniques of bear observation. The Department may consider construction of viewing facilities and trails where feasible and not in conflict with aesthetics and may initiate a permit system for recreational use of bear concentration areas during periods of peak use.

* Other recreational uses, including fishing and camping, may be competitive with bear observation and could reduce the quality of bear viewing opportunity. Competing recreational activities should be prohibited near good bear viewing areas during the prime viewing season.

IMPACTS

* Opportunity for observing brown bears in their natural environment will be assured.

* Hunting may be reduced to provide good opportunity for viewing, photography, and research.

* Productivity of the bear population will be maintained or enhanced.

* Other recreational uses may be restricted seasonally to provide best conditions for brown bear viewing.

* Brown bear research projects may require periodic restrictions on access for observation, hunting and other activities.

WOLVES IN SOUTHWESTERN ALASKA

Wolves (*Canis lupus*) occur throughout most of Southwestern Alaska, but are absent on Kodiak Island and the Aleutian Islands west of Unimak. Generally they appear most abundant in the eastern portion of the region. Since the turn of the century wolf abundance has apparently varied, probably in response to numerical changes in big game prey species. Limited government control work occurred during the 1950's and undoubtedly affected local wolf populations. Aerial hunting has never had a sustained impact on Alaska Peninsula wolves because winter snow conditions seldom favor extensive use of this technique. It has, however, been both popular and effective in the upper drainages of the Nushagak and Mulchatna Rivers. Wolves are commonly observed throughout most areas of Southwestern Alaska, but estimates of wolf densities in specific areas are lacking.

Wolves usually occur in packs which may consist of parents with pups of the year, young from 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 Southwestern Alaska pack sizes usually range from 5 to 8, although packs of 18 individuals have been observed. The range of a pack may include a sizeable area, but where optimal food resources exist wolves may utilize areas as small as a few hundred square miles. Even with adequate food, 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.

The diet of wolves in Southwestern Alaska varies according to season, location, and prey species available. Caribou are the major prey in most of the Southwestern Region although moose are also important where they occur. During winter, these species constitute nearly the entire diet of wolves. During summer, young ungulates make up the major portion of the diet. Small animals such as voles, lemmings, ground squirrels, 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 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 relatively high reproductive potential of wolves is seldom realized. Several factors may regulate wolf population levels either by reduced productivity or direct mortality. These include reduced fertility, social inhibition of breeding, malnutrition and starvation (especially among pups), cannibalism and 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 to 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 until 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 Southwestern Alaska has also changed during this century. Early harvests were primarily by trapping or occasional ground shooting, and harvest levels were low. This pattern gradually shifted to aerial hunting with somewhat increased harvest until the practice was discontinued in the early 1970's. Presently most wolves are taken by ground shooting, either by sport hunters or trappers. Harvest is almost entirely by residents. Occasionally animals are taken by nonresidents. Pelts are sold primarily to the fur market with only a few used for local clothing or handicraft. Some of the animals harvested are sold to hunters or taxidermists to be mounted as trophies.

PROBLEMS

* Increasing human demands on moose 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 emotional 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 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.

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.

CARIBOU IN SOUTHWESTERN ALASKA

Several barren ground caribou (*Rangifer tarandus granti*) populations exist in Southwestern Alaska. On the Alaska Peninsula three basically separate herds occur from King Salmon to Unimak Island. The largest of these numbered about 10,000 animals in 1975 and is located between King Salmon and Port Moller. About 2500 range between Port Moller and Cold Bay and at least 3000 are resident on Unimak Island. Some interchange between the latter two groups has occurred in the past when caribou have crossed Isanotski Strait, a distance of about one-half mile. All three segments of Alaska Peninsula caribou are increasing from low population levels, estimated at 2,500 animals in the 1940's.

The Mulchatna herd, the largest in Southwestern Alaska, numbers about 14,000 caribou and ranges in an area generally south of the Stony River, east of the Nushagak River, north of Iliamna Lake, and west of the Alaska Range. Some interchange of Mulchatna and Alaska Peninsula caribou has occurred when animals seasonally moved on and off the Peninsula. However, since the turn of the century there have been no interchanges between these populations. The Mulchatna herd is recovering from the low population levels of the 1940's.

A small herd is located on Adak Island in the central Aleutian Islands. Caribou were first introduced to Adak from the Nelchina herd in 1958 and 1959. Because of the abundant and excellent quality forage, the population has grown rapidly. Large animals are common. One adult male was killed that weighed 700 pounds, a record weight for North America. The population numbered about 450 in 1975.

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 southwestern Alaska this zone can vary from sea level on the Alaska Peninsula to above 2,500 feet north of Iliamna Lake. Below Becharof Lake the Peninsula is treeless. Here the lowland areas are dominated by wet sedge meadows, interspersed with heath on the drier sites. At higher elevations, heath, willow, alder and grass communities become more abundant. Above 1,200 feet heath dominates.

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. In Southwestern Alaska, calving areas are above timberline or in treeless tundra areas.

Almost any vegetated habitat type can serve as caribou winter range, but the greatest use is made of timbered areas, especially spruce-lichen associations which can be found north of Becharof Lake. For caribou wintering below Becharof Lake, sedges constitute a major portion of the winter diet.

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. North of the Kvichak River, 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 Southwestern Alaska fire does not seem to have been a significant factor in controlling recent caribou populations because with the exception of the Mulchatna herd they are not dependent on lichens. Possibly because of the milder climate found on the Alaska Peninsula, the range there does not appear to be limiting herd growth at the present time. Volcanic activity over the years has claimed an undetermined amount of range.

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 populations 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.

Use of caribou for domestic consumption and utilization has long been important for residents of the Southwestern Region. Long hunting seasons and liberal bag limits, which are among the least restrictive in the state, allow for local use in the region.

Early exploitive human use of Alaska Peninsula caribou occurred in the late 1800's when intensive commercial hunting for hides and meat took place. Declines of caribou populations in the area and reduced demands for meat by a declining whaling industry brought an end to large scale harvests. Negligible harvests occurred from the early 1900's until the early 1960's.

Since 1960, recreational use of caribou on the Alaska peninsula and of Mulchatna caribou has increased as Alaska's human population has grown with caribou populations near human population centers in other parts of the state harvested at maximum rates, hunting pressure has shifted toward more remote populations.

Hunting of caribou on the Alaska Peninsula prior to 1972 was largely by guided hunters, many of them nonresidents. In recent years however, the proportion of unguided resident hunters has increased sharply as caribou hunting opportunities have been limited elsewhere. The Mulchatna herd, although less accessible than Peninsula caribou, have also received increased hunting pressure in recent years.

Almost all hunter access to caribou in Southwestern Alaska is by aircraft. Terrain on the Alaska Peninsula, in particular, lends itself to aircraft operation with numerous cinder-patch landing areas in the fall and treeless snow fields in the winter. Access to Mulchatna caribou by

aircraft is limited largely to lakes during snowfree periods, but improves in winter when additional areas become accessible to ski-equipped aircraft.

PROBLEMS

* A revival of interest in domestic reindeer herding in Southwestern Alaska has the potential for serious conflicts with caribou in the region. The sedentary nature of reindeer can result in severe overutilization of ranges, reducing the carrying capacity of the area for both reindeer and caribou. In addition, unless closely herded, reindeer herds suffer attrition of animals which run off with passing caribou, necessitating construction of fences or elimination of caribou to maintain the reindeer herds intact. Finally, feral reindeer which join caribou populations may serve as vectors of disease and when incorporated into caribou populations may introduce undesirable genetic characteristics into the wild caribou stocks. Experience of large-scale and largely unsuccessful reindeer herding attempts along much of northwestern, western and southwestern Alaska during the early to mid-1900's suggests that reindeer herding should be limited to areas where caribou and reindeer will not come into contact and where caribou will not need to forage in the forseeable future.

* Accelerated exploration and development of off-shore, near-shore and on-shore oil resources in Alaska affects the welfare of caribou on the Alaska Peninsula where oil deposits are known to exist. Construction of roads and pipelines and attendant increases in human activity in the area may impede caribou movements and adversely affect critical calving areas. Close control of developmental activities will be required to minimize detrimental impacts on caribou populations.

12. MULCHATNA CARIBOU MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 17 which drains into Bristol Bay east of Kulukak Bay; all drainages of the Kvichak River watershed above the Alagnak River in Game Management Unit 9; and that portion of Game Management Unit 19 lying south of the Chukowan River, Holitna River, Kuskokwim River, and the Swift River, except for the area included in the Farewell Caribou Management Plan.

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

2. Regulate hunting seasons, bag limits and methods and means of taking caribou, if necessary, to provide for local use.

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

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

THE SPECIES

The Mulchatna caribou herd ranges in an area generally south of the Stony River, east of the Nushagak River, north of Iliamna Lake and west of the Alaska Range. Numbers of caribou have fluctuated in the past, but historical data on the herd are limited. In the mid-1960's the herd was estimated at 3,000 animals. A census conducted in 1974 established a minimal herd size of 14,231 animals. The herd appears to be very productive at this time with an October 1974 calf/cow ratio of about 35 calves per 100 cows. The calving ground for the Mulchatna herd is in the Bonanza Hills area. Scattered calving also occurs along the northeastern shore of Lake Iliamna.

Migrational patterns are not well documented. Wintering areas have varied in recent years, but normally late winter concentrations occur in the drainages of the Chilikadrotna, Mulchatna, and Koholitna Rivers. Prior to the turn of the century, this herd regularly crossed the Kvichak River and interchanged with the northern portion of the Alaska Peninsula herd. During the winter of 1972-73 approximately 3,000 caribou crossed the Kvichak and wintered below Igiugig. There has been no repeated major crossing since.

Data on the condition of the caribou range are lacking. The observed reproductive success and excellent physical condition of the animals in the harvest suggest the range is in good condition; however, continued herd growth could adversely effect the condition of the range. Predators do not appear to be having any significant impact on the herd at this

time although local residents are concerned about the effects of wolf predation. The number of wolves killed in the area used by wintering caribou has been high in recent years. Predation by wolves and bears may have an impact in the future, particularly if the Mulchatna herd declines significantly. No major outbreaks of disease have been reported, but disease could become a factor influencing the population and its subsequent management.

Hunting pressure on this herd has been low. Historically, the herd has been hunted by local residents, particularly from the villages of the Nushagak River and Lake Clark-Lake Iliamna area. A University of Alaska "subsistence survey" placed the harvest at just over 400 animals in 1974. The majority of the harvest occurs in the winter when dog sleds, snowmachines, and aircraft are used for transportation. Occasional caribou are taken at other times of the ear when locally available or when village activities allow hunting opportunity.

In the past access difficulties during the fall discouraged extensive sport harvest, and most sport hunting was by guided hunters. In recent years the number of guide operations within the area has increased and there has also been an increase in nonguided sport hunters from other areas of the state. The estimated sport harvest during the fall months is considered less than 200 caribou. In the past two years this herd has been subjected to a greatly expanded harvest level as a result of airborne hunting during the winter months. The proximity of its wintering grounds to the human population centers of the Cook Inlet area has made it readily accessible to ski-equipped aircraft. During periods of favorable weather and snow conditions, a large force of hunters has been transported into the area and hunter success has been high. Estimated harvest during the late winter period has been 1,250 to 1,500 caribou. The majority of this harvest has been by Alaskan residents living outside the range of the Mulchatna herd.

At this time the herd appears to be increasing in numbers, although the large harvest of the past two winters may have curtailed growth. Large antlered bulls are available and the area has produced good trophies.

PROBLEMS

* Development of hard mineral or oil resources within the range of the Mulchatna herd may prove detrimental to habitat or block traditional migration routes. The size of the population which would be compatible with remaining habitat could be lowered. The numbers of caribou then available for use by various segments of the public would be reduced. The Department should discourage development in all areas of critical habitat; large development elsewhere should be modified to minimize adverse effects on caribou.

* Harvest pressure can be expected to increase and may reach a level detrimental to the population. Restrictive big game seasons and bag limits in other areas of the state will encourage increased sport hunting of this herd. Continued human population growth, particularly if a large influx of persons enter the area as a result of mineral development, will also place a larger demand on the resource. The Department will then recommend that seasons, bag limits, and methods of hunting be altered to maintain the desired level and allotment of the harvest. The optimum population size for the Mulchatna herd should be identified and necessary adjustments in regulations should be made to achieve the desired level. A relatively stable population should be maintained with the reproductive capacity to provide for a liberal harvest.

* Continued growth of this population may eventually exceed the carrying capacity of the range. Emigration to other areas or

actual loss of animals to disease or starvation may occur. The Department will recommend that seasons, bag limits, and methods and means be regulated to produce a harvest level that will maintain the herd in balance with its habitat.

* A proposal to establish reindeer grazing in portions of this area might remove critical habitat from use by the Mulchatna caribou herd depending on where the reindeer were grazed. Free-ranging caribou may attract reindeer, causing losses to the reindeer herd. Such action would also cause dilution of the caribou gene pool. Past incompatibility of caribou with reindeer grazing has been documented in other areas of the state. Depending upon the areas utilized by the reindeer industry, the carrying capacity of the Mulchatna herd may be reduced and lower population size result. In addition, hunting of caribou in areas of reindeer grazing may be prevented, resulting in lower harvest and/or congestion of hunters in remaining areas. Efforts should be made to prevent reindeer grazing from being established in areas critical to the well-being of the caribou herd. Reindeer would also have to be carefully herded to prevent mixing of domestic stock with caribou. In addition, herds should be maintained at a level that will not result in deterioration of range. The Department should recommend that the reindeer be marked in a manner as to differentiate them from caribou. To implement these conditions, good liason and cooperation will have to be maintained with the reindeer industry.

* The transfer of lands to private ownership as a result of the Native Claims Settlement Act may seriously affect access or reduce the areas available for the public to hunt. As a result, hunting may be concentrated on remaining public lands. Concentration of hunters may result in local overharvest of some segments of the herd. 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. Appropriate restrictions on harvests will be implemented to prevent overharvests.

* The recreational harvest may reach a level that is incompatible with the needs of local residents to take caribou for domestic use. The Department will recommend that limits, or methods and means of hunting be altered to give local residents the most favorable opportunity to compete for the resource. Such regulations would be maintained so long as the demand for local use remains justified and the harvest level is not detrimental to the resource. However, demands for exclusive local use of the resource will not be met.

IMPACTS

* No deterioration of the range is expected if herd size can be regulated.

* Both domestic and recreational use of the resource will continue.

* Uncontrolled reindeer grazing will be discouraged in areas that would prove incompatible with caribou.

* Operational costs of resource development may be increased by stipulations imposed to protect caribou.

13. TOGIAK CARIBOU MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 17 draining into Bristol Bay between Cape Newenham and Kulukak Bay and including Kulukak Bay drainages.

MANAGEMENT GOAL

To provide for an optimum harvest of caribou.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Establish a harvestable caribou population by restricting the harvest.
2. Regulate hunting seasons, bag limits, and methods and means of taking caribou to provide for local use.
3. Control hunter distribution, if necessary, to direct harvest efforts at specific segments of the population.
4. Maintain a minimum post-hunting season population sex ratio of 25 bulls per 100 cows.

THE SPECIES

At present this area does not have a population of caribou, although suitable habitat appears available. Local villages in this area have a high domestic use demand for meat which exceeds the availability of other local large game animal populations. The establishment of a caribou herd in this area could help provide for this demand as well as provide new recreational opportunities for nonresidents of the area.

PROBLEMS

* The presence of absence of suitable habitat to maintain a viable caribou herd has not been determined. Studies should be conducted and the future of proposed management based upon a determination that suitable range exists.
* Establishing a caribou population will be difficult if any caribou are killed before the herd establishes a home range and demonstrates a herd cohesiveness and reproductive capability of a viable population. Seasons would have to be closed until harvest was biologically desirable; the cooperation of local residents would be required to prevent losses to the herd through illegal hunting.
* Private lands may not be open to public use. Cooperative agreements with private land owners would need to be obtained to allow adequate harvesting opportunity by any member of the public during legal seasons if a herd is to be established on private lands.
* Reindeer grazing may be established in this same area and would conflict with a free-ranging caribou population. If reindeer grazing is established, plans to establish caribou should be abandoned.
* Development for oil or mineral resources may adversely impact caribou habitat. Attempts will be made to minimize the impact of

such development. Cooperation of both private land owners and the industry will be sought.

* The Mulchatna caribou herd may establish regular migratory use of this area, making it unfeasible to establish a resident herd. Separate management for this area would then be rescinded and that for the Mulchatna herd applied.

* Domestic use by local residents and recreational use by others may be in conflict. Harvest opportunities for both uses shall be provided, but domestic use shall have priority. Regulations may be established that enable use by local residents to be competitive with recreational use.

IMPACTS

* A viable resident caribou herd may be established in presently unused habitat to provide for both domestic and recreational use.

* The habitat within the area would be altered by its utilization by caribou. The herd size shall be regulated at a level below the carrying capacity of the area in order to avoid range damage associated with wide fluctuations in caribou numbers.

* Operational costs of resource development may be increased by stipulations imposed to protect caribou.

15. CENTRAL ALASKA PENINSULA CARIBOU MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, that portion of the Alaska Peninsula south of the Kvichak and Alagnak Rivers, Kukaklek Lake, Battle Lake, McNeil Lake and River, to a line drawn between the head of Port Moller Bay on the Bering Sea side and American Bay on the Pacific side, except for Katmai National Monument.

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. Maintain a pre-calving caribou population of 10,000 to 13,000 caribou.
2. Harvest the annual increment of caribou to the population.
3. Control hunter distribution and methods of hunter transport, if necessary, to distribute hunting pressure through the area and to maintain desired harvest levels.
4. Maintain a minimum post-hunting season sex ratio of 25 bulls per 100 cows.
5. Regulate hunting seasons, bag limits and methods and means of taking caribou, if necessary, to provide for local use.

THE SPECIES

This area contains the largest single segment of the Alaska Peninsula caribou population. Numbers have fluctuated widely in the past with an apparent peak population just prior to the turn of the century and another of about 20,000 caribou in the early 1940's. The last population low occurred during the late 1940's when the U.S. Fish and Wildlife Service estimated only 2,000 caribou. Since that time the herd has experienced steady growth. A 1975 census indicated approximately 13,000 caribou in the population.

The primary calving ground is on the Bering Sea Flats near Ilnik. In recent years a secondary calving ground has been established near the mouth of Cinder River. Also, small bands of caribou calve at scattered locations throughout the area. The herd is presently experiencing high reproductive success. A June 1975 census indicated between 48 and 60 calves per 100 cows. In addition, a November 1975 count indicated that summer calf mortality was very low. High reproductive success and good yearling survival are indicative of a range in good condition.

Migration patterns have been increasingly erratic in recent years. Animals now regularly spend the summer and fall in the Pacific drainages. The "traditional" migration path along the Bering Sea flats is used sporadically and the herd appears to be spending increasing time in the foothills of the Aleutian Range. The break in the migratory paths

identified for this group of caribou in the late 1950's and early 1960's is considered to be a reflection of the relatively high population density. Continued growth may be detrimental to carrying capacity of the range.

The effect of predators on this herd are unknown at this time, although wolves and brown bear are known to feed on caribou. In 1968 a major infection of "hoof rot" occurred in this area. An estimated 2,000 caribou died directly or indirectly of the disease. Undocumented reports indicate that a condition of freezing rain ""silver thaw") may occasionally coat the tundra in a layer of ice thick enough to prevent feeding. In such a case a large proportion of the herd may starve in a single winter. However, such mortality has not been documented with certainty in this herd.

Hunting pressure on caribou in this area is moderate to high as it is the area most readily accessible to visiting hunters. Most of the harvest now occurring is from trophy or recreational hunters, although there is a substantial harvest for domestic use. A major portion of the Alaska Peninsula guide industry utilizes this area. In recent years the area has become increasingly popular with hunters from the more heavily settled areas of the state. Selection for bulls by trophy and recreational hunters has altered the bull-cow ratios. In the fall of 1970 the herd had 59 bulls per 100 cows, but by 1975 the retio had dropped to 33 bulls per 100 cows. The majority of the Alaska Peninsula caribou in the Boone and Crockett record book were reported from this area. Nine communities on the Alaska Peninsula harvest this segment of the herd for domestic use. A University of Alaska subsistence survey in 1974 indicated a harvest of approximately 560 caribou for domestic use. The estimated annual harvest from all sources is 1,500 to 2,000 caribou annually. Precise harvest data are lacking due in part to the lack of a harvest report requirement.

The majority of the range of this group of caribou is still wilderness and unaltered by development. Access is primarily by light aircraft. Some strips for larger aircraft exist as a result of exploratory oil work, but most landings are on water surfaces, beaches, or natural pumice patches and gravel bars. Tracked vehicles are locally important in some guide camps. Local residents frequently use snow machines or boats to facilitate harvest. Hunting aesthetics within the area remain high.

PROBLEMS

* Continued population growth may exceed the area's carrying capacity and result in range deterioration. Liberal seasons and bag limits should be maintained to encourage a harvest level that will keep the herd at approximately 13,000 caribou.

* Weather or disease may substantially reduce the population. Emigration to other areas, harvest, or poor reproductive success may also result in low numbers. Restriction in season and bag limits will then need to be applied to re-adjust harvest to a level that would allow for desired herd growth.

* Continued selection for males by recreational and meat hunters may significantly reduce the number of males in the population. Shed-antler males should be protected from harvest during the winter season and the bag limit restricted during the fall period when the greatest harvest of males occurs.

* Loss of public hunting access to lands transferred to private ownership or incorporated into National Parks or Refuges may concentrate hunting on remaining public lands. The resulting concentration of

hunters may result in over-harvest of segments of the population. The Department should enter into cooperative agreements with land controlling agencies to maintain public hunting in as much of the area as possible. 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. Seasons, bag limits, or methods and means may be restricted to prevent over-harvest if hunter pressure becomes excessive.

* Development of oil and mineral resources may adversely impact habitat or block migration routes, thereby reducing the usable habitat available to the caribou population. Landing strips, roads, or population centers associated with development may encourage excessive harvest. The Department should recommend controls on development that will minimize these adverse impacts.

* The re-establishment of a reindeer grazing industry would create a situation where reindeer would occupy range utilized by caribou or block migration paths. Free ranging caribou would attract reindeer, causing losses of reindeer to the industry and, at the same time, causing dilution of the gene pool of the caribou population. The Department should discourage the establishment of reindeer grazing in any area vital to caribou. If reindeer were established on public lands, close herding of reindeer to minimize reindeer-caribou conflicts should be required.

* Recreational harvesting of caribou may lower success of local residents in their efforts to obtain sufficient caribou to fill legitimate domestic needs. Local residents may insist that the resource be managed exclusively for domestic use. The Department will recommend regulations to provide for both uses at a harvest level compatible with the desired population level of caribou. When necessary, regulations favoring domestic use would be applied, but at no time would the level of harvest be permitted to be detrimental to the herd's well being.

* Harvest levels are not adequately documented. With increased pressure, it will be necessary to accurately identify the level and distribution of harvest. The Department will devise a program for legally requiring harvest information from hunters.

IMPACTS

* A pre-calving herd of 10,000 to 13,000 caribou would be maintained, barring natural catastrophy.

* Range would be retained in a condition which would provide for a healthy, highly productive population of caribou.

* Liberal season length would provide for both domestic and recreational use of the resource.

* The adverse impacts of mineral, oil, or reindeer developments would be minimized and a healthy herd maintained.

* Public lands available for reindeer herding will be limited. In areas where reindeer are permitted, herders will be required to practice close herding practices.

16. SOUTHWESTERN ALASKA PENINSULA CARIBOU MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 9 on the Alaska Peninsula south and west of a line drawn from the head of Moller Bay on the Bering Sea side to the head of American Bay on the Pacific side, and in Game Management Unit 10, Unimak Island.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOALS

To provide an opportunity to take large-antlered caribou.

To provide the greatest opportunity to participate in hunting caribou.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Establish early hunting seasons for aesthetically pleasing hunts and establish late seasons to allow for local use.

2. Restrict methods of hunter transport, if necessary, to maintain aesthetic hunting conditions.

3. Maintain a minimum post-hunting season population sex ratio of 40 bulls per 100 cows.

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

THE SPECIES

This area contains two major populations of caribou. One is on Unimak Island and the second extends northeast on the Alaska Peninsula to the west side of Moller Bay. Prior to the turn of the century interchange between these two groups was documented but no documentation of such movements exists in recent years. There is no evidence of any interchange of the mainland group with other caribou populations further to the northeast, beyond Port Moller Bay. Both groups of caribou within the Southwestern Alaska Peninsula area appear to be increasing in numbers and the geographic isolation of the two may not be maintained in the future.

Historically, the size of the mainland population has fluctuated widely. Population highs apparently occurred prior to the turn of the century and again in the late 1920's. The most recent population low occurred in the late 1940's or early 1950's when the U. S. Fish & Wildlife Service estimated about 500 animals present. The population has been increasing since the 1960's and in 1976 was estimated at 4,000 animals. The causes of low populations have not been documented but a reported condition of freezing rain which encases the tundra in ice may occassionally cause massive mortality during a single winter. Predation by wolves and brown bear is not considered significant at this time. Some caribou losses did occur from a minor outbreak of "hoof rot" during the late fall of 1975.

This group of caribou calves in the eastern portion of the area near the Black Hills and the Caribou River. It is currently experiencing good reproductive success with 49 calves per 100 cows observed in June 1971. Data are lacking on range conditions, but the high reproductive success and reported good physical condition of animals in the harvest suggest the range is in good condition. Continued growth of this population of caribou appears probable.

Population fluctuations of caribou on Unimak Island have closely coincided with changes in caribou numbers on the nearby Alaska Peninsula. This would seem to indicate that similar mortality factors have affected both populations. The most recent population low also occurred in the late 1940's or early 1950's when the U.S. Fish & Wildlife Service estimated less than 500 animals on the island. By the mid-1960's an estimated 1,500 animals were present. In 1976 the Unimak caribou population was considered to be in excess of 5,000 animals.

Calving on Unimak Island occurs in the eastern portion of the island. Specific data on reproductive success are lacking, but calving generally occurs one week later than for mainland populations. Data on range conditions are lacking.

The harvest of caribou from Unimak Island is low, with estimates of less than 100 animals annually. Similarly, hunter harvests are low on the adjacent mainland population, estimated at less than 200 caribou annually. Most of the harvest of these caribou is by local residents. The harvest by guided nonresidents is small. The low resident population at False Pass, Cold Bay, King Cove, and Nelson Lagoon have only a minor impact on the caribou resource. The majority of hunting by local residents occurs on an "as available" opportunity basis. Beause of the cost of logistics to and within the area, use by hunters from outside the area is light and usually is concentrated during the traditional September-October hunting period. The area lacks roads and has few man-made landing areas for light aircraft. As a result, most transportation is by aircraft landing on water surfaces, beaches, or natural landing sites. Local residents hunt primarily from boats or use vehicles to travel the limited roads or along the beaches. Because of the low harvest level, large-antlered males are available for trophies on both Unimak Island and the mainland.

Unimak Island is part of the Aleutian Island Refuge System and Izembek National Wildlife Range occupies significant acreage in the Cold Bay area. In both of these areas, the U. S. Fish & Wildlife Service has imposed additional restrictions on methods of transportation. These restrictions make it unlikely that a sufficient concentration of hunters would occur that would be imcompatible with management objectives, except in the immediate area of Cold Bay.

PROBLEMS

* Large losses from disease or from freezing rain conditions which coat the tundra with ice may occur. Should significant reductions in population sizes occur, the Department will recommend that seasons and bag limits be reduced to restrict or eliminate human harvest until conditions have allowed population recovery.

* The continued growth of the caribou population on both the mainland and Unimak Island may exceed the carrying capacity of the range. Emigration to other areas and/or actual loss of animals through mortality may occur. The Department will then recommend that seasons and bag limits be altered to insure that human use of the resource is not detrimental to the remaining population. The projected hunting pressure in the immediate future is not capable of regulating the population size at the maximum level compatible with its habitat.

* Development of oil and mineral resources may have impacts incompatible with the maintenance of a productive, free-ranging caribou population. Pipelines and roads may block traditional migration routes. Associated development may increase hunter access and/or hunter numbers to the point that harvest may be excessive. Under such conditions the Department would recommend that restrictive regulations be implemented to insure that the harvest level does not exceed the productive capacity of the caribou population. Hunting could then be utilized to regulate the populations at levels compatible with their habitat and regulated herd sizes would become a management objective.

IMPACTS

* Proposed management will have little effect on the caribou population on either Unimak Island or the western tip of the Alaska Peninsula. Numbers of animals will fluctuate naturally in response to factors other than harvest by man.

* Trophy hunting with selection for mature bulls may alter the sex ratio, particularly of the mainland population. However, at the present level of harvest, such effects would be minor.

* Hunting conditions shall remain basically wilderness with high aesthetic qualities.

17. ALEUTIAN ISLANDS CARIBOU MANAGEMENT PLAN

LOCATION

In Game Management Unit 10, Umnak, Atka and Attu Islands.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting caribou.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Encourage greater utilization of Aleutian caribou populations.

THE SPECIES

Feral reindeer occur on Umnak, Atka and Attu Islands. Data are lacking for present population sizes or trends on any of these islands. Large predators are absent, so fluctuations in numbers occur in response to range condition and/or disease. Because of the low human population in the area, harvest has only a minor impact. Specific harvest data are lacking.

Regulations governing hunting feral reindeer on these islands are the most liberal in the state. Wide fluctuations in numbers of animals are expected and it is doubtful human harvest can influence present population trends. Local domestic use shall continue as the primary use of the resource. Cost of logistics to and within the area makes recreational and trophy hunting insignificant.

PROBLEMS

* Unregulated population growth of reindeer shall damage the limited range of these island populations and drastic reduction in reindeer numbers can be expected. No efforts shall be made by the Department to modify or minimize these natural fluctuations.

* Access to the area is costly and difficult. The availability of the resource is almost unknown to the public. Efforts should be made to publicize the availability of these populations and encourage use.

* Reindeer populations on Umnak Island may conflict with range use by domestic sheep. Liberal seasons and bag limits shall be maintained to encourage reindeer harvest in order to minimize conflicts. The State will not control or fence reindeer populations to benefit sheep ranching.

IMPACTS

* Reindeer populations will fluctuate naturally in response to factors other than human harvest.

* The primary use of the resource shall be to provide domestic use for local residents and commercial fishermen.

18. ADAK CARIBOU MANAGEMENT PLAN

LOCATION

In Game Management Unit 10, Adak Island.

PRIMARY MANAGEMENT GOAL

To provide for an optimum harvest of caribou.

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a pre-calving population of 240-250 caribou until it is demonstrated that a larger population can be regulated below carrying capacity levels by available hunting pressure.

2. Control methods of hunter transport, if necessary, to maintain desired harvest levels and to maintain aesthetic hunting conditions.

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

THE SPECIES

Caribou on Adak Island are the result of a cooperative transplant program between the U.S. Fish and Wildlife Service, the U. S. Navy and the Alaska Department of Fish and Game conducted in 1958 and 1959. Twenty-four caribou were released and became the nucleus of the existing herd. By 1967 the herd had grown to 189 animals and recent population estimates place the herd in excess of 350 caribou. The herd is experiencing high reproductive success and apparently the range is in excellent condition. The area occupied by the caribou herd remains wilderness with high aesthetic quality. No large predators exist on the island and indications are that these caribou are relatively free of the disease and parasites reported in mainland populations. Hunting is the best available method for stabilizing the population and preventing the extreme fluctuation in numbers that have characterized other island reindeer populations.

The first hunt occurred in 1964 with a maximum of ten permits issued for bull caribou only. As the herd increased in size, harvest quotas and season lengths were liberalized to allow additional hunting. From 1972 through 1974 the harvest averaged nearly 100 animals annually while the harvest approached 150 animals in the 1975-76 season. Hunting is by persons associated with the Naval base on Adak. Harvest is monitored by personnel of the U.S. Fish and Wildlife Service and the U.S. Navy, and if necessary, the season is extended or shortened by emergency order under the authority of the Department of Fish and Game.

PROBLEMS

* Inadequate harvest may result in a population level above which available hunting pressure cannot prevent undesired additional growth. Unchecked growth would ultimately result in range deterioration and a significant decline in caribou numbers. Demands to increase the herd to a higher population level that would temporarily result

in higher hunter success and a larger total harvest should be resisted. If necessary, a temporary program to remove excess animals may be implemented to reduce the herd to the desired level.

IMPACTS

* By maintaining population levels below the carrying capacity of the island, range quality will remain high and the caribou can be expected to maintain high reproductive success.

* Liberal seasons and bag limits shall encourage sport hunting to achieve the desired reduction, but control by the Department will be applied if necessary.

* Caribou use of the range will be at a level well below the island's carrying capacity. Range deterioration will be limited to areas of concentrated use and will not have any significant impact on the caribou population or the overall carrying capacity of the range itself.

* Recreational opportunity shall be maintained for residents of Adak Island.

* Hunting conditions shall remain basically wilderness with high aesthetic qualities.

DALL SHEEP IN SOUTHWESTERN ALASKA

In Southwestern Alaska, Dall sheep (*Ovis dalli*) occupy alpine portions of the western slope of the Alaska Range from the head of Lake Clark northward. Population surveys have been limited in this area, but a count conducted in 1967 showed a minimum of 258 sheep between Lake Clark and Two Lakes.

Dall sheep were introduced to Kodiak Island with releases of 13 sheep in 1965 and 2 sheep in 1967. Initial heavy mortality and subsequent lack of observations suggested the transplant attempt had failed. However, in the winter of 1974, seven sheep, including one adult ram, two lambs, and four ewes, were observed near the head of Zacher Bay. Habitat on Kodiak Island is believed to be marginal for sheep due to unfavorable snow accumulation, and it remains to be seen whether a viable sheep herd will become established.

Like most northern ungulates, Dall sheep 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. It is probable that herds in Southwestern Alaska reached a peak in the late 1960's, as did sheep herds elsewhere in the state. Since this region contains the southernmost limit of Dall sheep habitat in the Alaska Range, a limit probably imposed by snow depth, it is expected that sheep numbers would fluctuate more than in more suitable habitats to the north. Reports by local residents suggest the population in the Lake Clark-Twin Lakes area may have been reduced during the severe winter of 1969-70. Additional population data are unavailable, but harvest information suggests that the population is again increasing in the area.

Dall sheep are largely animals of alpine habitat. 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 predator attack. Upon completion of lambing, the ewes and young follow the retreating snowline upward and move onto summer ranges. Rams may preceed ewes by several weeks in moving to summer range.

Subsequent to lambing, sheep use natural mineral licks extensively. Several such licks are 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 distribution, particularly in the southern limits of Dall sheep range where heavy snow accumulation occurs 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 populations.

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 winter 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 Southwestern Alaska.

Sheep harvests in this relatively small portion of Alaska's sheep range have increased gradually over the past 13 years during which harvest data have been available. Although sheep harvests have often fluctuated in relation to weather during sheep hunting seasons, a distinct peak was reached in this region in 1968, followed by a decline in 1970 and then a steady rise until 1975. This pattern possibly reflects the 1969-70 population decline as well as increasing hunting pressure in the region. The average annual harvest over the past 13 years was 11 rams, while 18 were taken in 1975. Nonresident hunters took 59 percent of the harvest in 1975 although they constituted only 34 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 number of hunters utilizing the Alaska Range west of Mt. McKinley National Park has been increasing steadily, while hunting success has been decreasing. This increased hunting pressure may possibly cause the number of large rams to decline 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. However, the average age of rams taken in recent harvests remains above the average age required to reach full-curl in this region. This indicates that sufficient older rams still remain to allow hunters to be selective for large animals rather than merely taking the minimum legal size.

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.

Although nonconsumptive uses of Dall sheep are important in other areas of Alaska, little such use occurs in Southwestern Alaska due to its inaccessibility to the general public.

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 most 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 herds in other regions 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 an imbalance in sheep sex ratios in many herds. Since some sheep populations may be near the carrying capacity of the range, an imbalance in sex ratios coupled with heavy hunting pressure results in less rams being available to hunters. Additionally, since relative densities of sheep populations are probably high, the production and survival of lambs probably is low, as it is elsewhere in Alaska under similar conditions. Low lamb survival in turn results in relatively few legal rams being recruited into the population. Management of harvests providing the option for either-sex hunting would benefit use significantly as well as benefit the resource. Harvests of either sex would allow more animals to be taken. Reduction in population density

would improve lamb production and survival, as well as possibly decreasing 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.

* Population fluctuations will probably be more frequent and severe in Southwestern Alaska than in other parts of the state due to variations in winter snowfall which are, in turn, related to the maritime influence. Snow depths above the tolerance level for Dall sheep probably restrict distribution south of Lake Clark, and probably cause changes in distribution and abundance at this edge of their range that are of a greater magnitude than found in Interior herds.

12. FAREWELL SHEEP MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 9 draining into Lake Clark east of and including the Tanalian River, and draining into Cook Inlet north of the Johnson River; that portion of Game Management Unit 17 drained by the Chilikadrotna and Mulchatna Rivers east of the outlet of Turquoise Lake; and that portion of Game Management Unit 19 including the area lying east of a line drawn from the northwest corner of Mt. McKinley National Park west southwest to Farewell, west to Lone Mountain, and south southeast to the confluence of the Telaquana River and Trail Creek, and the area drained by Trail Creek.

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. Develop hunter access, if necessary, to distribute hunting pressure through the area.

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

THE SPECIES

Little information is available regarding past sheep populations in this area. Local residents report sheep were not abundant during the 1940's, but became more numerous during the 1950's and 1960's. After 1968 the sheep population declined somewhat during a series of severe winters. The Farewell sheep population shows signs of good recovery from this setback. Aerial surveys of sheep in this area during the summers of 1972 and 1973 suggested the population may exceed 2,000 animals. Composition data from both years indicated rams composed about 25 percent of the herd. Roughly 10 percent of the sheep observed were 3/4 curl rams or larger. Summer lamb:ewe counts in 1972-75 ranged from 20 lambs to 60 lambs per 100 ewes, with low values in 1972 and 1973 following severe winters and delayed springs. Range conditions in the Farewell area are poorly understood, but a ground reconnaissance of the heavily used lambing and wintering area in the Sheep Creek drainage indicated there has been some range damage occurring from heavy use. Another important lambing and wintering area occurs along the headwaters of the Tonzona River. Range conditions in this section are not presently known.

Sheep hunting became popular in the Farewell area in the early 1960's, and hunting pressure has increased to moderate or heavy levels in much of the area. Harvests have ranged from 24 sheep in 1962 to 119 in 1974. Since 1973 more than 200 hunters have hunted in the area each year. The harvest is fairly evenly distributed through the 42-day season.

Hunter success has ranged from 70 to 49 percent, depending on weather conditions. Although resident hunters outnumber nonresident in most years, more than half the harvest is taken by nonresidents. Higher

success by nonresidents results from the requirement that they be accompanied by guides. About 15 guides operate in the area.

The sheep harvest has not significantly reduced the availability of legal rams except in some heavily hunted drainages. Sheep in some drainages rarely see hunters due to problems of access. Hunters have taken many trophy sheep from the area, including several rams exceeding 42 inches in horn length. Horn curl sizes have averaged about 34.0 inches over the past 10 years.

Access into the area has been primarily by aircraft, with 90 percent of the sheep being taken by airborne hunters. A few hunters utilize horses, boats, and all-terrain vehicles. There are few differences between local, nonlocal, and nonresident means of access.

Domestic use of the Alaska Range sheep was important to villagers of Nikolai and Telida prior to 1955. Hunting usually took place after the first snowfalls in mid-October or early November. Travel was by dog team and the meat was hauled back to the villages by sled.

PROBLEMS

* Much of the Farewell area is highly mineralized and will be subject to increased prospecting and mining activities in the near future. The Sheep Creek area, an important sheep lambing and wintering area, has been heavily staked with discoveries of extensive ore bodies. In addition to disturbance of sheep in critical habitats, mining activity may increase access into the Farewell area, and will result in a deterioration of the wild character of the area. Important sheep habitat within the Farewell area should be identified and mining activities should be regulated to minimize disturbance to sheep. Restrictions on developmental activities may be necessary to minimize environmental degradation.

* Hunting pressure has been concentrated near relatively few unimproved bush airstrips. Availability of rams in proximity to access points is reduced and crowding of hunters detracts from aesthetic enjoyment of hunters. The Department may develop additional access strips to reduce hunter crowding and to distribute the harvest through the area.

* Development of a proposed road from Anchorage to McGrath through Rainy Pass and down the South Fork of the Kuskokwim River would open the area to increased hunting pressure and use of all-terrain vehicles. The number of hunters in heavily hunted portions of the area will be controlled by permit. Off-road vehicle restrictions would be necessary in areas accessible by road.

* Portions of the upper Tonzona River drainages have been recommended for inclusion in the proposed Mt. McKinley National Park extension. The Tonzona drainage is an important lambing area in addition to supporting a significant population of sheep, and its inclusion into a national park will substantially reduce hunting opportunity in the Farewell area.

IMPACTS

* Permits will be used to control hunter density.

* Productivity and survival of lambs should improve as range conditions improve.

* Restrictions in some drainages on mechanized transport while hunting will improve aesthetic hunting conditions.

* Guides and outfitters may be affected by restrictions on numbers of hunters and controls on hunter transport.

* Development of more aircraft access strips should help relieve the present problem of hunter concentration around a few localized areas.

* Some seasonal or spatial limitations on mining activity in important sheep habitat may be recommended.

MOOSE IN SOUTHWESTERN ALASKA

Moose (*Alces alces*) are found throughout most of the Southwestern Alaska mainland below elevations of 5500 feet. Prior to 1900 moose were rare in the southern part of the region, although they were beginning to filter south and west from the Lake Clark-Lake Iliamna region. During this early expansion moose reached the Katmai area by 1910 and extended south to Black Lake by the early 1940's. Nearly all suitable habitat on the Alaska Peninsula was occupied by the early 1950's, with major concentrations extending from Katmai Monument south to the Meshik River. South of the Meshik drainage to Port Moller moose populations have never become as dense as populations to the north. Few moose exist south of Port Moller. Cook Inlet drainages north of Katmai and those in the vicinity of Iliamna Lake and Lake Clark have fair numbers of moose, but substantially less than areas further south. Bristol Bay drainages from the Mulchatna River west have few moose; these are found primarily along stream bottoms and in the foothills of the Alaska Range.

Moose populations in the central Alaska Peninsula peaked during the mid-1960's and have declined from one third to one half since that time. Populations in Cook Inlet drainages and in the Iliamna Lake region north of Katmai are reduced from peak levels of the 1940's and 1950's and are presently stable at relatively low densities. Moose were relatively abundant in the Wood River-Tikchik Lakes area in the mid-late 1950's, but in other northern Bristol Bay drainages moose have not been abundant and are presently static at a low level.

Major factors causing the decline in the central Alaska Peninsula area are believed to be habitat related. Deficiencies in habitat are generally manifested by the scarcity of essential browse during the critical winter months. The lack of variety of browse species has historically limited the moose to two preferred species of willow. With those species presently greatly reduced due to prior over-utilization it is possible that food quality is now low even during the prewinter months of October and November. Consequently moose may not be in good condition at winter's onset and their condition then continues to decline until spring. Cows debilitated by poor nutrition may give birth to weakened offspring which they cannot adequately feed or that prove highly vulnerable to predators. Such is apparently the case on the central Alaska Peninsula since spring surveys indicate the lowest summer calf:cow ratios in the state. Mid-June averages over the past 5 years have been only 21 calves per 100 cows. Additional calf mortality throughout the first year of life, such as starvation, predation, and various other factors result in very few yearling moose being added to the population. Such extremely poor recruitment, in addition to natural losses and hunting mortality among adults, has resulted in significant population reductions.

Moose in the Cook Inlet drainages and the Iliamna Lake area north of Katmai have been utilized by local village residents since moose first became available. Recreational hunting for both meat and trophies by other than local residents has been popular since the mid-1950's. Several professional guides operate within the area. Annual harvests over the past several years have averaged slightly less than 100 moose, 75 percent of which were bulls. In 1975 a shortened season and no antlerless hunting resulted in a harvest of only 34 bulls. Aircraft and boat travel are the most popular means of transport for hunters.

Moose in the Bristol Bay drainages from the Mulchatna River west have been harvested by local village residents over the past several decades. Only bull moose may be legally taken. Moose numbers in the vicinity of all villages are presently reduced as a result of overharvesting of all sex and age classes during the late winter and spring by local residents. This harvest goes unreported and is suspected to exceed the known reported

sport harvest by several fold. During recent years recreational hunting by other than local residents has become increasingly popular and presently accounts for most of the reported harvest. Sport harvests have increased greatly in the past 2 years due to a shift in hunting pressure from the central Alaska Peninsula area, where a lack of trophy moose and shortened seasons forced hunters elsewhere. Between 1964 and 1973 an average annual harvest of only 34 moose were reported in the northern Bristol Bay area, with harvests never exceeding 42 per year. In 1974 and 1975, 69 and 115 moose, respectively, were taken. Actual harvest levels are substantially higher than records indicate because of the unreported kill by local villagers. Aircraft and boat travel are the most popular means of transport for sport hunting while snowmachines are important in the illegal winter harvest. Several professional guides are active in this area.

Moose populations from Katmai National Monument south to Port Moller have been heavily utilized by nonlocal hunters since the late-1950's. The area supports a substantial and very active guide industry, particularly south of King Salmon. Village residents also harvest some moose for domestic use, many of which are not reported. During the 1960's and early 1970's the area supported perhaps the finest trophy moose population in North America. Most of the largest antlered moose ever killed came from the Alaska Peninsula.

Greatly increased hunter pressure (over 800 hunters both in 1973 and 1974), with greater than 70 percent success, resulted in harvests averaging 650 moose (one-third females) during 1973 and 1974. Large harvests coupled with poor recruitment of adults has resulted in a marked reduction of moose. Ratios of bulls older than yearlings have declined from a high of 80 bulls per 100 cows in 1963 to a low of 17 bulls per 100 cows in 1974. Very few extremely large bulls have been harvested during the past 2 years. Recent prohibitions on hunting moose the same day airborne, shortened seasons, and restrictions on shooting moose with antler spreads less than 50 inches, should increase the availability of trophy bulls within the limits that poor recruitment allows. Aircraft are the most popular means of transport for sport hunting but some guide operations make extensive use of all-terrain vehicles.

PROBLEMS

* An influx of people associated with Outer Continental Shelf Oil development or nearshore or onshore oil and mineral development will contribute significantly to the hunting pressure on local game populations. Subsequent major developments in transportation would substantially alter the access patterns and would greatly increase pressure on populations adjacent to transportation corridors. As pressures increase on the moose resources of this region it will be necessary to further restrict hunters and hunting seasons in the area.

* Hunting may be excluded by statute from several large areas in Southwestern Alaska. Possible extentions of Katmai National Monument, establishment of Lake Clark National Park and Wood River-Tikchik State Park are potential areas for exclusion of moose hunting. Transfer of title for several hundred thousand acres of land to village and regional corporations under terms of the Alaska Native Claims Settlement Act may significantly reduce public hunting opportunity in much of this region since the majority of hunters come from outside the region. The Department should advocate retention of hunting opportunity on all public lands. Public access across private land for the purpose of hunting should be maintained to allow the use of adjoining public lands.

* Populations of moose may decline in many areas to the level where they can no longer support established consumptive use. As the resource declines various segments of the public can be expected to demand management of the resource for their exclusive benefit. In some instances the level of demanded use may exceed the capability of the population to support harvest. Harvest should not be allowed to exceed limits imposed by sound biology. The priority uses of the resource will be established after evaluating public demands, herd status, and the relationship of management to moose management elsewhere in the state. Established management should be altered only if it is in the best interest of the resource.

34. KVICHAK-MULCHATNA MOOSE MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 9 north of the Egegik Bay drainages except Katmai National Monument, and all of Game Management Unit 17 except the Lower Nushagak-Wood River-Togiak Moose Management Plan area.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control access, number and distribution of hunters, and methods of hunter transport, if necessary, to distribute hunting pressure throughout the area.

2. Regulate hunting seasons, bag limits, and methods and means of taking moose, if necessary, to provide for local use.

3. Harvest antlerless moose, if necessary, to maintain the population in balance with its habitat.

4. Maintain a post-hunting season population sex ratio of no less than 25 bulls per 100 cows.

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

THE SPECIES

Moose numbers were reportedly high in the Lake Iliamna-Cook Inlet watershed during the 1940's. They have since declined and the area now (1976) has a low density population that appears to be relatively stable. Data are lacking on moose in the upper Nushagak and Mulchatna watersheds, but populations there also appear to be relatively stable at a low density. Areas of concentration have been located near Big Mountain, Chekok Creek, the Tikchik Lake system, and the upper Mulchatna-Chulitna Rivers area. The estimated population within the Kvichak-Mulchatna area is about 1,500 moose.

Both wolves and brown bears prey on moose. At the time of this report predation is not considered to have a significant impact on the population. However, residents of the Nushagak River drainage have expressed concern about the impact of wolf predation and have requested wolf control or more liberal harvest regulations on wolves.

The area is hunted primarily by Alaskan residents. Nonresidents have taken only 28 percent of the reported harvest since 1969. In recent years, the area has become more popular with hunters other than local residents, and harvests have been increasing. The annual kill in lower Cook Inlet has averaged 132 moose since 1969. Reduced seasons during the 1975-1976 regulatory year lowered the kill to only one-half that average. The upper Mulchatna River drainages had low annual harvests until 1975 when hunting pressure increased as a result of restrictive

seasons elsewhere in the state. That year the reported harvest increased to 71 moose, a sharp increase from the 6 moose reported taken in 1974. Current harvests are probably approaching maximum levels.

The Kvichak-Mulchatna area has a well-established guiding industry, but emphasis is on sport fishing (23 active sport fishing lodges). Many guides also offer big game hunting to their clients. Pressure from nonresident hunters will increase in the future. In addition to moose, the area also has brown bears, black bears, caribou, and Dall sheep. Multi-species hunts are popular with both residents and nonresidents.

The majority of the reported harvest is by residents living in urban areas of the state. Additional moose are taken by local residents and never reported. The villages of Levelock, Igiugig, Newhalen, Kokhanok, Pedro Bay, and Nondalton reported a harvest of 98 moose for domestic use in 1973 according to a survey by the University of Alaska. Although not located entirely within the proposed boundaries of this management plan, the same survey indicated 113 moose were taken by villagers living along the Nushagak River. The percentage of this harvest that occurred in the Mulchatna and upper Nushagak drainages is unknown. The importance of moose as a meat animal is clearly reflected by the high reported antlerless harvest for lower Cook Inlet: 36 percent of the animals reported harvested since 1969 have been antlerless.

Transportation within the area is primarily by light aircraft. Boats are used along the waterways and in the major lakes. During the winter, snow machines are widely used by local residents. The area is essentially wilderness. The impact of oil exploration and mineral development has been minimal. Test holes have been drilled at one location in Cook Inlet and a few small claims are being worked. It is probable that resources will be developed in the future and such development may affect moose habitat or hunting pressure. Roads within the area are now limited to local service roads and a single road connecting Lake Iliamna to Cook Inlet. Proposals to tie the existing system into the main state highway system could significantly alter the existing transportation patterns, cause an influx of people into the area, and drastically alter the economy and life style of the area.

PROBLEMS

* Oil and mineral exploration and development may increase access and prove detrimental to moose habitat. Development will be discouraged in critical habitat and hopefully modified elsewhere to minimize adverse impacts. Restrictive regulations governing hunting may be applied to adjust harvests if improved access results in excessive harvests.

* Land in private ownership or controlled by the National Park Service, other federal agencies, or state parks may be closed to public hunting, or access across these lands for hunting on adjoining lands could be prevented, thereby concentrating hunting pressure on remaining land, possibly resulting in overharvests of local moose populations. Much land in the Lake Iliamna and lower Lake Clark area will be transferred to private ownership under terms of the Alaska Native Claims Settlement Act. If established, a national park in the Lake Clark-Mulchatna River area would probably be closed to recreational hunting. The possible inclusion of a federal fish refuge in the Lake Iliamna area could also affect resource management depending upon priorities established by the administering agencies. The creation of a proposed state park in the Wood River-Tikchik Lakes area may also reduce recreational and domestic hunting opportunity. Primary efforts of the Department will be to maintain access to the moose resource. Hunting regulations will be modified as necessary to prevent overharvests of moose.

* Methods used for moose hunting may be incompatible with management of brown bears. Separate seasons may be maintained for the two species, or moose hunting regulations will be adjusted to be compatible with those for brown bears.

* Segments of the public may willfully ignore hunting regulations to insure hunter success. Regulations governing hunting will be vigorously enforced.

* The area may be joined to the main state road system by road construction and/or marine highway system additions. The influx of persons, increased recreational use and increased access would undoubtedly alter the existing life style. Management plans would be re-evaluated and regulations altered to respond to changing demands on the resource.

IMPACTS

* Local domestic requirements will be satisfied in part through antlerless moose seasons. Antlerless seasons shall be established when local residents can most effectively compete with other segments of the public for the resource.

* Sport hunting and hunting access shall be retained over the widest possible area.

* Costs of resource development may be increased by constraints imposed to protect moose habitat.

35. LOWER NUSHAGAK-WOOD RIVER-TOGIAK MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 17, all drainages of the Togiak River, Wood River and Nushagak River below the confluence of the Mulchatna River and the Nushagak River.

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. Increase the moose population to the carrying capacity of its habitat by restriction of harvests if necessary.
2. Maintain a minimum post-hunting season population sex ratio of 15 bulls per 100 cows.
3. Regulate hunting seasons, bag limits and methods and means of taking moose, if necessary, to provide for local use.
4. Control access, number and distribution of hunters and methods of hunter transport, if necessary, to maintain desired harvest levels.

THE SPECIES

Moose numbers within this area are quite low. Excellent habitat occurs along waterways and in the lower elevations of the Wood River Mountains. Surveys have not located sufficient concentrations of animals to gather usable data on numbers or composition. The estimated population of the entire area is less than 300 animals.

Moose hunting is almost entirely by local residents for domestic use. Although the Wood River Lakes system experiences heavy sport fishing use (four established guides plus additional pressure from nearby sport fishing lodges), the low density of moose has not encouraged guided sport hunting. The reported annual harvest for the past three years has averaged 24 moose. The majority of moose killed within this area are never reported. Most of the harvest by local residents occurs illegally in winter or early spring when access by snow machine makes hunting easy and moose are at lower elevations. In recent years, the intensity of this late winter harvest has increased as snow machines have proliferated. Sunshine Valley, for example, has decreased from 53 wintering moose in 1971-72 to only 14 during the winter of 1975-76. Nearly 20 illegal late-winter kills were located in the drainage during the winter of 1971-72. A survey of villages in Game Management Unit 17 by the University of Alaska in the summer of 1974 indicated a total harvest of 188 moose in the previous year. This exceeded the reported 1973 sport harvest for all of Unit 17 by 448 percent. Late winter harvesting of moose for domestic use by local residents has exceeded the reproductive capabilities of the moose population for several years. The moose population within this area has declined significantly and, unless the size of the illegal late winter-early spring harvest can be substantially reduced, the decline can be expected to continue.

Predation by wolves and brown bears is known to occur. Because of the low density of moose present, predation is helping keep moose populations depressed. However, predator control would not be justified so long as illegal harvesting by local residents remains the primary factor affecting the decline of the moose population.

The area is essentially wilderness. Impacts of oil and mineral exploration have been minimal. Possibilities of future development of these resources exist and could have an effect on management, particularly on private lands. Transportation within the area is primarily by light aircraft. Boats are used along rivers and in lakes. During winter, snow machines are the primary method of transportation. A limited road system exists in the Dillingham-Aleknagik area, and there are local service roads in the vicinity of some villages.

PROBLEMS

* Oil and mineral exploration or development may increase access and prove detrimental to moose habitat. Development will be discouraged in critical habitat areas and hopefully modified elsewhere to minimize adverse impacts. Regulations governing hunting will be adjusted in response to major changes in harvest pressure resulting from increased access.

* Large acreages of land along river systems containing prime moose habitat will be transferred to private ownership under terms of the Alaska Native Claims Settlement Act. Use of these lands by the public may be prohibited by private landowners, thereby concentrating public use on lands remaining open, and creating potential overharvest conditions. Additional lands may be lost for moose hunting if a proposed state park is established in the Wood River Lakes area, or on lands controlled by the U. S. Fish and Wildlife Service. Through agreements with private and governmental landowners, the Department should attempt to maintain public hunting in as many areas as possible. Additional restrictions on harvests would be necessary where hunting pressure becomes excessive.

* Methods used for moose hunting may be incompatible with management of brown bears. Separate seasons shall be maintained for the two species or moose hunting regulations will be made compatible with those for brown bears.

* The area may be joined with the main state road system by additional road construction and/or marine highway system additions. An influx of people into the area and increased recreational use would probably alter the existing life style. Management plans will be re-evaluated and regulations proposed to respond to changing demands on the resource.

* The illegal winter-spring harvest by local residents will lower the moose population to a level that can no longer support any form of harvest. Efforts will be made to obtain voluntary compliance with regulations and domestic harvest restricted to the open hunting season. Seasons may be established during the period of traditional "subsistence" use only when moose densities have increased to near carrying capacity and the harvest would not be biologically detrimental. Acceptance and compliance of hunting regulations must be obtained through a combined public relations program and vigorous law enforcement.

IMPACTS

* A lower sport harvest will occur and illegal take during the winter and early spring will be reduced.

* Moose populations will increase and expand into unoccupied habitat to a level approaching the carrying capacity of the range.

* Use by local residents shall have priority so long as the economy remains dependent upon use of fish and wildlife resources.

* Recreational hunting and hunter access shall be retained over the widest possible area.

* Costs of resource development may be increased by constraints imposed to protect moose habitat.

37. BECHAROF LAKE-CINDER RIVER MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, all drainages into Bristol Bay south of and including the King Salmon River that flows into Egegik Bay to but not including drainages of Port Heiden.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to take large-antlered moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the moose population slightly below the carrying capacity of its habitat.

2. Harvest antlerless moose, if necessary, to maintain the desired population size and structure.

3. Control access and methods of hunter transport, if necessary, to distribute hunting pressure through the area.

4. Maintain a post-hunting season population sex ratio of 30 to 40 bulls per 100 cows.

5. Maintain an average antler spread of 50 inches or more in the harvest of bull moose.

6. Regulate hunting seasons, bag limits, and methods and means of taking moose, if necessary, to provide for local use.

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

THE SPECIES

The greatest densities of moose on the Alaska Peninsula occur within this area. The estimated population in the Becharof Lake-Cinder River area is about 2,000 moose. The largest concentrations are in the vicinity of Dog Salmon River, Mother Goose Lake, and Cinder River. Moose spend summer and fall in the lower elevations of the Aleutian Range. Winters are spent at slightly lower elevations; rarely do winter snow depths force moose far from the foothill areas.

Moose entered the area in the 1930's and gradually expanded their range south and west. Numbers increased until the mid-1960's when the population peaked. Since that time, numbers have declined as a result of poor reproductive success. The lack of calves appears related to past overuse of the range during the period of peak population. Since 1970, fall surveys have indicated less than 22 calves per 100 cows for any area. Counts have ranged as low as 8 calves per 100 cows, and the combined average for all count areas since 1970 is only 12 calves per 100 cows. Moose removed from the population by hunting, predators, disease, old age and accidents are not being replaced through calf production. Not all cows are successful in giving birth and there is also an evident

decline in the abundance of calves immediately following parturition. Although predators have been observed in calving areas, their numbers appear too low to account for the calf loss observed. Both wolves and brown bears prey on moose, and predation, like sport hunting, is accelerating the decline; however, the herd would continue to decline in the absence of hunting and predation with the present rate of calf production. Predation and hunting may be beneficial since lowering the number of moose reduces browsing pressure and hopefully will speed recovery of the habitat. However, the herd may continue to decline and eventually reach a level where, even with sport hunting eliminated, predation would prevent moose numbers from recovering under favorable habitat conditions. Only in that situation would a limited predator control program be considered a justifiable management option.

Trophy hunting has long been recognized in the area, producing some of the largest Alaskan moose on record. Multi-species hunts for moose, brown bears, and caribou are popular with both residents and nonresidents. The area supports a highly competitive guide industry; 15 permanent guide camps are established. Harvests have averaged about 230 moose annually since 1969, with bulls comprising 74 percent of the harvest.

Resident and nonresident hunters use the area in about equal numbers (51 percent residents). Since 1969, the area has become increasingly popular with Alaskan residents for recreational/meat hunts. The magnitude of the antlerless moose harvest clearly reflects the impact of this category of hunter. This area has produced 51 percent of the total Alaska Peninsula antlerless moose harvest over the 1969-1974 period. Harvests have averaged 63 antlerless moose annually since 1969 with a peak of 117 antlerless moose in 1974. An increased harvest of bulls in the early 1970's also resulted from the influx of resident recreational/meat hunters. Harvests of bulls has had a significant effect on herd composition. In the popular hunting areas, such as Mother Goose Lake, the bull-cow ratio dropped from 30 bulls per 100 cows in 1970 to 16 bulls per 100 cows in 1975. The less heavily hunted Dog Salmon River dropped from 62 bulls per 100 cows in 1970 to 22 bulls per 100 cows in 1974. Similar declines were observed in other portions of the area. The most noticeable effect of the harvest by recreational/meat hunters was the decline in the availability of large-antlered bulls. While large-antlered bulls were receiving heavy hunting pressure by both trophy and recreational/meat hunters, recruitment of large bulls from the younger age classes was reduced because young bulls were also being heavily harvested by recreational/meat hunters. In 1976, only seven to ten percent of the population was composed of bulls capable of growing antlers exceeding 50 inches in spread the next year.

Harvest by local residents for domestic use has been small. A survey by the University of Alaska indicated the villages of Port Heiden, Pilot Point, Ugashik, and Egegik harvested 14 moose in 1973-74. This represented three percent of the 410 moose reported harvested for the area that season.

Transportation within the area is primarily by light aircraft with hunting then conducted on foot. Most guides operate with their own aircraft, and many resident hunters use private aircraft. All terrain vehicles are used by a few guides for transportation. Air charter services in King Salmon provide transportation for both guides and hunters. The area is basically wilderness little affected by human activity. Past oil exploration activities included test drillings and construction of large landing strips at four locations. Extensive seismic work was conducted with the use of all-terrain vehicles in the past; recent work has been with helicopters or conducted on frozen tundra in winter. Trails from past all-terrain vehicle use are readily visible from the air but less evident on the ground except in areas of concentrated use.

PROBLEMS

* Oil and mineral exploration and development may alter the wilderness nature of the area, increase access, and prove detrimental to moose habitat. Efforts will be made to discourage development in critical habitat and to recommend guidlines for development elsewhere to minimize adverse impacts. Restrictive regulations governing hunting may be applied to adjust harvests if improved access results in excessive harvests.

* Land in private ownership or controlled by the National Park Service (Katmai National Park or Aniakchak Caldera National Monument) may be closed to hunting or block access to other lands, thereby concentrating hunting pressure on remaining areas open to hunting. Concentration of hunters could result in excessive harvests of moose. Hunting regulations will be modified to prevent overharvest but primary efforts will be to maintain public hunting on and access across private or federal lands.

* Methods used for moose hunting may be incompatible with management for brown bears. Separate seasons may be maintained for the two species or moose hunting regulations will be adjusted to be compatible with those for brown bears.

* Segments of the public may willfully ignore hunting regulations to insure hunter success. Regulations governing hunting will be vigorously enforced.

* Continued decline of the moose population may result in insufficient animals to maintain harvests or necessitate reduced harvest levels. Restrictive seasons may be applied or season closures implemented to protect remaining animals. Causes of poor reproductive success shall be identified and corrective measures applied if feasible.

IMPACTS

* The harvest of bulls will be reduced.

* Restrictive regulations on antler size or number of bulls in the harvest will maintain a population with abundant older age individuals.

* Local domestic requirements will be satisfied through antlerless moose seasons, and through seasons set when area residents can most effectively compete with other segments of the public for the resource.

* Accessibility of bull moose to hunters will be reduced by restrictive regulations on methods of transport. Relaxed restrictions may apply to the taking of antlerless moose when bull moose are not hunted.

* Recreational hunting and hunter access shall be retained over the widest possible area.

* Costs of resource development may be increased by constraints imposed to protect moose habitat.

38. MESHIK-PACIFIC MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, all drainages into the Pacific Ocean from Katmai National Monument on the northeast to Cape Kumliam on the southwest and all drainages into Port Heiden Bay.

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 an average antler spread of 50 inches in the bull harvest.

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

3. Maintain a post-hunting season population sex ratio of 40 to 50 bulls per 100 cows.

4. Harvest antlerless and young moose to maintain the population in balance with its habitat, and to provide for local use.

5. Regulate hunting seasons, bag limits, and methods and means of taking moose to provide for local use.

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

THE SPECIES

The estimated population for the entire Meshik-Pacific area is less than 500 moose. Greatest densities occur in the Meshik River and southernmost Pacific drainages. Lower densities of moose occur in the Pacific drainages north and east of Cape Kuyuyukak. Moose entered the area in the early 1940's and increased in numbers until the mid 1960's, when the population apparently peaked. Since that time numbers have been declining, apparently due to poor reproductive success related to past overuse of the range. No large winter mortalities have been observed and predators do not appear to be an important factor affecting the decline. Instead, it appears that not all cows are successfully giving birth and immediately following birth there is a high mortality of calves. Moose removed from the population by hunting or natural mortality are not being replaced through reproduction.

Results of surveys in the Meshik River since 1970 indicate a decline in both the number of moose and the bull-cow ratio. The Pacific side has been surveyed only twice, so trend data are lacking. In both areas, the bull-cow ratio is below 50 bulls per 100 cows. Although the existing ratios are more than adequate to provide for good reproductive success, only ten percent of the moose observed were calves.

The area is primarily wilderness little altered by humans. Large landing strips associated with oil or mineral exploratory work were constructed near the Meshik River and at Wide Bay. The use of tracked vehicles for hunting has been established only in the Meshik Valley, but similar vehicles have been used throughout most of the southern area in oil exploratory efforts. Tracks from these vehicles are readily visible for several years from the air, but less evident on the ground except in areas of concentrated use.

Sport hunting became increasingly important in the Meshik-Pacific area during the 1960's and early 1970's after hunting pressure on the Bering Sea drainages of the Alaska Peninsula had reduced the availability of trophy bulls. Seasons in the area were very liberal until 1975 when greatly reduced seasons were implemented. Over the past seven years, the annual harvest has averaged nearly 50 moose, but the peak period, 1972-1974, produced 60 percent of the reported harvest. In 1975, the harvest dropped to only one-half the seven-year average. Prior to 1972, Alaskan residents accounted for 63 percent of the harvest. Since 1972, with the first heavy trophy hunting pressure, nonresidents have taken more moose than residents. The importance of guiding is reflected in the increasing level of the nonresident harvest. Six permanent guide camps are established, but most guiding still occurs from temporary camps. Multi-species hunts are popular with both Alaskan residents and nonresidents. Additional hunting pressure has been attracted to the areas because of the excellent brown bear population. The intensity of trophy hunting since 1972 has exceeded the capability of the moose population to produce a sustained harvest of large antlered bulls.

Most moose hunting is for trophies with only a few Alaska Peninsula residents or commercial fishermen hunting the area for meat. The expense of logistics to the area has discouraged extensive meat hunting by residents from other areas. The antlerless harvest has averaged only eight animals annually since 1969. A survey by the University of Alaska indicates villagers of Meshik took only three moose in 1973 for domestic use. An additional harvest by residents of the Chignik area may have occurred but is unreported.

Transportation for hunters is primarily by light aircraft with landings on intertidal beaches or on natural pumice-gravel strips. Hunting then occurs on foot. Track vehicles are banned for hunting in the Pacific Management Area which encompasses a portion of the proposed Meshik-Pacific area. The Pacific watersheds have a record of light hunting pressure because weather frequently makes travel to, from, and within the area difficult and, until recently, other lightly harvested moose populations with good trophies were more readily available. The Meshik River drainages have also had light hunting pressure because access, even by aircraft, is limited. Float landings are possible in some locations. Other access for aircraft is restricted to wheel landings on pumice patches or abandoned mining strips. The river, although shallow, can be floated by raft. Boats can be used on the lower river and a single air boat is present that can travel the river and many of its large tributaries. Competition for large-antlered bulls on the Alaska Peninsula has recently encouraged heavy hunting pressure in spite of these limitations.

PROBLEMS

* Oil and mineral exploration and development may seriously alter the wilderness nature of the area, increase access, and prove detrimental to moose habitat. Efforts will be made to discourage development in critical habitat and to modify development elsewhere to minimize adverse impacts. More restrictive regulations may be applied to adjust harvest to desired levels or to distribute hunting pressure.

* Portions of the area may be included in the proposed Aniakchak Caldera National Monument. Restrictions by National Park Service management could eliminate hunting on a significant portion of the moose population. Also lands within the area may be transferred to private ownership as a result of the Alaska Native Claims Settlement Act. Sport hunting by the public may be restricted by the land owners, or access across private land to public land could be blocked. These actions would serve to concentrate hunting pressure on remaining lands available to recreational hunters. More restrictive management would be essential in the areas remaining open to the public in order to retain high hunting aesthetics and avoid hunter crowding. 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.

* Methods used in hunting moose may be incompatible with management for brown bears. Separate seasons will be established for bears and moose or moose hunting regulations will be made compatible with those for brown bears.

* Aircraft restrictions may encourage an increase in the use of all-terrain vehicles for hunting. Additional vehicles could result in an excessive harvest or in a significant deterioration of hunting aesthetics. Regulations restricting the use of all-terrain vehicles may be implemented.

* A segment of the public may willfully ignore hunting regulations to insure hunter success. Regulations governing hunting will be vigorously enforced.

* The continued decline of the moose population through continued poor reproductive success may result in insufficient animals to support hunting. Shorter seasons or season closures may be applied. Causes of the poor reproductive success will be investigated and corrective measures instituted if feasible.

IMPACTS

* The proportion of large bulls in the population will increase.

* Domestic needs of local residents will be satisfied by providing for antlerless moose harvests.

* An opportunity to hunt large antlered moose under aesthetically pleasing conditions will be maintained.

* Accessibility of bull moose to hunters will be reduced by restrictive regulations on methods of transport. Relaxed restrictions may apply to the taking of antlerless moose when bull moose are not hunted.

* Recreational hunting shall be retained.

* Costs of resource development may be increased by constraints imposed to protect moose habitat.

39. PORT MOLLER-BLACK LAKE MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, the Bering Sea drainages north and east of Port Moller, to and including all drainages into Ilnik Lagoon, and all Pacific Ocean drainages into Chignik Bay.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting moose.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to take large-antlered moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain the moose population slightly below the carrying capacity of its habitat.
2. Harvest antlerless moose, if necessary, to maintain the desired population size and structure.
3. Control access and methods of hunter transport, if necessary, to distribute hunting pressure through the area.
4. Maintain a post-hunting season population sex ratio of 30 to 40 bulls per 100 cows.
5. Maintain an average antler spread of 50 inches or more in the harvest of bull moose.
6. Regulate hunting seasons, bag limits, and methods and means of taking moose, if necessary, to provide for local use.
7. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Although moose occur throughout the area, they tend to concentrate along the stream bottoms and in the foothills of the Aleutian Range in the summer and fall. Winters are spent in areas of suitable habitat on the Bering Sea flats. The population apparently entered the area in the 1940's and increased in numbers until the late 1960's. Since that time, numbers have been declining, apparently in response to poor reproductive success resulting from overuse of the habitat that occurred during years of abundance. No moose surveys have been made in the area so data on population size or composition are lacking. The estimated population is about 500 animals.

Hunting is primarily by trophy hunters. Reported harvests have averaged nearly 40 moose annually during the past seven years. Bulls have comprised 84 percent of the harvest. In 1975, the harvest was half the seven-year average (20 moose) because the season length was greatly reduced. Successful nonresidents outnumber successful resident hunters by nearly two to one. The area has an active guide industry with seven permanent guide camps established. Additional seasonal guiding occurs from temporary

camps. Multi-species hunts for moose with brown bears and caribou are popular with both residents and nonresidents. Residents of the Chignik area take a few moose each year for domestic use. Occasionally persons from Ivanof, Perryville, Nelson Lagoon, and Meshik also hunt the area. The greatest impact on the resource, however, comes from nonresidents and Alaskan residents living elsewhere in the state.

Transportation within the area is primarily by light aircraft with hunting then occurring on foot. Most guides have their own aircraft, and resident hunters use private airplanes or charter with air charter services in Naknek, King Salmon, or Bear Lake. Two all-terrain vehicles have been operated by guides and, in some winters, residents of Chignik make extensive use of snow machines. Boats are used for transportation along the Chignik River system.

The area is essentially wilderness in spite of numerous oil exploratory efforts in recent years. All-terrain vehicles trails, readily visible from the air, but less evident on the ground, mark the paths of extensive seismic work. Test holes were drilled and a large landing strip constructed in one location. A high possibility exists that the area will have oil and mineral development in the future.

PROBLEMS

- Oil and mineral exploration and development may seriously alter the wilderness nature of the area, increase access, and prove detrimental to moose habitat. Efforts will be made to discourage development in critical moose habitat and to recommend guidelines for development elsewhere to minimize impacts. More restrictive regulations may be applied to adjust harvests if improved access results in excessive harvests.

- Land in private ownership may be closed to public hunting or access to adjoining public lands may be blocked thereby concentrating hunting pressure in remaining areas. Concentrations of hunters that would cause overharvests of local moose populations could result. Hunting regulations will be adjusted to prevent overharvests. 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.

- Methods used for moose hunting may be incompatible with management of brown bears. Separate seasons shall be maintained for the two species or moose hunting regulations will be adjusted to be compatible with those for brown bears.

- Segments of the public may willfully ignore hunting regulations to insure hunter success. Regulations governing hunting will be vigorously enforced.

- Continued decline of the moose population through poor reproductive success may result in insufficient animals to maintain harvests or necessitate a lower harvest level. Restrictive seasons may be applied or closures implemented to protect remaining animals. Causes of poor reproductive success shall be identified and corrective measures applied if feasible.

IMPACTS

- The harvest level of bulls will be reduced from the levels of recent years. Restrictive regulations on antler size or number of bulls in the harvest will maintain a population with abundant older-age individuals.

* Local domestic requirements will be satisfied through antlerless moose seasons and through seasons set when local residents can most effectively compete with other segments of the public for the resource.

* The number of hunters allowed to participate will be restricted only if other methods fail to maintain desired harvest levels or characteristics.

* Sport hunting shall be retained.

* Accessibility of bull moose to hunters will be reduced by restrictive regulations on methods of transport. Relaxed restrictions may apply to the taking of antlerless moose when bull moose are not hunted.

* Costs of resource development may be increased by constraints imposed to protect moose habitat.

40. IVANOF-PERRYVILLE MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, all Alaska Peninsula drainages into the Pacific Ocean between American Bay and Castle Cape.

MANAGEMENT GOAL

To provide for an optimum harvest of moose.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Harvest antlerless moose, if necessary, to maintain the population in balance with its habitat.

2. Maintain a post-hunting season population sex ratio of no less than 15 bulls per 100 cows.

3. Regulate hunting seasons, bag limits, and methods and means of taking moose, if necessary, to provide for local use.

THE SPECIES

The recent volcanic nature of the area is evident, and vegetation has only been sparsely re-established. Moose within the area are not abundant, but may be expanding into unoccupied habitat. Data on population numbers, composition, reproductive success, harvest, and natural mortality are lacking.

Moose are used almost entirely by local residents for domestic use. A bull may be taken rarely in conjunction with a brown bear hunt. Guides have not established permanent camps, and few Alaskans, other than local residents, hunt the area for moose.

Harvest levels are low, but data are lacking. The occasional moose taken by residents of Perryville and Ivanoff are normally not reported. Moose are taken wherever available. Both sexes are taken and harvests have not necessarily been restricted to open seasons. Present use may be maintaining low population levels. Because of the scarcity of game in the area, some hunting for domestic use occurs on the Bering Sea side of the Aleutian Range.

The area is rugged wilderness with much of it in early successional vegetation stages. There has been little noticeable effect of human use except in the immediate vicinity of villages. Transportation to the area is primarily by light aircraft or by commercial fishing boat. Motor bikes and "Three Wheelers" are popular with residents for local transportation. These vehicles are also utilized as an aid in hunting.

PROBLEMS

* Mineral development could have serious local impacts on the limited moose habitat or create additional hunting pressure through improved access or increased human population. Efforts will be made to discourage development in prime habitat and to recommend guidelines for development elsewhere to minimize adverse impacts. More restrictive hunting regulations may be applied if the resource requires additional protection.

* Although present harvest levels are suspected to be excessive, no data are available with which to base regulation of harvests. Baseline data should be obtained on moose in the area, and if current harvest levels exceed the capability of the population to sustain such use, regulations would be applied to reduce harvests to acceptable levels and encourage growth of the population to the maximum density compatible with available habitat. To be effective, restrictive regulations would require the cooperation of local residents in addition to vigorous enforcement effort.

* As the human population of the Alaska Peninsula increases with the development of oil and mineral resources, local residents may not be able to compete with other segments of the public to obtain moose for domestic use. Regulations should be established that allow local residents to most effectively compete for the resource so long as the dependence on the resource remains justified. Such management would not be maintained if the area establishes a substantially different economy that negates the traditional dependence upon fish and wildlife resources.

IMPACTS

* Initially, increases in numbers of moose and their expansion into additional areas are expected. Harvest will then approach the annual recruitment.

* Production of moose will be increased by management of moose sex ratios to favor females.

* Domestic use of the resource by local residents shall have priority over recreational hunting. Regulations favoring such use shall be continued.

* Aesthetics of hunting shall not be a factor in management except as related to other big game species.

* Costs of resource development may be increased by constraints imposed to protect moose habitat.

41. SOUTHWESTERN ALASKA PENINSULA MOOSE MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, the Alaska Peninsula south and west of a line drawn between the heads of Moller Bay and American Bay.

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. Allow the moose population to increase to a level that will support a sustained harvest.
2. Maintain an average antler spread of 50 inches in the harvest of bull moose.
3. Maintain a post-hunting season population sex ratio of approximately 40 bulls per 100 cows.
4. Control access, number and distribution of hunters, and methods of hunter transport to maintain desired harvest levels and to maintain aesthetic hunting conditions.
5. Regulate hunting seasons, bag limits, and methods and means of taking moose, if necessary, to provide for local use.
6. Harvest antlerless and young moose to maintain the population in balance with its habitat and to provide for local use.
7. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Only token numbers of moose exist within this area, probably less than ten individuals. Rugged terrain at the head of Port Moller Bay appears to prevent large numbers of moose from entering the area. Suitable habitat appears available, but too few moose have immigrated to establish a viable population.

Moose may become important for recreational hunters and as an additional meat source for local residents in the future. Presently, the area has excellent populations of brown bears and caribou; a local guide industry has been established on these species at five permanent guide camp locations. Residents of Nelson Lagoon, King Cove and Cold Bay hunt the area, but little big game hunting is done by residents from other areas of Alaska.

Most transportation is by light aircraft. Local residents use boats and four-wheel drive vehicles along beaches. Roads within the area are restricted to the immediate vicinity of settlements. Transportation by commercial fishing boats occurs along the coast line. Izembek National

Wildlife Refuge occurs within the area. Access and transportation on the Refuge is restricted by regulations of the U.S. Fish and Wildlife Service. At this time, Izembek receives minimal recreational use other than seasonal waterfowl hunting. The southwestern Alaska Peninsula is essentially wilderness. Oil exploratory efforts have had local impacts, with test holes and large landing strips placed in five locations. A natural gas deposit was reportedly located in one drilling project. A mineral exploratory program is currently underway at Balboa Bay.

PROBLEMS

* The area presently lacks a viable moose population. Seasons should remain closed until emigration or reproduction have established a huntable population. Transplants could be utilized to enhance establishment.

* Oil and mineral exploration and development may seriously alter the wilderness nature of the area and prove detrimental to potential moose habitat. Development will be discouraged in areas of prime habitat. The Department should recommend procedures to minimize adverse impacts elsewhere.

* Hunting may be restricted on private lands acquired by Natives under terms of the Alaska Native Claims Settlement Act, or public access to adjoining lands may be blocked, forcing concentration of hunters elsewhere. 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.

* Segments of the public may ignore regulations and harvest moose at a level that prevents a viable herd from becoming established. Regulations protecting moose in the area will be vigorously enforced.

IMPACTS

* A viable moose population should become established.

* The opportunity to harvest moose for both recreation and domestic use shall be established and maintained.

* Not all hunters may be able to participate during any season.

* Costs of resource development may be increased by constraints imposed to protect moose habitat.

MOUNTAIN GOATS IN SOUTHWESTERN ALASKA

Southwestern Alaska's only mountain goat (*Oreamnos americanus*) population occurs on Kodiak Island. This herd results from transplants conducted in 1952 and 1953 when a total of seven males and ten females were released. The population slowly increased and is presently estimated at 150-200 animals. The herd is gradually expanding its range southward and westward from the original release site at Hidden Basin. The largest groups of goats are found in the Crown Mountain area within a few miles of the release site. Recent population surveys indicate that the growth of the herds inhabiting the Crown Mountain area may have stabilized. Overall population growth appears to have slowed considerably. Large areas of apparently good habitat have not yet been occupied or are only sparsely populated with goats. It will be several years before the success of the Kodiak transplant can be fully evaluated.

From early spring until fall mountain goats primarily utilize alpine and subalpine areas which are often extremely rugged and precipitous. These areas, characterized by heavy snow accumulations in winter and short, cool summers, 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 such as brush and ferns is utilized.

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. Although occasional predation by brown bears undoubtedly occurs, it is probably not a limiting factor.

Hunting of Kodiak Island goats by permit has been allowed each year since 1968. Although the number of hunters afield has been gradually increasing, unfavorable fall weather limits hunting success. Most of the hunting effort has been concentrated in the relatively accessible Crown Mountain area which is inhabited by the largest group of goats.

Occasionally goats have been observed near the City of Kodiak. In an effort to encourage the establishment of goats in areas where they could be easily observed, the drainages adjacent ot the Island's road system have been closed to hunting. Presently little effort is expended in viewing or photographing of goats on Kodiak.

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.

* Hunting pressure has been concentrated in easily accessible areas. This results in localized overharvest while adjacent, less accessible areas receive little hunting pressure. Management of harvests will require restricted hunting in easily accessible areas, thereby encouraging hunting in more remote areas.

* Goat populations are slow to move into new habitat. Although numerous sightings of lone animals or small groups confirm that the goat population is expanding, the bulk of the population is centered near the original transplant site. Additional transplants might increase the rate at which goats colonize new habitat.

9. CROWN MOUNTAIN GOAT MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, all of Kodiak Island.

PRIMARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting mountain goats.

SECONDARY MANAGEMENT GOAL

To provide an opportunity to hunt mountain goats under aesthetically pleasing conditions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Limit harvests of mountain goats to allow for a population increase.
2. Control hunter distribution, if necessary, to maintain aesthetic hunting conditions.
3. Encourage public viewing and photography of mountain goats.
4. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

Mountain goats have steadily expanded their range since their introduction to Kodiak Island in 1952 and 1953. Goats now occur throughout much of the higher mountainous terrain, although many areas are sparsely populated. The highest densities of goats occur in the Hidden Basin Creek and Wild Creek drainages.

Winter ranges in the Hidden Basin area have been heavily utilized and appear to have deteriorated to some extent. Mortality is poorly documented, but it is suspected that a combination of heavy snows and a decline in winter range quality produce some losses due to malnutrition. There is overlap in winter range with deer and some of the same plant species are used for winter forage. Goats tend to utilize steeper slopes at higher elevations than do deer, so competition for food is possibly not extensive. Cattle grazing occurs in part of the goat winter range in Ugak Bay, but competition is negligible with current stocking and distribution of livestock.

As a recent arrival on Kodiak, the mountain goat attracts considerable attention from local hunters wishing to hunt the species for the first time. The first Kodiak Island goat hunt was held in 1968, sixteen years after the first transplant. Six goats were taken that year by nine hunters. Hunting by permit has been allowed each year since 1968. Annual harvests have averaged about ten goats, although sixteen goats were taken in 1974. Hunter success has averaged over 50 percent. Both sexes have been about equally represented in the harvest. Although as many as 66 permits have been issued during the two month season, seldom have more than half the permittees actually hunted. Weather severity largely determines actual hunting pressure. Most of the hunting effort has been concentrated in the Crown Mountain area. Most hunters use float equipped aircraft for transportation to either Terror Lake or

Hidden Basin. Some hunters drive to Saltery Cove and take skiffs to Hidden Basin.

PROBLEMS

* Concentration of hunting pressure in the Terror Lake and Hidden Basin areas may diminish quality of hunting experience and result in localized overharvest. The Department should limit the number of hunters in each accessible area and direct additional hunting pressure into previously unhunted areas.

* The goat population has been slow to colonize new habitat although much suitable unoccupied habitat is available. The Department should consider additional transplants of goats in specific areas which have potential for supporting a goat population. Harvest should be restricted in newly established goat herds to allow herd growth.

* Changing patterns of land use, including planned construction of a road along the coastline of Ugak and Kiliuda Bays and scheduled construction of the Terror Lake hydroelectric dam and associated power plant and road in the Kizhuyak Bay drainages, will have impacts on goat habitat and will make goats more accessible to people. Aesthetic qualities of goat hunting will also be affected. The Department should participate in land use planning and review of development plans to assure maximum protection of critical goat habitat. Restrictions on hunters in affected areas may be necessary to prevent local overharvests.

IMPACTS

* Productivity of the goat population will be maintained and additional hunting opportunity will be available in the future as goat populations become established in unoccupied habitat.

* As hunting pressure increases, further permit restrictions will be necessary and hunters will have less freedom to choose hunting areas.

* Selected drainages near the present Kodiak Island road system where goats occur only occasionally will be managed for observation and photography. Hunting opportunity will be restricted to a minor extent.

ELK IN SOUTHWESTERN ALASKA

In Alaska, elk (*Cervus canadensis roosevelti*) occur only in the northern Kodiak Archipelago on Afognak Island and nearby Raspberry Island. Established on Afognak Island in 1929 by a transplant of eight calves from Washington state, the elk population grew rapidly to an estimated 212 animals in 1948 and to a peak of 1,200-1,500 elk by 1965. A decline associated with over-utilization of winter range began in the late 1960's. Unusually heavy accumulations of snow and cold temperatures during the winters of 1970 and 1971 caused massive die-offs and by 1972 only about 450 animals remained. The elk population appears to be gradually increasing and in 1975 was estimated at about 500 animals. Even during recent relatively mild winters, however, losses to malnutrition have occurred and it is unlikely that the population levels of the mid-1960's will be attained again without significant improvements in habitat quality.

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

Mortality caused by winter severity has been and will continue to be the major population regulatory mechanism affecting Afognak's elk population, until such time as hunting becomes effective in controlling elk numbers. A different situation exists on Raspberry Island where heavy harvests of the accessible herd necessitated a closure to hunting in 1968. Poaching is suspected to be a primary factor controlling the growth of the Raspberry Island herd since that time.

Elk meat was rumored to have been on local tables for several years prior to the first legal hunt in 1950. During 25 years of hunting over 1,500 elk of both sexes have been harvested. When the population was at its highest, hunting was relatively successful. Harvests during the 1971-1975 period, however, have averaged less than 25 elk annually and hunter success has been less than 15 percent. The best elk populations now occur in interior and eastern Afognak Island where dense timber and difficult access result in relatively poor hunter success. A few elk are taken incidental to deer and bear hunting. Usually more than half the harvest is usually taken during September and October when floatplane or small boat access is best. After mid-November hunters utilize commercial fishing boats to hunt coastal areas with limited success.

An increased harvest of elk could easily be sustained as the average harvest is less than 10 percent of the population. Harvests may increase on herds accessible to roads constructed during logging operations. Other less accessible herds will continue to go largely unharvested.

PROBLEMS

* Potential losses of elk winter habitat to logging are an important consideration in the management of sustained elk populations. The most valuable stands of commercial timber grow along the coast; and many are critical winter habitat for elk. Depletion of willow and

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

- Illegal kills of elk have retarded desirable growth in the accessible Raspberry Island elk herd. While development of an extensive logging road system on Afognak Island will improve distribution of hunters and facilitate attaining desirable harvests on some elk herds, increased poaching can be expected. Enforcement of hunting regulations will require greater emphasis as access to elk improve.

1. PARAMANOF ELK MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, that portion of Afognak Island which includes the area draining into Shelikof Strait north of Tanaak Cape, and the area north and west of the outlet stream of Little Waterfall Lake.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Control hunter numbers and distribution during early seasons with minimal restrictions during late seasons.

2. Improve hunter access and control methods of hunter transport, if necessary, to distribute hunting pressure through the area.

3. Encourage viewing and photography of elk.

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

THE SPECIES

Since the initial introduction of elk to Afognek Island, they have expanded very slowly into the interior and northwestern portions of the island. In the early 1960's scattered small bands were observed in the area. The population reached a peak in the late 1960's. Heavy winter mortality in 1970 and 1971 reduced the population significantly. Malnutrition during winters, when heavy snow accumulations limit movements and forage availability, is the major mortality factor. The Waterfall Lake herd winters along the coast of Perenosa Bay. The Paramanof Peninsula herd occupies the area north of Malina Bay and the Paramanof Mountain herd inhabits the drainages into the head of Paramanof Bay. The current population in the area is estimated at 200 elk. Recent aerial surveys indicate a slight upward population trend.

Sitka spruce is invading the western coast area, but open expanses of grass-brushland predominate over extensive areas. Browse plants have been heavily utilized in some traditional winter ranges along Paramanof Bay. Winter ranges are generally in better condition in this area than in areas with a longer history of occupation by elk. Recurring winter mortality in recent winters indicates that sufficient browse is not available during severe winters.

Stands of commercially valuable timber occur in the Shuyak Straits, Bluefox Bay and Perenosa Bay areas. Several clearcuts are planned for the Perenosa Bay drainage in traditional elk wintering areas. Consideration has been given to spacing and design of the cutting units to minimize impacts on these winter ranges. Previous studies indicate that elk are highly dependent on spruce timber for cover and that during heavy snow accumulation they forage extensively on understory vegetation. Some

improvement in available forage may occur as grass and shrubs invade the clearcuts. Proportionately heavier snow accumulations in clearcuts than in adjacent timber will limit elk to foraging along the clearcut boundaries during severe winters.

Significant hunting pressure did not occur in the Paramanof area prior to the late 1960's. Presently, hunting pressure is relatively light and the area contributes less than 20 percent of the annual total elk harvest. Floatplane access is available to several lakes and bays although freeze-up may limit fresh water access after early November. Commercial fishing boats and skiffs are used by local hunters for hunting, although severe weather limits their use in the latter part of the season. Lack of suitable anchorages and floatplane landing areas limits access to much of the management area.

Largely uninhabited, the northwestern part of Afognak Island provides some of the most scenic vistas in the Kodiak Archipelago. Afognak's highest peaks occur here and the rugged, icy profile of the Alaska Range appears westward across Shelikof Straits. The U.S. Forest Service has recognized these special scenic qualities by recommending a 55,000-acre tract in the Red Peak-Ban Island area for a Scenic Area. Another 5,300 acres have been designated the Paramanof Research Natural Area.

PROBLEMS

* Much of the coastal land has been selected by Native village corporations under terms of the Alaska Native Claims Settlement Act. Should the corporate landowners close their lands to trespass, a serious loss of hunting opportunity could occur. The Department should solicit the cooperation of private landowners to facilitate progressive management of elk. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Logging, planned for the Perenosa Bay drainage, may have negative impacts on elk winter range. In addition to possible loss of available forage, disturbance by logging activity and truck traffic may temporarily reduce elk use of some areas. The Department should initiate research to determine effects of logging on elk habitat and should participate in planning and layout of timber sales to assure mitigation of negative impacts of logging. Whether or not the long term impacts of logging will be beneficial or detrimental to elk populations will depend on the willingness of the logging industry to incorporate considerations for elk habitat maintenance into logging plans.

* Severe weather conditions and lack of adequate shelter discourage hunting and other recreational use of the area. The U.S. Forest Service should be encouraged to develop recreational cabins at selected locations.

* The limited availability of access points and trails may cause excessive hunter crowding in localized areas. The Department should provide assistance to and encourage the U.S. Forest Service to develop a system of primitive foot trails linking access points and to develop additional access points including boat and floatplane docking facilities at designated locations.

IMPACTS

* Improvement in access, shelter and transporation facilities will improve distribution of harvest and increase the usability of the management area to hunters and other recreational users.

- Increased harvest may stabilize population growth and allow winter ranges to recover to some extent, but may reduce the availability of large bull elk in most easily accessible areas.

- A permit system may be needed to achieve better distribution of hunting pressure and avoid hunter crowding. This would limit the individual hunter's freedom to choose where and when he wishes to hunt.

- Participation by residents of other parts of Alaska and nonresidents seeking wilderness hunting experiences may increase. Local hunters would be faced with increased competition for the opportunity to use traditional hunting areas.

- Seasonal hunting closures in specific areas used by photographers and wildlife observers may be needed to avoid conflicts. This may limit hunting opportunity to some extent.

2. TONKI ELK MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, that portion of Afognak Island east of a straight line from the mouth of Seal Bay Creek to the mouth of Saposa Creek.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting elk.

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. Improve hunter access, if necessary, to distribute hunting pressure through the area.

3. Maintain a post-hunting season population sex ratio of no less than 10 bulls per 100 cows to maximize productivity of the elk population.

4. Use either-sex harvests, if necessary, to maintain the desired elk population size and structure.

5. Encourage public viewing and photography of elk in a wilderness setting.

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

THE SPECIES

Elk were well established in the Tonki area by the 1950's. As elsewhere on Afognak, the population declined during the severe winters of 1971 and 1972. Aerial surveys indicated, however, that the Tonki herd was less seriously affected than elk herds elsewhere on the Island. Approximately one-third of the Afognak Island population now occupies the Tonki area during part of the year.

During summer and early fall elk occupy the extensive alpine and subalpine areas east of Izhut and Seal Bays. Two types of winter range are used by these elk. Mature Sitka spruce habitat in Seal Bay and Izhut Bay drainages are utilized extensively from November through May. Other groups of elk inhabit the capes along Tonki Bay and Marmot Straits where spruce forest is interupted by open grass meadows and heath vegetation. The cape winter ranges are relatively small and after more than two decades of heavy winter use are deteriorating. Apparent malnutrition-induced mortalities have been recorded during recent winters on these ranges. Elk inhabiting the forested portion of this management area are less restricted in movements and winter range quality does not appear to have declined seriously. During winters with deep snow accumulations, however, a narrow belt of coastal forest becomes critical to survival. Local overuse of winter range can be expected to occur under these conditions.

The Seal Bay and Izhut Bay drainages are scheduled for logging within the next ten years. Several clearcuts are to be made in coastal elk winter ranges. A road will be constructed linking Seal Bay and Izhut Bay, as well as numerous roads connecting the clearcut units. Consideration has been given to spacing and design of the clearcut units to minimize

impact on critical winter ranges. Additional forage will be provided as grasses and shrubs invade the cut-over areas. This forage will be relatively unavailable when heavy snow accumulations occur except along the fringes of clearcuts.

During the 1973-75 period the Tonki area elk harvest ranged from seven to twelve animals annually. Most of the hunting effort occurs during August, September and October when weather is relatively mild. After October, freeze-up limits access to fresh water lakes and small boat operators are less willing to risk the chance of severe fall storms. Larger commercial fishing vessels are utilized throughout the season and provide the only reliable access to many of the less protected bays in the northeastern part of the area. The limited availability of protected anchorages or suitable landing areas continues to restrict hunting pressure to a relatively low level despite liberal either-sex seasons.

Presently, more than half the elk hunters are Kodiak residents. Residents of mainland Alaska and occasional nonresident hunters make up the balance. Many hunters pursue elk rather casually, as they count on taking the relatively more abundant blacktailed deer to make their trips successful from a meat-gathering standpoint.

Many hunters pursue elk with the hope of taking a large trophy bull. Although antlered bulls make up less than ten percent of the population, about half the reported annual harvest are males, most of which are antlered animals. There is no indication that productivity is limited either by the current harvest level or selectivity for bulls.

PROBLEMS

* Limited availability of access points and trails may cause excessive hunter crowding in localized areas. The Department should provide assistance to and encourage the U.S. Forest Service to develop a system of primitive foot trails linking access points and to develop additional access points including boat and floatplane docking facilities at designated locations.

* Severe weather conditions and lack of adequate shelter discourages hunting and other recreational use of the area. The U.S. Forest Service should be encouraged to develop recreational cabins at selected locations.

* Elk winter range in Seal Bay and Izhut Bay drainages will be impacted by road construction and clearcut logging within ten years. The Department should initiate research to determine the effects of logging on elk habitat and should participate in planning and layout of timber sales to assure mitigation of negative impacts of logging. Whether the long term impacts of logging will be beneficial or detrimental to elk populations will depend on the willingness of the logging industry to incorporate considerations for elk habitat into logging plans.

IMPACTS

* Improvement in access, shelter and transportation facilities will improve distribution of harvest and increase the usability of the area to hunters and other recreational users.

* Increased harvest may stabilize population growth and allow winter ranges to recover to some extent, but may reduce the availability of large bull elk in easily accessible areas.

* A permit system may be needed to achieve better distribution of hunting pressure and avoid hunter crowding. This would limit the individual hunter's freedom to choose where and when he wishes to hunt.

* Participation by residents of other parts of Alaska and nonresidents seeking wilderness hunting experiences may increase. Local hunters would be faced with increased competition for the opportunity to use traditional hunting areas.

3. AFOGNAK ELK MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 8 on Afognak Island which includes all drainages into Shelikof Strait south of Tanaak Cape; all drainages into Raspberry Strait, Afognak Bay, Marka Bay, Kazakof Bay, Duck Bay and drainages into Izhut Bay west of the head of Saposa Bay; all drainages into Perenosa Bay west of the mouth of Seal Bay Creek and east of the head of Big Waterfall Bay and including Raspberry and Little Raspberry Islands.

MANAGEMENT GOAL

To provide for an optimum harvest of elk.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain a post-hunting season population sex ratio of no less than 10 bulls per 100 cows to maximize productivity of the elk population.

2. Use either-sex harvests, if necessary, to maintain the desired elk population size and structure.

3. Improve hunter access and control methods of hunter transport, if necessary, to distribute hunting pressure through the area.

4. Encourage timber harvest regeneration practices that will increase carrying capacity of logged areas for elk.

THE SPECIES

The Afognak management area includes all or parts of the ranges of six elk subpopulations. The Raspberry Island, Raspberry Straits, Duck Mountain and Kitoi Lake herds range exclusively within this management area. Herds which occur seasonally are the Paramanof Mountain and Paramanof Peninsula subpopulations. Recent aerial surveys indicate that the population of the area does not exceed 300 elk.

After the 1928 transplant, elk steadily expanded throughout southwestern Afognak Island and nearby Raspberry Island. In 1961, the elk population was estimated at 1100 animals, two-thirds of which occupied the Afognak area. Approximately 500 elk wintered in the Afognak-Lake-Raspberry Straits drainages. Range surveys conducted in the early 1960's indicated serious overuse of winter ranges. By 1969 a major decline in the Malina herd was apparent. Deteriorating winter range and overharvest contributed to the decline. The hunting season was closed in most of the Malina and Raspberry Straits areas in 1969 when excessive harvest in both these herds became apparent. More than half the Raspberry Straits elk population was lost to malnutrition during the 1970 and 1971 winters. Only 45 elk were located there during a 1972 survey. The Malina herd which numbered over 200 animals in the mid-1960's has failed to reoccupy its former range and may no longer exist. Gradual recovery has occurred in the Raspberry Straits herd and limited hunting will soon be allowed.

Elk on Raspberry Island reached a 1965 peak of at least 230 animals. A two-elk bag limit was in effect from 1964 through 1966 and during this period nearly half the total elk harvest came from Raspberry Island. The population at its peak was undoubtedly excessive for the available winter range and increased harvest was needed. The population declined

precipitously and by 1967 less than 50 elk could be located. Sport harvest totaling 146 animals during the 1964-66 period was a major factor in the population decline. Unreported illegal harvest, emigration, and a natural reduction associated with increased winter mortality were possible additional factors in the decline. Despite a complete closure on hunting since 1968 and good calf crops the herd has failed to increase significantly. Winter mortality may be a factor but illegal hunting is suspected to be primarily responsible for the herd's failure to increase. The Kitoi Lakes and Duck Mountain herds are difficult to census as they inhabit densely timbered areas. Their total population probably does not exceed 125 animals.

Elk winter range has deteriorated seriously in the southwestern part of the management area. Range studies conducted in the early 1960's indicated severe overbrowsing on willow and elderberry, two of the major winter forage species. The heavy die-off of elk in this area during the 1970 and 1971 winters was a further indicator of poor range conditions. Limited recovery of winter range may be occurring at current low elk population levels. The fact that winter mortality has occurred during recent less severe winters indicates range conditions are less than optimal.

Logging is the only imminent land use with potential impact on elk habitat. A limited logging operation has been conducted on the north side of Raspberry Straits for several years. A logging road was constructed in 1975 linking Kazakof and Discoverer Bays and clearcut logging was begun in late 1975. Cutting units are located throughout coastal elk winter range along Discoverer, Kazakof and Seal Bays. Consideration has been given to spacing and design of the cutting units to minimize impacts on critical elk winter ranges. Some improvement in forage conditions may be provided as grass and shrubs invade the clearcuts. Proportionately heavier snow accumulations in clearcuts than in adjacent timber will limit elk to foraging along the clearcut boundaries during severe winters. Previous studies indicate that elk are highly dependent on spruce timber for cover and during heavy snow accumulations forage extensively on the understory vegetation.

The first elk hunting season occurred in the Afognak area in 1950. Approximately 80 percent of the elk harvest during the 19581966 period were taken from the Raspberry Island, Raspberry Straits and Malina herds. The southwestern part of the area contains large open expanses of grass-brushland vegetation interspersed with spruce, and elk are much easier to locate there than in more heavily forested parts of the island. Access is relatively good. Small boats are popular for transport to the Raspberry Straits area and float-equipped aircraft can land in several lakes and protected bays. A good trail connects Malina Lakes, Afognak Lake and Muskomee Bay. Good access and relatively easy hunting conditions precipitated excessive harvest which eventually contributed to a population decline. Beginning in 1968 with the closure of Raspberry Island to hunting, the southwestern portion of the area, including the ranges of the Malina and Raspberry Straits herds, was closed to hunting by 1973. During 1974 and 1975 approximately half the harvest for Afognak Island was taken from the more densely forested central part of the island in the Kazakof and Discoverer Bay drainages. Elk did not become established in significant numbers there until the early 1960's and were largely unhunted until the more popular hunting areas were closed. This management area has been hunted primarily by local residents because of its proximity to Kodiak and the villages of Port Lions and Ouzinkie.

PROBLEMS

* Most of the land in the area has been selected by Native village corporations under terms of the Alaska Native Claims Settlement Act. Should the corporate landowners close their lands to trespass,

a serious loss of hunting opportunity could occur. The Department should solicit the cooperation of private landowners to facilitate progressive management of elk. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* The introduction of logging to much of the management area may have negative long-term impacts on elk habitat. Disturbance by logging activity may reduce elk use of some areas, at least temporarily. The Department should initiate research to determine effects of logging on elk habitat and should participate in planning and layout of timber sales to assure mitigation of negative impacts of logging. Whether or not the long-term impacts of logging will be beneficial or detrimental to elk populations will depend on the willingness of the industry to incorporate considerations for elk habitat maintenance into logging plans.

* Additional access provided by logging road construction could result in localized overharvest. Motorized access for hunting may be regulated by the Department.

* Illegal harvest limits herd productivity in localized areas and diminishes opportunity for legal sport hunters. Additional access provided by logging roads may increase illegal kills. The Department of Public Safety, assisted by the Department of Fish and Game should increase enforcement effort in areas most susceptible to poaching.

IMPACTS

* Increased harvest may stabilize population growth and allow winter ranges to recover to some extent.

* Crowed hunting conditions will occur in easily accessible areas.

* As hunting pressure increases further restrictions in season length or limitations on the availability of hunting permits may be necessary to keep harvests within allowable limits. Harvest of bulls may need to be restricted in accessible areas to maintain optimum bull/cow ratios for maximum productivity.

* Improvement in access, shelter and transportation facilities will improve distribution of harvest and increase the usability of the area to hunters and other recreational users.

* If transportation means are controlled and access confined to specific corridors, hunter's freedom to utilized favorite hunting areas may be restricted.

* Implementing suggested modifications in logging plans based on elk habitat considerations may increase construction and operational costs for the industry.

DEER IN SOUTHWESTERN ALASKA

In Southwestern Alaska Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) are found only on Kodiak and Afognak Islands and several small nearby islands. Efforts to transplant deer to the Kodiak area began in 1924 with the release of 14 animals on Long Island. Two more deer were released there in 1930, but failure of the deer to move to Kodiak Island prompted the release of nine deer on Kodiak Island in 1934. Deer rapidly expanded into the northeastern corner of Kodiak Island and adjacent small islands. The first hunting season was held in 1953. By the early 1960's, the general southward and westward movement of the deer population had reached the Uganik Island area. Concurrent with the population increase in newly colonized areas, a significant decrease in populations occurred in the northeastern corner of Kodiak where deer had first become established. In the late 1960's deer populations began to build in the Uyak, Zachar and Spiridon Bay areas and those areas presently have the highest deer populations on Kodiak and Afognak Islands. Areas farther north and east appear to have experienced declines from mid-1960's levels. On the eastern side of Kodiak Island, the Shearwater Peninsula between Ugak and Kiliuda Bay has relatively high deer populations; however, this population appears to have declined significantly during the 1974-1975 winter. Raspberry, Shuyak, and Afognak Island's deer populations became well established in the late 1960's.

Deer that move into new habitats reach high initial population levels which usually exceed the carrying capacity of the range. Within a few years they significantly alter the carrying capacity of their habitat and populations decline to levels below those observed in the first years after colonization. Field observations of browse plant condition generally confirm that major browse species on older winter ranges have declined in forage production capability.

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 sea level to alpine areas, influenced by snow depths and availability of food. During summer, deer utilize forbs extensively. Fireweed, which grows in abundance at elevations from sea level to subalpine is heavily utilized. With the first frosts in September deer begin a general movement from alpine areas to lower elevations where succulent vegetation may still be found. As fall progresses, shrubs such as wild rose, elderberry, willow, salmonberry, and highbush cranberry constitute an increasing proportion of the deer's diet. Wind-blown knolls near the coast which support heath vegetation, including bearberry and crowberry, are heavily utilized during winter. Alternating periods of rain and cold wind often produce heavily crusted snow conditions which allow deer to move to subalpine areas where they feed on shrubs which would otherwise be unavailable. In the Afognak Island area and other Sitka spruce habitats on northern Kodiak Island, deer also utilize spruce tips, blueberry, and low growing forbs.

Although deer populations do fluctuate in response to winter conditions, the fluctuations do not appear to be as frequent nor as devastating as in Southeastern Alaska. Frequent rains during the winter usually prevent heavy snow accumulations at lower elevations. It is not unusual to find deer foraging at elevations above 500 feet elevation in mid-winter. Heavy deer losses did occur in the 1969-1970 and 1970-1971 winters, but populations have since recovered and are now at moderately high levels in many areas.

Competition with cattle for winter forage occurs in the coastal drainages of northeastern Kodiak Island, from Anton Larsen Bay to Ugak Bay. Cattle feed extensively on willow and elderberry, two major deer forage species. During periods of heavy snowfall woody plants provide the bulk

of winter cattle forage. In some coastal areas where cattle concentrate, the browse has been heavily hedged or killed by cattle. There may be competition for forage between elk and deer on Afognak and Raspberry Islands, where deer have only recently become established.

Some loss of deer winter range to housing and industrial development has occurred in the northeastern corner of Kodiak Island where most of the human population is centered. Free roaming dogs are a serious decimating factor near the town of Kodiak and other areas of human habitation. Although actual kills by dogs are not common, the indirect effects of stress produced by dogs chasing deer take an unknown toll. Illegal harvest by Kodiak residents occurs commonly during winter months as deer are easily accessible from the Island's road system.

Observed loss of deer to other natural mortality factors have not been significant. Deer in the Kodiak area are remarkably free of parasites and diseases.

Deer are the most actively pursued big game species in the Kodiak-Afognak Island complex. Many hunters count on venison to supply a portion of their annual red meat demands. A five-month season and liberal bag limits provide ample hunting opportunity for deer hunters in the area. Depending on deer population levels as many as two thousand Kodiak deer hunters annually harvest 600-2,000 deer. With recent reductions of moose and caribou seasons in other areas of Alaska, increasing numbers of hunters from Anchorage, Fairbanks and other mainland population centers utilize the Kodiak and Afognak deer ranges. Harvests, including either-sex hunts, have not had a significant impact on deer numbers. In the more accessible areas along Kodiak's road system where late season hunting is a potentially limiting factor, seasons and bag limits have been restricted. Over most of the deer ranges, however, deer populations are only lightly harvested and periodic lows are related to weather factors. With protection of habitat, deer populations should be adequate for public use in the future.

PROBLEMS

* Distribution of hunting pressure proportional to deer population density cannot be achieved. Rapidly expanding deer herds in remote areas cannot be harvested in sufficient numbers to prevent range deterioration and subsequent population declines.

* Competition for habitat in areas with high human populations limits deer populations in most accessible hunting areas. Competition for forage with cattle, usurpation of winter range by housing and industrial development, increasing harassment and predation by free-roaming dogs, and illegal harvest of deer reduce hunting opportunity in readily accessible areas.

* Development of the logging industry may have a negative impact on deer range in forested areas on Afognak, Shuyak, Raspberry Islands and northern Kodiak Island. Experience with logging in other areas of Alaska indicates that large clearcuts in deer winter range may be detrimental. Information on deer-logging relationships in the Kodiak-Afognak area is required for rational recommendations on timber removal and regeneration practices to minimize adverse impacts on important deer habitat.

I. NORTHEASTERN KODIAK ISLAND DEER MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, that portion of Kodiak Island draining eastward into Anton Larsen Bay, including all drainages into Narrow Strait and Chiniak Bay, and those drainages into Ugak Bay east of the Rough Creek drainage.

MANAGEMENT GOAL

To provide for an optimum harvest of deer.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Use either sex harvests, if necessary, to maintain the desired deer population size and structure.

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

3. Discourage land use practices that adversely affect deer winter range.

THE SPECIES

Sitka blacktailed deer spread rapidly over the Chiniak Bay drainages after a 1934 transplant. The deer population reached its highest levels in the 1950's. By 1962 it was apparent that the population had declined appreciably from Women's Bay to Kalsin Bay. The deer population still remains far below the late 1950's level. The Chiniak Peninsula and drainages into Ugak Bay presently have the best deer populations along the Kodiak road system.

Habitat has undergone considerable deterioration since population highs in the 1950's. The conservative hunting seasons and bag limits during the initial years of hunting produced harvests which, hindsight suggests, were insufficient to prevent overutilization of deer winter ranges. Heavy use of winter ranges by cattle further depleted deer browse, including major deer forage species such as willow and elderberry. Gradual increases in human settlement have occurred along the road system. Increased use of snowmachines for recreation and small game hunting introduced an additional disturbance factor into deer wintering areas. Deterioration of the habitat is indicated by the fact that mortality from malnutrition has occurred even in relatively mild winters. As is true on all Alaskan deer ranges, when excessive snow depths make forage unavailable, deer mortality can be high. Predation and stress induced by pursuit by dogs is another significant mortality factor which occurs near the city of Kodiak and other human settlements.

The first hunt, held in 1953, produced a harvest of 38 bucks during the four-day August season. The harvest was distributed from Kizhuyak Bay to the Chiniak Peninsula, most of which is accessible by road. Harvests have declined with reductions in the deer population. The 1975 estimated harvest was 86 deer (8 percent of the total Game Management Unit 8 harvest), as compared to the 1960 kill of 390 deer. Despite the implementation of progressively more restrictive seasons, the deer population remains below former levels.

A 1973 survey indicated that approximately half the Kodiak resident deer hunters pursue deer in this management area one or more days during the August through October season. Most do not hunt until October when frosts somewhat reduce the density of vegetation. Either-sex hunting is now allowed only during October. The legal annual harvest is estimated at 75-125 animals, although the bag limit of one animal is difficult to enforce with adjacent areas open to the taking of four deer. Since most of the area is accessible by road, it is popular for brief, spur-of-the-moment hunts by Kodiak city residents. Although most hunters use automobiles for transportation, small boats and aircraft are also utilized to reach less accessible areas. Sufficient snow seldom occurs in October to allow the use of snowmachines, although they were used to some extent when seasons extended into December.

Despite relatively easy access, hunting pressure on deer is generally not excessive under present seasons. In the most accessible drainages with heavy human settlement and attendant habitat deterioration the cumulative pressure of legal and illegal hunting has the potential to limit deer production. In the less accessible drainages deer are being harvested at a level below the annual increment.

PROBLEMS

* Much of the deer winter range is deteriorating due to residential and industrial development associated with human population growth and poor land use practices. Overbrowsing of winter ranges by cattle precludes any improvement in the quality of these areas for deer. Development of land use plans which consider impacts of development on deer habitat will be encouraged and participated in by the Department. Efforts will be made to correct land use practices detrimental to deer habitat.

* Most of the management area has been selected by Native village corporations under provisions of the Alaska Native Claims Settlement Act. Should the corporate landowners close their lands to trespass, a serious loss of deer hunting opportunity would occur. The Department should solicit the cooperation of private landowners to facilitate progressive management of deer. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* Non-compliance with bag limits and out-of-season kills restrict the effectiveness of management. The State should intensify enforcement efforts where needed.

IMPACTS

* As hunting pressure increases further restrictions in season length will be necessary to maintain maximum productivity and keep harvests within allowable limits.

* The availability of large, trophy bucks will decrease with increasing hunting pressure.

* Assignment of hunters to specific hunting areas may be needed to improve distribution of the harvest. Limitations on methods and means of hunting, transportation and hunter numbers may be necessary.

* Crowded hunting conditions may occur in accessible areas.

2. TONKI DEER MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, that portion of Afognak Island east of a straight line from the mouth of Seal Bay Creek to the mouth of Saposa Creek.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting deer.

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. Improve hunter access to distribute hunting pressure through the area.
3. Maintain an either-sex deer hunting season.
4. Encourage public viewing and photography of deer in a wilderness setting.
5. Discourage land use practices that adversely affect the wild character of the area.

THE SPECIES

As in other sections of Afognak Island, deer in the Tonki area were well established by the mid-1960's. Deer populations appear to be relatively high on the Tonki Peninsula compared to other parts of Afognak. Better conditions for winter survival may exist here, resulting in higher deer populations than in the more heavily forested areas. Compared to central and western Afognak, snow accumulations are generally lighter and high winds expose vegetation on capes and steep slopes. Eastern Afognak Island is characterized by steep hillsides covered with grass-brushlands interspersed with spruce forest. Abrupt rock cliffs and wind blown capes typify the coastline.

Winter deer mortality has been recorded during past years when heavy snows occurred, and populations undoubtedly fluctuate to some extent as in other areas. Overuse of winter range can be expected to occur resulting in an eventual population decline. The Tonki area presently supports a minimum of 200 Roosevelt elk occupying some of the same winter ranges as deer. Some competition for forage may occur, but the extent of overlapping food requirements is unknown. Winter ranges in Seal Bay and Izhut Bay are scheduled for logging within ten years. Experience in other areas of Alaska indicates that clearcutting may be detrimental if sufficient mature timber is not maintained for winter cover and forage.

Tonki has a local reputation for producing large trophy bucks. During August and September, deer can be readily observed in alpine areas and

selection for trophy bucks is possible. The isolated, inaccessible nature of the area makes it popular among hunters who enjoy backpack hunting. Elk are also available early in the season and many hunters seek both species. Excellent scenery and low density of hunters makes it appealing to the hunter who prefers a wilderness experience. The single public recreational cabin at Pillar Lake is usually fully booked several months prior to the hunting season.

Annual deer harvests from the Tonki area are low, probably less than 100 animals. Hunters using commercial fishing boats take much of the November and December harvest. A few small lakes and ridgetops provide marginal landing areas for small planes. Fatal aircraft accidents involving hunters occur occasionally and at least one aircraft accident is recorded there every hunting season. Protected anchorages are found in Seal Bay and Izhut Bay, but the remainder of the coastline is exposed to storm winds. Few beaches are suitable for skiff landings and small boat hunters seldom venture beyond the Izhut Bay drainages. Amphibious and float-equipped aircraft can operate in a few protected areas in Seal Bay and Izhut Bay. Most hunters who use small boats and aircraft for transportation do their hunting prior to mid-November, while daylight hours are longer and weather is warmer. The Tonki area has a local reputation for unusually severe weather.

Extensive rolling alpine areas provide relatively easy hiking routes. During July, August and September, both deer and elk can commonly be observed in these areas. The Tonki area provides ample opportunity for deer and elk photography during this season for those willing to undertake a backpack trip.

PROBLEMS

* The limited availability of access points and trails may cause excessive hunter crowding in localized areas. The Department should encourage the U. S. Forest Service to develop a system of primitive foot trails linking access points and should encourage development of additional access points such as boat and floatplane docking facilities at designated locations.

* Severe weather conditions and lack of adequate shelter discourage hunting and other recreational use. The Department should encourage the U. S. Forest Service to develop recreational cabins at selected locations.

* Low flying aircraft, which are used to locate elk herds, disturb deer and diminish the quality of recreational experience for hunters and other recreationists. The Department should discourage low flights over the management area during July, August, September and early October when deer use alpine areas.

* Deer winter range in Seal Bay and Izhut Bay drainages will be impacted by road construction and clearcut logging within ten years. The Department should initiate research to determine the effects of logging on deer habitat and should participate in planning and layout of timber sales to assure mitigation of negative impacts of logging.

IMPACTS

* Improvement in access, shelter and transportation facilities will improve distribution of harvest and increase the availability of the management area to hunters and other recreational users.

* Increased harvest may reduce the availability of large trophy deer in most easily accessible areas.

* A permit system may be needed to achieve better distribution of hunting pressure and avoid hunter crowding. This would limit the individual hunter's freedom to choose where and when he wishes to hunt.

* Participation by residents from other parts of Alaska and nonresidents seeking wilderness hunting experiences may increase. Local hunters would be faced with increased competition for the opportunity to use traditional hunting areas.

* If transportation means are controlled and access confined to specific corridors, hunters freedom to utilize favorite hunting areas may be restricted.

* Seasonal hunting closures in specific areas used by photographers and wildlife observers may be needed to avoid conflicts. This may limit hunting opportunity to some extent.

* Deer and other wildlife will be less easily observed by non-hunting recreationists during hunting seasons.

* Improvements in access will stimulate increased hunting pressure and may increase the harvest of elk and brown bear. Should excessive harvests on these species occur, it will be necessary to reduce season lengths and reduce the extent of overlapping seasons for these species.

3. SOUTHERN KODIAK ISLAND DEER MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, that portion of Kodiak Island west and south of the Anton Larsen Bay drainage, including Whale, Uganik and Amook Islands, and that part of Kodiak Island west and south of the Saltery Creek drainage including Sitkalidak Island.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting deer.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain either-sex deer hunting seasons.

2. Improve hunter access and facilities to distribute hunting pressure through the area.

3. Control access, number and distribution of hunters and methods of hunter transport on a seasonal basis, if necessary, to conform with brown bear management objectives.

THE SPECIES

Deer have made a general southwestward movement across Kodiak Island since their introduction, in 1934. The largest populations are found in the most recently colonized areas from Larsen Bay to Spiridon Bay. Deer are found in extremely low densities south and west of Larsen Bay, and populations become progressively lower as one moves northeast from Spiridon Bay. In the eastern part of Kodiak Island deer numbers are highest in the southern Ugak Bay and northern Kiliuda Bay region. In 1976 deer populations appeared to be increasing as far south as Deadman Bay, but at a much slower rate than occurred on the west side of Kodiak Island.

Periodically, severe winters cause heavy mortality and subsequent population declines. Deer in the area from Uganik Bay northeast to Anton Larsen Bay appear to be most susceptible to winter mortality. This area has supported higher deer populations in the past and winter range quality has declined. Although the extent of range deterioration has not been quantified, field observations confirm heavy utilization of willows, elderberry, and other browse species. Highbush cranberry seems to be a good indicator, as it is a preferred browse species of relatively low abundance. This species is severely hedged and appears at reduced frequency on the older ranges in the northern part of the area. In the area from Spiridon Bay southward, which has been exploited heavily by deer for less than ten years, highbush cranberry is generally vigorous and only lightly used. This area undoubtedly has a much higher winter carrying capacity than areas with a longer history of use. Generally, snow depth and the length of time snow persists decrease as one moves southwestward along Kodiak Island. Possibly, high deer densities will be prolonged by this apparent weather phenomenon. Overutilization of the range is inevitable with current harvest levels and an unusually severe winter will impact the population strongly.

Encompassing most of Kodiak Island's best deer habitat, this area sustains well over half the Game Management Unit 8 harvest. Even so, most of the area is only lightly harvested. Estimated annual harvests in the mid-

1970's have been 1000-1500 deer. Most of the harvest occurs from Spiridon Bay northward with less than five percent of the harvest occurring in the area west of Zachar and Deadman Bays. Illegal harvest by residents of remote areas and commercial fishermen occurs yearlong. Conservatively this harvest is estimated at 10 percent of the legal harvest figure, but it is not a limiting factor. Males comprise at least 60 percent of the reported harvest. Hunter success usually exceeds 50 percent. About 90 percent of the harvest occurs during Ocotber, November and December. Comparatively speaking, the most accessible part of the area between Outlet Cape and Anton Larsen Bay receives a moderate harvest. Whale Island is one accessible and popular hunting area which most closely approaches harvest at maximum sustained yield levels.

Residents of Kodiak and the villages of Port Lions and Larsen Bay take most of the harvest. Nonresidents and residents from other parts of Alaska probably take less than ten percent of total harvest. Crowded hunting conditions seldom occur and the area could accommodate a considerable increase in hunting pressure. Lack of accessibility significantly limits hunting over much of the unit. The expense of chartering aircraft or boats to the best hunting areas is too great for some hunters. Frequent fall storms cancel many well-planned hunting trips. Storms lasting up to a week are not unusual. Lack of adequate shelter in remote areas discourages many of the less hardy hunters.

Small skiffs provide good access to the area between Outlet Cape and Sharatin Bay. Larger commercial fishing boats are used to reach more remote areas south of Uganik Bay and in Kiliuda Bay. More than half the harvest is taken by hunters using boats for transportation. Approximately one fourth of the harvest is taken by hunters utilizing private and chartered aircraft.

PROBLEMS

* Areas with high deer densities are relatively inaccessible and the deer population is underharvested. Development of additional boat launching sites to provide better access should be encouraged along with yearlong maintenance of roads to bays with boat launching areas.

* Lack of adequate shelter discourages hunting in more remote areas. The Department should encourage construction of public hunting cabins and boat landings.

* Many of the best deer hunting areas have been selected by Native corporations under provisions of the Alaska Native Claims Settlement Act. Native corporations may prevent trespass upon receiving title to the land. The Department should solicit the cooperation of private landowners to facilitate progressive management of deer. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

IMPACTS

* Distribution of the harvest will be improved by improvements in accessibility and provision for hunter shelters.

* Quality of hunting experience may be reduced as hunting pressure increases.

* Improving access to hunting areas may necessitate reductions in seasons, bag limits and levels of hunter participation in portions of the area.

4. AFOGNAK ISLAND DEER MANAGEMENT PLAN

LOCATION

In Game Management Unit 8, that portion of Afognak Island west of a straight line from the mouth of Seal Bay Creek to the mouth of Saposa Creek, and including Raspberry, Shuyak, Marmot and adjacent islands except Whale Island.

MANAGEMENT GOAL

To provide the greatest opportunity to participate in hunting deer.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Maintain either-sex deer hunting seasons.
2. Improve hunter access and facilities within the area, if necessary.
3. Control hunter access and methods of transport, if necessary, to distribute hunting pressure through the area.
4. Encourage timber harvest and regeneration practices that improve deer habitat.

THE SPECIES

Observations of deer on Afognak and Raspberry Islands became frequent in the early 1950's. Since there are no records of actual transplants to the islands it is assumed that deer became established by swimming from Whale Island and the Kupreanof Peninsula. By the mid-1960's deer were well established on Afognak and Raspberry Islands. Little Raspberry, Marmot and Ban Islands are all now inhabited by deer and deer populations on Afognak and Shuyak Islands appear to be increasing.

Sitka spruce forest is the dominant vegetative type in the Afognak Island group. The central part of Afognak is heavily forested and spruce is gradually invading along the westernmost Shelikof Strait side. Deer here exhibit seasonal migrations typical of other Alaskan deer ranges, moving onto alpine-subalpine ranges in the summer and dropping to lower elevations according to snow conditions. Preferred winter habitats as indicated by relative population densities are areas with patchy spruce groves interspersed with open areas of grass-brushlands, such as occur on southeastern Raspberry Island. Southern exposures near the coastline and windblown capes where vegetation is exposed receive heavy deer use during the winter. Deep snows force deer to the beachline as occurs in Southeastern Alaska. Afognak Island generally has heavier snowfall than further south on Kodiak Island and Afognak's breakup is frequently somewhat later. During many winters heavy rains prevent deep snow accumulations. When heavy snows do occur, sub-canopy snow accumulations in mature timber are much less than in openings. Deer become heavily dependent on timber near sea level to provide cover and food.

Winter deer mortality has been observed in the Afognak Island group during periods of deep snow, but the extent to which populations have fluctuated in the past is unknown. Generally the population seems to be increasing despite periodic winter losses. Relatively high populations of Roosevelt elk occupied many of the deer winter ranges during the 1960's. A heavy die-off occurred in 1970 and 1971 and elk numbers have not recovered to former levels. The reduction in elk numbers may have allowed increased deer populations in areas where elk wintered. Although deer and elk use many of the same plant species on winter ranges, the extent of competition is unknown.

Hunting pressure is increasing on Afognak and Raspberry Islands as these areas gain the reputation for producing deer. Most of the harvest comes from Raspberry Island and the southern part of Afognak Island which are

relatively accessible to Kodiak hunters. By 1971 these islands yielded 10 percent of the Game Management Unit 8 harvest. In 1975 a record harvest of 256 deer from Afognak was reported (24 percent of the total Unit 8 kill). Some deer are taken incidental to elk and bear hunting. The relatively difficult hunting conditions in heavy spruce forest discourage many hunters.

Skiffs and commercial fishing boats are the chief transportation means utilized by local residents. Private and charter aircraft are used to a lesser extent. Access to the interior of the island is limited primarily to a few lakes where floatplanes may land. A road recently constructed connecting Discoverer and Kazakof Bays will improve access to a limited extent although it does not transect particularly high density deer range. Hunting pressure will undoubtedly increase as logging roads provide additional access, but it is unlikely that hunting will reach a level sufficient to crop the annual increment in the forseeable future.

PROBLEMS

* Most of the area has been selected by Native village corporations under provisions of the Alaska Native Claims Settlement Act. Should the corporate landowners close their lands to trespass, a serious loss of hunting opportunity could occur. The Department should solicit the cooperation of private landowners to facilitate progressive management of deer. Easements across private lands to public lands will be sought as provided for in the Alaska Native Claims Settlement Act.

* The logging industry has only recently been introduced to Afognak Island. Experience in Southeastern Alaska suggests that logging can be detrimental to deer winter range without proper design and layout of cuts. Deer are dependent on cover and food provided by mature timber during severe winters. Examination of previously logged areas on Afognak Island indicates that heavy growth of grass, fireweed and salmonberry dominates clearcuts and that little forage is available under heavy snows except on the fringes near spruce timber. Small well-spaced clearcuts could benefit deer populations by increasing preferred forage and improving habitat diversity. The Department should initiate research studies to determine effects of logging on deer habitat and should participate in planning and layout of timber sales to assure mitigation of negative impacts of logging.

* Difficult access, severe fall weather, and lack of shelter restricts hunting effort. Improvements in floatplane and boat docking facilities should be supported by the Department. Public and private landowners should be encouraged to develop recreational cabins, and construction of primitive foot trails should be encouraged to provide better access to deer populations.

IMPACTS

* Deer populations will continue to fluctuate according to the severity of winter conditions and hunting will have minimal impact on population trends.

* Increased hunting opportunity may be provided if improvements in access and shelter are not offset by closure of private lands to hunting.

* Habitat will be maintained or improved if proper consideration of deer requirements can be incorporated into logging plans.

* Crowded hunting conditions may occur in more accessible hunting areas as hunting pressure increases.

* Implementation of logging practices to benefit deer habitat may increase the industry's operating costs.

FURBEARERS IN SOUTHWESTERN ALASKA

All species of furbearers* common to Alaska occur in the Southwestern Region. A great diversity of furbearer habitat is present in this region which encompasses an area from the Aleutian Islands to the crest of the Alaska Range. The distribution of furbearers reflects the diversity of the habitat.

Excellent beaver habitat exists in the northern half of this region and on Kodiak Island where they were introduced some years ago. In the Nushagak drainage beavers achieve some of the highest densities within Alaska. Beavers do not exist on the western end of the Alaska Peninsula or the Aleutian Islands. On the extremity of their range on the Alaska Peninsula beaver populations may fluctuate with the condition of their habitat. Wolverines occur throughout the mainland portion of the region and on Unimak Island, but are absent on the Aleutian Islands. Wolverines appear to be abundant, but, as elsewhere in the state, accurate information on population size and composition is not available. Arctic fox, particularly the blue phase, occur on many of the Aleutian Islands, the Alaska Peninsula, and the coastal fringe to the north. Foxes were introduced to many of the Aleutian Islands and efforts have been made recently to remove them from islands where they are seriously impacting ground nesting birds. Fox populations are abundant throughout the area but have a tendency to fluctuate in density over the years. Coyotes are found only rarely in some rare portions of the region and where found do not achieve the abundance that they do elsewhere in the state. Lynx are found in the northeastern portion of the area but do not achieve densities similar to those in the Interior and Southcentral Regions. Land otters reach high population levels in many portions of the region but are not present on the Aleutian Islands. There is little of marten habitat in the area and they do not achieve the high densities found in the Western and Interior areas. Marten and red squirrels were transplanted to Afognak Island in 1952 and both have become established on the island. Mink and weasels are found throughout most of the region and at times are very abundant. Red squirrels and ground squirrels achieve high populations in many portions of this area. Little is known about population densities of flying squirrels. Marmot are also common but population densities are unknown.

Population levels and trends of carnivorous furbearers are often closely tied to relatively few prey species or even to a single prey species. The abundance of lynx can often be predicted from snowshoe hare population trends. Lynx in Southwestern Alaska do not achieve densities as high nor exhibit fluctuations in population levels as extreme as those found in Interior Alaska, possibly because snowshoe hare densities are lower than those of Interior areas. Densities of marten, red foxes, weasels and coyotes appear to be dependent upon densities of small rodents, although red fox abundance also appears related to snowshoe hare population levels. Mink, marten, and beaver achieve population densities as high as anywhere in the state.

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. Beavers, muskrats, squirrels, and marmots are subject to significant levels of predation by other furbearers.

* A list of furbearer species considered in these plans follows this regional account.

Human consumptive use of furbearer populations in Southwestern Alaska is highly variable and generally depends on the abundance and current market value of the various species. Long-established traditions, market conditions and trapping regulations have generally limited use to the seasons when the pelts are prime. This period is generally October through May depending upon the species. In some locations trapping effort is expended on beaver and wolverine regardless of market conditions. Wolverine are in high demand for local use as parka ruffs. Beaver are sought for food as well as fur, and beaver trapping is a traditional spring activity in many areas. Beaver are generally more heavily trapped than other furbearer species. Beaver distribution in the lower Nushagak drainage may be severely restricted because of excessive utilization. They are not present in parts of some drainages where the habitat appears capable of supporting them. Other drainages within this area have experienced excessively high use of beaver in the past, but in the early 1970's the harvest did not appear to be excessive.

Trapping is a very important and traditional use of furbearers in this region, particularly in Game Management Unit 17 and in the upper portions of Unit 9. Over the years there has not been a great change in the use of furbearers within this area. In some locations trapping still provides a substantial portion of a family's needs. This situation may not persist for a long period of time. If the human population increases significantly and new population centers are established, the trend will be towards more trappers who will trap on a part-time basis. The take of furbearing animals may become a less important part of the annual income of the trapper. As in other areas of Alaska this may precipitate a shift in the value of trapping from an economic sustenance activity to a cultural or outdoor experience.

Little nonconsumptive use of furbearers occurs in Southwestern Alaska. Most species are nocturnal or secretive in nature and provide limited viewing opportunities. However, red squirrels and beavers provide viewing opportunity for fishermen and hunters, and in alpine areas ground squirrels and marmots are commonly observed incidental to other activities. In some areas, arctic or blue foxes and red foxes are readily available to viewers and photographers.

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 beavers 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.

* Outbreaks of rabies in foxes periodically endanger humans and domestic animals. Increased development and the attendant influx of people to the area will result in greater potential contact with foxes. Increased trapping or control efforts around population centers and development sites may be necessary. Public education is needed to inform people of the hazards of rabies.

* Underharvested furbearer populations are a significant economic loss to the area. Efforts to properly utilize all furbearer populations could provide substantial economic benefits.

* Development activities may occur at a rapid rate in Southwestern 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 SOUTHWESTERN ALASKA

	Common Name	Scientific Name
Canids	Coyote	*Canis latrans*
	Red Fox	*Vulpes vulpes*
	White (Arctic) Fox	*Alopex lagopus*
Felids	Lynx	*Lynx canadensis*
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*
	Arctic Hare	*Lepus arcticus*
	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 availablity. 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.

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.

13. NAKNEK RIVER WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, the Naknek River from its mouth to Naknek Lake.

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 hunter access and methods of transport, if necessary, to minimize disturbance or harassment of waterfowl.

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 detrimental to waterfowl habitat.

THE SPECIES

The Naknek River is of interest primarily because of whistling swan concentrations in the spring and fall, and lesser numbers during the summer. Because the river is one of the first bodies of water to open in the spring, large numbers of swans congregate, particularly in the King Salmon area, for several weeks. In some years up to 10,000 swans are present. During the summer several hundred molting nonbreeding swans can be found on the river above King Salmon. Fewer swans are present during the fall than in the spring, but several thousand birds may stay until the river freezes. Large numbers of ducks and geese also use the river during the spring. In the aggregate, 50,000 or more birds may be present at any one time. Summer populations number several hundred ducks (primarily scoter, harlequin, and scaup), while in the fall perhaps 5,000 birds can be found here at any one time.

Waterfowl viewing opportunities are excellent during the spring as large bird concentrations are present adjacent to and in King Salmon. For example, ducks and geese are frequently found near the river in people's yards. Local residents and others traveling through the area are the primary springtime users. Hunting pressure during fall months is light and comes mainly from King Salmon, South Naknek, and Naknek residents. A few moose and caribou hunters also take birds incidentally to their primary game. Hunter access is primarily by boat but a limited number of trails are present.

PROBLEMS

* Waterfowl interpretative information for viewers is not available except by personal contact at the Alaska Department of Fish and Game office in King Salmon. Informative signs placed at primary viewing sights and/or brochures made available in the department office would aid viewers.

* No land classification now exists to provide complete protection to this important swan concentration area. The Naknek River should be designated as critical habitat by the legislature.

* Bird concentrations may create temporary hazards to aircraft at the King Salmon Airport. In addition, aircraft may harass birds away from areas of traditional use. The State Department of Aviation and the Federal Aviation Administration will be encouraged to manage the airport and associated aircraft to minimize problems related to flying safety and maintenance of high seasonal bird use.

IMPACTS

* The river's value as a waterfowl resting-staging area and hunting area would be maintained.

14. EGEGIK WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, lands in the Egegik estuary, designated critical habitat by AS 16.20.230.

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. Maintain waterfowl hunting seasons and bag limits that reflect climatic conditions.

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 harmful to waterfowl habitat.

THE SPECIES

This area accomodates very large numbers of ducks, geese and swans during the fall and spring. Peak fall duck numbers are perhaps 100,000 and emperor geese numbers about 10,000 in the Egegik area. Snow and cackling Canada geese are also present. Spring goose populations probably number about 10,000 during a short time period.

Hunting pressure on the area is light. A few local residents and big game hunters combining hunts are the primary users. Hunter access to the area is primarily by aircraft, except for the few local residents who own boats. Hunting pressure in the future is not expected to increase to a point where excessive harrassment of birds will occur.

PROBLEMS

* Planned Outer Continental Shelf (OCS) oil lease sales in Bristol Bay would result in drilling and tanker traffic that could have devastating effects on waterfowl if accidental spills occur. Federally funded OCS bird studies by the Department and the U.S. Fish and Wildlife Service must be continued and close cooperation between state and federal agencies must be maintained. The Department advocates that no OCS or near shore oil development should occur in Bristol Bay.

* Native land withdrawals of uplands around the area could result in incompatible land uses which would affect the waterfowl resources. Critical habitat status of these areas should be maintained and close cooperation with Native landowners should be attained to ensure habitat protection.

* Public hunting or access may not be permitted on lands under private ownership. This could result in concentrations of hunters in remaining areas. Public hunting and hunting access will be maintained over the largest possible area.

IMPACTS

* Limitations on oil development activities in Bristol Bay would assure the welfare of millions of waterfowl as well as many other biological resources of the area.

15. PILOT POINT WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, lands in the Pilot Point estuary, designated critical habitat by AS 16.20.230.

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. Maintain waterfowl hunting seasons and bag limits that reflect climatic conditions.

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 harmful to waterfowl habitat.

THE SPECIES

This area accommodates very large numbers of ducks, geese and swans during the fall and lesser numbers of birds during other periods of the year. Nearly all the cackling Canada geese in the world (about 150,000) stop at Pilot Point in the fall. Most of the snow geese from Wrangell Islands in Russia (perhaps 250,000) also stop for a lesser period of time. Large numbers of whitefronts also occasionally stop in the fall, depending on weather conditions. Peak duck numbers on the area exceed 100,000. Probably over 25,000 emperor geese also use the area.

Pilot Point ranks as the number two goose harvest area in Alaska. During the four hunting seasons 1971-1974, there was a calculated average yearly harvest of 2,165 birds. Duck harvest averaged 1,575 birds while there was a calculated 1,275 hunter days spent on the area. Most waterfowl hunters using the area are from Anchorage and Kodiak, but the area is also popular with residents of Dillingham and the King Salmon-Naknek area. Hunter access to the area is primarily by aircraft, except for the few local residents who own boats. Hunting pressure in the future may increase to a point where excessive harassment of birds occurs.

PROBLEMS

* Planned Outer Continental Shelf (OCS) oil lease sales in Bristol Bay would result in drilling and tanker traffic that could have devastating effects on waterfowl if accidental spills occur.

Federally funded OCS bird studies by the Department and The U.S. Fish and Wildlife Service must be continued and close cooperation between state and federal agencies must be maintained. The Department advocates that no OCS or near shore oil development should occur in Bristol Bay.

* Native land withdrawals of uplands around the area could result in incompatible land uses occurring which would affect the waterfowl resources. Critical habitat status of these areas should continue and close cooperation with Native landowners be maintained to ensure habitat protection.

* Public hunting or access may not be permitted on lands under private ownership. This could result in concentrations of hunters in remaining areas.

IMPACTS

* Public hunting and hunting access will be maintained over the largest possible area.

* Limitations on oil development activities in Bristol Bay would assure the welfare of millions of waterfowl as well as many other biological resources of the area.

16. CINDER RIVER WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, lands in the Cinder River estuary, designated critical habitat by AS 16.20.230.

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. Maintain waterfowl hunting seasons and bag limits that reflect climatic conditions.
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 harmful to waterfowl habitat.

THE SPECIES

This area accommodates large numbers of ducks, geese and swans during the fall and lesser numbers of birds during other periods of the year. Peak fall duck numbers are perhaps 100,000 and emperor geese number about 10,000. Up to 20,000 sea ducks utilize the intertidal area and river mouth. Up to 30,000 snow and cackling Canada geese are also present.

Hunting pressure in the area is light. A few local residents and big game hunters are the primary users. Hunter access to the area is primarily by aircraft. Hunting pressure in the future is not expected to increase to a point where excessive harassment of birds is experienced.

PROBLEMS

* Planned Outer Continental Shelf (OCS) oil lease sales in Bristol Bay would result in drilling and tanker traffic that could have devastating effects on waterfowl if accidental spills occur. Federally funded OCS bird studies by the Department and the U.S. Fish and Wildlife Service must be continued and close cooperation between state and federal agencies must be maintained. The Department advocates that no OCS or near shore oil development should occur in Bristol Bay.
* Native land withdrawals of uplands around the area could result in incompatible land uses occurring which would affect the waterfowl

resources. Critical habitat status of these areas should continue and close cooperation with Native landowners be maintained to ensure habitat protection.

IMPACTS

* Limitations on oil development activities in Bristol Bay would assure the welfare of millions of waterfowl as well as many other biological resources of the area.

17. PORT HEIDEN WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, lands in the Port Heiden estuary, designated critical habitat by AS 16.20.230.

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. Maintain waterfowl hunting seasons and bag limits that reflect climatic conditions.

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 harmful to waterfowl habitat.

THE SPECIES

This area accommodates large numbers of ducks, geese and swans during the fall and lesser numbers of birds during other periods of the year. Approximately 75,000 sea ducks (scoters, eiders, old-squaw and harlequin) utilize the waters of the bay each spring and fall. More than 50,000 game ducks concentrate in the marshes in the fall. Peak duck numbers on the area exceed 100,000. Probably over 25,000 emperor geese and over 25,000 total of snow, cackler, and white-fronted geese also use the area.

Hunting pressure on the area is light. A few local residents and big game hunters combining hunts are the primary users. Hunter access to the area is primarily by aircraft, except for local residents who own boats. Hunting pressure in the near future is not expected to increase to a point where excessive harassment of birds is experienced.

PROBLEMS

* Planned Outer Continental Shelf (OCS) oil lease sales in Bristol Bay would result in drilling and tanker traffic that could have devastating effects on waterfowl if accidental spills occur. Federally funded OCS bird studies by the Department and the U.S. Fish and Wildlife Service must be continued and close cooperation between state and federal agencies must be maintained. The Department advocates that no OCS or near shore oil development should occur in Bristol Bay.

* Native land withdrawals of uplands around the area could result in incompatible land uses occurring which would affect the waterfowl resources. Critical habitat status of these areas should continue and close cooperation with Native landowners be maintained to ensure habitat protection.

* Public hunting or access may be prevented on lands in private ownership. This could result in concentrations of hunters on remaining areas. Public hunting and hunting access will be retained over the largest possible area.

IMPACTS

* Limitations on oil development activities in Bristol Bay would assure the welfare of millions of waterfowl as well as many other biological resources of the area.

18. PORT MOLLER WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, lands in the Port Moller estuary, designated critical habitat by AS 16.20.230.

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. Maintain waterfowl hunting seasons and bag limits that reflect climatic conditions.

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 harmful to waterfowl habitat.

THE SPECIES

This area accommodates very large numbers of ducks, geese and swans during the fall and lesser numbers of birds during other periods of the year. Few Canada or snow geese use the Port Moller area, but emperor geese during spring and fall number over 100,000. Peak duck numbers are probably over 500,000 (mostly nongame species).

Hunting pressure on the area is light. A few local residents are the primary users. Hunter access to the area is primarily by boats. Hunting pressure in the future may increase to a point where excessive harassment of birds is experienced if the community of Nelson Lagoon achieves the growth figures projected by some agencies.

PROBLEMS

* Planned Outer Continental Shelf (OCS) oil lease sales in Bristol Bay would result in drilling and tanker traffic that could have devastating effects on waterfowl if accidental spills occur. Federally funded OCS bird studies by the Department and the U.S. Fish and Wildlife Service must be continued and close cooperation between state and federal agencies must be maintained. The Department advocates that no OCS or near shore oil development should occur in Bristol Bay.

* Native land withdrawals of uplands around the area could result in incompatible land uses occurring which would affect the waterfowl

resources. Critical habitat status of these areas should continue and close cooperation with Native landowners be maintained to ensure habitat protection.

* Public hunting or access may not be permitted on lands under private ownership. This could result in concentrations of hunters in remaining areas. Public hunting and hunting access will be maintained over the largest possible area.

IMPACTS

* Limitations on oil development activities in Bristol Bay would assure the welfare of millions of waterfowl as well as many other biological resources of the area.

19. IZEMBEK WATERFOWL MANAGEMENT PLAN

LOCATION

In Game Management Unit 9, the intertidal areas of Izembek Lagoon including Moffet Lagoon and Applegate Cove.

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. 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 or to minimize disturbance or harassment of waterfowl.

3. Obtain, maintain and improve public access to waterfowl areas.

4. Encourage public viewing and photography of waterfowl and enhance viewing facilities.

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 utilizaiton of habitat by waterfowl, and discourage land use practices that are harmful to waterfowl habitat.

THE SPECIES

Each fall essentially the entire North American black brant population (150,000 birds) and emperor goose population (150,000 geese) use the area. Also, about 100,000 lesser Canada geese and in some years one-quarter of a million ducks are also found on the area. Whistling swans numbering some 100 birds are permanent residents, interchanging between Unimak Island and the southern portion of the Alaska Peninsula. Spring waterfowl use is substantially less for brant and ducks. Emperor geese, eiders and some game ducks overwinter on Izembek in mild years when complete freeze-up does not occur. Total numbers of wintering birds probably are less than 5,000. The lagoon is used as a molting area during September by Steller's eiders which have traveled from North Slope, Canadian and Russian nesting areas. Total numbers of Steller's eiders in Izembek Lagoon probably exceed 100,000 birds. The world's largest eel grass bed in the lagoon is critical to brant. Upland browse, berries, eel grass and other foods are critical to other waterfowl. All waterfowl which use the area, except black brant, are considered to be in excellent status. The brant population has decreased over 75,000 birds during the past 20 years and the population has failed to stabilize.

Izembek Lagoon is the top goose harvest area in Alaska. During the four hunting seasons 1971-1974, an average of 2,630 geese (20 percent of state total) were taken there annually. The composition of the harvest is estimated to be: Canada and emperor geese - 35 percent each and black brant - 30 percent. The four year average number of hunter days on the area is 735. Duck harvest averages 615 each year.

Although local residents at Cold Bay account for some waterfowl harvest, the majority of birds are taken by hunters from the Anchorage vicinity and Kodiak. Several large groups annually charter aircraft for weekend hunts in October. Visiting military personnel also account for substantial harvest. Although hunting is excellent in September, most harvest occurs in October when the birds are in better physical condition.

Hunter access is primarily walk-in from the roads to Outer Marker and the Air Force radar site. Only a few other trails are available which are suitable for standard vehicles. Limited use is made of boats and outboard motors on the lagoon partially due to the problem of operating an outboard motor in the eel grass. Growing numbers of hunters in the northeast end of Applegate Cove and in the Outer Marker area appear to be keeping the geese out of these areas to some degree. Although this is not adversely affecting the birds, hunting conditions at times become crowded and success is lowered. The U. S. Fish and Wildlife Service has closed an area around Grant Point, near the radar site, to hunting. This is designated as a viewing area and receives substantial use by local and itinerant viewers. Other viewing and photography opportunities are available along the road systems. The only factor keeping Izembek Lagoon from being Alaska's foremost waterfowl viewing area is its distance from population centers.

PROBLEMS

* Planned Outer Continental Shelf (OCS) oil lease sales in Bristol Bay would result in drilling and tanker traffic that could have devastating effects on waterfowl if accidental spills occur. Federally funded OCS bird studies by the Department and the U.S. Fish and Wildlife Service must be continued and close cooperation between state and federal agencies must be maintained. The Department should advocate that no OCS or near shore oil development should occur in Bristol Bay.

* Crowded hunting conditions and decreased hunter success are increasing as the number of hunters using the area increases. Limited access and the fact that most people hunt in October cause hunter concentrations in a few areas, usually on weekends. Encouraging people to hunt in September would spread hunting effort. The U. S. Fish and Wildlife Service should be encouraged to improve at least one additional access route to the lagoon. Hunting closures of some upland tundra areas could possibly attract and hold geese near areas from which geese are now displaced, thus encouraging field hunting and spatial distribution of hunters.

* The reduction in the black brant population, although attributable to factors operating in other areas of the species range, nevertheless would affect hunting opportunity in the Izembek area if restrictions on harvest are imposed. Studies to better determine harvest and crippling loss of brant at Izembek should be continued to enable a better assessment of such loss on the brant population.

* If airboats are introduced to the area as a method of hunter transport, excessive disturbance to geese would result and many birds would move out of the area and become unavailable to hunters. Use of airboats should be prohibited on the lagoon.

* Bird concentrations may cause a temporary hazard for aircraft using the Cold Bay airport. The State Department of Aviation and the Federal Aviation Administration will be encouraged to manage the airport and associated aircraft to minimize problems of flying safety related to high seasonal concentrations of waterfowl.

IMPACTS

* Limitations on oil development activities in Bristol Bay would assure the welfare of millions of waterfowl as well as many other biological resources of the area.

* Efforts to reduce hunter crowding will result in a more esthetic hunting experience for most people and increase hunting success.

* Efforts to better identify brant kill at Izembek will dictate the need for harvest restrictions. Such restrictions would allow for a population increase, if done in cooperation with other states, Canada and Mexico.

* An area critical to the world's population of black brant shall be maintained for use by that population.

MARINE MAMMALS IN SOUTHWESTERN ALASKA

Southwestern Alaska coastal waters provide habitat for a number of marine mammal species* including harbor seals, sea lions, walrus, fur seals, 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 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, and in the case of fur seals, the National Marine Fisheries Service, under a moratorium on use established by the Marine Mammal Protection Act. Little use of marine mammals other than fur seals now occurs in Southwestern 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 160,000 seals are estimated to occur around the Kodiak Archipelago, Alaska Peninsula and Aleutian Islands. Several of the largest concentrations of harbor seals in the world occur along the north side of the Alaska Peninsula and at Tugidak Island.

Harbor seals are primarily fish eaters, although marine invertebrate species are also taken. They compete with fishermen for certain species of sport and commercially valuable fish. Depredation on gill-netted salmon has occurred, most notably in the salmon fishery in Bristol Bay.

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 contamainants 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. A substantial harvest of pups continued around Kodiak and the north side of the Alaska Peninsula until 1972. 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 Southwestern coast with at least 185,000 animals known to be associated with over 150 different rookeries and hauling-out sites. This area contains the largest rookeries in the world including Sugarloaf Island, Marmot Island, Ugamak Island, Akutan Island and Attu Island, each of which may support 10,000 or more sea lions during the breeding season. Rookeries and haul-out areas of lesser importance occur throughout the area. Movements and interchange of sea lions between these areas occurs during the fall when many animals leave the breeding areas and move to winter

* A list of marine mammal species considered in these plans follows this regional account.

feeding areas, and again in the spring when they return to the breeding rookeries. No changes in sea lion population size have been detected in recent years and populations in Southwestern 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. Some animals are found far offshore in association with foreign fishing fleets and increasing numbers utilize seasonal pack ice in the southern Bering Sea. 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 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

Between 88,000 and 131,000 sea otters, perhaps 90 percent of the world's population, inhabit Southwestern Alaska. Dense populations occur around Afognak Island, Kujulik Bay, the Shumagin Islands, Sanak Island, the Sandman Reefs, north of Unimak Island and the Alaska Peninsula and the Andreanof, Delarof and Rat Islands. Smaller populations are found in Kamishak Bay, the Fox and Krenitzin Islands, the Pribilof Islands and the Near Islands.

Population in the Rat, Delarof and western Andreanof Islands have reached carrying capacity and are probably not contributing significantly to repopulation of other areas. The population north of the Alaska Peninsula and Unimak Island is currently being limited by periodic formation of sea ice. Only small numbers occur in the Pribilof Islands. All other populations appear well established and are expanding their range into unpopulated habitat.

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. 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. Between 1962 and 1971 approximately 3,500 sea otters were removed from the area between Amchitka and Adak Islands for experimental harvest, transplants and scientific studies. Almost 600 of these were transplanted to other areas. In 1971 an estimated 1,000 or more sea otters were killed by a nuclear test at Amchitka Island.

Walrus

Portions of the Pacific walrus population inhabit Bristol Bay and the waters north of the Alaska Peninsula seasonally. Distribution of walrus in winter is strongly influenced by the distribution of sea ice. When sea ice advances to Bristol Bay, a portion of the walrus population moves to the area north of Port Heiden and Port Moller. In years of extreme sea ice coverage, walrus may be found as far south as Unimak Island. In spring most of the walrus move northward with the retreating ice pack. In some years 80 to 100 may haul out on Amak Island for a brief period. Over 10,000, mostly bulls, remain in northern Bristol Bay througout the summer spending much of their time hauled out on Round Island.

Prior to passage of the Marine Mammal Protection Act of 1972, State regulations prohibited the taking of walrus south of Cape Newenham and the Walrus Islands were designated as a State game sanctuary. After 1972 federal laws permitted the taking of walrus in these areas by Natives. In order to reduce disturbance, State regulations required a permit for access to Round Island and adjacent waters. In 1976 walrus management authority was returned to the State and hunting by all individuals was again prohibited south of Cape Newenham.

Fur Seal

The Pribilof Islands are the breeding ground for approximately 1.3 million northern fur seals. This species rarely occurs near shore in other areas. Vast offshore areas north and south of the Alaska Peninsula and eastern Aleutian Islands serve as feeding areas. Eastern Aleutian passes are major migration routes. Management authority for fur seals is under the National Marine Fisheries Service. The population was greatly reduced by commercial hunting but has fully recovered since signing of the Fur Seal Treaty in 1911. A regulated annual harvest is taken each year.

Whales Dolphins and Porpoises

More than twenty species of whales may occur 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. Some 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 Dall porpoises and harbor porpoises occur in Alaskan waters; the latter two 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.

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 mammals 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 SOUTHWESTERN ALASKA

	Common Name	Scientific Name
Seals	Harbor Seal	*Phoca vitulina*
	Northern Fur Seal	*Callorhinus ursinus*
	Ribbon Seal	*Phoca fasciata*
Whales	Belukha Whale	*Delphinapterus leucas*
	Blue Whale	*Balaenoptera musculus*
	Bowhead Whale	*Balaena mysticetus*
	Finback Whale	*Balaenoptera physalus*
	Gray Whale	*Eschrichtius gibbosus*
	Humpback Whale	*Megaptera novaeangliae*
	Killer Whale	*Orcinus orca*
	Minke Whale	*Balaenoptera acutorostrata*
	Pacific Blackfish (Pacific Pilot Whale)	*Globicephala melaena*
	Sei Whale	*Balaenoptera borealis*
	Sperm Whale	*Physeter catodon*
Porpoises	Dall Porpoise	*Phocoenoides dalli*
	Harbor Porpoise	*Phocoena phocoena*
	Pacific Whitesided Dolphin	*Lagenorhynchus obliquidens*
Other Marine Mammals	Pacific Walrus	*Odobenus rosmarus*
	Sea Otter	*Enhydra lutris*
	Steller Sea Lion	*Eumetopias jubata*

3. BRISTOL BAY WALRUS MANAGEMENT PLAN

LOCATION

Those portions of Game Management Units 9 and 17 in Bristol Bay.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

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

EXAMPLES OF MANAGEMENT GUIDELINES

1. Perpetuate the use of hauling grounds by walrus on the Walrus Islands.

2. Prohibit walrus hunting in Game Management Units 9 and 17.

3. Regulate numbers, means of transport and activities of visitors to Round Island.

4. Encourage scientific and educational studies of walrus that are compatible with protection of the hauling grounds and with public viewing opportunities.

5. Disallow developments not compatible with primary management objectives or that would substantially alter the wilderness nature of the area on Round Island.

THE SPECIES

A portion of the north Pacific walrus population uses this area when seasonal pack ice extends into Bristol Bay. In an average year several thousand walrus may occur in the northern portion of Bristol Bay with smaller groups as far south as Port Heiden. In periods of more extreme sea ice formation walrus may occur as far south as Unimak Island. Most of the walrus remain offshore, although small numbers may occur at various points along the north side of the Alaska Peninsula. Up to 100 may briefly haul out on Amak Island as the ice retreats in spring.

Most of the walrus population moves north with the retreating ice pack, but several thousand males remain in Bristol Bay using Round Island in the Walrus Islands State Game Sanctuary as a hauling area. Round Island has attracted world wide fame as a place to photograph and view walrus. Walrus concentrations vary from day to day as animals leave the island to feed and return. Numbers vary from less than 1,000 to more than 8,000 individuals. Animals hauling out on the island are primarily males. Females are uncommon. Walrus are present from the time the ice departs in late May until freeze up.

Historically walrus were harvested in Bristol Bay for food and other domestic uses. Following a period of many years when walrus hunting was prohibited in the area, the Marine Mammal Protection Act of 1972 removed restrictions on harvest by Eskimos, Indians and Aleuts. Harvests of walrus since 1972 were primarily to obtain ivory for sale. Little ivory was carved and most ivory was sold illegally as raw ivory. Ivory carving, an art form which was dormant in this region for many years, has only

recently been revived. In April 1976 walrus management authority was returned to the State of Alaska and walrus hunting in Game Management Units 9 and 17 by any individual was again prohibited.

The primary use of walrus in the area has been for viewing and photography on Round Island. As the number of visitors to the area increased the Department initiated access restrictions to Round Island and surrounding waters. Transportation to the island is primarily by boat. Float-equipped or amphibious aircraft can land when sea conditions allow. Close, low flights over the island are not allowed as these disturb resting walrus.

PROBLEMS

* Excessive human disturbance can place undue stress on walrus and cause abandonment of hauling areas. Public access to Round Island should continue to be restricted and regulated by a permit system. The permit would impose restrictions to prevent activities that would be detrimental to the walrus population. The Department should station personnel on the island to regulate the permit system and prevent illegal harvesting of animals.

* Activities associated with oil and gas exploration, extraction, transportation, refinement and other industrial activities may result in direct mortality of walrus or alter walrus habitat. The Department should identify areas of critical walrus habitat and areas of high recreational opportunity and should encourage studies of the habitat requirements of walrus and elements in their food chain. The Department should encourage regulation of industrial activities to minimize impact on walrus and on walrus viewing opportunities.

IMPACTS

* The opportunity to view and photograph walrus at close range in an undisturbed wilderness setting will be preserved.

* The opportunity to legally harvest walrus and the limited income from the harvest in the area would be lost. Since a major part of the recent harvest was conducted illegally in the restricted area around Round Island and much of the income came from illegal sale of raw ivory, this impact on legal use would be minor.

* Illegal harvest would be reduced in the vicinity of Round Island.

* Income to local residents for transportation services to Round Island should increase and more than offset loss of income from hunting.

* As public demand to visit the area increases, permits would regulate numbers of persons present at any one time and would restrict human use to certain areas of the island.

4. ILIAMNA LAKE HARBOR SEAL MANAGEMENT PLAN

LOCATION

Iliamna Lake in Game Management Unit 9.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy harbor seals.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit hunting for harbor seals in Iliamna Lake.

2. Discourage human activity that might cause abandonment of hauling and feeding areas.

3. Encourage consideration of the food requirements of Iliamna harbor seals in fisheries management.

THE SPECIES

Iliamna Lake supports one of the few populations of fresh water seals in the world. Seals enter other lakes in Alaska seasonally, but only the Iliamna population remains in fresh water throughout the year. There appears to be interchange with the Bristol Bay seal population through the Kvichak River. The degree of interchange is unknown but appears sufficient to consider Iliamna seals a subpopulation rather than a population by itself. Data about numbers of seals in the lake are limited. During the late 1960's the population numbered approximately 300 seals. In 1975 it was estimated at less than 100. The reduction was probably due to a series of severe winters which greatly reduced the limited areas of suitable winter habitat.

No harvest data specific to Iliamna Lake are available. Seal hunting by all persons was legal there until passage of the Marine Mammal Protection Act of 1972. Since then, only taking by Eskimos, Indians and Aleuts has been permitted. In the past, small numbers have been taken for recreational and domestic purposes. As Iliamna Lake has increased in popularity as a recreational area, the demand for viewing seals has increased. Support for preserving this subpopulation has grown as more people have become aware of its unique nature and the seal population has declined.

PROBLEMS

* 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 restriction 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.

* Little is known about the numbers, degree of interchange with other areas, or habitat requirements of seals using Iliamna Lake. The Department should encourage studies of the Iliamna Lake seal population.

IMPACTS

* Harvest of seals on Iliamna Lake would no longer be allowed.

* Viewing and photographic opportunities should remain similar to those in the past, unless disturbance or habitat changes beyond the Department's control take place.

6B. SOUTHWESTERN ALASKA SEA OTTER MANAGEMENT PLAN

LOCATION

Alaska coastal waters in Game Management Units 8, 9, and 10 except Katmai National Monument.

PRIMARY MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sea otters.

SECONDARY MANAGEMENT GOAL

To provide for an optimum harvest of sea otters.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Allow sea otters to repopulate all of their former range.
2. Protect sea otter populations from adverse effects of resource development activity.
3. Encourage increased participation in viewing and photographing sea otters.
4. Encourage scientific and educational studies of sea otters and their role in marine communities.
5. Where sea otter populations are high they may be harvested under strictly controlled conditions.

THE SPECIES

Southwestern Alaska contains a large percentage of the sea otter's former range. When white men arrived in the 1740's sea otters were distributed along most of the Southwestern coasts. There was probably interchange between areas throughout the range although broad deep waters between islands may have provided partial barriers to movements. Commercial hunting between 1742 and 1911 eliminated the sea otter from parts of the range and greatly reduced numbers in all other areas. In 1911 only small scattered groups of otters were left. A number of these colonies persisted and grew. Suspected locations of surviving groups include Augustine Island, the Barren Islands, Shuyak Islands, the Trinity Island, Sutwick Island, Simeonof Island, the Sandman Reefs, Savak Island, northern Unimak Island, Tigalda Island, Sanalga Island and several locations in the Andreanof, Delarof and Rat Islands.

Some of these nucleus populations have increased to the tens of thousands, and expanded their range into adjacent unpopulated areas and in some cases merged with other populations. Other populations have barely become established. At the present time sea otters occupy all but a few small areas of their former range. Although densities in many areas have reached carrying capacity and thousands starve annually, there are large areas where densities are still well below carrying capacity. Some dense populations are contributing to the repopulation of adjacent areas while others are not.

The following is a summary of the present status of sea otters in various parts of the region.

Kamishak Bay - estimated population 1,000, increasing and expanding its range southwestward along Katmai coast.

Kodiak Archipelago - estimated population 4,000 to 6,000, near carrying capacity around the Barren, Shuyak and northern Afognak Islands, lesser concentrations around the Trinity and Chirikof Islands. Increasing and expanding range around southern Afognak and northern Kodiak Islands.

Southern Alaska Peninsula - estimated population 8,000 to 10,000, near carrying capacity between Chignik and Amber Bays, increasing rapidly and expanding range both northeastward and southwestward.

Shumagin Islands - estimated population 8,000 to 10,000, near carrying capacity in southern islands, rapidly expanding to adjacent mainland coast.

Sanak Island and Sandman Reefs - estimated population 6,000 to 10,000, near carrying capacity around Sanak Island and vicinity of Cherni Island, expanding to mainland coast and merging with Shumagin population.

North Unimak-Alaska Peninsula - estimated population 5,000 to 10,000, high densities north of Unimak Island and Izembek Lagoon. By 1970 expanded range to Port Heiden. Range and numbers were reduced by extreme sea ice conditions in early 1970's. May expand to Krenitizin Islands in future.

Pribilof Islands - estimated population less than 25, seven transplanted in 1959 and 55 in 1968; possibly some immigration from Bristol Bay. Future of population uncertain.

Fox and Krenitzin Islands - estimated population 600 to 1,200, four established and growing concentrations, population far below carrying capacity.

Islands of Four Mountains - no known population.

Andreanof Islands - estimated population 32,000 to 40,000, near carrying capacity around all islands west of Atka Pass, rapid eastward expansion along Atku Island and well established populations on Amlia and Sergeran Islands.

Delarof Islands - Estimated population 6,000 to 8,000, near carrying capacity, not contributing to repopulation of any other area.

Rat Islands - estimated population 17,000 to 24,000, near carrying capacity, some animals may be emigrating from Kiska to Near Islands but most of the population not contributing to repopulation of any area.

Near Islands - estimated population 500, established but well below carrying capacity.

After 1911 federal laws prohibited the taking of sea otters except by Eskimos, Indians and Aleuts using aboriginal means. A small but unknown number were taken under these laws and a few more were taken for scientific purposes and transplants. In 1959 management authority passed to the State and all public harvest was prohibited. Between 1962 and 1971 a total of 1,927 were removed from Amchitka Island, 606 from Tranaga Island, 318 from Kanaga Island, 494 from Adak Island and 144 from the Delarof Islands for experimental harvests, transplants and scientific studies. In 1971 an estimated 1,000 to 1,350 were killed at Amchitka Island by a nuclear test. Small numbers were illegally taken or accidentally caught in crab fishing gear.

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. No known harvest other than small numbers of accidental and illegal kills has occurred since 1972, however Native corporations have considered the possibility of starting a sea otter hunting industry.

While many areas in the region provide excellent opportunities for viewing and photographing sea otters, most of the area is inaccessible to the general public. Public viewing has been a significant use in a few areas such as Sweeper Cove and Finger Bay at Adak and portions of Amchitka Island when the Atomic Energy Commission was active there. Viewing opportunities should also increase as sea otters repopulate range near towns. This should occur in the Chiniak Bay area of Kodiak in the next few years and small numbers can already be seen near Sand Point, Cold Bay, Resurrection Bay, Nikolski and Atka. Commercial fishermen, and to a lesser degree recreational boaters, are able to visit much of the sea otter range. Many individuals throughout the world who will never see a sea otter derive satisfaction from the knowledge that a species that almost became extinct because of man's activities now inhabits most of its former range in large numbers.

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. Several scheduled Outer Continental Shelf oil and gas lease areas are situated near populations that are restricted in range or expanding into areas of low sea otter density. 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 request regulation of industrial activities to minimize impact 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 towns connnected to the road system. 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 such options to the public.

* Harvesting of sea otters could slow the rate of repopulation of former habitat and in some areas could reduce viewing and photography opportunities. The Department should limit harvesting activities

to sea otter populations that have completely recovered from exploitation and are not contributing significantly to the repopulation of any other area. Harvest activities should be zoned in time and space to reduce conflicts with viewing and photography.

* Sea otters are vulnerable to modern hunting methods. Females tend to concentrate in more protected and accessible areas. The Department should maintain strict control of all harvest activities and carefully regulate numbers and precise locations of harvest.

IMPACTS

* Present populations should continue to expand until all areas of former sea otter habitat support aboriginal densities. Juvenile mortality will increase as food becomes limiting but will be partially offset in areas where extensive harvests are conducted.

* Viewing and photography opportunities should increase as areas near population centers are repopulated.

* Predation by sea otters should alter the numbers and age structure of some species of invertebrates, particularly sea urchins, crabs, and mollusks. There may be an increase in size of kelp beds as 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.

8. CHINIAK BAY SEA LION MANAGEMENT PLAN

LOCATION

That portion of Game Management Unit 8 in Chiniak Bay between Spruce Cape and Cape Chiniak.

MANAGEMENT GOAL

To provide an opportunity to view, photograph and enjoy sea lions.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Prohibit hunting for sea lions in Chiniak Bay.
2. Limit human activity that might cause abandonment of the Long Island and Cape Chiniak hauling areas.
3. Encourage consideration of the food requirements of sea lions in fisheries management in Chiniak Bay.

THE SPECIES

Chiniak Bay is used by several thousand sea lions throughout the year. There are two hauling areas. Up to 75 may be hauled out at Long Island and 775 at Cape Chiniak. Little information on seasonal movements exists but there is probably regular interchange between Chiniak Bay and other sea lion concentrations in the area, such as Marmot Island. No information is available on historic changes in sea lion occurrence in the bay, however, the population as a whole appears to have remained near carrying capacity in recent years.

Human activities have not had any apparent effect on sea lion numbers in Chiniak Bay. Human development in the vicinity of the town of Kodiak may have altered some sea lion habitat; however, the regular occurrance of sea lions around Long Island suggests that such impacts have been minor. Proposed onshore facilities associated with Outer Continental Shelf oil and gas development could influence sea lion use of Chiniak Bay in the future.

Little information is available on harvest of sea lions in Chiniak Bay. Small numbers may have been taken for domestic purposes, bait or animal food, or in response to fisheries conflicts. No commercial harvest was ever conducted in Chiniak Bay, but a total of 14,180 pups were commercially harvested from nearby Marmot Island between 1963 and 1972.

The Long Island and Cape Chiniak hauling areas are accessible to recreational boaters from Kodiak and provide good viewing and photographic opportunities. As the human population of Kodiak grows in response to Outer Continental Shelf activities, the demand for such opportunities will increase.

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 their food chain. Excessive disturbance can cause abandonment of rookeries and hauling areas. The Department should identify areas of critical sea lion habitat and areas of high recreational value 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 impact on sea lions and on sea lion viewing opportunities.

* Foreign fishing fleets may compete with sea lions for certain fish stocks. Excessive fishing may lower habitat carrying capacity for sea lions. 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 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 sea lion management authority and reinstate regulations controlling the take of sea lions by all individuals.

* Disturbance can cause abandonment of hauling areas by sea lions. This could be particularly important on 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 Chiniak Bay.

* Opportunities for viewing and photography 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.

Southwestern Alaska consists of a vegetational mosaic of bird habitats composed of markedly different plant communities with abrupt transitions into neighboring types. The Alaska Peninsula and the Aleutians are particularly distinctive for it is here that the rich, moist, spruce-hemlock and spruce-birch forests of Southcentral and Southeastern Alaska end. The generally low elevation of the Aleutian Range on the Alaska Peninsula permits an intrusion of plant species which attract some associated birds typical of interior Alaska, but the base of the Peninsula remains an abrupt transition area in bird distribution. Many abundant "mainland" species, particularly the smaller passerines, extend their range only a short distance onto the Peninsula. Although the interior portion of the region shares many species with Southcentral and even Southeastern Alaska, the Alaska Peninsula has relatively few species in common and also supports few distinctive nongame bird species of its own.

As with the rest of coastal Alaska, bird species diversity and abundance show dramatic increases during the spring and fall migration periods; many waterbirds heading for the Kuskokwim and Yukon River Deltas traverse Southwestern Alaska. Of the estimated 60 nongame bird species that occur in Southwestern Alaska, about 40 are summer residents and 20 are present year-round. The diverse wetlands habitat on the Alaska Peninsula is used heavily by breeding shorebirds, especially greater yellowlegs, least sandpipers and semipalmated plovers. Winter residents of the Peninsula that do not venture inland are mainly waterbirds such as oystercatchers and rock sandpipers. Magpies, gray jays, crossbills, pine grosbeaks, chickadees and woodpeckers are fairly common in the Lake Clark region in winter but are rare south of Lake Iliamna. Species common in winter to both the Peninsula and the interior of Southwestern Alaska are limited to snow buntings, two species of redpolls, ravens, dippers and northern shrikes.

Human uses of nongame birds in Southwestern Alaska are limited, partly because the human population is sparse, and because the most avid bird viewers and photographers generally come from distant urban areas. There are no large communities in Southwestern Alaska. Local residents derive considerable enjoyment from the presence of nongame birds.

SEABIRDS

The Aleutians, Pribilofs, Semidis, and other island groups together with the long coastline of mainland Southwestern Alaska support seabird populations of greater variety and abundance than any location of comparable area in North America. Approximately 40 species of seabirds representing the families Diomedeidae, Procellariidae, Hydrobatidae, Phalacrocoracidae,

Stercorariidae, Laridae, and Alcidae occur as breeding residents, seasonal residents, or migrants in Southwestern Alaska during the course of a year. Representatives of six of the seven families breed in the region; the exception, Diomedeidae, including the rare short-tailed albatross, summer in Alaskan waters but breed on islands in the mid-Pacific.

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

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

Although much of the north side of the Alaska Peninsula is not generally suitable for nesting seabirds, rookeries are present on Amak and Unimak Islands and Cape Seniavin. The cliffs of Cape Newenham, with major colonies of murres, kittiwakes, puffins and cormorants, is one of the largest rookeries in the North Pacific and Bering Sea region. Other large rookeries are present on the nearby Walrus Islands.

The rugged coasts and numerous islands and islets of Southwestern Alaska provide a variety of nesting habitats. Most seabirds are colonial nesters, with colony size apparently related to inaccessibility of the site. Steep cliffs and isolated islets devoid of mammalian predators generally support the largest and most conspicuous colonies. Colony size and location may also be a function of the distance that adults have to forage. Species that are pelagic feeders generally have larger colonies and place their eggs in burrows or crevices. Inshore foragers have smaller and more ubiquitous colonies in more exposed sites. Cliff-nesting species include the cormorants, kittiwakes, glaucous-winged gulls, fulmars, guillemots, and some alcids. Petrels, puffins, and some murrelets and auklets nest in burrows on relatively open terrain or in crevices or fissures on cliff faces. Common murres generally nest on cliff ledges but also form colonies on exposed ground on islands.

Seabirds can be grouped into two broad categories, pelagic (offshore) and neritic (nearshore), depending on the distance from land they forage. Both groups feed primarily on animal foods, especially small fish, crustaceans, and mollusks.

Seabird species diversity is maintained by variations in food preferences, nesting habitat requirements, timing of breeding seasons, and foraging zones at sea. Most pelagic and some neritic species feed on organisms near or at the water surface. Other neritic species may forage at the sea floor. Gulls, petrels, and fulmars are also scavengers. Some gulls and particularly jaegers specialize in robbing other species of their prey, and are also predators on eggs and nestlings of other seabirds. Albatrosses, most procellarids, storm petrels, and alcids are typically pelagic feeders. Cormorants, jaegers, some petrels, and the larids concentrate in the nearshore environment.

RAPTORS

Raptors* which occur in Southwestern Alaska include the bald and golden eagles, osprey, rough-legged and red-tailed hawks, marsh hawk, goshawk,

* A list of raptor species considered in these plans follows this regional account.

sharpshinned hawk, gyrfalcon, peregrine falcon, merlin, kestrel, and the great horned, snowy, hawk, short-eared and boreal owls. Goshawks and sharpshinned hawks are not widely distributed in this region. The Steller's and white-tailed sea eagles have been recorded in this region but are rare visitors. The diurnal birds of prey are principally summer residents with the exception of the gyrfalcon and goshawk. The owls of Southwestern Alaska are resident except for the short-eared owl and, in some years, the snowy owl. Migration times vary among species and seasonal weather patterns, but summer residents generally arrive in the region in April and leave in early fall.

Resident raptor populations 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 in the mid 1970's migratory species were at moderate levels of abundance. Breeding populations of bald eagles, peregrine falcons, and ospreys, endangered or threatened in eastern and southern North America, do not appear seriously low at this time in Southwestern Alaska. The Aleutian Islands provide one of the highest concentrations of peregrine falcons in North America.

Most habitat types in Southwestern Alaska are used 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 as nesting habitat although some eagles nest on sea cliffs and rock outcrops on the Alaska Peninsula and Aleutian Islands. Golden eagles, gyrfalcons and rough-legged hawks prefer to nest on cliffs. Other buteos, accipters, merlins, kestrels and owls, except for the short-eared owl, are principally tree-nesters, and are found throughout forested areas. Of these species, goshawks display a marked preference for hardwood stands, while kestrels utilize cavities in trees as nest sites. The peregrine falcon is commonly associated with sea bird colonies in this region and can be found nesting on adjacent cliffs. The marsh hawk and short-eared owl are the only consistent ground-nesters in the 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 all major habitat types during the winter in search of food. The minor human-caused habitat changes that have occurred to date in the Southwestern Region 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 in Southwestern Alaska varies seasonally and encompasses a wide array of species of birds, mammals, fish and insects. The abundance and distribution of these prey species are important, and diseases or harmful chemical 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 not only in Alaska but 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, gyrfalcons 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 18 species of small mammals*** are found in Southwestern Alaska. The house mouse and rat are both introduced species associated with human habitations. Of the indigenous species, the common and dusky shrew, brown lemming, red-backed and tundra voles and the meadow jumping mouse are distributed throughout the mainland portion of this region. Of these species only the tundra vole is found on Kodiak Island. Five additional species of shrews are found in this region but are very limited in distribution. The Unalaska shrew is found only on Unalaska Island; the Pribilof Island shrew is found only on the Pribilof Islands; the tundra shrew occurs in the drainages of Bristol Bay; the pygmy shrew is known only from the upper drainages of the Nushagak River; and the northern water shrew is known only from the vicinity of Lake Iliamna.

Three species of lemmings inhabit mainland Southwestern Alaska: the brown, northern bog and collared lemmings. The brown lemming occurs in all mainland areas of the region. The collared lemming is found on the Alaskan Peninsula and lower basin of Bristol Bay while the northern bog lemming is found in the upper drainages of Bristol Bay north of Lake Iliamna. Their distributions overlap little in this region. A fourth species, the black-footed lemming, is found only on St. George Island of the Pribilof group.

Other small mammals include the little brown bat, the only bat occurring in this region, the meadow vole, found only in the Nushagak River drainage, and the collared pika, found in suitable alpine habitat in the southern extension of the Alaska Range.

Habitat requirements are as varied as the number of species found in this group. Species such as the pika, which requires higher 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 or tundra 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, 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 affects populations either, by causing direct mortality or by lowering reproductive success. Decreased populations of peregrine

*** A list of small mammal species considered in these plans follows this regional account.

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 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.

* Petroleum-related contaminants may adversely impact seabirds in Southwestern Alaska. Oil spills in marine waters could cause large losses of shearwaters, fulmars, kittiwakes, and a variety of gulls and alcids. Pollutants entering certain lagoons and estuaries at critical seasons could have catastrophic consequences. Baseline data on coastal seabird habitat and colony location, size, and composition are required to interpret population fluctuations and the implications of oil impacts.

* Russians and Americans introduced foxes to at least 77 Aleutian Islands, and open range fur farming was practiced until the early 1940's. Foxes persist on many of these islands, and they, along with introduced rats, have reduced the population of ground-nesting birds. The U. S. Department of Interior has removed foxes from some islands as part of a recovery plan for the Aleutian Canada Goose.

* Commercial fishing is an unknown entity in marine ecology with potentially adverse consequences for seabirds. Some seabirds prey on commercially valuable stocks, 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 seabird species, the ancient murrelet. Japanese gillnet fisheries have directly caused seabird losses as high as 10,000 birds per day as a result of the birds being entangled in nets. Local seabird populations cannot 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 cause nest abandonment or egg loss. Nonconsumptive use of seabirds will continue to increase, leading to a corresponding increase in disturbance. Reduced reproductive success and a chronic decline in colony sizes, especially near urban centers, may result unless measures are taken to protect habitat and to control numbers and activities of humans.

* 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 incentive for illegal traffic in these birds. Laws and regulations must be stringently enforced to minimize illegal use of raptors. Falconry is a legimate 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 SOUTHWESTERN ALASKA

	Common Name	Scientific Name
Eagles		
	Bald Eagle	*Haliaeetus leucocephalus*
	Golden Eagle	*Aquila chrysaetos*
	Osprey	*Pandion haliaetus*
Hawks		
	Goshawk	*Accipiter gentilis*
	Sharpshinned Hawk	*Accipiter striatus*
	Redtailed Hawk	*Buteo jamaicensus*
	Rough-legged Hawk	*Buteo lagopus*
	Marsh Hawk	*Circus cyaneus*
Falcons		
	Gyrfalcon	*Falco rusticolus*
	Peregrine Falcon	*Falco peregrinus*
	Merlin (Pigeon Hawk)	*Falco columbarius*
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 SOUTHWESTERN ALASKA

	Common Name	Scientific Name
Shrews		
	Common Shrew	*Sorex cinereus*
	Dusky Shrew	*Sorex obscurus*
	Pygmy Shrew	*Microsorex hoyi*
Bats		
	Little Brown Bat	*Myotis lucifugus*
Pikas		
	Pika	*Ochotona collaris*
Rodents		
	Collared Lemming	*Dicrostonyx groenlandicus*
	Bog Lemming	*Synaptomys borealis*
	Brown Lemming	*Lemmus trimucronatus*
	Red-backed Vole	*Clethrionomys rutilis*
	Meadow Vole	*Microtus pennsylvanicus*
	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.

KATMAI NATIONAL MONUMENT WILDLIFE MANAGEMENT PLAN

LOCATION

Katmai National Monument is located on the Alaska Peninsula in Game Management Unit 9 approximately 290 airmiles southwest of Anchorage.

PRIMARY MANAGEMENT GOAL

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

SECONDARY MANAGEMENT GOAL

To provide an opportunity for the scientific and educational study of wildlife.

EXAMPLES OF MANAGEMENT GUIDELINES

1. Cooperate with the National Park Service in its management of Katmai National Monument according to established National Park Service management objectives including but not limited to:

    * Assuring maximum protection of the wild lands and life forms therein by keeping both geologic and biotic processes essentially undisturbed by modern man.

    * Providing visitors with opportunities for wilderness-related experiences and assuring that developments and visitor use of the area do not interfere with a major objective of the area: the preservation of a naturally perpetuated Alaska brown bear population.

THE SPECIES

An abundant brown bear population occurs within the Monument boundaries. Data are lacking on numbers present, but a denning survey conducted in May, 1974, located 107 dens within the Monument. There is free interchange of bears between the Monument and public lands outside its boundaries. Bears captured in Naknek have been observed travelling through Brooks Camp. Bears are subject to legal sport hunting when they travel outside the Monument. Except for the "defense of life and property" kills in the Naknek-King Salmon area, the level of harvest has been low.

Moose are locally abundant within the park, particularly in the headwaters of the King Salmon River and around Naknek Lake-Savonski River. A mid-winter survey in 1975 identified 1,097 moose in the Monument area. The moose population within the monument has been experiencing poor calf production, and is declining in numbers. Moose that spend a portion of their lives inside Katmai are important in providing the domestic needs of residents of Naknek, King Salmon and South Naknek. Prior to the 1964 extension of the Monument boundaries around the western end of Naknek Lake, this area provided the majority of the moose hunting for local residents.

Caribou occasionally range inside the Monument boundaries in the winter. Concentrations of up to 1,000 animals have been observed, but use to date has been only temporary. No resident animals exist and caribou are dependent upon the habitat outside the Monument.

Wolves are commonly observed in the Monument, but data on numbers are lacking. Moose provide the primary big game prey species for wolves. Other mammals present in the Monument are red foxes, lynx, wolverines, river otters, mink, weasels, beavers, arctic hares, and snowshoe hares. Several species of squirrels and small rodents are also present. Coastal waters abound with marine life. Sea lions, harbor seals and sea otters are often observed, as well as various species of whales and porpoises.

Whistling swans, ducks, loons, grebes, gulls, terns and shorebirds nest on the lakes and in marshes. Spruce grouse and ptarmigan occur in the upland areas. More than 40 species of song birds spend their summers at Katmai. Along the coast seabirds are abundant with several substantial rookeries of cormorants, murres, kittiwakes and puffins. Bald eagles nest in nearly all areas of the Monument except the rugged Aleutian Range itself. Surveys conducted in summer 1974 identified 57 active eagle nests in the Katmai area. Ospreys, falcons, hawks, and several species of owls also occur in the area.

Major eruptions have deposited ash in the Katmai area 10 times during the past 7,000 years. Today most volcanoes of Katmai are dormant; however, the area may exhibit further volcanic activity as evidenced by the Augustine Island eruption in February, 1976. Plumes of smoke rising from Mt. Mageik, Mt. Martin, and Mt. Trident indicate the potential for new eruptions. An eruption bringing major change to Katmai could occur any time.

The resident wildlife species are used primarily as a nonhunted population for the enjoyment of tourists. Tourists are attracted to the region largely through package tours of the Monument offered by the concessionaire. As a result, nearly all visitor use occurs in the area of Brooks Camp - the Valley of Ten Thousand Smokes. Tourism presently contributes only a small part to the regional economy, especially in years of large salmon runs. Most tourist activity occurs between June 1 and September 15. Total visitation to the Monument has varied somewhat from year to year; however, from 1970 through 1973 about 10,000 tourists visited the Monument annually. The National Park Service projects an annual visitation to Katmai of 20-25,000 people by 1981.

Weather imposes certain constraints on access. Strong winds and sudden rain storms frequently sweep the area. The sky is clear only about 20 percent of the summer. Winter weather is more severe. Winter use of the Monument is low. Access by users is by amphibious or float aircraft during the summer. A concessionaire bus travels the road from Brooks River to the Valley of Ten Thousand Smokes. Foot trails and small boats are also available. Local residents of the area primarily enter the monument on the road from King Salmon and utilize small boats for transportation within the area. Recreational opportunities include sport fishing, camping, animal observation, and berry picking.

In the past the area at the western end of Naknek Lake was important to local residents as an area they hunted and trapped, but with the 1964 extension of Monument boundaries such use has been curtailed.

PROBLEMS

* Future volcanic action may seriously alter habitat resulting in massive losses of wildlife. No actions are considered as the area will be allowed to respond naturally to such occurrences.

* Wide fluctuations in wildlife numbers may occur due to natural factors. During periods of low population levels, opportunities to observe wildlife species will be reduced.

* Illegal hunting may reduce wildlife populations or alter sex and age structure of populations within the Monument. Greater enforcement efforts by the National Park Service and the state are required to curtail poaching. Some allowance in Monument regulations should be made for consumptive domestic utilization in areas of traditional use where this use is not in conflict with established visitor use.

* Brown bears, both inside and outside the Monument, may represent a danger to life and property. Legal sport hunting shall be encouraged to reduce bear population levels in the immediate vicinity of human communities outside the Monument boundaries in order to minimize problems. The Defense of Life and Property regulation may be used to remove specific problem bears. Transplants of problem bears may also be employed within the Monument. A public information program should be established to advise visitors of the potential dangers of certain wildlife confrontations.

IMPACTS

* Management of wildlife within Katmai National Monument 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 other than allowing consumptive domestic use in areas of traditional use where not in conflict with established visitor use.