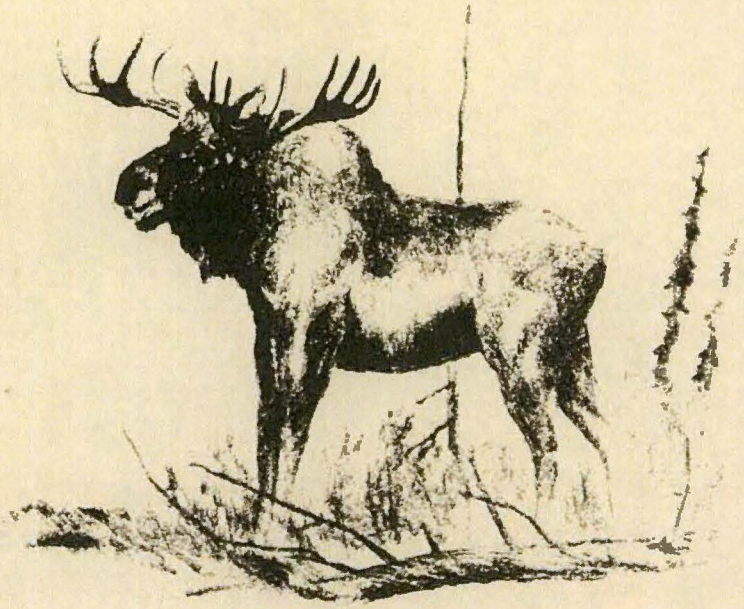
STRATEGIC PLAN
FOR MANAGEMENT OF MOOSE
IN REGION I, SOUTHEAST ALASKA

1990-94



by

Alaska Department of Fish and Game

Division of Wildlife Conservation

PUBLIC REVIEW DRAFT

STATE OF ALASKA
Steve Cowper, Governor

DEPARTMENT OF FISH AND GAME
Don Collinsworth, Commissioner

DIVISION OF WILDLIFE CONSERVATION
W. Lewis Pamplin, Jr., Director

This project was partially funded by Federal Aid in Wildlife Restoration funds as part of an ongoing program in Region 1.

Additional copies of this report may be obtained from:
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STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

SOUTHEAST REGIONAL OFFICE

STEVE COWPER, GOVERNOR

P.O. BOX 20
DOUGLAS, ALASKA 99824-0020
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July 1989

Dear Reviewer:

The Strategic Management Plan for Moose in Region I, southeast Alaska 1990-94 is now available for public review and comment. This plan sets the direction for management of moose in southeast Alaska by the Alaska Department of Fish and Game/Division of Wildlife Conservation for the next five years. It will also be used by the state Board of Game as one basis for setting hunting regulations for moose in southeast Alaska.

The plan includes background information on the history of moose management and human use, as well as current available habitat information, and past harvest and population data. In addition, the regional goals and specific objectives and management strategies for each of the 11 discrete moose populations in the region are presented.

In reviewing this plan, you should pay particular attention to the management objectives, and problems and strategies. Please review them in light of the current (1988) management situation, and let us know if you think them appropriate. Comments on other aspects of the plan are also welcome.

The public review period is 60 days, August 1 - September 30. An important element in the preparation of the final plan will be public reaction to and comments on this draft plan. Written comments should be submitted to Anne Firman or Tom Paul, ADF&G/Division of Wildlife Conservation, Box 20, Douglas, Alaska 99824 by the September 30 deadline. Questions or requests for additional copies can also be handled by telephone, 465-4265. Questions on aspects of a specific area's plan can be directed to the appropriate ADF&G/DWC area office in Douglas, Sitka, Petersburg, or Ketchikan.

Public meetings were held in Haines, Yakutat, Juneau, Wrangell, Petersburg, Ketchikan, and Sitka at the outset of the planning process. However, additional meetings may be held before preparation of the final plan if a number of requests are received by residents of a community.

This is the first of several strategic management plans envisioned for big game species in southeast Alaska. In the future, strategic plans for deer, brown bears, black bears, and mountain goats will be developed.

Sincerely,

David A. Anderson
Regional Supervisor

ACKNOWLEDGEMENTS

This strategic plan represents the efforts of many individuals. It was developed jointly by field and regional staff of the Southeast Region, Division of Wildlife Conservation, Department of Fish and Game. The Regional Planning Project was supervised by David Anderson, Regional Supervisor, and David Johnson, Regional Management Coordinator. The management plans for specific areas were developed by the following Area Management Biologists:

Unit 1(A) - Bob Wood, Ketchikan
Units 1(B) & 3 - David James, Petersburg
Units 1(C) & 5 - Bruce Dinneford, Douglas
Unit 1(D) - Tom McCarthy, Douglas

We would like to extend our thanks to Doug Crowe, Wyoming Department of Fish and Game, for sharing his planning expertise with us during the early stages of this project.

Sterling Eide, former regional supervisor, made the commitment in 1986 to develop a planning program in Region I. Kris Hundertmark was responsible for early project development, the collection of initial public input, and drafted portions of the plan. Butch Young, Area Management Biologist, Sitka, worked on the Unit 1(B) and Unit 3 plans while stationed in Petersburg. Charlie Land, biologist, Petersburg, also contributed to the development of the Unit 1(B) and Unit 3 plans.

The following staff of the USDA Forest Service assisted with the public meetings: Martin Prather, Vivian Hoffman, Virgil Henke, and Dave Reeder.

The development of this plan was assisted greatly by the numerous individuals who attended public meetings or completed questionnaires.

We coordinated the effort and produced this plan.

Rod Flynn
Regional Biologist

Tom Paul
Technical Coordinator

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FOREWARD

Whether we like it or not, life in Alaska is becoming increasingly complex. The "good old days" when the free spirit could move unimpeded by government controls and regulations, when horizons were limitless, and when wild resources were able to bear the uses of a tiny human population without need for allocation are gone forever.

This is an inevitable consequence of our growing population, of the ceaseless march of technology, and of monetary wealth. We have entered a new age, an age demanding greater vigilance and stewardship of our wild resources. And for those of us charged with the conservation of wildlife, it means that we must plan for the future.

This document represents the Division of Wildlife Conservation's first effort at developing a comprehensive management plan for moose in southeast Alaska. This plan is the outcome of an effort begun in 1986, and is based on public meetings, surveys of public opinion and desires, and involvement by numerous professional biologists.

This plan differs from previous efforts of our agency in two ways. First, we are attempting to set objectives which we can measure for wildlife populations. This is necessary if we are to be able to determine whether we have succeeded. Second, wildlife populations, as well as public desires, are dynamic. They change over time. To reflect that, we view these plans as the first cycle of an ongoing process. The process will involve constant evaluation and revision.

We will always be asking ourselves and you, the public, four questions: 1) Where are we? 2) Where do we want to be? 3) How do we get there? and 4) Did we arrive? So these plans are not intended to be something that we will put on a shelf to gather dust, but rather, a way of doing business. They will be used as a guideline for Board of Game deliberation on regulations, for land use planning, and for our internal operations.

I want to extend my sincere thanks to all who have contributed time and thought to this process. Your efforts are invaluable in helping us determine how to manage your wild resources.

David A. Anderson
Regional Supervisor

GLOSSARY

ADF&G -- Alaska Department of Fish and Game.

DWC -- Division of Wildlife Conservation (Alaska Dept. of Fish and Game).

GAME MANAGEMENT UNIT -- A geographic area used by ADF&G Division of Wildlife Conservation for managing wildlife populations.

GOAL -- A general statement of management direction or intention.

HABITAT CAPABILITY -- The number of animals that the habitat can support.

OBJECTIVE -- A specific target which can be used to measure the success of a management plan.

OPERATIONAL PLAN -- An outline of the specific techniques and approaches to be used in the day-to-day operations of the Division of Wildlife Conservation in order to achieve the goals and objectives of the strategic plan.

PLANNED MANAGEMENT SYSTEM -- A method of management that links planning and the setting of goals, objectives, and priorities more closely with day-to-day operations to make management more efficient, effective, and responsive to public desires.

PLANT SUCCESSION -- The natural, progressive replacement of one kind of plant community by another. One example is the gradual change in vegetation in formerly glaciated areas beginning with early colonizing plants and progressing through larger deciduous shrubs to coniferous forest.

POPULATION -- A group of organisms of the same species (in this case, moose) occupying a particular space at a particular time and having no more than 10% interchange with other groups.

PROBLEM -- Any obstacle which stands in the way of achieving a goal or objective.

RECRUITMENT -- The annual increment of young animals to a natural population.

SPECIES MANAGEMENT POLICY -- A statement which reflects current Alaska Department of Fish and Game and Board of Game management philosophy for a particular species of Alaska's wildlife.

STRATEGY -- A broad statement of a possible approach to solving a problem and achieving desired goals and objectives.

STRATEGIC PLAN -- An overall wildlife management plan developed in consultation with the public and other public agencies that sets the goals and objectives for management of moose for a five year period.

UNIT 1(A)...1(B)...3...5(A), etc. -- See Game Management Unit.

USDA FOREST SERVICE -- United States Department of Agriculture, Forest Service.

WILDLIFE ANALYSIS AREA -- A geographic area used by the Division of Wildlife Conservation in Southeast Alaska to analyze harvest, population, and habitat data for wildlife planning and management. Wildlife analysis areas are similar to game management units but are considerably smaller and allow for more refined analysis and management of wildlife populations.

Introduction

Purpose and Need for Plans

The purpose of these plans is to establish goals, objectives, and strategies that will direct the programs of the Division of Wildlife Conservation in Region I (southeast Alaska) for the next five years. The plans are designed to communicate the objectives of the Division to all Department personnel, other agencies, and the public. Also, the plans provide a mechanism for the Division to review and update objectives and provide the public with an opportunity to inform the Division of their concerns and desires. In short, they help the Division carry out its mission under state law.

The constitution of the state of Alaska charges that "fish, forests, **wildlife**, grasslands, and all other replenishable resources belonging to the state shall be utilized, developed, and maintained on the sustained yield principle..." (emphasis added)

The Alaska Statutes Title 16 invests the Board of Game with regulation-making powers for the state. The Board has authority to establish such regulations as hunting season lengths, bag limits, quotas, methods and means of taking game, etc. Title 16 gives the commissioner of the Department of Fish and Game administrative authority to "supervise and control the department...", and 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..." (emphasis added). It also grants the commissioner power to delegate his authority to subordinate officers and employees of the department. For wildlife resources, the commissioner's administrative authority has been delegated to the Division of Wildlife Conservation.

Carrying out the Division's mission is increasingly difficult. Wildlife management has become quite complex because questions of biology are inextricably intertwined with political, social, economic, and fiscal considerations. For instance, although biologists recognize that wildlife and habitat are inseparable and that no wild species can be maintained effectively outside of its natural biotic community, in southeast Alaska the two are managed separately. The Alaska Department of Fish and Game is charged with managing wildlife; however, most of the habitat is part of the Tongass National Forest and thus managed by the USDA Forest Service.

Maintaining and preserving adequate wildlife habitat in the face of demands by other resource users is the major wildlife management issue in southeast Alaska. Other land and resource uses (logging, mining, roading, intensive tourism, or other development activity) can cause loss of habitat and increased disturbance to wildlife.

Allocation of wildlife to different users --- subsistence hunters, resident recreational hunters, non-resident recreational hunters, and non-hunters (non-consumptive users) --- is also an issue. For each user group, wildlife provides substantial economic and social values that may be affected by allocation decisions or by loss of wildlife and habitat to conflicting land uses.

Fiscal considerations are an issue in wildlife management. The ADFG/Division of Wildlife Conservation must decide which objectives and strategies are the most feasible and beneficial given the time and the limited financial and personal resources at its disposal. Human population and the impacts of development are increasing in many areas of southeast Alaska. Where developmental impacts are great, the costs of managing wildlife will increase substantially.

In addition to its mission under state statutes, the Division of Wildlife Conservation has other tasks that require development of comprehensive plans. The U.S. Fish and Wildlife Service has requested that measureable objectives be established for the state wildlife management program to assist in the accounting of Federal funds. The Forest Service has requested the Division of Wildlife Conservation

February 3, Yakutat on February 5, Sitka on February 10, and Ketchikan on Feb. 11. A total of 79 people attended these meetings.

In addition to the meetings, another method for receiving public comment was employed. A written questionnaire was passed out at the public meetings and mailed to all people in southeast Alaska who obtained moose harvest tickets or permits in the 1985 and 1986 seasons. Over 900 written questionnaires were distributed. Of those, 360 were returned completed.

Additional public input is being sought. Copies of these draft region and area-specific management plans have been sent out for public review and comment. As with the draft version, the final version of the plans will be developed with attention paid to public criticisms and suggestions made during review of the draft.

The Planning System

It is important to understand how these plans fit into the system of management and planning being developed by the Division of Wildlife Conservation in Region I. These moose management plans are **strategic plans**. That is, they set the goals and objectives for management of moose in light of what is known about the current situation. In other words, they answer the questions -- "Where are we?" and "Where do we want to be." Strategic plans will be officially revised at approxmiately five year intervals.

In these plans, **goals** are defined as general statements of management direction or intention and generally apply to the region as a whole. For example, one goal might be, "To maintain viable populations of moose in their historic range in the region". **Objectives** are specific targets which can be used to measure the success of a management plan. An example of an objective is, "To provide and maintain a post hunt population of 850 moose in the Yakutat Forelands area."

Once the goals and objectives have been set by the strategic plans after consultation with the public, **operational plans** are devised by the Division of Wildlife Conservation to select the management techniques to achieve the objectives. The operational plans answer the question -- "How do we get there?" Operational plans change from year to year and govern the day-to-day operations of the Division of Wildlife Conservation. The decisions in them are based on such things as available money and what the priority of a project is in relation to others. Although the Division of Wildlife Conservation will retain considerable flexibility in devising its operational plans, the techniques and methods chosen in carrying them out will be consistent with the provisions in the strategic plans.

The final element of the planned management system is to ask -- "How well did we achieve our goals and objectives?" This evaluation of progress is done not only at the end of a planning period, it is a constant monitoring necessary to know what the next step should be to achieve the plan objectives. The information in these plans is the best available. The Division of Wildlife Conservation recognizes, however, that constant upgrading, evaluation, and revision are necessary. In practice, the "How did we do?" of one cycle in the plan becomes the "Where are we?" of the next so that plan updating and fine tuning are a continuing process.

Organization of Plans

The management plans for moose in Region I have been organized on two levels: regionwide and by specific areas.

The regional plan provides the background and summary information for moose management in the entire southeast Alaska region. The goals it sets are general and applicable to the entire region. The objectives of the regional plan are mainly aggregations of the objectives set out in the area plans. Problems and strategies in the regional plan are those common to all the areas of the region.

Area plans have been developed for each discrete population of moose that has been identified in the region. The background sections of these provide more detail on the history of moose and moose management in the area, human use, the condition of moose habitat, and population status. The goals, objectives, problems and strategies in the area plans are focused on the unique situation and needs of each area population. Public input was an important part in development of the area plans.

REGIONAL PLAN

Background

Origins of Southeast Alaska Moose and Management History

Moose are relatively recent immigrants to southeast Alaska. With the exception of 2 transplants, all of the populations are indigenous and immigrated independently from Canada primarily in this century. Most of these migrations were by way of river valley corridors from the interior through the Coast Range. A few populations, such as those of Thomas Bay, the Chilkat Range, and the Malaspina Forelands, represent expansions of nearby coastal river moose into new range. By the 1950's, moose were present on all major ranges in the region.

Moose were also transplanted into the Berners Bay area and the Chickamin River valley in the 1950's and 1960's. High, glaciated mountains prevented the natural migration of moose into those drainages. Unlike the Berners Bay transplant, the Chickamin River transplant did not result in an established herd because suitable habitat is limited.

In most cases, on their arrival in southeast Alaska, moose found an unexploited range. They thrived as a consequence and their populations increased rapidly. Hunting and other human use expanded as the herds grew. During the late 1960's, most moose ranges were heavily populated. Deep snow conditions during the early 1970's caused steep declines in most populations. Since then, populations have gradually recovered. Currently, most populations are felt to be at or near the carrying capacity of the habitat.

Generally, in the region, hunting regulation has become more restrictive over time. Starting as open hunts with liberal season lengths, the majority of hunts now require permits and have harvest quotas, and seasons are now generally one month or less. Bulls-only hunts have predominated, although occasional cow or either-sex hunts have been held. Moose are hunted in southeast Alaska primarily for meat. None of the populations or hunts has been managed to produce trophy animals, although the Berners Bay hunt is managed to provide a high quality hunting experience.

Human Use

Moose have been an important game species in southeast Alaska since their appearance here in the first half of the 1900's. During the past three decades, as moose expanded their range into the Chilkat Valley and onto the Yakutat Forelands they were incorporated into the subsistence diets of the residents of those areas. Recreational hunting and nonconsumptive uses of moose have also become important in the region as both the human and moose populations have increased. The human demand for moose exceeds the supply in nearly all areas of the region.

Physiographic Features and Habitat Description

Except for small numbers of moose on islands in central southeast Alaska, moose are found chiefly on the mainland coast which is characterized by steep, glaciated mountains and icefields interrupted by fjords and narrow, isolated river valleys. In the northern parts of the region, flat glacial outwash plains extend for a few miles between the mountains and the sea. Most of the region was covered by glacial ice until only recently in geologic time, about 10,000 years ago. The mountains, icefields, steep fjords, and valleys combine to isolate most areas of the southeast Alaska coast from each other and from the interior of the continent in Canada. Access to the coast from the interior is only along narrow corridors -- the valleys of a few, large, trans-montane rivers like the Unuk, Stikine, Taku, Chilkat, and Alsek-Tatshenshini.

Moose habitat in southeast Alaska is associated primarily with riparian and post-glacial early-successional vegetation types. As a consequence, moose are confined to the valleys around the large trans-montane rivers and to areas recently exposed by receding glaciers.

In most areas, much of the moose habitat is declining as a result of plant succession. Succession in some areas is transforming deciduous vegetation types (dominated by cottonwood trees, willows, etc.) into conifer stands. In other areas, climax deciduous vegetation is growing to sizes less valuable as moose browse. Lately, clearcut logging has returned conifer stands to early successional vegetation types which may temporarily create or enhance forage for moose within surrounding areas of coniferous forest. This forage enhancement exists for only about 25 years of the 100 to 150 years of a timber harvest rotation, however. After that initial period, a second-growth coniferous forest becomes established and forage is severely diminished below that of the original old-growth forest. The short-term advantages of clearcutting for moose may be offset by the longer period of reduced forage in the second-growth conifer forest and the loss of shelter habitat for moose during the time when the area is a clearcut. Because it results in less change in plant and ecological characteristics, cutting back mature climax deciduous vegetation and maintaining it in an early stage of succession to provide shorter browse plants which are more useable as moose forage may be a better moose range enhancement practice for declining habitats than clearcutting conifer stands. This management practice could be applied in recently glaciated areas to delay the development of coniferous forests.

Only in the bottoms of river valleys like the Stikine and Chilkat, where periodic flooding and erosion keep vegetation in the early successional stages, is the habitat generally stable. For the most part, moose habitat is quite limited in the region and all the historic range is currently occupied.

Population Status

Geography in southeast Alaska has operated to divide the moose into eleven discrete populations. Because these populations mix little if at all, they are managed separately. The eleven areas are: the Unuk-Chickamin river valleys, Stikine River, Thomas Bay, Unit 3 islands, Taku River (and other mainland areas to the south of it), Berners Bay, Chilkat Range, Chilkat Valley, Yakutat Forelands, Nunatak Bench, and Malaspina Forelands (See map Fig. 1). The total moose population in Region 1 is currently estimated to be about 2,530 animals. The largest populations are on the Yakutat and Malaspina Forelands and in the Chilkat and Stikine river valleys.

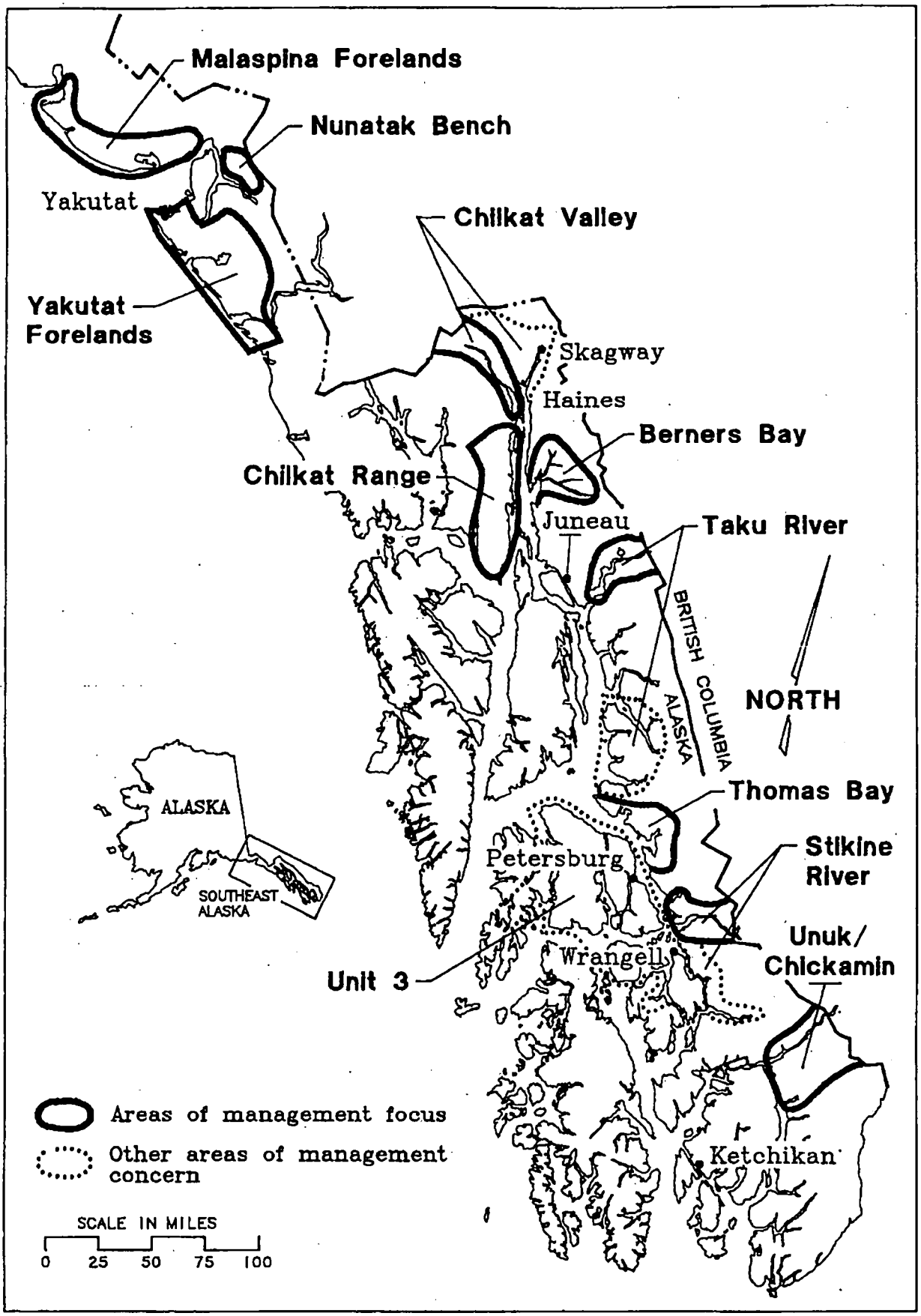

Figure 1. Planning areas for moose in Region I, Southeast Alaska.

Regional Goals (These are general statements of direction or intention for moose management in the region.)

The goals of moose management in Region I are:

1) To maintain, protect, and enhance moose habitat and other components of the ecosystem.

2) To maintain viable populations of moose in their historic range throughout the region.

3) To manage moose on a sustained yield basis.

4) To manage moose in a manner consistent with the interests and desires of the public.

5) To manage primarily for meat hunting and not trophy hunting of moose.

6) To manage for the greatest hunter participation possible consistent with maintaining viable populations, sustained yield, subsistence priority, and the interests and desires of the public.

7) To provide opportunities to view and photograph moose for the benefit of non-hunters (non-consumptive users) of moose.

8) To develop and maintain a database useful for making informed management decisions.

Regional Objectives (These are specific targets which can be used to measure the success of regional moose management.)

	Current 1988	Objective 1994
Post-hunt moose numbers	2,530	2,675
Annual hunter kill	202	231
Number of hunters	1,008	1,215
Hunter-days of effort	4,165	5,275
Hunter success	20%	19%

Discussion: The Regional Objectives for 1994 were developed by aggregating the objectives of the area plans. Except for the hunter success rate, the Regional Objectives are higher than current levels. The increase in post-hunt moose numbers reflects our feeling that not all moose populations in the region are at the capability of the habitat. Greater numbers of moose would allow for a higher annual hunter kill. The greater annual hunter kill objective reflects an expressed public desire to take more moose, and our belief that the harvest rate could be increased slightly for some populations.

The objectives for hunter participation (number of hunters and hunter days) have been set higher than current levels because the public has indicated that greater participation would be desirable in some areas. Consequently, the hunter success rate will decline as hunter participation increases. Because moose population objectives have been set near the maximums that the habitat can support, it has been assumed that the needs of non-hunting wildlife users will be met.

Regional Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: Because of several factors (including large survey areas, unpredictable weather, and dense evergreen foliage), only rough estimates of moose population characteristics are available.

Strategies:

Analyze moose population and harvest data using the best available methods to make inferences on population size and trends.

Monitor trends in numbers and sex and age composition using aerial surveys as regularly as possible in areas where population levels have not been satisfactorily determined by other methods.

Problem: In many areas the capability of moose habitat is not known and is difficult to determine.

Strategies:

Establish and monitor vegetation transects in important moose wintering areas to monitor trends in habitat condition.

Work with USDA Forest Service, Alaska Department of Natural Resources, and other land management agencies to develop ways to estimate habitat capability using vegetation maps and other geographic information tools.

Problem: Moose habitat in the region is limited. In some cases the habitat base is inadequate to support the human demand for moose. In many areas, the quality and quantity of habitat are declining because of plant succession.

Strategies:

Work with the USDA Forest Service, Alaska Department of Natural Resources, and other public as well as private landowners to maintain moose habitat.

Determine the feasibility of various habitat management techniques to reclaim decadent moose habitat, and institute such measures where appropriate and cost effective.

Problem: Conflicting land uses may cause a reduction of moose habitat capability.

Strategies:

Work with the USDA Forest Service, the Alaska Department of Natural Resources, and other public agencies as well as private interests to insure adequate consideration for moose habitat in long range land use plans.

Work with the above agencies and interests to develop and/or implement alternatives, preventative measures, compensation, or mitigation for all projects and activities which diminish the quality or quantity of wildlife habitat.

Work with the ADFG/Division of Habitat, the Alaska Department of Natural Resources, and the USDA Forest Service to develop effective programs of environmental monitoring.

Problem: Informed management decisions need a useful and current database.

Strategy:
Maintain a current and readily available database that includes information on human use, moose population characteristics, and habitat condition by appropriate geographic areas.

Harvest statistics for moose in southeast Alaska, 1984-88.

Year	No. of hunters	No. of hunter days	Annual hunter kill	Hunter success
1984	1,146	5,782	204	18%
1985	793	4,397	172	22%
1986	860	3,950	159	18%
1987	964	4,172	164	17%
1988	1,008	4,165	202	20%

Strategic Plan for Management of Moose in the Unuk/Chickamin Area, Unit 1(A)

1990-94

Introduction

This strategic plan sets the direction for the management of moose in the Unuk/Chickamin areas by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management of the Unuk/Chickamin areas during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Moose came to the Unuk River earlier in this century as migrants from Canada. So, they are indigenous to the valley although their numbers are few.

Small numbers of moose may have found their way to the Chickamin valley by natural means. Despite the natural scarcity of moose in the 1960's, the area was thought by biologists to have good moose habitat. Consequently, during 1963 and 1964, 14 moose calves were transplanted to the Chickamin drainages. Since the transplant, however, few moose have been spotted in surveys and the transplant is not considered to be successful. Hunting on the Chickamin was opened in 1973. One moose was reported shot on the Chickamin in 1977.

Since 1960, a one-month, one bull season has been in effect on the Unuk River. In the 1980's, the harvest has averaged between 2 and 3 moose a year. Seven bulls were killed there in 1984, 5 in 1983, 2 in 1987, and 8 were taken in 1988. The high 1988 harvest corresponds to high harvests in other areas of the region that year and is probably a result of mild winters and high survival rates during previous years.

The Unuk and Chickamin River moose populations are relatively small and isolated. In addition, thick cover in the Unuk Valley and a scarcity of moose in the Chickamin make the areas difficult to hunt. Consequently, they are unattractive to most hunters.

The Board of Game has determined that there are no subsistence uses of the Unuk/Chickamin area moose population.

Physiographic Features and Habitat Description

The Unuk and Chickamin rivers rise in the mountains of the Coast Range. The source of the Unuk is in Canada and its valley is a natural corridor for moose from the interior. The Chickamin, on the other hand, has its source amidst extensive glaciers and icefields which are a barrier to the migration of interior moose. Both river valleys are within the boundaries of the Misty Fjords National Monument wilderness area of the Tongass National Forest.

The areas of the Unuk/Chickamin where moose occur correspond with ADF&G wildlife analysis areas 716, 717, and 718 (Fig. 2).

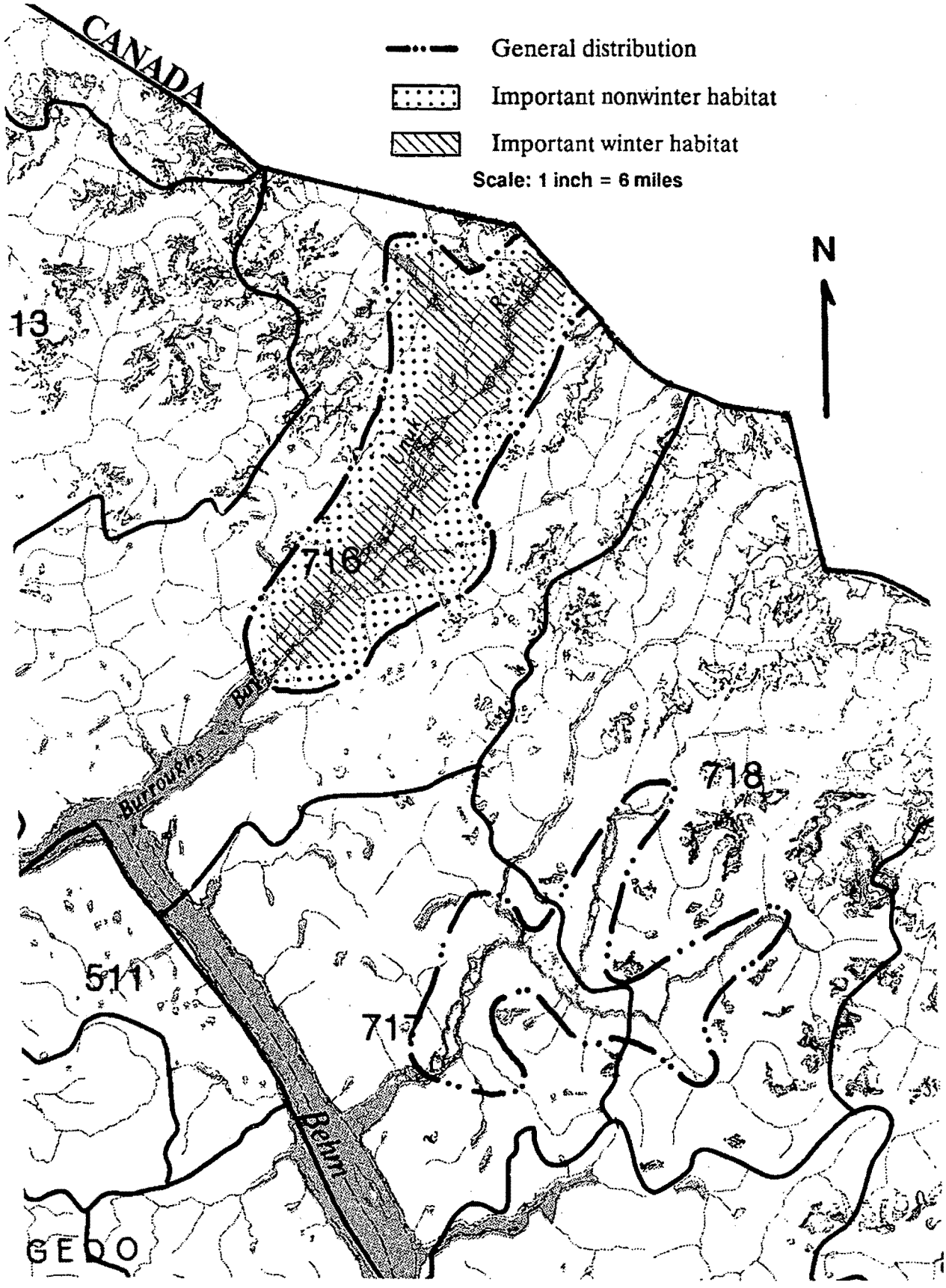

Figure 2. **Moose distribution and important habitat in the Unuk/Chickamin area, Unit 1A.**

The extent and quality of moose habitat in Unit 1(A) is not well known. It is assumed, however, that the current moose population is at or near the habitat capability.

Population Status

No population surveys have been conducted on Unuk or Chickamin moose since the early 1970's. An estimate in 1980 put the Unuk population at 20 to 30 animals, and the Chickamin total at 10 to 15 moose. Based on hunter success, current populations on the Chickamin are probably lower.

The population on the Unuk River has consistently supported an average annual harvest of 2 to 3 bulls. This harvest level should be supportable in the future if population numbers are equal to the habitat capability.

Objectives (These are specific targets which can be used to measure success in moose management in the Unuk/Chickamin areas.)

	Current 1988	Objective 1994
Post-hunt moose numbers	35	35
Annual hunter kill	8	3
Number of hunters	24	20
Hunter-days of effort	123	90
Hunter success	33%	15%

Discussion: Current moose numbers are based on a best estimate. Moose numbers are assumed to be near the capability of the habitat, and habitat capability should remain stable during the next 5 years. The objective for annual hunter kill is based on an assumed sustained yield. The higher annual kill of 1988 is not sustainable given the estimated population size. Objectives for number of hunters and hunter days of effort are based on averages for the years 1982-87.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: Numbers and population characteristics of Unuk/Chickamin moose are hard to assess because of dense foliage in the river valleys and the small number of moose overall.

Strategy:
Use harvest information including annual kill, hunter success, and hunter days as a means of monitoring the size and condition of the Unuk/Chickamin moose populations.

Problem: Private development at the mouth of the Unuk River, improved access, and/or increased hunter interest may increase hunting pressure and harvest to an unacceptable level.

Strategies:
Monitor land use practices and determine the extent of any impacts on the moose population.

Work with private landowners to minimize adverse effects their operations may have on the moose population.

Monitor harvest for a significant increase in the annual kill that may have detrimental effects on the moose population.

If the annual harvest becomes unacceptably high, work with the local advisory committee to develop harvest strategies or regulations (including the possibility of establishing a drawing hunt) to protect the stability of the moose population.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M1AUCC5A

Date: 15 January 1989

Comment: Moose/Unit 1A/Unuk-Chick/Historical Harvest

	Data source # 1 = Harvest ticket reports						Data source # 2 =						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total harvest	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total harvest	No. hunters	% success	♂	♀	??	All
1980																
1981	3	0	0	3									3	0	0	3
1982	0	0	0	0	5	0							0	0	0	0
1983	3	0	0	3	35	9							3	0	0	3
1984	7	0	0	7	42	17							7	0	0	7
1985	0	0	0	0		0							0	0	0	0
1986	0	0	0	0	14	0							0	0	0	0
1987	2	0	0	2	10	20							2	0	0	2
1988	8	0	0	8	24	33							8	0	0	8

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M1AUCC5E

Date: 15 January 1989

Comment: Moose/Unit 1A/Unuk-Chick/Hunter Success

Data Source(s): Harvest tickets reports.

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1981	3	9	3.0						
1982	0	0	0	5	57	7.4	5	37	7.4
1983	3	11	3.6	32	150	4.7	35	161	4.6
1984	7	28	4.0	35	165	4.7	42	193	4.6
1985	0	0	0						
1986	0	0	0	14	110	7.8	14	110	7.9
1987	2	11	5.5	8	36	4.5	10	47	4.7
1988	8	50	6.3	16	73	4.6	24	123	5.1

Strategic Plan for Management of Moose in the Stikine River Area, Unit 1(B)

1990-94

Introduction

This strategic plan sets the direction for the management of moose in the Stikine River area by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management of Stikine moose during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

The Stikine River moose population is an indigenous but recently established population. Moose migrated into the valley of the lower river from the interior of British Columbia on the Canadian side of the Coast Range. Few moose were noted on the American side of the boundary in the early part of the 20th century, but by the early 1950's, U.S. Fish and Wildlife Service reports show that hunting pressure for moose had become intense.

The average annual hunter take of bulls for the 36-year period 1952-1987 was 28. However, during 1980-87 the average annual harvest was 39; and during each of the 3 most recent seasons(1986-88) the harvest was 50 or more.

Since 1957, hunting seasons on the Stikine have been for bulls only from Sept. 15 - Oct. 15 with the exception of 1970 through 1973. In 1970, the season lasted only 16 days. In 1971, with evidence of a poor calf:cow ratio in the population, a short, late season (Oct. 15 - Oct. 30) was held after the rut to insure that cows were being bred. The next season the calf:cow ratio was excellent. Because of better calf production and the likelihood that the population would increase, 16-day cow seasons were held in 1972 (18 killed) and 1973 (22 killed) followed by short bull seasons. However, they proved to be unpopular with hunters and were discontinued.

Based on harvest ticket reports, the number of hunters in the field has ranged from 125 to 255 during the 1980's. The hunter success rate averaged 21% from 1980 through 1987. However, discrepancies noted in 1988 between hunters reporting through harvest ticket reports and those contacted in the field were analyzed. The result was a 35% increase in estimated actual number of hunters over those recorded from harvest ticket reports. It is likely similar underreporting of hunter numbers occurred in previous years as well.

The Board of Game has determined that only residents of Wrangell have subsistence uses of moose in the Stikine River drainage.

In 1987, 86 Stikine area moose hunters responded to an ADF&G questionnaire on moose management planning. Of those, 91% hunted moose the previous year (1986) and 15% killed a moose. That was less than the 21% success rate of all Stikine moose hunters that year based on hunter check station information. Almost all (88%) of the respondents went moose hunting at least once every year. About 40% had not yet killed a moose, and 39% said they kill a moose at least as often as once every three years. Respondents spent an average of 10-1/2 days in the field, 3 days longer than the average for all Stikine hunters that year based on harvest ticket reports. On average, respondents said they traveled 70 miles from their homes for hunting and spent 2 hours en route.

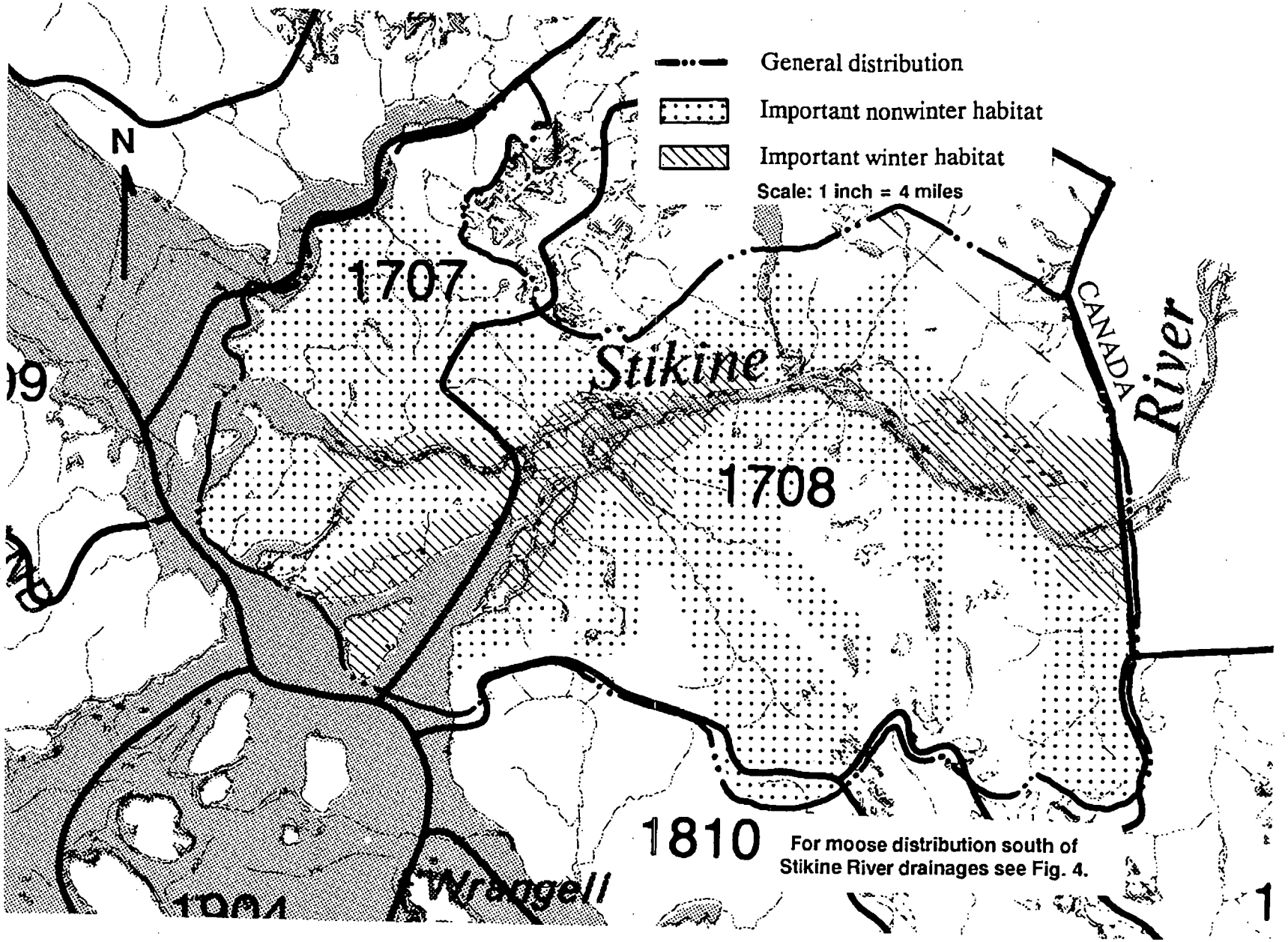

Figure 3. Moose distribution and important habitat in the Stikine River area, Unit 1B.

More than half (56%) thought that a desirable moose hunting success rate would be one moose per year, but only 11% said they were that successful. Ninety-one percent felt the current hunting regulations gave them a reasonable chance of killing a moose.

Hunters were evenly divided in their preferences for hunting regulations. If further regulation of the Stikine hunt became necessary, 28% preferred antler size restrictions, 25% preferred a registration permit with a harvest quota, and 22% favored a season timing change as the best method. Only 13% favored instituting a drawing permit. A majority (65%) of respondents wanted to keep open the option of having a cow season if it were biologically sound; and 41% saw predation as a significant factor limiting the moose population.

Almost half (47%) said they would not go elsewhere if the chance of bagging a moose on the Stikine became unacceptably low.

For 69% of the respondents, certain types of access are not essential and they use whatever is available. But 15% said they need a cabin to hunt an area, and 10% said a boat anchorage was necessary. A full 72% felt that some restriction was needed on methods of transportation used in hunting. Thirty-six percent believed there was a problem with using aircraft to spot moose from the air. Altogether, 40% wanted some restriction on aircraft, 8% wanted restrictions on 3-wheelers and other ATV's, and 6% wanted all motorized access restricted.

Physiographic Features and Habitat Description

The Stikine River originates in Spatsizi Plateau of British Columbia and transects the Coast Range near Wrangell, Alaska. The river was an important travel route for gold prospectors during the late 1800's and early 1900's when moose were either rare or absent in the lower river. The river is classified as navigable and the small community of Telegraph Creek, British Columbia, more than 100 miles upstream, may be reached by boat. About 30 miles of the river lie within the boundaries of Alaska.

The focus of moose management is on the Stikine drainage and immediate area which corresponds to ADF&G wildlife analysis areas 1707 and 1708 (Fig. 3). Moose also occur and are occasionally hunted and killed in drainages on the mainland coast south of the Stikine to the head of Bradfield Canal. Parts of ADF&G wildlife analysis areas 1809, 1810, 1811, 1812, and 1813 are included in that area (Fig. 4). Hunting regulations for the Stikine apply to these areas as well, and Stikine harvest figures include the kill from these areas.

The area used by Stikine River moose encompasses the drainage of the Stikine River and the Stikine River delta and parts of adjacent drainages. The principal use area consists of about 55 square miles (142 km^2) of riparian habitat that lies entirely within the boundaries of the Stikine-LeConte Wilderness Area. Moose also traverse and use portions of the Stikine River delta, which is a 77 square miles (200 km^2) area consisting of marshlands, tidal flats, and uplands. There are about 29 square miles (74 km^2) of moose winter habitat in the Stikine valley. Radio-telemetry studies of Stikine moose indicate that there is minimal movement of moose between Canada and Alaska, and no major seasonal migrations were detected occurring across the international border. Moose were most often found at elevations below 2,000 feet, with 60% of moose in the telemetry studies found below 100 feet during relocation surveys.

Observations of Stikine moose show that they are more often associated with vegetation in early successional stages than with advanced stages. Alder-willow dominated vegetation types are used most frequently, and Stikine moose thrive where there is a wide mix of habitat types in an area. During heavy rain, snow, or strong winds, Stikine moose seek shelter in old-growth spruce stands. Because the Stikine valley is subject to heavy snow accumulation, the availability of old-growth spruce may be essential to winter survival of moose there. Willow and red osier dogwood are the preferred browse species, and both occur in abundance in the area.

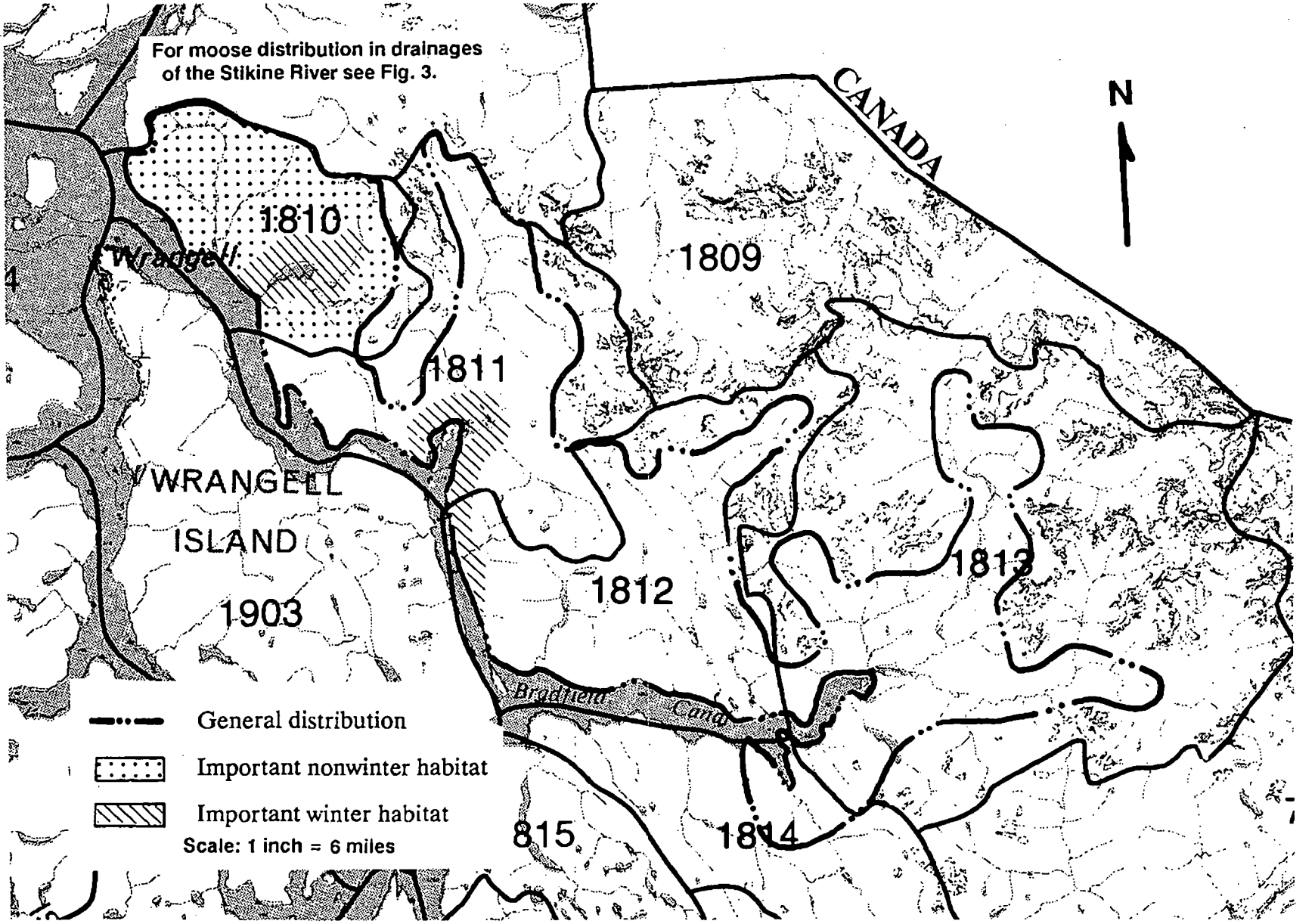

Figure 4. **Moose distribution south of the Stikine River drainages, Unit 1B.**

The habitat capability of the Stikine River area is not precisely known. Overbrowsing of range has not been detected which suggests that habitat capability has not been exceeded. The post-hunt number of moose in the Stikine area is estimated to be about 450 animals. This is probably close to the current habitat capability.

Population Status

Aerial surveys of the Stikine River moose population date back to the mid-1950's. Although dense vegetation on the river substantially reduces the effectiveness of the aerial survey technique, no satisfactory alternative has been discovered. During the decade of the 1950's, the calf:cow ratio averaged 39:100, and the pre-season bull:cow ratio was 26:100. In the 1960's, the calf:cow ratio averaged 57:100, and the bull:cow ratio was not known because all flights were made after antler drop. In the 1970's the pre-winter calf:cow ratio averaged 52:100, and pre-season bull:cow ratios were 18:100. In the 1980's (through 1987) the calf:cow ratio averaged 39:100, and the average pre-season bull:cow ratio was 19:100.

In the early 1950's, U.S. Fish and Wildlife Service biologist Dave Klein estimated a population of 342 moose on the river based on harvest and population composition. In the mid-1970's, ADF&G biologist Bob Wood estimated a population of 436 moose. During the radio-telemetry study in the 1980's, Peterson's Adjusted Index indicated a range of 78 to 315 moose in March 1982. The same index during a November 1982 flight indicated a population range of 92 to 633 moose. The researchers concluded that 300 was the most reasonable estimate. The population is probably higher today (1988), approximately 450 moose, because there have been no severe winters for more than a decade.

Studies have revealed some interesting aspects of the Stikine moose population. Popular belief among local hunters was, and may still be, that maintenance of the relatively high level of harvest of Stikine moose in Alaska depends on continual replenishment from the Canadian moose population. However, the radio-telemetry study mentioned previously in this report failed to detect any evidence to support the above scenario. This study, therefore, suggests that the harvest, which has been 50 or more since 1986, depends almost solely on the moose living on the Alaska side of the border.

Local hunters often express puzzlement over the apparent lack of increase in the cow segment of the population despite a bulls-only hunting season. Predation may be the most likely mortality factor preventing an increase in the number of cow moose. Predation by wolves on adult moose is concentrated on cows because they far outnumber bull moose largely as a result of bulls-only hunting seasons.

Objectives (These are specific targets which can be used to measure the success of Stikine River area moose management.)

	Current 1988	Objective 1994
Post-hunt moose numbers	450	450
Annual hunter kill	58	40
Number of hunters	327	300
Hunter-days of effort	2,348	2,100
Hunter success	18%	13%

Discussion: Current moose numbers are based on a best estimate. Post-hunt moose numbers are assumed to be near the capability of the habitat. Habitat capability should remain nearly constant during the next 5 years. The annual kill objective is based on an assumed sustainable level over the

long term. The higher annual kill of recent years is not sustainable unless current moose numbers are larger than estimated or calf recruitment is higher than historic levels.

Number of hunters shows a notable increase in 1988 over previous years. Discrepancies between the number of hunters returning harvest tickets and those contacted in the field were analyzed. The result was a 35% increase in hunter numbers over those recorded from harvest ticket reports. It is likely that hunter numbers were similarly underreported in previous years.

The objectives for number of hunters and hunter days of effort are set near the current level reflecting an expressed public desire for continued high hunter participation. A continued high number of hunters along with a decrease in the annual hunter kill will result in a reduction in the hunter success rate.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: Harvest levels and population characteristics can fluctuate from year to year as a result of both hunting and natural processes.

Strategies:

Allow for some fluctuation of harvest around the objective of 40 moose annually. Trends in harvest level, hunter participation and success rates, and age of harvested animals monitored over several years may be more indicative of the ability of the population to support current harvest than year-to-year harvest fluctuations. On the other hand, a large difference between one year's harvest and that of the previous year may indicate that a regulation or other management change is needed.

Problem: Results of aerial surveys of the moose population are difficult to interpret because poor weather conditions often prevent flights during the optimum fall and early winter period, and poor snow conditions and heavy timber often limit visibility.

Strategies:

When weather conditions permit, conduct aerial surveys to estimate the following ratios: calf:100 cow, bull:100 cow, and/or calf:100 adult.

Use harvest information, including annual kill, hunter success rates, and age of harvested animals as additional means of monitoring population characteristics of Stikine moose.

Problem: The relative accessibility of the area to hunters and high hunter participation have the potential to result in an overharvest of bulls.

Strategies:

Monitor the bull:cow ratio preferably by fall aerial surveys, otherwise by winter or spring surveys.

Take annual measurements and/or specimens from harvested moose to assess age structure of the bull population.

Work with the local advisory committees and other sectors of the public to adjust seasons, bag limits, and other regulations when necessary to assure that the post-hunt sex ratios are within desired levels. This includes the option of holding a biologically sound cow season.

Problem: Public comment revealed a widespread perception that there are abuses in the use of aircraft in hunting. Many called for more restriction on methods of transportation (particularly aircraft) used in hunting.

Strategies:
Work with the Department of Public Safety/Fish and Wildlife Protection to find ways to improve surveillance and enforcement of existing hunting regulations on the Stikine.

Work with the public and local advisory committee to encourage hunters to adhere to current regulations on hunting methods.

Investigate the need for additional regulations and controlled use areas on the Stikine.

Problem: The habitat capability and condition of moose range in the Stikine area are not well known.

Strategies:
Determine the level of browse use in key moose wintering areas, particularly those areas studied in previous moose research projects.

Assist the USDA Forest Service in developing vegetation maps of Stikine area moose range.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M1BSRC2D Date: 24 March 1989

Comment: Moose/Unit 1B/Stikine River/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100 ♀	Calves per 100♀	Calves % in herd	Moose per hour
1973			2	40	17	5	62	28	96	2.6	3	45	29	37
1974			0	43	21	5	69	31	125	3.8	0	45	25	33
1975	0	1	1	10	11	2	23	15	68	3.2	4	65	22	21
1977								18	79				23	
1978								11	59				19	
1982	0	2	2	21	12	6	39	24	113	2.8	5		21	40
1983	4	0	4	23	4	1	28	6	38	1.9	14	21	16	20
1984[a]														
1985[a]														
1986[a]														
1987	2	3	5	20	8	1	29	10	45	2.9	24	48	22	15
1988[b]			12	43	3	1	47	5	77	4.4	26	11	6	18

[a] No survey
b Early winter survey.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M1BSRC5A Date: 15 January 1989

Comment: Moose/Unit 1B/Stikine River/Historical Harvests

	Check Station and Data Source # 1 = harvest ticket reports						Check Station Data source # 2 = special cow season						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1970	28	0	0	28	125	22							28	0	0	28
1971	25	0	0	25	125	20							25	0	0	25
1972	8	0	0	8	100	8	0	18	0	18	27	67	08	18	0	26
1973	25	1	0	26	130	20	2	22	0	24	26	92	27	23	0	47
1974	24	1	1	26	150	17							24	1	1	26
1975	18	0	0	18	180	10							18	0	0	18
1976	21	0	0	21									21	0	0	21
1977	19	0	0	19									19	0	0	19
1978	29	0	0	29									29	0	0	29
1979	26	0	0	26									26	0	0	26
1980	33	1	0	34	125	26							33	1	0	34
1981	37	1	0	38	125	26							37	1	0	38
1982	36	0	0	36	130	24							36	0	0	36
1983	44	1	0	45	215	21							44	1	0	45
1984	43	0	0	43	231	15							43	0	0	43
1985	38	0	0	38	255	15							38	0	0	38
1986	51	1	0	52	247	21							51	1	0	52
1987	47	0	0	47	224	21							47	0	0	47
1988[a]	58	0	0	58	327	18							58	0	0	58

[a] 1988 hunters expanded to account for underreporting.

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M1BSRC5E

Date: 15 January, 1989

Comment: Moose/Unit 1B/Stikine River/Hunter Success

Data Source(s): Harvest ticket reports. 1983-88 successful hunters and 1988 unsuccessful hunters corrected for underreporting.

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1983	44	339	7.7	171	1383	8.1	215	1722	8.0
1984	43	284	6.6	188	1453	7.7	231	1737	7.5
1985	38	358	9.4	217	1556	7.2	255	1914	7.5
1986	51	485	9.5	196	1373	7.0	247	1858	7.5
1987	47	341	7.3	177	1344	7.2	224	1671	7.2
1988	58	330	5.7	269	2018	7.5	327	2348	7.2

AGE STRUCTURE OF HARVEST
BGDIF C5g

Document No.: M1BSRC5G

Date: 11 April 1989

Comment: Moose/Unit 1B/Stikine River/Age Structure

Sex: Male

Year	Age Class																Total kill	% aged	Mean age
	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5			
1976	0	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0	21	38	
1978	0	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	29[a]	83	
1980	0	14	1	2	1	0	0	0	0	0	0	0	0	0	0	0	33	55	1.9
1981	0	14	2	1	0	0	0	0	0	0	0	0	0	0	0	0	33	52	1.7
1982	1	10	7	1	0	0	0	0	0	0	0	0	0	0	0	0	35	54	2.0
1983	0	18	7	4	1	0	0	0	0	0	0	0	0	0	0	0	41	73	2.1
1984	0	18	5	1	1	1	0	0	0	0	0	0	0	0	0	0	41	63	2.0
1985	0	16	4	2	0	0	0	0	0	0	0	0	0	0	0	0	38	58	1.9
1986	1	16	3	4	2	0	0	0	0	0	0	0	0	0	0	0	50	52	1.5
1987	0	34	5	0	0	0	0	0	0	0	0	0	0	0	0	0	47	83	1.6
1988	0	20	12	2	0	0	0	0	0	0	0	0	0	0	0	0	58	59	2.0

[a] Eight animals were aged as greater than 3.5.

Strategic Plan for Management of Moose in the Thomas Bay Area, Unit 1(B)

1990-94

Introduction

This strategic plan sets the direction for the management of moose in the Thomas Bay area by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management in the Thomas Bay area during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Thomas Bay moose probably immigrated from the nearby Stikine River. There were no moose in the area in 1930, but homesteaders on the Muddy River report that moose moved in as early as 1937 when a large bull was seen by several people. Leif Loseth, a dairy farmer, recalls killing a bull moose as early as 1942. Mr. Loseth said that the population grew at a rapid rate after 1937 with moose seeming to immigrate from the direction of Horn Cliffs and the Muddy River glacier. With the advent of roading and clearcut logging in the early 1950's, residents of Petersburg became aware of the moose and more hunters were attracted to the area each year.

From 1960 through 1981 the Thomas Bay season was for bulls-only and 31 days long. Since 1984 it has been a fifteen day season. A scarcity of calves prompted closure of the season in 1982 and 1983. When the season was reopened in 1984, the Thomas Bay hunt was made a registration hunt and antler restrictions were placed on bulls. The restrictions were implemented to protect a portion of the breeding males in the herd while providing hunting opportunity without adopting a limited permit system. The antler restrictions were changed for the 1988 season.

U.S. Fish and Wildlife Service records indicate that 3 bulls were taken in the Thomas Bay area in 1953. Subsequently, harvest reports for the Thomas Bay area were sporadic until the 1970's. The average annual take for the period 1972 through 1988 was 14 bulls. The highest kill was during 1987 and 1988 when 22 and 27 bulls respectively were taken.

In response to hunter desires, vehicle restrictions are in effect that prohibit motorized land vehicle use for hunting moose. One result of the vehicle restriction was the extensive use of bicycles by moose hunters. Some hunters obtain annual U.S. Forest Service permits to maintain tent platforms.

The Board of Game has determined that there are no subsistence uses of the Thomas Bay moose population.

In 1987, 68 Thomas Bay area moose hunters responded to an ADF&G questionnaire on moose management planning. Of those, 91% hunted moose the previous year (1986) and 14% killed a moose. That is higher than the 8% success rate reported by all Thomas Bay hunters that year. Most respondents (69%) went moose hunting at least once every year. About 58% had not yet killed a moose, and only 21% said they kill a moose at least as often as once every three years. Respondents spent an average of 5-1/2 days in the field in 1986, two days longer than the average for all Thomas Bay hunters that year based on registration permit information. On average, respondents traveled 20 miles from their homes for hunting and spent 2 hours en route.

More than half (52%) thought that a desirable moose hunting success rate would be one moose per year, but only 5% said they were that successful. Eighty-eight percent felt the current hunting regulations gave them a reasonable chance of killing a moose.

Hunters were split in their preferences for hunting regulations but prefer current methods of regulation to limiting hunter participation by drawing permit or other means. If further regulation of the Thomas Bay hunt were to become necessary, 35% would prefer antler size restriction, and 32% would prefer a registration permit with harvest quota. Only 15% favored a drawing permit, and 12% preferred limiting hunting to every other year. A majority (65%) of respondents wanted to keep open the option of having a cow season if it were biologically sound; and only a third (34%) saw predation as a significant factor limiting the moose population.

More than half (55%) said they would travel only as far as the Stikine if the chance of bagging a moose in Thomas Bay became unacceptably low.

For 58% of respondents, certain types of access are not essential and they use whatever is available. But 21% said a boat anchorage was necessary, and 16% need a road. A full 70% felt that some restriction was needed on methods of transportation used in hunting. Twenty-five percent believed there should be restrictions on highway vehicles, and 3-wheelers and other ATV's; 13% wanted all motorized access restricted.

Physiographic Features and Habitat Description

The Thomas Bay area is on the mainland coast of Frederick Sound just north of Petersburg. The area used by Thomas Bay moose encompasses the drainages of the Patterson River and the Muddy River and parts of adjacent drainages. Primary management focus is on the area which corresponds to ADF&G wildlife analysis areas 1603 and 1605 (Fig. 5). Moose also occur and are hunted in the Farragut Bay area to Cape Fanshaw and south to Le Conte Glacier (wildlife analysis areas 1601, 1602, and 1706). Regulations for Thomas Bay moose apply to these areas as well, and kill figures include those from Farragut and Le Conte.

Thomas Bay moose are unique among the moose in southeast Alaska because they occupy an area which has been heavily logged. Clearcut logging began in the early 1950's and from 1950 through 1976 over 2500 hectares were harvested. The Thomas Bay area is a patchwork of riparian vegetation, old-growth timber, muskegs, recent clearcuts, dense second-growth conifers, and roads.

There are about 20 square miles (51 km^2) of moose habitat in the Thomas Bay area, and the principal riparian wintering habitat consists of about 5 square miles (13 km^2) along the Patterson River. Radio-telemetry studies conducted in the 1970's indicate that there is minimal movement of moose between the Stikine River and Thomas Bay, and no major seasonal migrations occur.

Observations of Thomas Bay moose show that they are more often associated with riparian vegetation in early successional stages than with other types of vegetation. Alder-willow-cottonwood dominated vegetation types along the river are used most frequently. Like the Stikine River moose, Thomas Bay moose seek shelter in old-growth spruce stands during heavy rain, snow, or strong winds. Because Thomas Bay is subject to heavy snow accumulation, the availability of old-growth spruce stands in close proximity to winter forage areas may be essential to winter survival of moose there. Willow and cottonwood are the major browse species, and both occur in riparian sites.

Unlike habitat on the Stikine River, the moose habitat quality in Thomas Bay is declining each year. The explosive growth of conifers in clearcut areas is eliminating moose browse and restricts travel by the animals. Visibility and hunter access are greatly restricted as well. The loss of habitat and the resulting decline in food availability is of great concern to hunters and biologists. Thomas Bay moose

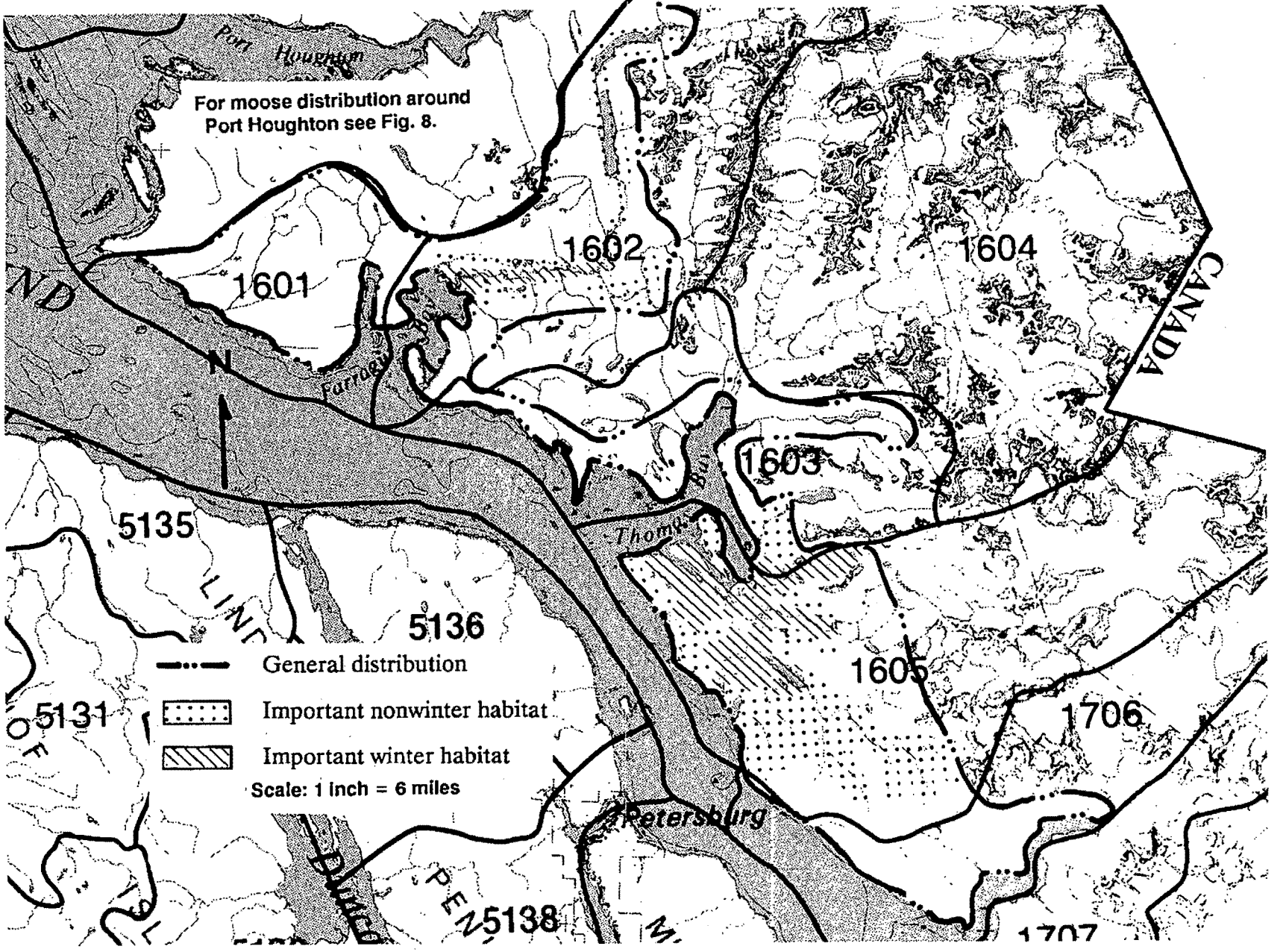

Figure 5. Moose distribution and important habitat in the Thomas Bay area, Unit 1B.

have been found to be in poor physical condition in late winter and the continuing loss of quality forage could have dire consequences for moose.

Rumen samples were taken from Thomas Bay moose killed by hunters in the 1970's. These showed that trailing black currant, shield fern, lady fern, bunchberry, and early blueberry comprised approximately 60% of the fall diet. These species were most abundant in 8-23 year old clearcuts, whereas the preferred browse species, willow and cottonwood, were relatively scarce. This supplemental food source probably increased the habitat capability temporarily. As the conifers began to reclaim the clearcut sites and shaded out browse species, the habitat capability was again reduced.

Population Status

In 1978, the population was estimated to be 180 animals. The current (1988) population is probably slightly larger. The 1987 harvest of 22 moose, and the 1988 harvest of 27 moose (of which the majority were yearlings) suggest a population of about 200 moose. Wolves, black bears, and brown bears occur in the area, but predation rates are unknown.

Dense conifer regrowth in clearcut areas has and will continue to reduce carrying capacity for moose at Thomas Bay. It appears that the only way to prevent futher decline of moose habitat is to institute habitat manipulation procedures. Recently, the ADF&G and the U.S. Forest Service initiated a joint review of habitat manipulation techniques that would be appropriate for Thomas Bay.

Objectives (These are specific targets which can be used to measure the success of moose management in the Thomas Bay area.)

	Current 1988	Objective 1994
Post-hunt moose numbers	200	200
Annual hunter kill	28	20
Number of hunters	120	160
Hunter-days of effort	504	675
Hunter success	23%	12%

Discussion: The population objective has been set at the estimated current population level. In order to meet this objective, current habitat capability will need to be maintained during the next 5 years. The annual kill objective is based on an assumed sustainable level over the long term. The higher annual kill of recent years is not sustainable unless current moose numbers are larger than estimated or calf recruitment is higher than historic levels. The objectives for number of hunters and hunter days of effort allow for slight increases reflecting an expressed public desire for high hunter participation. An increase in the number of hunters along with a decrease in the annual hunter kill will result in a reduction in the hunter success rate.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: Results of aerial surveys of the moose population are difficult to interpret because poor weather conditions often prevent flights during the optimum fall and early winter period, and poor snow conditions and heavy timber often limit visibility.

Strategies:
When weather conditions permit, conduct aerial surveys to estimate the following ratios: calf:100 cow, bull:100 cow, and/or calf:100 adult.

Regularly obtain measurements and/or specimens from all harvested moose to assess age structure of the bull population.

Use age of harvested animals and other harvest information, including annual kill, and hunter success rates, as additional means of monitoring population characteristics of Thomas Bay moose.

Problem: Moose habitat capability is declining as a result of plant succession.

Strategies:
Work with the USDA Forest Service to assess current vegetation characteristics in the Thomas Bay area.

Work with the USDA Forest Service to determine the feasibility of various habitat management techniques to reclaim decadent moose habitat, and institute appropriate measures.

Work with private landowners to maintain moose habitat.

Problem: Moose habitat capability is likely to be affected by other land uses in the area.

Strategies:
Work with the USDA Forest Service to insure consideration of moose habitat in planning and laying out timber sales and other activities in the Thomas Bay area.

Work with the Division of Habitat to respond effectively to land use issues on private, state, and federal lands and design mitigation programs.

Problem: Although hunting with a motorized land vehicle is prohibited, roads are important for access in Thomas Bay and help distribute hunting pressure and use of the area. However, access is declining because roads are deteriorating.

Strategy:
Urge the Forest Service to maintain and restore roads and bridges to improve access for both hunters and non-consumptive recreation.

Problem: There is public controversy over the appropriate use of motorized vehicles for hunting.

Strategy:
Work with advisory committees and other sectors of the public to devise acceptable solutions to the problem of hunter access and allowable methods and use of transportation.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M1BTBC2D Date: 24 March 1989

Comment: Moose/Unit 1B/Thomas Bay/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100♀	Calves per 100♀	Calves % in herd	Moose per hour
1981	0	0	0				16	4	20	2.0	0	25	20	10.0
1982	0	1	1				20	0	22	3.1	10	0	0	7.1
1983	2	0	2	0	3	2	5	7	22	1.0	40	140	32	22.0
1984[a]														
1985[a]														
1986			3	2	1	0	3	1	7					
1987[a]														
1988[b]			4	13	11	0	24	11	39	4.6	17	46	28	8

[a] No survey
[b] Early winter survey

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M1BTBC5A

Date: 24 March 1989

Comment: Moose/Unit 1B/Thomas Bay/Historical Harvest

	Data source # 1 = Registration permit reports						Data source # 2 = Harvest ticket reports						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1972							5	0	0	5			5	0	0	5
1973							3	0	0	3			3	0	0	3
1974							4	0	0	4			4	0	0	4
1975							8	0	0	8			8	0	0	8
1976							16	0	0	16			16	0	0	16
1977							12	1	0	13			12	1	0	13
1978							14	0	0	14			14	0	0	14
1979							21	0	0	21			21	0	0	21
1980							17	0	0	17			17	0	0	17
1981							10	2	0	12			10	2	0	12
1982[a]	0	0	0	0	0	0							0	0	0	0
1983[a]	0	0	0	0	0	0							0	0	0	0
1984	12	0	1	12	92	13							12	1	0	13
1985	13	0	0	13	96	14							13	0	0	13
1986	15	0	0	15	192	8							15	0	0	15
1987	22	0	0	22	110	20							22	0	0	22
1988	28	0	0	28	120	23							28	0	0	28

[a] Season closed

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M1BTBC5E

Date: 24 March 1989

Comment: Moose/Unit 1B/Thomas Bay/Hunter Success

Data Source(s): Registration permit reports

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1984	12	25	2.1	77	261	3.4	89	286	3.2
1985	13	26	2.0	83	316	3.8	96	342	3.6
1986	15	58	3.9	146	663	4.5	161	721	4.5
1987	22	99	4.5	88	359	4.1	110	458	4.2
1988	28	98	3.5	92	406	4.4	120	504	4.2

AGE STRUCTURE OF HARVEST
BGDIF C5g

Document No.: M1BTBC5G

Date: 11 April 1988

Comment: Moose/Unit 1B/Thomas Bay/Age Structure

Sex: Male

Year	Age Class																Total kill	% aged	Mean age
	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5			
1981	0	8	1	0	0	1	0	0	0	0	0	0	0	0	0	0	10	100	1.8
1982[a]																			
1983[a]																			
1984	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	25	1.5
1985[b]																	13		
1986		5	4	2	0	0	0	1	0	0	0	0	0	0	0	0	15	80	2.7
1987		10	6	4	0	0	0	0	0	0	0	0	0	0	0	0	22	91	2.2
1988		25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	28	100	1.2

[a] Season closed.
[b] No data available.

Strategic Plan for Management of Moose in Unit 3

1990-94

Introduction

This strategic plan sets the direction for the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC) management of moose in Game Management Unit 3. It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management in Unit 3 during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Moose on the Unit 3 islands have migrated in the past several decades from the Stikine or Thomas Bay populations on the mainland. Moose are found in low numbers on most of the islands in Unit 3.

In the early 1960's, a one month bull season was open in Unit 3. Because of low numbers of moose the season has been closed from 1968 to the present. A 1987 ADF&G questionnaire on moose management planning included a question for hunters in Petersburg and Wrangell about moose management in Unit 3. Of those responding, 54% indicated support for managing for non-hunting (non-consumptive) uses in some areas of the unit and 46% favored managing moose in Unit 3 for maximum hunter participation.

Physiographic Features and Habitat Description

Game Management Unit 3 is comprised of islands in the central portion of southeast Alaska. Mitkof, Kupreanof, Kuiu, Wrangell, Etolin, Zarembo, and Woronkofski are the largest islands in the unit. Smaller islands include several at the mouth of the Stikine such as Rynda, Kadin, and Sokolof. Sightings of moose have been recorded on all of these islands except Zarembo and Woronkofski (Fig. 6).

Moose habitat in Unit 3 consists primarily of old-growth spruce-hemlock forest and clearcut areas. Extensive clearcutting on many of the islands has resulted in early successional vegetation which may temporarily provide good moose browse. Some wintering areas have been tentatively identified on Kupreanof Island from Castle River on Duncan Canal to Tunehean and Irish Creeks and Big John Bay on Keku Strait, and from Portage Bay to Duncan Canal; also on the southeast portion of Wrangell Island, and east Mitkof Island including Blind Slough (Fig. 6). However, no estimate has been made of the amount or quality of moose range in the unit.

Population Status

No population surveys have ever been conducted on moose in Unit 3. There are currently no estimates of moose numbers in the unit. Predators (wolves, black bears, and a few brown bears) exist on most of the islands but the extent of predation is unknown.

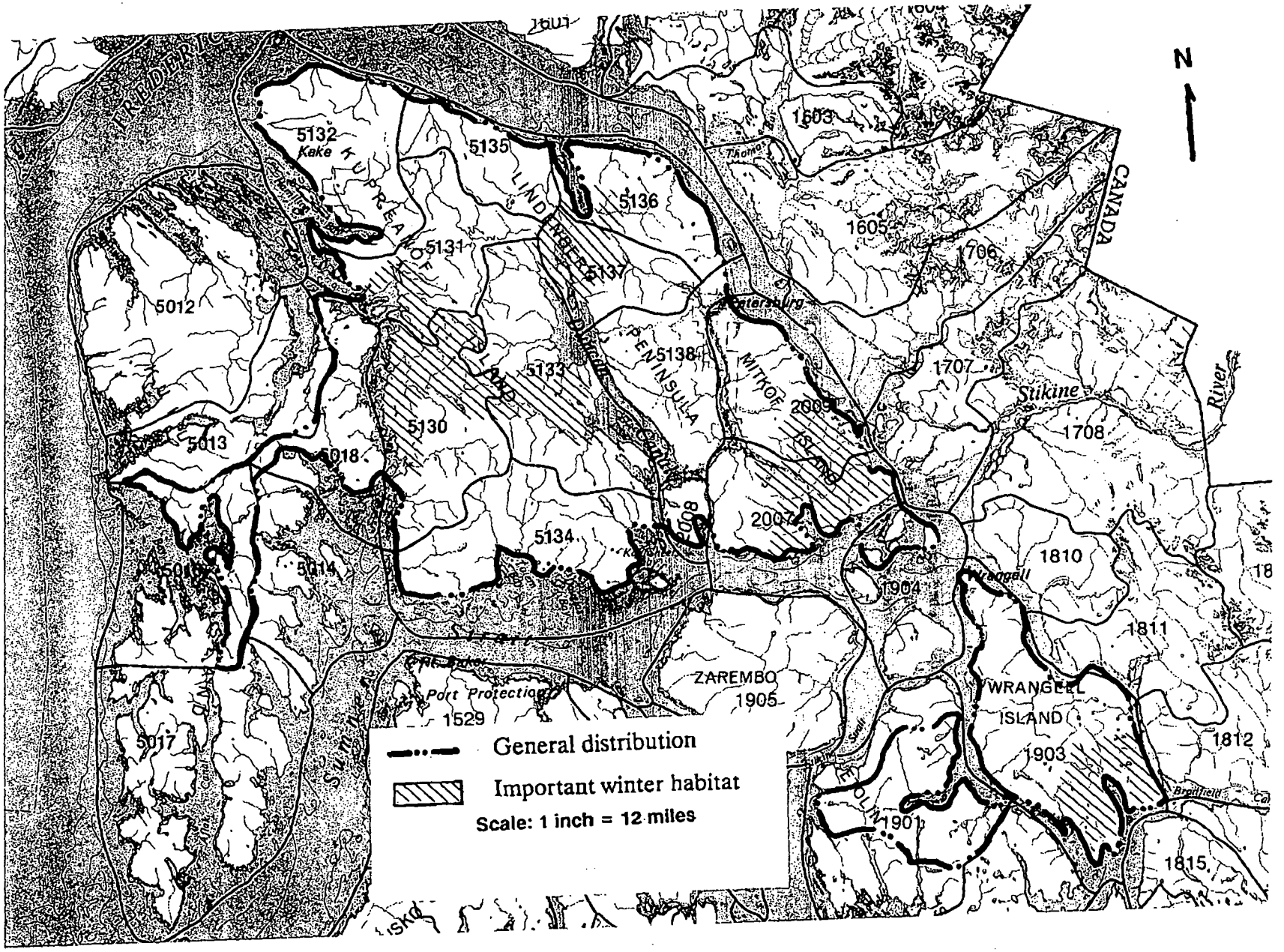

Figure 6. **Moose distribution and important habitat in Unit 3.**

Problems and Strategies

The following have been identified as current or potential problems facing moose management in Unit 3. Each is accompanied by suggested strategies to deal with it.

Problem: Numbers, distribution, sex and age ratios, and other population characteristics of moose in Unit 3 are not well known.

Strategy:
Monitor moose population trends in Unit 3 through public reports and informal observations.

Problem: Portions of this area are accessible from the Petersburg and Wrangell road systems. Management of moose in this unit primarily for hunting may be in conflict with the desires of those members of the public who wish to observe moose.

Strategies:
Determine with the help of the public which areas of the unit would be appropriate for moose hunting.

Strategic Plan for Management of Moose in the Taku River Area, Unit 1(C)

1990-94

Introduction

This strategic plan sets the direction for the management of moose in the Taku River area by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in management of Taku River moose during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Moose are indigenous although fairly recent inhabitants of the Taku River area. They almost certainly migrated from the interior of British Columbia down river through the coast range. Moose were reported in the Taku River valley in Canada as early as the 1880's. It is not known when they first appeared along the Alaska portion of the river. They were undoubtedly hunted for food by prospectors and other visitors and settlers in that country shortly after their appearance.

Data on the annual moose kill in the Taku exist from 1959 to the present. The reported annual kill has ranged from a low of 5 in 1975 to a high of 35 in 1964, with a typical kill of 20 to 25 moose. Since statehood, seasons have been one month long, with a bag limit of one bull. Hunter participation peaked in 1973 when about 144 hunters reported hunting.

Periodic aerial surveys of the population since the early 1960's have indicated a low bull:cow ratio for Taku River moose. This aroused concern that the reproductive rate may be too low. A regulatory proposal for an either sex hunt in 1974 was appealed by some Taku hunters opposed to cow hunts and rescinded before taking effect. The bull:cow ratio remains low but migration of bulls from Canada may be sufficient to breed cows and maintain stability of the herd.

In 1984, the hunt became a registration hunt. In recent years, hunter participation has ranged from a low of 65 in 1981 to a high of 119 in 1985. The hunter success rate has ranged from 16 to 24%. The Board of Game has determined that there are no subsistence uses of the Taku River moose population.

In 1987, 41 Taku moose hunters responded to an ADF&G questionnaire on moose management planning. Of those, 93% hunted moose the previous year (1986) and 21% killed a moose. That is slightly higher than the 16% success rate of all Taku moose hunters in 1986. Almost all (88%) went moose hunting at least once every year. About 15% had not yet killed a moose, and 63% said they kill a moose at least as often as once every three years. Respondents spent an average of 5 days in the field in 1986, the same as all Taku hunters. On average, they traveled 52 miles from their homes to where they hunt and spent 3 hours en route.

Almost two thirds of the questionnaire respondents thought that a desirable moose hunting success rate would be one moose per year; but only 17% said they were that successful. Nevertheless, 93% felt the current hunting regulations for the Taku area gave them a reasonable chance of killing a moose.

Questionnaire responses indicated that Taku hunters overwhelmingly favor regulations that keep hunter participation high. If further regulation of the Taku hunt became necessary, 89% said setting a harvest quota or changing the timing of the season was preferrable to limiting the number of hunters

through a drawing hunt. Fully 80% of the respondents favored keeping open the option of having a cow season if it were biologically sound.

Twenty-two percent of the respondents were troubled by the use of aircraft for spotting moose on the Taku and wanted some restriction of aircraft during the moose season. Sixty-two percent thought that predation was substantially limiting the number of moose in the Taku valley.

Physiographic Features and Habitat Description

The Taku River originates in British Columbia and flows through the Coast Range to empty into Stephens Passage southeast of Juneau. On its passage through the mountains, the Taku River is fed by several glacial outwash streams. The glaciers at the source of the streams are all in retreat except for the Taku Glacier. The Taku Glacier is one of the few glaciers born in the Juneau icefield that is advancing. The Taku's advance is relatively rapid. At its current pace, it would advance completely across the river before the end of the next decade, possibly damming the river at Point Taku and transforming the area upstream into a freshwater lake.

The area occupied by Taku River moose corresponds to ADF&G wildlife analysis areas 2518 and 2519 (Fig. 7). Moose also occur in other mainland areas of Unit 1(C) south of the Taku drainage from Holkham Bay to Port Houghton, and occasionally some are harvested from those areas. Those areas correspond to ADF&G wildlife analysis areas 2824, 2825, 2926, and 2927 (Fig. 8). Although this plan focuses on management of Taku River moose, harvest and population figures and other data apply to all of Unit 1(C) south of Juneau.

No detailed analysis of the extent and composition of moose habitat in the Taku drainage exists. A general visual survey was made by river boat in June of 1975. A mix of cottonwood, alder, and willows of several different species was noted. Browse on the surveyed Canadian portion of the river was typified by more willow and was judged to be more extensive per unit area than on the Alaska portion of the river.

The habitat capability for moose in the Taku River valley is unknown. As in other areas of southeast Alaska, moose habitat is generally associated with riparian sites with suitable forage. In the Taku valley, because of recent glacial activity, much of the habitat is typified by successional, post-glacial vegetation types that may be of only transient value to moose. Isostatic rebound (the uplifting of land following the retreat of weighty glacial ice) may also be at work, raising land in relation to the local water table and ultimately changing the vegetation in localized areas. Currently, the best habitat for moose is upstream from Taku Glacier and so is at risk should the glacier dam the river in the future.

Population Status

Reliable population estimates of moose in the U.S. portion of the Taku River drainage have been difficult to make. Moose show little regard for international boundaries, confounding wildlife managers who must, of necessity, limit their actions to their own side of the border. The best moose habitat in the lower Taku drainage straddles the border and moose likely migrate between the countries freely and often.

For this reason, aerial surveys may give only a partial picture of the composition of the moose population on the Taku. The most recent aerial survey of Taku River moose was conducted in January 1989. A total of 22 moose was seen, 4 of them calves. The survey was flown too late in the season to determine the sex composition of the population. During a previous survey in November 1986, 45 moose were seen -- 2 bulls, 42 cows, and 1 calf. Based on the survey, the population along the U.S. portion of the river was estimated to be about 100 animals. Sex and age ratios based on that survey were 5 bulls:100 cows and 2 calves:100 cows. The bull:cow ratio remains low as it has been since the

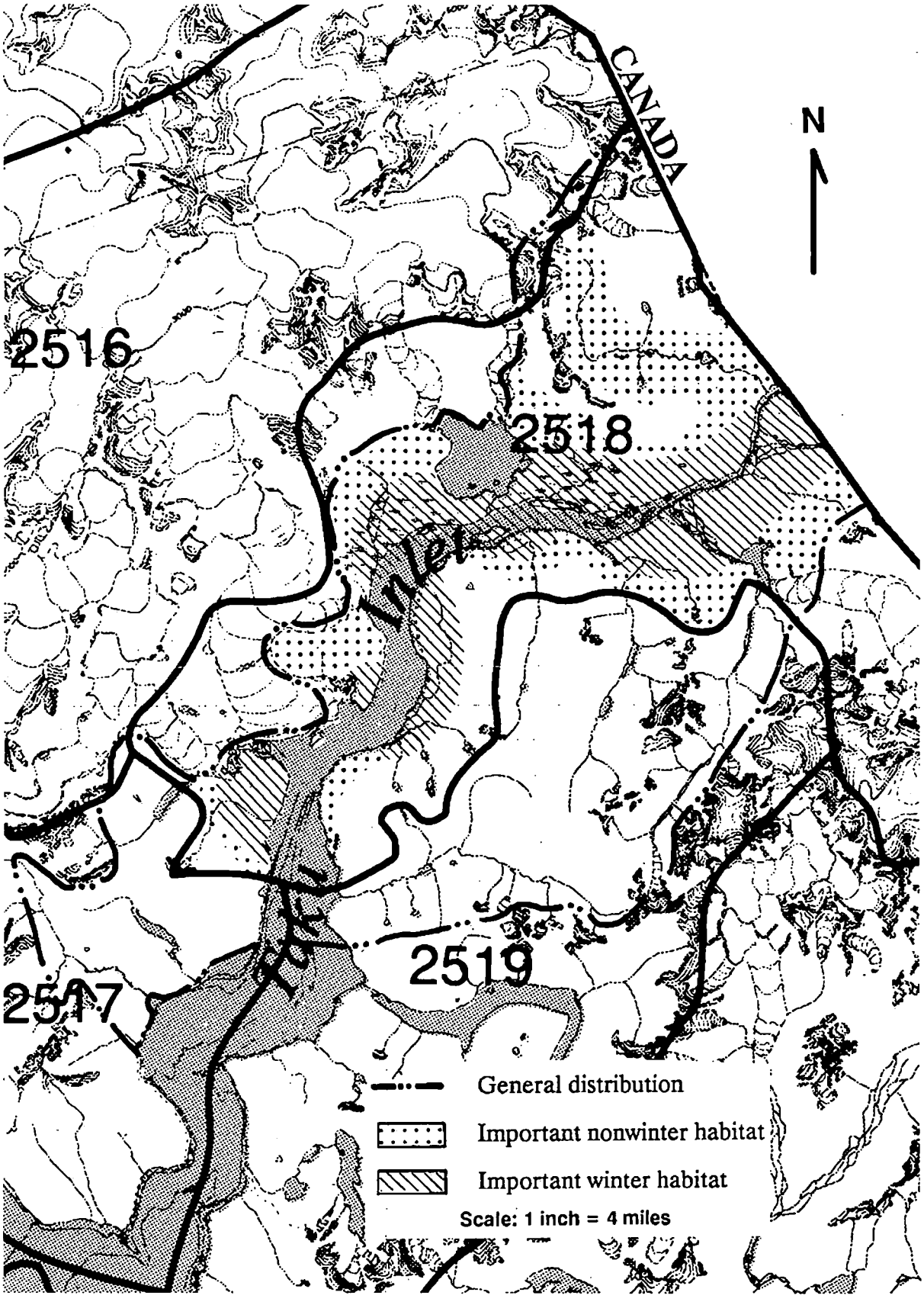

Figure 7. **Moose distribution and important habitat in the Taku River area, Unit 1C.**

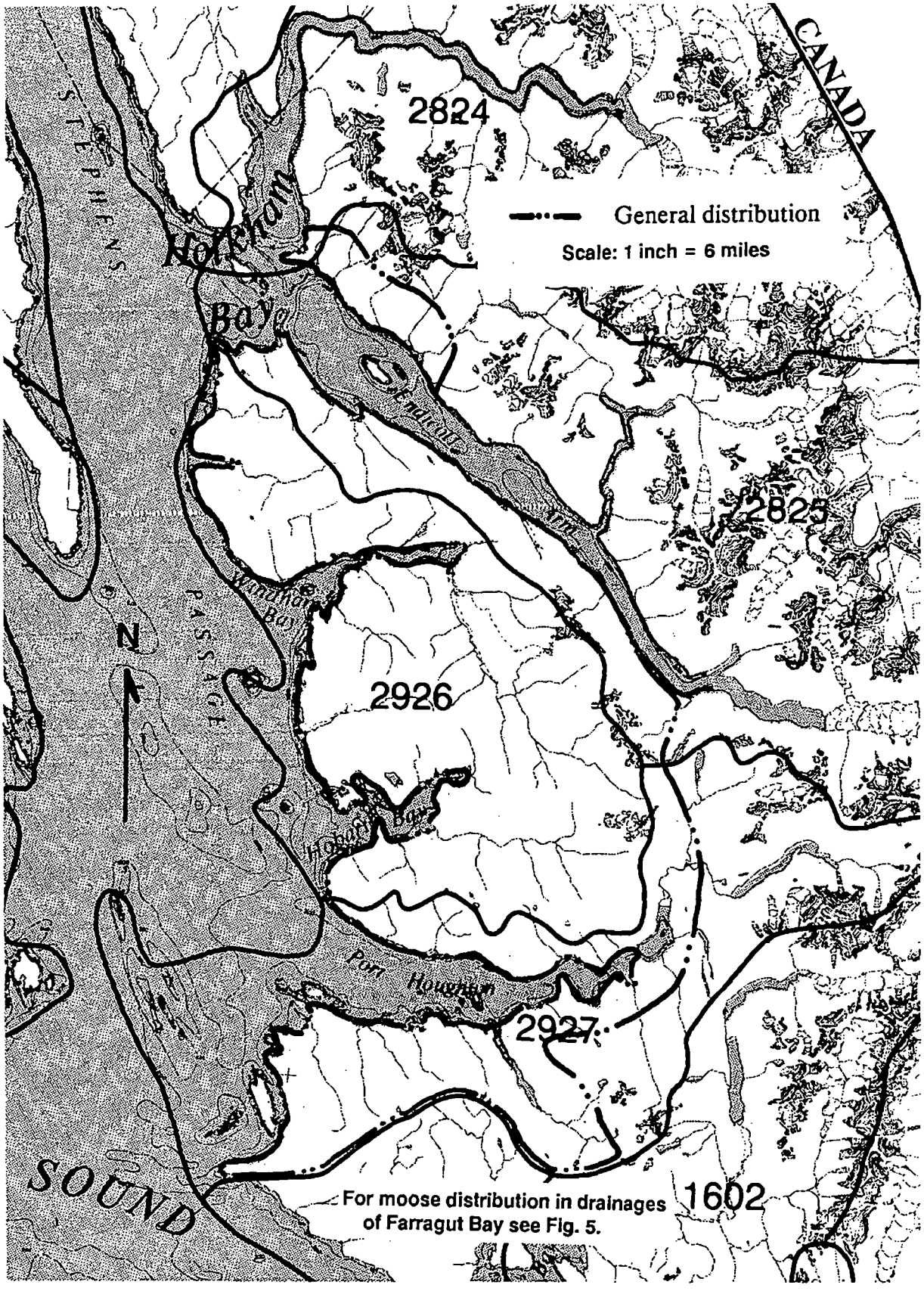

Figure 8. Moose distribution in Unit 1C south of the Taku River.

early 1960's. In addition, calf production appears to be extremely low. Nevertheless, the population is considered to be stable, and, in the absence of more detailed habitat information, near the habitat capability.

Although the estimates based on aerial surveys seem too low to support the current level of harvest, influx of animals from Canada may be bolstering the population on this side of the border. Moose harvest since statehood has been consistently around 20 bulls annually and, in the absence of particularly severe winters, intense hunting pressure, or the damming of the river by the Taku Glacier, the harvest is expected to remain near that level.

A large percentage of Taku moose hunters believes predation significantly limits the growth of the moose population. The low harvest of predators in the Taku drainage since 1980 (4 brown bears, 5 wolves), however, does not indicate a large predator population on the Alaska side of the border. Predation may be significant further upstream in Canada.

The moose population of Unit 1(C) beginning at and including the Taku River drainage south to Cape Fanshaw is perhaps 150 animals.

Objectives (These are specific targets which can be used to measure the success of moose management in the Taku River drainage and neighboring areas of Unit 1(C)).

	Current 1988	Objective 1994
Post-hunt moose numbers	150	150
Annual hunter kill	17	20
Number of hunters	70	100
Hunter-days of effort	238	450
Hunter success	24	20

Discussion: Current moose numbers are based on a best estimate. Moose numbers are assumed to be near the capability of the habitat, and habitat capability should remain stable during the next 5 years. The objective for number of hunters is slightly greater than the average for the past 5 years. The objective for hunter days of effort is based on maintaining the average number of days per hunter for the years 1981-88 of about 4.5 days.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: The moose population of the Taku River valley appears to be dependent on an influx of animals from Canada which is beyond our management jurisdiction.

Strategy:
Work with Canadian officials to determine a population estimate for the entire lower Taku River drainage, monitor harvest in Canada, obtain information on predation levels, and possibly develop a joint management strategy for the valley.

Problem: Aerial surveys of the moose population may be unreliable because of poor survey conditions (insufficient snow), poor weather conditions during fall and early winter, and the movements of moose back and forth across the international border.

Strategies:
When weather conditions permit, conduct annual aerial surveys of Taku River moose.

Use harvest information, including annual kill, hunter success rates, and age of harvested animals as additional means of monitoring population characteristics of Taku River moose.

Problem: Because of the interplay of Canadian and Alaskan populations of moose, the number of moose available for harvest and the level of the harvest may vary from year to year in response to factors other than Division management actions or Board regulations.

Strategies:
Allow for some fluctuation of the harvest around the objective of 20 moose annually. Trends in harvest level, hunter participation and success rates, and age of harvested animals (from jaws of harvested moose) may be more indicative of the ability of the population to support current harvest than year-to-year harvest fluctuations. On the other hand, a large difference between one year's harvest and that of the previous year may indicate that a regulation or other management change is needed.

If further regulation of the Taku hunt becomes necessary, recommend a harvest quota, a season timing change, or antler restrictions before a drawing permit or other means of limiting hunter participation.

Problem: The habitat capability and condition of moose range in the Taku River drainage are not known.

Strategy:
Work with the USDA Forest Service on ways to evaluate moose habitat in the Taku River drainage. Establishing vegetation transects in key moose wintering areas, and use of vegetation mapping are among the techniques that should be considered.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M1CTRC2D

Date: 13 January, 1989

Comment: Moose/Unit 1C/Taku River/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100 ♀	Calves per 100♀	Calves % in herd	Moose per hour
1978	1	2	3	19	8	3	30	15	49	3.4	10	50	31	14.3
1983	2	0	2	30	8	2	40	12	54	1.7	5	30	22	31.8
1986	0	2	2	41	1	0	42	1	45	1.8	5	2	2	25.0
1987	No data													
1988[a]	0	2	2	13	2	1	16	4	22	1.6	13	25	18	13.8

[a] Early winter survey, sex and age ratios not reliable.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M1CTRC5A

Date: 15 January, 1989

Comment: Moose/Unit 1C/Taku River/Historical Harvest

	Registration Data Source # 1 = permits reports						Data source # 2 = Harvest ticket reports						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No.	Total	No.	%	♂	♀	??	All
1980							16	0	0	16	94	17	16	0	0	16
1981							23	0	0	23	65	31	23	0	0	23
1982							14	0	0	14	77	18	14	0	0	14
1983							11	0	0	11	85	13	11	0	0	11
1984	18	0	0	18	83	22							18	0	0	18
1985	26	0	0	26	120	22							26	0	0	26
1986	15	0	0	15	99	16							15	0	0	15
1987	14	0	0	14	89	16							14	0	0	14
1988	17	0	0	17	70	24							17	0	0	17

Comments (include comments on aberrations in data collection procedures):

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M1CTRC5E

Date: 15 January 1989

Comment: Moose/Unit 1C/Taku River/Hunter Success

Data Source(s): Harvest ticket reports 1980-83; registration permit reports 1984-86

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days
1980	16			78			94		
1981	23	124[a]	5.9	42	260	6.2	65	384[b]	6.0
1982	14	89	6.4	63	347	5.5	77	436	5.7
1983	11	77	7.0	74	412	5.6	85	489	5.8
1984	18	75	4.2	75	280	3.7	83	355	4.3
1985	26	132	5.1	93	384	4.1	119	516	4.3
1986	15	84	5.6	84	395	4.7	99	479	4.8
1987	14	48	3.4	75	305	4.1	89	353	4.0
1988	17	36	2.1	53	202	3.8	70	238	3.4

[a] n = 21

[b] n = 64

Strategic Plan for the Management of Moose in Berners Bay, Unit 1(C)

1990-94

Introduction

This strategic plan sets the direction for the management of moose in Berners Bay by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management in Berners Bay during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

The Berners Bay moose population is the result of two transplants of moose calves into the area in 1958 and 1960. A total of 21 moose were released into the area at that time. The transplants were successful and a limited hunting season for bull moose was established in 1963.

Hunting has continued until the present with the exception of the four years 1975, 1976, 1977, and 1985 when moose hunting was closed. Either-sex and cow-only hunts have been instituted periodically to maintain a balanced sex ratio in the herd. Because of its proximity to Juneau, Berners Bay has been of great interest to moose hunters. It has been a drawing hunt since 1971. As many as 1,200 people a year have applied for a Berners Bay moose permit. Between 200 and 600 people annually applied for permits during the years 1983 to 1988.

Peak hunter success was during 1971-1974 when more than 20 moose a year were killed. In the 1980's, the take has varied from 5 to 14 animals depending to a great extent on the number of permits issued. Nonresidents were prohibited from applying for a permit beginning in 1986. The Board of Game has determined that there are no subsistence uses of the Berners Bay moose population. The current (1988) take is limited by drawing permit to 5 bulls per year.

Physiographic Features and Habitat Description

Berners Bay is on the east side of Lynn Canal and includes the clearwater drainage of the Berners River and the glacial fed Lace, Antler, and Gilkey rivers. The mountains and icefields of the coast range isolate it from other drainage systems on the coast and in the interior. The area occupied by Berners Bay moose lies within ADF&G wildlife analysis areas 2409, 2410, 2411, 2412, and 2413 (Fig. 9).

As elsewhere in southeast Alaska, moose habitat is generally associated with riparian vegetation. In Berners Bay, much of the habitat is in early successional, post-glacial vegetative types that may be of only transitory value to moose. Willow (Salix spp.) and black cottonwood (Populus trichocarpa) are the most abundant preferred browse species in Berners Bay.

In 1981, a management study was initiated to obtain a better understanding of the extent, composition, and capability of winter moose habitat in Berners Bay. Habitat types of all valley bottoms and adjacent slopes to an elevation of 200 feet were identified, classified, and mapped. In the areas of preferred winter moose range (pioneer plant communities, alder-willow, and deciduous willow vegetation types), samples of vegetation were collected and mass and nutritional composition analyzed.

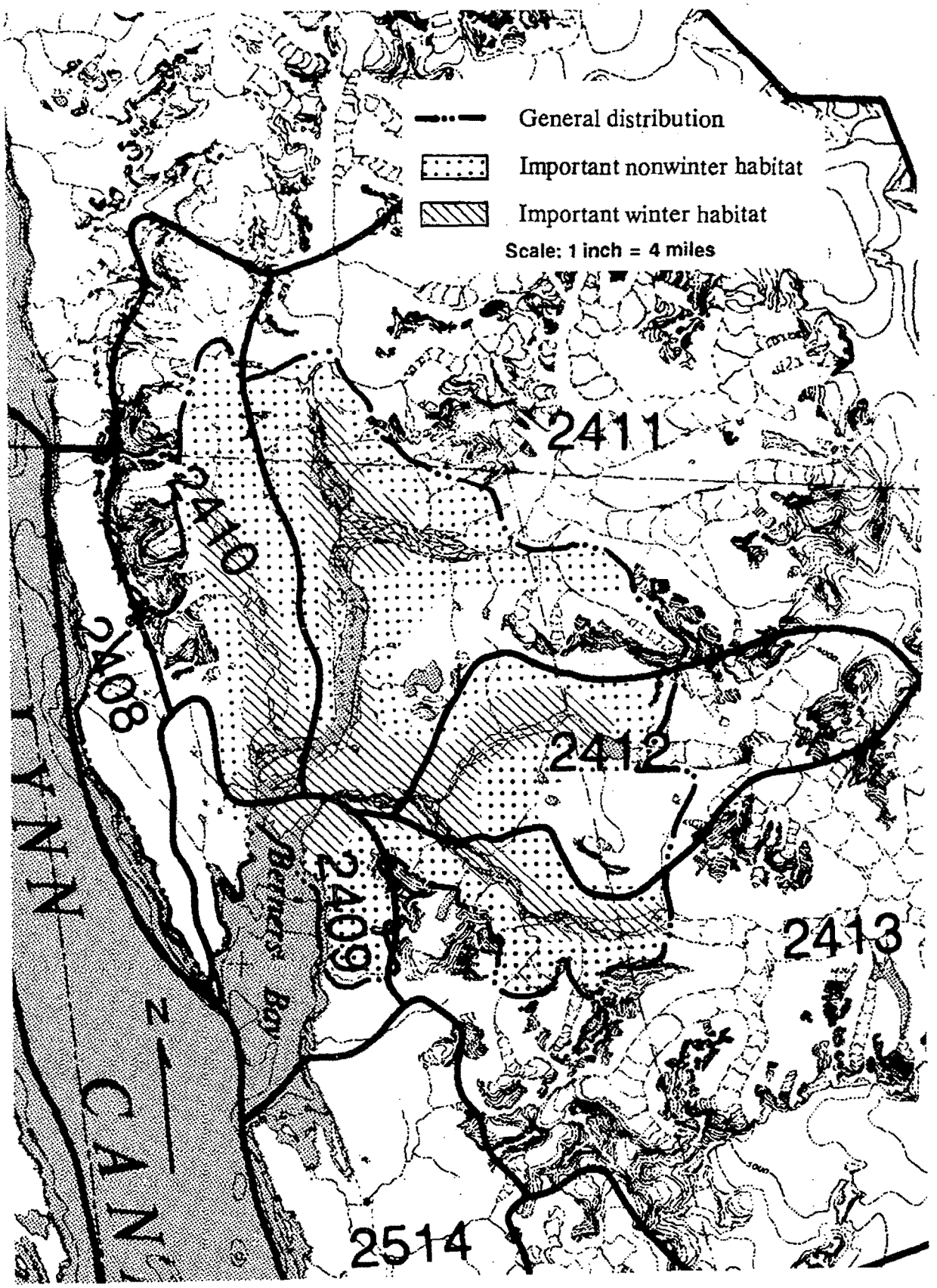

Figure 9. Moose distribution and important habitat in the Berners Bay area, Unit 1C.

It was found that an estimated 3,947 acres of winter moose range exist in Berners Bay. The range is classified into 3 major vegetative communities:

1) The deciduous willow community, which is dominated by Sitka alder (Alnus sinuata) but includes park willow (S. monticola) makes up 1,726 acres or 44 percent of the moose winter range in Berners Bay. The high percentage of alder (over 99%) reduces its value to moose.

2) An alder-willow community, including primarily Sitka alder and Sitka willow (S. sitchensis) and containing park willow and feltleaf willow (S. alaxensis) with some black cottonwood, totals 1,317 acres and makes up 33 percent of the winter range. This is considered good moose habitat but is a successional plant community and will likely decline in value to moose as it changes to conifers.

3) The pioneer community is made up of primarily alder, cottonwood, and Sitka willow. It occupies 904 acres or 23 percent of the identified winter range. The high occurrence of cottonwood makes this valuable moose habitat. However, this is an early successional stage of vegetation which is by nature changeable and so cannot be relied upon as perennial moose winter range.

Isostatic rebound, the rising of land after deglaciation, may also be a factor influencing plant succession and thus moose habitat in Berners Bay. As land rises with respect to the water table, the land becomes drier and vegetation may change to types less valuable as moose forage.

Population Status

The most recent fall aerial population survey was conducted in December 1986; 68 moose were observed. The bull:cow ratio was 33:100 and the calf:cow ratio was 15:100. A winter survey in January 1989 also found 68 moose. Because of the timing of the survey, sex determination and age ratios were unreliable. The population is thought to be near the habitat capability, between 80 and 110 animals. Recently, calf recruitment has been low.

The small harvest quota (7 or 5 bulls) since 1986 is a result of low recruitment and the inability in recent years to obtain reliable sex and age ratios for the population. Bear predation and poor range conditions have both been suggested as factors in reducing calf production at Berners Bay. A more complete analysis of habitat conditions is necessary before examining predation as a major cause of poor calf recruitment.

Objectives (These are specific targets which can be used to measure the success of moose management in Berners Bay.)

	Current 1988	Objective 1994
Post-hunt moose numbers	90	90
Annual hunter kill	4	8
Post-hunt bull:cow ratio	N.A.	25:100
Number of hunters	5	10
Hunter-days of effort	16	30

Discussion: Current population numbers are a best estimate based on an analysis of annual aerial survey data and harvest statistics. Moose numbers are assumed to be near the capability of the habitat, and habitat capability should remain stable during the next 5 years. The objective for annual hunter kill is greater than the current level. The annual kill objective is based on an assumed sustainable level over the long term. The higher annual kill will not be sustainable unless calf recruitment is near

historic levels. The higher levels of hunter participation (number of hunters and hunter days) would maintain current hunter success rates and average days per hunter.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: In a small moose population the age and sex composition (and thus the harvestable surplus) can change significantly from year to year due to intensive harvest and natural processes.

Strategies:

Monitor population closely giving priority to fall aerial sex and age composition surveys.

Adjust seasons and bag limits to assure that post-hunt sex ratios are within desired levels, including the options of closing the season or instituting either-sex or cow hunts if the bull:cow ratio is below 25:100, or closing the season if the calf:cow ratio becomes extremely low.

Work with the local advisory committees to devise new harvest strategies that are consistent with this plan and are acceptable to the public.

Problem: Available data indicate that recruitment has been low since 1983. A limited amount of quality winter habitat may be affecting herd recruitment; and non-hunting mortality may be reducing the number of animals available for human use, but the causes and extent of this mortality are unknown.

Strategies:

Complete analysis of habitat condition and capability.

Determine whether habitat condition influences reproductive capacity of herd.

If habitat condition and capability are adequate to support higher recruitment, determine the extent of predation on moose calves in spring and summer and the predators involved.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M1CBBC2D

Date: 13 January, 1989

Comment: Moose/Unit 1C/Berners Bay/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100 ♀	Calves per 100♀	Calves % in herd	Moose per hour
1980			8	21	5	0	26	5	40	1.8	31	19	13	22.2
1981			0	20	2	2	24	6	30	2.3	0	25	20	13.0
1982	1	3	4	69	7	6	82	19	105	3.4	5	23	18	30.9
1983	7	2	9	52	10	4	66	18	93	2.2	14	27	19	42.3
1984	15	7	22	47	7	6	60	19	101	2.2	37	32	19	45.9
1985	12	8	20	39	4	1	44	6	70	2.3	46	14	9	30.4
1986	6	9	15	41	3	2	46	7	68	1.6	33	15	10	41.2
1987	No data													
1988[a]	2	1	3	43	8	2	53	12	68	2.2	6	23	18	30.9

[a] Early winter survey, sex, and age ratios unreliable.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M1CBBC5A Date: 13 January, 1989

Comment: Moose/Unit 1C/Berners Bay/Historical Harvest

	Data source # 1 = Drawing permit reports						Data source # 2 = Harvest ticket reports						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1963[a]							3	0	0	3			3	0	0	3
1964							6	0	0	6			6	0	0	6
1965							11	0	0	11	70	16	11	0	0	11
1966							10	0	0	10	61	16	10	0	0	10
1967							18	0	0	18			18	0	0	18
1968							21	0	0	21			21	0	0	21
1969							14	0	0	14			14	0	0	14
1970							10	0	0	10			10	0	0	10
1971	3	20	0	23	28	82							3	20	0	23
1972	5	17	0	22	35	63							5	17	0	22
1973	25	18	0	43	42	79							25	18	0	43
1974	9	11	0	20	42	48							9	11	0	20
1975	0	0	0	0	0								0	0	0	0
1976	0	0	0	0	0								0	0	0	0
1977	0	0	0	0	0								0	0	0	0
1978	11	0	0	11	19	53							11	0	0	11
1979	17	0	0	17									17	0	0	17
1980	5	0	0	5	24	21							5	0	0	5
1981	10	0	0	10	17	53							10	0	0	10
1982	5	0	0	5	21	24							5	0	0	5
1983	0	13	0	13	14	93							0	13	0	13
1984	0	13	0	13	15	93							0	13	0	13
1985	8	5	0	13	14	93							8	5	0	13
1986	5	0	0	5	7	71							5	0	0	5
1987	5	0	0	5	5	100							5	0	0	5
1988	4	0	0	4	5	80							4	0	0	4

Comments (include comments on aberrations in data collection procedures):

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M1CBBC5E

Date: 15 January 1989

Comment: Moose/Unit 1C/Berners Bay/Hunter Success

Data Source(s): Drawing permit reports

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1980	5	13	2.6	18	114	6.3	23	127	5.5
1981	10	38	3.8	9	51	6.4	19	89	4.9
1982	5	26	5.2	16	94	5.9	21	120	5.7
1983	13	27	2.1	1	12	12.0	14	39	2.8
1984	13	31	2.2	1	6	6.0	15	37	2.5
1985	13	32	2.5	1	5	5.0	14	37	2.6
1986	5	7	1.4	2	9	4.5	7	16	2.3
1987	5	10	2.0	0	0	0.0	5	10	2.0
1988	4	8	2.0	1	8	8.0	5	16	3.2

AGE STRUCTURE OF HARVEST
BGDIF C5g

Document No.: M1CBBC5G

Date: 7 February, 1988

Comment: Moose/Unit 1C/Berners Bay/Age Structure

Sex: Male

Year	Age Class																Total kill	% aged	Mean age
	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5			
1978	0	1	2	1	2	2	0	1	1	0	0	0	0	0	0	0	11	91	4.6
1979	0	3	3	6	2	2	1	0	0	0	0	0	0	0	0	0	17	100	3.1
1980	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	5	80	4.8
1981	0	2	4	1	1	1	0	0	0	0	0	0	0	0	0	0	10	90	2.7
1982	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	5	100	2.3
1985	0	0	0	4	1	3	0	0	0	0	0	0	0	0	0	0	8	100	4.4
1986	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	5	80	3.8
1987	0	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	5	100	4.3
1988	0	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	4	100	4.0

AGE STRUCTURE OF HARVEST
BGDIF C5g

Document No.: M1CBBC5G

Date: 13 January, 1989

Comment: Moose/Unit 1C/Berners Bay/Age Structure

Sex: Female

Year	Age Class																Total kill	% aged	Mean age
	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5			
1983	0	0	1	1	2	1	1	2	1	1	1	1	0	0	0	1	13	100	7.5
1984	1	1	1	4	1	1	0	0	3	0	1	0	0	0	0	0	13	100	5.0
1985	0	1	0	1	0	1	0	0	0	1	0	1	0	0	0	0	5	100	6.3
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Strategic Plan for Management of Moose in the Chilkat Range, Unit 1(C)

1990-94

Introduction

This strategic plan sets the direction for the management of moose in the Chilkat Range by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in management of moose in the Chilkat Range during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Moose are relative newcomers to the Chilkat Range. They have undoubtedly immigrated from the Chilkat Valley population. Moose were first reported at Glacier Point by John Fox of Haines in 1960. In 1963, Fox also sighted moose at the mouth of Sullivan River. Moose tracks were reported along the Bartlett River in Glacier Bay National Monument in 1962. First evidence of moose in the Endicott River and St. James Bay areas was reported in 1965, and moose were actually sighted in the Endicott drainage in 1968. That year moose were also first reported in Gustavus. Moose have expanded into the Excursion River drainage and Adams Inlet and Wachusetts Cove in Glacier Bay.

Prior to 1984, the moose hunt in the Chilkat Range was a bulls-only open hunt with a 31-day season except for 15-day seasons in 1975 and 1976. The first reports of successful hunts were in 1974; 3 moose were taken that year. One bull was reported killed in both 1975 and 1976 during 15-day seasons. No other kills were reported until 1982 and 1983 when four and five were taken, respectively. In 1984, the hunt became a registration hunt for bulls only with a 31-day season. The average annual take since 1984 has been 7 moose. Interest in Chilkat Range moose has increased recently as a result of the harvest restrictions for Chilkat Valley moose in Unit 1(D). Between 60 and 70 hunters were in the field annually from 1985 through 1988. The Board of Game has determined that there are no subsistence uses of the Chilkat Range moose population.

In 1987, 26 Chilkat Range moose hunters responded to an ADF&G questionnaire on moose management planning. Eighty-eight percent hunted moose the previous year (1986) and 12% killed a moose. That is slightly lower than the 14% success rate for all Chilkat Range moose hunters in 1986. A majority (63%) said they went moose hunting at least once every year. About half (48%) had not yet killed a moose, and 36% said they kill a moose at least as often as once every three years. Respondents spent an average of 3.5 days in the field in 1986, about a day more than the average of all Chilkat Range moose hunters according to data from registration permits. On average they traveled 70 miles to their hunting area and spent 4.5 hours en route.

Fifty percent of the questionnaire respondents thought that a desirable moose hunting success rate would be one moose per year; but only 8% said they were that successful. Nevertheless, 92% felt the current hunting regulations for the Chilkat Range gave them a reasonable chance of killing a moose.

Questionnaire responses indicated that Chilkat Range hunters were split in their preferences for hunting regulations. If further regulation of the hunt became necessary, 46% prefer setting a harvest quota whereas 31% favor a drawing permit. Another 19% preferred antler size restriction as a method

of regulation. Eighty-four percent of the respondents favored keeping open the option of a cow season if it were biologically sound.

Sixty-two percent of the respondents believed that transportation methods should be restricted in certain areas. Off-road vehicles were those mentioned most often. A majority (67%) thought that predation was substantially limiting the number of moose in the Chilkat Range.

Physiographic Features and Habitat Description

The Chilkat Range is a mountainous and glaciated extension of the mainland in northern southeast Alaska. It is bounded on the east by Lynn Canal and on the west by Glacier Bay. Its principal physiographic features are the Chilkat Mountains and the major drainage systems of St. James Bay and the Endicott River. Chilkat Range moose are found in areas corresponding to ADF&G Wildlife Analysis Areas 2202, 2203, 2304, 2305, and 2306 (Fig. 10).

Major stream drainages are the primary areas used by Chilkat Range moose. As in other areas of southeast Alaska, moose rely on riparian habitats with suitable forage. Cottonwood and willow are the preferred forage species. No studies have been done on the condition or extent of moose habitat in the Chilkat Range. However, high quality moose range is believed to be limited. Some of the area which now supports increasing numbers of moose, particularly Adams Inlet, was glaciated until recently. The vegetation is in mid-successional stage, likely to give way to conifers, and thus of only transient value to moose. Moose range in St. James Bay, the Endicott River valley, and other areas on the east side of the Chilkat Range may already be declining as the deciduous vegetation matures to a size less valuable for forage. The ultimate habitat capability of this area for moose is unknown.

Population Status

A moose aerial survey was conducted on the Endicott River in December 1986. A total of 19 moose were counted. Sex and age ratios were: 30 bulls:100 cows and 60 calves:100 cows; 32% of the herd were calves.

Because of the geography of the Chilkat Range, moose are distributed in widely scattered pockets of animals whose overall numbers and population characteristics are hard to assess. Aerial surveys are costly, time-consuming, and less reliable than those in less forested areas. Based on recent hunter success, past surveys, anecdotal information, and present knowledge of the extent of moose range in the area, the population estimate for the huntable area of the Chilkat Range (i.e. outside the boundaries of Glacier Bay National Park) is about 150 animals. That number is probably equal to the current habitat capability and may decrease if range quality is declining.

Moose numbers in Glacier Bay may currently be increasing. The amount of mingling that occurs between moose on either side of the Chilkat Range is unknown. The huntable population may be discrete for the most part and so subject to little, if any, reinforcement from animals in the park. The wolf population in the Chilkat Range is relatively high and predation undoubtedly occurs, but its extent and effect on the condition of the moose population are unknown.

Moose have been seen in recent years on Chichagof Island across Icy Strait from the Chilkat Range. At this time, it is not known how many moose have emigrated to Chichagof or how permanent this apparent expansion of range may be.

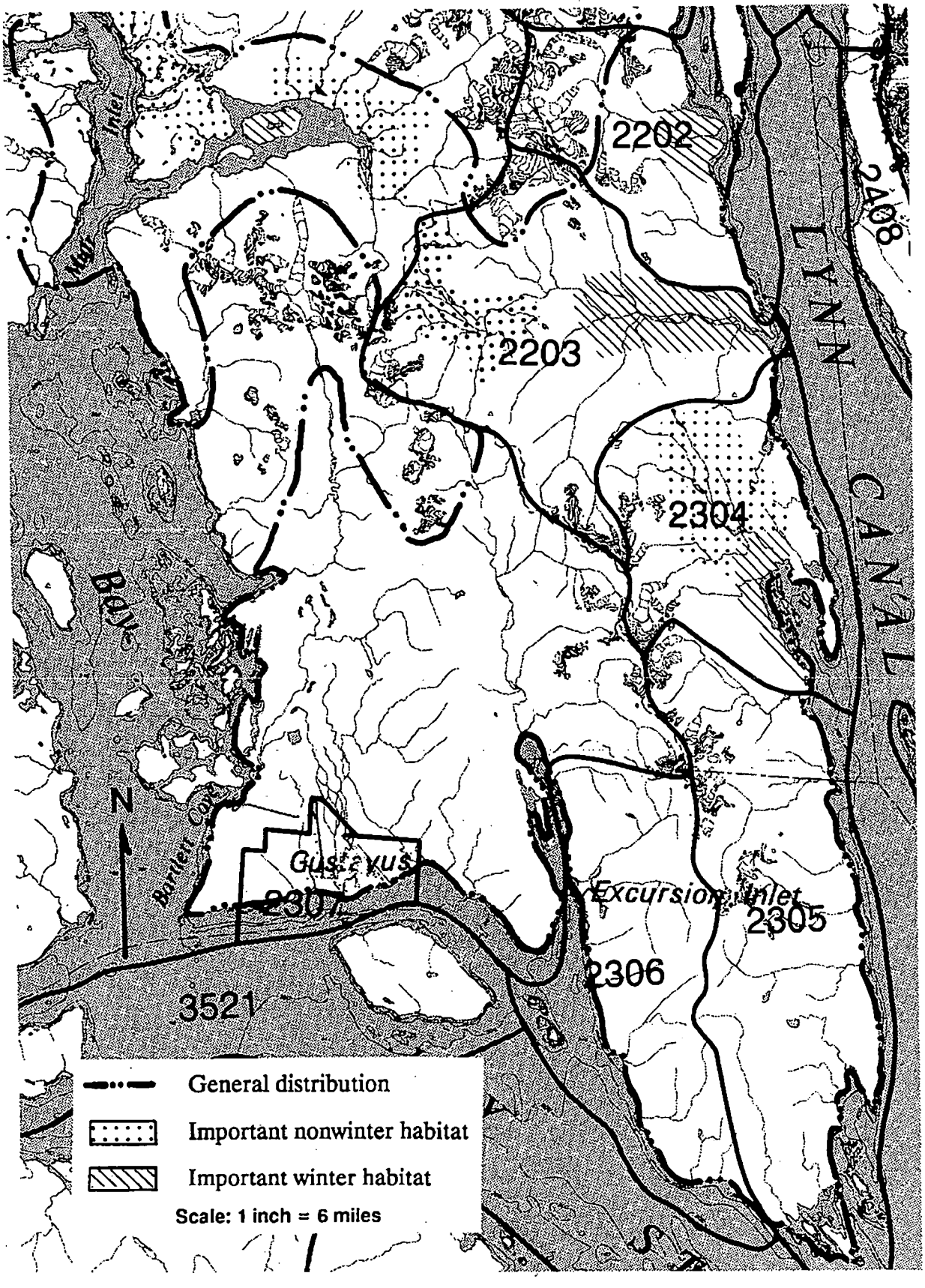

Figure 10. **Moose distribution and important habitat in the Chilkat Range, Unit 1C, and parts of Glacier Bay National Park.**

Objectives (These are specific targets which can be used to measure the success of the Chilkat Range management plan.)

	Current 1988	Objective 1994
Post-hunt moose numbers	150	150
Annual hunter kill	11	10
Number of hunters	63	65
Hunter-days of effort	196	195
Hunter success	17%	15%

Discussion: Current moose numbers are based on a best estimate. Moose numbers are assumed to be near the capability of the habitat, and habitat capability should remain relatively constant during the next 5 years. The objective for annual hunter kill is 2 moose more than the average for the past 5 years. The annual kill objective is based on an assumed sustainable level over the long term. The objective for number of hunters is slightly greater than the average for the past 5 years and reflects public desires to maintain recent levels of hunter participation. The objective for hunter days of effort is based on maintaining the average number of days per hunter for the years 1984-88 of about 3.0 days.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: Numbers and population characteristics of Chilkat Range moose are hard to assess because moose are scattered over a wide area in small pockets of habitat. Because of the large area involved and the small number of moose overall, the reliability and value of regular aerial surveys is marginal weighed against their relatively high cost.

Strategies:

Use harvest information including annual kill, hunter success rates, and information from collection of lower jaws of harvested moose as a means of monitoring the size, age composition, and condition of the Chilkat Range moose population.

When weather conditions and budget constraints permit, conduct aerial surveys of key moose areas in the Chilkat Range; for example, St. James Bay and the Endicott River valley.

Problem: Small, discrete, local populations of moose, such as those in the Chilkat Range, have the potential to be severely depleted in a short time by intensive hunting or predation, or by adverse local weather or habitat conditions.

Strategies:

Closely monitor annual harvest and hunter participation and success in each area of the Chilkat Range.

If localized populations appear to be depleted, work with local advisory committees to devise new harvest strategies or adjust seasons, bag limits, and other regulations to maintain huntable populations in important areas in the Chilkat Range.

If population declines are noted determine to what extent the declines are a result of natural factors such as predation or habitat condition.

Problem: The habitat capability and condition of moose range are not known. Both, however, are thought to be declining because of changes in plant communities as a result of succession.

Strategies:
Work with the USDA Forest Service, the U.S. Park Service, and the Alaska Department of Natural Resources to evaluate moose habitat in the Chilkat Range. Establishing vegetation transects in key moose wintering areas, and use of vegetation mapping are among the techniques that should be considered.

If investigation reveals habitat condition and capability are declining, determine the feasibility of various habitat management techniques to reclaim some areas of decadent moose habitat. Institute such measures, if appropriate, to maintain a huntable moose population.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M1CCRC2D

Date: 13 January, 1989

Comment: Moose/Unit 1C/Chilkat Range/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100 ♀	Calves per 100♀	Calves % in herd	Moose per hour
1968	1		1	1	1	0	2	1	4		50	50	25	
1975	0		0	2	0	1	3	2	5		00	67	40	
1986	3		3	6	3	1	10	6	19	1.5	30	60	32	
1987	No data													
1988	No data													

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M1CCRC5A

Date: 15 January, 1989

Comment: Moose/Unit 1C/Chilkat Range/Historical Harvest

	Data source # 1 = Registration permits						Data source # 2 =						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1984	6	0	0	6	40	15							6	0	0	6
1985	7	0	0	7	72	10							7	0	0	7
1986	10	0	0	10	69	14							10	0	0	10
1987	6	0	0	6	63	10							6	0	0	6
1988	11	0	0	11	63	17							11	0	0	11

Comments (include comments on aberrations in data collection procedures):

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M1CCRC5E

Date: 15 January 1989

Comment: Moose/Unit 1C/Chilkat Range/Hunter Success

Data Source(s): Registration permit reports

Year	Successful Hunters			Unsuccessful Hunters			Total Hunters		
	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1984	6	32	3.7	34	121[a]	3.7	40	143[a]	3.7
1985	7	19	2.1	65	161[a]	2.5	72	180[a]	2.5
1986	10	35	3.5	59	162	2.7	69	197	2.8
1987	6	21	3.5	57	134	2.4	63	155	2.5
1988	11	31	2.8	52	165	3.2	63	196	3.1

[a] One hunter did not report days hunted.

Strategic Plan for Management of Moose in the Chilkat Valley Area, Unit 1(D)

1990-94

Introduction

This strategic plan sets the direction for the management of moose in the Chilkat Valley area, Game Management Unit 1(D) by the Alaska Department of Fish and Game/Division of Game (ADFG/DWC). It is the product of participation by the general public, the Upper Lynn Canal and Klukwan Fish and Game Advisory Committees, the Alaska Chilkat Bald Eagle Preserve Advisory Council, and the ADFG/DWC

This plan updates the moose management plan for Unit 1D developed and implemented in 1986. Like the previous plan this one presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management in the Chilkat Valley area during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Moose migrated to the Chilkat Valley from Canada about 1930. Excellent moose browse, previously unexploited, allowed the moose population to grow rapidly. Moose were well established in the Chilkat Valley by the 1950's. Legal hunting seasons were established in 1959. Bulls only seasons lasting 4-6 weeks were in effect through 1963, with an average annual harvest of about 60 moose. Between 1964 and 1976 (with the exception of 1975), both bulls and cows were taken during seasons that ranged from 3 days to 4 weeks in length. A mean annual harvest of 64 bulls and 47 cows was recorded during this period; the maximum harvest was recorded in 1966 when 92 bulls and 60 cows were killed. Seasons during 1977-83 were monitored via harvest ticket returns and yielded an average harvest of 40 bulls. In 1984, under a permit registration system, the established quota of 35 bulls was taken in 13 days.

Since 1985, moose hunting in the Chilkat Valley has been limited to subsistence use. Under the 1985 registration permit system, 14 bulls (of a 15 bull quota) were taken in 6 days. Forty-three hunters were eligible to hunt that season. The 1986 season was closed by the Board of Game at the request of the Upper Lynn Canal Advisory Committee. Low calf recruitment and a bull:cow ratio below the objective stated in the strategic management plan were the reasons for the closure. In the spring of 1987, the Board designated all residents domiciled in Unit 1D (i.e. Haines, Klukwan, and Skagway) as the only subsistence users of the unit's moose population. The 1987 and 1988 seasons were opened under a registration permit system with a quota of 15 bulls. The low quota was designed to permit some harvest while maintaining a bull:cow ratio of about 25:100, and allowing the population to increase to the objective of 450 moose called for in the strategic plan. In 1987, 22 moose were shot and the season was closed by emergency order after 1 day. The 1988 season lasted only 14 hours. Eighteen bulls were killed in that time, 3 over the quota.

Hunter success has ranged from a high of 58 percent in the mid-1960's to a low of 9 percent in the mid-1970's, 1982, and 1988.

Physiographic Features and Habitat Description

Game Management Unit 1(D) is composed of the area around Upper Lynn Canal north of the latitude of Eldred Rock excluding Sullivan Island. It includes approximately 2,600 square miles. Although this plan addresses all of GMU 1(D), it recognizes that management will be focused in the Chilkat River drainage and its tributaries because most of the moose are located there. An estimated 200-250 square

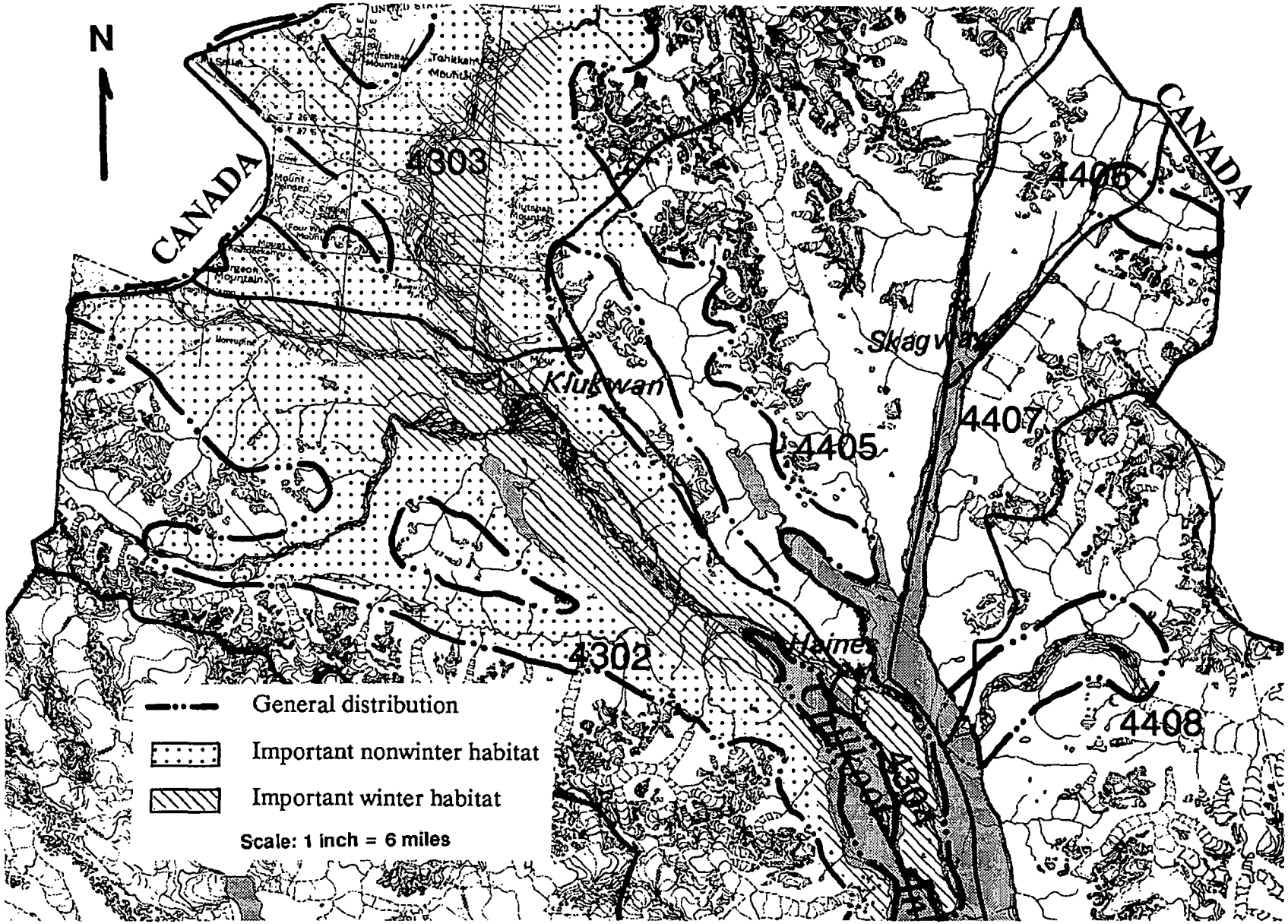

Figure 11. **Moose distribution and important habitat in the Chilkat Valley area, Unit 1D.**

miles of moose summer range are in the Chilkat River watershed. The Chilkat Valley corresponds to ADF&G/DWC wildlife analysis areas 4302 and 4303 (Fig. 11). Estimates of population size, predation, habitat, and hunting pressure pertain to this watershed unless specifically noted. Smaller parcels of moose habitat are located in the Katzehin, Chilkoot, and Warm Pass valleys, and on the Chilkat Peninsula. These areas correspond to ADF&G/DWC wildlife analysis areas 4408, 4407, 4405, 4406, and 4304. The majority of moose in Unit 1(D) occur in the Chilkat drainage; therefore, regulations governing allowable harvest likely will be made based on data collected from the Chilkat drainage but should pertain to the entire unit.

Most of the moose habitat in the Chilkat Valley lies within the boundaries of the Haines State Forest. The Haines State Forest Management Plan (prepared by the Alaska Department of Natural Resources in 1986) calls for clearcutting of over 46,000 acres of old-growth forest in the state forest over the next 100 years. About 11,000 acres have already been cut. These clearcuts are less than 25 years old and so provide early successional vegetation that is valuable for moose browse in summer and in low-snow winters. According to the management plan, over the long-term timber rotation, 20% of the logged areas (approx. 9,000 acres) will be in young clearcuts. The rest will be in second-growth stands older than 25 years which have little value to moose. Depending on the location and the design of the cutting units, the young clearcuts may increase the capability of moose non-winter range. However, winter range capability may be decreased depending on the severity of the weather.

The plan states that the logging of some mixed deciduous/coniferous stands will result in their conversion to pure coniferous second-growth stands. The long-term usefulness of those stands for moose will be reduced. Forested areas of Murphy Flats and the valleys of the Takhin and Kicking Horse rivers, which support some of the highest concentrations of moose in the Chilkat drainage, have been excluded from commercial timber harvest by the forest management plan.

An ADF&G study of winter habitat utilization by moose in the Chilkat Valley in 1981 through 1983 indicated that moose use a variety of habitats, including upland coniferous and mixed deciduous/coniferous forests, lowland deciduous forests, and non-forest areas.

Using a combination of aerial relocations and track counts, researchers found that although summer and winter moose ranges in the Chilkat Valley overlapped extensively, moose utilized different habitats at different seasons within those ranges. In mid-summer, moose were found to be almost exclusively in coniferous and deciduous forests with an overstory canopy. Because aerial surveys were flown at midday during the summer months, the observed use of forest habitat may have been biased as moose sought shelter from midday heat.

In autumn, more than half of the aerial relocations (55%) found moose in swamp or other nonforest areas. About 26% of the relocations were in coniferous forest, and 19% were in hardwood or clearcut stands.

Winter use of habitats varied depending upon the weather. In a low snow winter (1981-82), aerial surveys found moose using deciduous forest in greater proportion than its occurrence in the habitat. Coniferous forest, mixed deciduous/coniferous forests, and clearcuts were used with the same frequency as their occurrence. However, in a relatively deep-snow winter (1982-83), the mixed deciduous/coniferous stands were used more frequently than their occurence, other forest areas were used as available, and the clearcut and other open areas were used significantly less often than their availability. Moose appeared to prefer upland forested habitat during deep snow periods. After a heavy snowfall in January 1983, moose were found at higher average elevations than before the snow and in habitats with the least potential to accumulate snow (coniferous forest and steep slopes).

Moose winter track counts found more use of clearcuts, nonforest, and riparian areas and less use of forest than the aerial surveys indicated. The conclusion reached by the researchers was that moose are

highly selective in their use of habitat and, in winter, seek shelter and thermal cover in forested areas that are adjacent to open areas where they feed.

Willow and red osier dogwood were the most heavily browsed plants in the Chilkat Valley. They were most abundant in clearcut, riparian, and non-forested areas. In coniferous and mixed deciduous/coniferous forest, highbush cranberry was the most abundant forage species. It was browsed only lightly, however.

Although no comprehensive evaluation was made of habitat capability or condition, the study did find a disproportionately low number of young willows in the study area (i.e. on the Chilkat downstream from its confluence with the Klehini River). The researchers suspected that the low willow regeneration may be a consequence of silt deposition on river deltas and isostatic rebound (post-glacial uplift of land). As the land rises relative to the water table it becomes drier and supports a different plant community, one which may not be as valuable for foraging moose. This evidence, as well as less formal observations of other areas undergoing plant succession, suggests that moose habitat capability may be declining in the Chilkat Valley. However, current moose numbers are estimated to be below the habitat capability, and habitat capability is thought to be sufficient to support population objectives for at least the next 5 years.

Population Status

After a period of rapid growth, the moose population peaked in the mid-to-late 1960's, when fall aerial counts averaged 329 moose. The highest number of moose observed during this period was 375 in 1968, and the population was then estimated at 500 to 700 moose. Deteriorating range conditions due to heavy browsing were documented at that time. During the late 1960's, ratios of about 30 bulls:100 cows and 45 calves:100 cows were documented. Since the late 1970's, the number of moose observed during fall surveys has been fairly constant at about 200, suggesting a population of 350 to 400 animals. The number of moose observed per survey hour remained constant at about 40 during the same period (1974-1985). Historical records indicate that the bull:cow ratio was basically stable between 1971 and 1982 and averaged 17:100. The calf:cow ratio also was fairly constant from the late 1960's through 1983 and averaged about 30:100.

Since 1983, the bull:cow ratio has been depressed and the calf:cow ratio has declined. Although the bull:cow ratio responded to the reduced harvest in 1985, the calf:cow ratio remains low. Adverse weather conditions have prevented fall aerial surveys since 1986. Late winter surveys have been conducted to estimate moose densities and calf:adult ratios, but sex composition and calf:cow ratios have not been available since 1986. The current moose population is thought to be below the habitat capability, and so, has the potential to expand in the Chilkat Valley.

Harvest objectives identified by the public and ADF&G/DWC in the previous strategic plan for moose in the Chilkat Valley were based on projected calf survival rates higher than those realized over the past three years. Until calf survival rates increase and winter calf:cow ratios approach 25:100, an annual harvest of 40 bulls is not sustainable even when total population levels reach the prescribed 450 animals. With current low calf survival and current management procedures, the harvest should not be allowed to exceed 30 bulls.

Objectives (These are specific targets that can be used to measure the success of moose management in the Chilkat Valley.)

	Current 1988	Objectives 1994
Post-hunt moose numbers	375	450
Post-hunt bull:cow ratio	N.A.	25:100
Annual hunter kill	18	30
Number of hunters	206	250
Hunter-days of effort	206	500
Hunter success	9%	12%

Discussion: Current population numbers are a best estimate based on an analysis of annual aerial survey data and harvest statistics. In order to meet the population number objectives, the moose population would need to grow to the estimated capability of the habitat. Habitat management may be needed to maintain habitat capability or to increase it to objective levels. The current post-hunt bull:100 cow ratio is probably near objective levels, but the 1988 fall survey was not able to measure the bull:100 cow ratio accurately. The annual hunter kill objective is higher than current levels, but lower compared with the level set in the previous strategic plan. The annual kill objective is based on an assumed sustainable level that could be achieved by 1994. Although a post-hunt number of 450 moose would often allow a larger sustainable kill, current low calf recruitment is estimated to provided an annual sustainable harvest of only 30 moose. The longer term objective for annual hunter kill remains 40 moose. The objective for number of hunters was set higher than current levels and reflects an expressed desire by the residents of Haines, Klukwan, and Skagway that all interested hunters from these communities be allowed to participate. The hunter day objective indicates an intention to increase the length of the hunt from 1 to at least 2 days.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: More quantitative data is needed on the capability and the condition of moose habitat and its relation to the current moose population.

Strategies:

Establish and monitor vegetation transects in key moose wintering areas in an effort to determine habitat capability and trends.

- Conduct regular sex and age composition or trend count aerial surveys in an effort to more accurately determine moose numbers and monitor population trends.

Problem: The popularity of the Chilkat Valley moose hunt is high. Over 200 hunters have hunted in each of the past two years. The small harvest quota was reached and exceeded in less than 1 day after the seasons opened in both 1987 and 1988. Limiting the harvest to the quota is difficult with such high hunter participation.

Strategy:

Work with the advisory committees to develop alternative harvest strategies or new regulations, if necessary, to keep harvest within quota while slowing the pace of the hunt and extending the season from 1 day to 1 to 2 weeks.

Problem: Non-hunting mortality, particularly predation, is probably having an effect on the growth of the population, but the extent of this mortality is unknown.

Strategies:
Use such techniques as diversionary feeding of predators and/or intensive monitoring of radio collared calves to try to determine the effects of predation on moose calves.

Determine the number of documented road kills in recent years through a search of Department of Public Safety records. Improve DWC's documentation of road kills and make sure the Division is promptly informed of all future road kills. If road kill rate is excessive, work with the Department of Transportation and Public Facilities and the public to reduce it.

Initiate a public information program to inform citizens of the deleterious effect poaching has on the huntable surplus of the population, and encourage the public to participate in the Fish and Wildlife Safeguard program.

Problem: Preliminary indications are that moose habitat is being lost in some areas because of plant succession.

Strategies:
Based on the results of a vegetation study and other investigations, determine the feasibility and appropriateness of various habitat management techniques to reclaim decadent habitat.

Investigate ways of implementing habitat enhancement including soliciting help from other agencies, public volunteers, etc.

In consultation with the general public, the Department of Natural Resources, and other public and private land owners and managers, select areas suitable for habitat enhancement.

Institute such measures if appropriate to help achieve moose population objectives.

Problem: Moose habitat capability is likely to be affected by other land uses in the area.

Strategies:
Work with the Department of Natural Resources to insure consideration of moose habitat in planning and laying out timber harvest and other activities in the Haines State Forest.

Work with the Division of Habitat to respond effectively to land-use issues on state and federal land, and design mitigation programs if needed.

Work with public and private landowners to maintain moose habitat and mitigate impacts of development.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M1DCVC2D

Date: 24 March 1989

Comment: Moose/Unit 1D/Chilkat Valley/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total	Total	Count time	Tot ♂ per 100 ♀	Calves per 100♀	Calves % in herd	Moose per hour
1982			34				115	51	200	4.8	30	44	26	42
1983			16				148	47	211	5.8	11	32	22	36
1984			15				135	37	187	5.2	11	27	20	36
1985			23				155	29	207	5.5	15	19	14	38
1986			33				93	13	139	3.5	36	14	14	40
1987[a]														
1988[b]								31	252	4.4			12	57

[a] No fall surveys
[b] Early winter survey, sex and age ratios unreliable.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M1DCVC5A Date: 15 Janaury, 1989

Comment: Moose/Unit 1D/Chilkat Valley/Historical Harvests

	Check Station Data Source # 1 = general bull season						Data source # 2						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1980	48	0	0	48	342	14							48	0	0	48
1981	36	2	0	38	315	11							36	2	0	38
1982	24	1	0	25	267	9							24	1	0	25
1983	62	0	0	62	354	17							62	0	0	62
1984	35	1	0	36	349	10							35	1	0	36
1985	14	0	0	14	43	33							14	0	0	14
1986[a]	0	0	0	0	0	0							0	0	0	0
1987	22	0	0	22	230	10							22	0	0	22
1988	18	0	0	18	206	9							18	0	0	18

Comments (include comments on aberrations in data collection procedures):

[a] Season closed.

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M1DCVC5E Date: 15 January 1989

Comment: Moose/Unit 1D/Chilkat Valley/Hunter Success

Data Source(s): Harvest ticket reports 1983; registration permit reports 1984-88

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days
1983	62			292			354		
1984	35	149	4.3	314	1,540	4.9	349	1,689	4.8
1985	14	43	3.1	29	109	3.8	43	152	3.5
1986	0	0	0.0	0	0	0.0	0	0	0.0
1987	22	22	1.0	208	208	1.0	230	230	1.0
1988	18	18	1.0	188	188	1.0	206	206	1.0

[a] n = 21

[b] n = 64

AGE STRUCTURE OF HARVEST
BGDIF C5g

Document No.: M1DCVC5G

Date: 24 March 1989

Comment: Moose/Unit 1D/Chilkat Valley/Age Structure

Sex: Bull

Year	Age Class																Total kill	% aged	Mean age
	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5			
1983	1	3	7	10	6	0	1	2	0	1	0	0	0	0	0	0	62	50	3.8
1984	2	15	12	2	2	1	0	0	0	0	0	0	0	0	0	0	36	94	2.3
1985	0	7	4	1	0	1	0	0	0	0	0	0	0	0	0	0	14	93	2.3
1986[a]																			
1987	0	3	6	7	3	1	0	0	0	0	0	0	0	0	0	0	22	91	3.2
1988	0	6	5	3	1	1	1	0	0	0	0	0	0	0	0	0	18	94	2.9

[a] Season closed

Strategic Plan for Management of Moose on the Yaktutat Forelands, Unit 5(A)

1990-94

Introduction

This strategic plan sets the direction for the management of moose on the Yakutat Forelands by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management on the Yakutat Forelands during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Moose emigrated from Canada via the Alsek/Tatshenshini corridor onto the Yakutat Forelands during the late 1920's and early 1930's. The population increased to an estimated 2,000-2,500 by 1968, at which time bull:cow ratios were higher than 50:100 and calf:cow ratios approached 40:100. The population began to decline, however, as a result of several factors; declining range, browse overuse, several severe winters (notably 1969-70 and 1971-72), and, secondarily, wolf and brown bear predation, and hunting. Despite mild winters in 1973 and 1974, the population continued to decline and reached a low of 300 animals in 1974. The hunting season was closed for four years, from 1974 through 1977. Population size, bull:cow ratio, and calf:cow ratio all began increasing after 1974, and by fall 1977 the population estimate was 700 animals.

Hunting from 1962 until the closure in 1974 was under terms of a harvest ticket, and thus the harvest was not tightly controlled. Seasons were up to 3-1/2 months long and over 300 moose were taken in some years from all of Game Management Unit 5 including Nunatak Bench and the Malaspina Forelands. In 1978 and 1979, hunts were by registration permit with quotas of 25 bulls. In 1980 and 1981, open (i.e. harvest ticket) hunts were held but limited to 4-day seasons. From 1982 through 1986, with the exception of 1985, registration permit hunts were held with seasons one month long and quotas of 50 bulls. In 1985, because of changes in the statewide subsistence law, a subsistence hunt with limited participation was established for the Yakutat Forelands. The Board of Game has determined that only Yakutat residents have subsistence uses of moose on the Yakutat Forelands. In 1987 and 1988, registration hunts with a 50-bull quota were held with the first week of a four-week season for Yakutat residents only. The area west of the Dangerous River was subject to closure if 25 bulls were taken from that area.

In 1987, 86 Yakutat Forelands moose hunters responded to an ADF&G questionnaire on moose management planning. Of those, 88% hunted moose the previous year (1986) and 27% killed a moose. That is the same success rate as all Yakutat Forelands moose hunters had in 1986. A large majority (79%) of the respondents went moose hunting at least once every year. About 24% had not yet killed a moose, and 64% said they kill a moose at least as often as once every three years. Respondents spent an average of 5 days in the field in 1986, almost two days longer than the average for all Yakutat Forelands moose hunters that year. On average, they traveled 160 miles from their homes to where they hunt and spent almost 4 hours en route.

More than half (56%) thought that a desirable moose hunting success rate would be one moose per year; but only 23% said they were that successful. Seventy-two percent felt the current hunting regulations gave them a reasonable chance of killing a moose. Two thirds of those who said they did

not have a reasonable chance of success complained either that the season was too short, or that too many hunters were in the field.

If further regulation of the Yakutat hunt became necessary, 57% of respondents favored retaining the current regulation of registration hunt with a harvest quota. Others (13%), favored limiting hunter participation with a drawing permit hunt, and another 13% favored limiting hunting to every other year. A large majority (81%) of respondents wanted to keep open the option of having a cow season if it were biologically sound; and 44% saw predation as a significant factor limiting the moose population.

About half (45%) of the respondents said they would not go elsewhere to hunt if the chance of bagging a moose on the forelands became unacceptably low.

For most respondents (63%), certain types of access are not essential and they use whatever is available. But 15% said they need a cabin to hunt an area, 11% said a road was necessary, and another 11% need an airstrip handy. Thirty-eight percent believed there should be some restriction on the use of 3-wheelers and other ATV's for moose hunting. Six percent wanted some restrictions on the use of aircraft.

Physiographic Features and Habitat Description

The Yakutat Forelands in Game Management Unit 5(A) extend from Cape Fairweather in the east to Disenchantment Bay and Hubbard Glacier in the west, covering over 2,700 square miles. The area occupied by Yakutat Forelands moose corresponds to ADF&G wildlife analysis areas 2102 and 4503 (Fig. 12). An estimated 450-600 square miles is moose habitat, including both meadows and forested habitats. The area is frequently subject to winters with heavy snow.

Winter ranges were overbrowsed by the late 1960's but recovered considerably in subsequent years as a result of the moose population decline. Some areas of browse, especially in critical winter range near the coast, showed heavy use in the mid 1980's. A more significant condition is thought to be the decadence of many willow and cottonwood stands because of plant succession.

In 1986, the advancing Hubbard Glacier temporarily closed Russell/Nunatak Fjord to the north and west of the forelands, inundating the immediate shoreline. The ice dam burst a few weeks later allowing water levels to recede. Although the glacier has remained stable since then, glaciologists predict it will likely advance again in the near future. This reclosure of the fjord will, it is thought, be more permanent and the subsequent rising of "Russell Lake" by 39 meters would cause it to spill over into the Situk River watershed to the south inundating areas currently used by Yakutat Forelands moose.

The flooding of the Situk watershed would change the riparian habitats along the system, and would likely rejuvenate browse species found within the floodplain. The overall effect on moose is not known but may be beneficial.

Clearcut logging, which is anticipated to increase across the forelands in the 1990's, may encourage the growth of young browse plants in selected areas; however, there are indications that the soil types of the Yakutat Forelands may not provide for the same degree of plant diversity in clearcuts as in other areas of southeast Alaska and so the value of young clearcuts for moose forage may be diminished on the forelands. Also, the potential for the growth of moose forage plants and the use of young clearcuts by moose depend upon proper post-logging clean-up, allowing both sunlight access to disturbed soil and moose access to new forage plants. Stands of old-growth are important for escape cover, snow interception, migratory corridors, and calving locations. Logging may reduce the amount of old growth to a level below what is needed by the moose population.

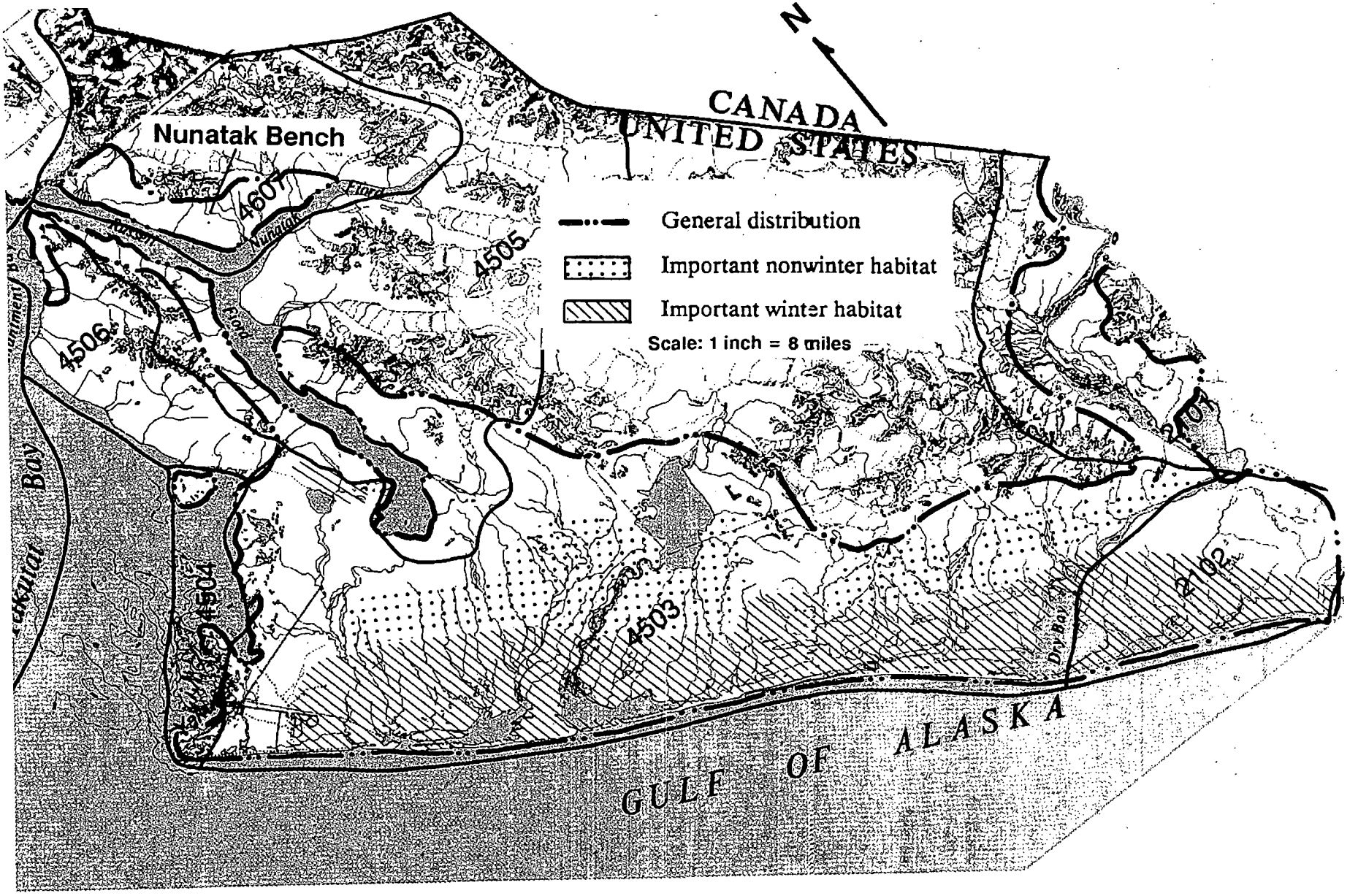

Figure 12. Moose distribution and important habitat on the Yakutat Forelands and Nunatak Bench, Unit 5A.

Plant community succession will probably move more areas to climax condition, which is primarily coniferous spruce forest on the Yakutat Forelands. Optimal mixes of deciduous and coniferous species for moose habitat are not completely understood at this time.

Although no data have been collected on range condition or habitat capability, subjective evaluation of winter browse suggests moose numbers on the Yakutat Forelands are at or approaching current habitat capability.

Population Status

Some evidence indicates the moose population on the Yakutat Forelands may still be increasing. The results of a mark/recapture study in the area in 1977 indicated that the number of animals seen in aerial surveys is probably no more than half of those present in the area surveyed. The most recent aerial survey of Yakutat Forelands moose was done in December 1988. Survey conditions were only fair and the portion of the range east of the Alsek River could not be surveyed at all because of weather conditions. A total of 515 moose were seen. The count was the highest since the late 1960's pre-crash level. Sex and age ratios indicated a well-balanced, healthy population. The bull:cow ratio was 27:100 and the calf:cow ratio was 25:100. Calves comprised 17% of those animals seen. In addition, 77% of the 1988 season kill was 1-1/2 and 2-1/2 year old bulls indicating good survival rates and good numbers of young animals in the population.

Based on this most recent survey, the moose population of the Yakutat Forelands is estimated to be 800-850 animals. If indications of declining habitat capability are accurate, moose numbers are projected to level off at this figure over the long term. Management strategy should be developed to ensure that the population does not exceed habitat capability.

Objectives (These are specific targets which can be used to measure the success of moose management on the Yakutat Forelands.)

	Current 1988	Objective 1994
Post-hunt moose numbers	835	850
Annual hunter kill	47	70
Post-hunt bull:cow ratio	27:100	20:100
Number of hunters	153	250
Hunter-days of effort	375	1,025
Hunter success	31%	28%

Discussion: Current population numbers are a best estimate based on an analysis of annual aerial survey data, habitat condition, and harvest statistics. Current moose numbers are assumed to be slightly below the capability of the habitat, and habitat capability should remain relatively constant during the next 5 years. The objective for annual hunter kill is 20 more than the current quota. The annual hunter kill objective reflects the estimated sustainable level given the population objectives and recent calf recruitment levels. The objectives for hunter participation (number of hunters and hunter days) would provide for a hunter success rate slightly lower than that of 1988 and an average of 4.1 days afield per hunter. The hunter participation objectives represent an increase over current levels, but an increase in the number of hunters and hunter days can be accommodated while still meeting subsistence needs.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: There are no recent quantitative data on the capability and condition of moose habitat on the Yakutat Forelands.

Strategy:
Work with the USDA Forest Service on ways to evaluate moose habitat. Establishing vegetation transects in key moose wintering areas, and the use of vegetation mapping should be considered.

Problem: Moose habitat is thought to be declining because of plant succession and conflicting land uses.

Strategies:
Work with advisory committees and other sectors of the public to devise regulations and harvest strategies to ensure the moose population does not exceed habitat capability. This includes the option of holding biologically sound cow seasons.

Determine the feasibility of various habitat management techniques to reclaim decadent moose habitat and institute such measures, if appropriate and cost effective, to maintain moose population objectives.

Work with the USDA Forest Service, the Alaska Department of Natural Resources, the National Park Service, and other public agencies as well as private landowners to insure adequate consideration for moose habitat in long range plans.

Work with the ADFG/Division of Habitat, the Alaska Department of Natural Resources, and the USDA Forest Service to develop effective programs of environmental monitoring.

Work with public and private landowners and interests to develop and/or implement methods for mitigation or compensation in cases where moose habitat has been unacceptably diminished.

Problem: Some hunters believe predation may be significantly limiting the growth of the moose population on the Yakutat Forelands. Although calf survival rates are fair and other factors such as habitat capability may currently have a greater effect on the rate of population growth, the number of predators is likely to increase along with the moose population. The effects of predation may increase as well.

Strategy:
When personnel and budget constraints permit, determine the extent and effects of predation on the moose population as a whole.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M5AYFC2D Date: 19 January 1989

Comment: Moose/Unit 5A/Yakutat Forelands/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100♀	Calves per 100♀	Calves % in herd	Moose per hour
1974			21				81	29	131	5.2	26	36	22	25
1975			43				183	32	288	10.9	23	17	11	26
1977			82				198	44	334	11.1	41	22	13	30
1978			50				134	32	229	7.4	37	24	14	31
1981			93				243	65	402	15.7	38	27	16	26
1984			90				229	60	379	12.1	39	26	16	31
1985			50				168	41	259	11.0	30	24	16	24
1986	20	14	34	116	43	7	166	60	260	11.3	20	36	23	23
1987[a]				175	46	18		83	322	11.2			26	29
1988[a]	52	39	91	269	58	12	339	85	515	10.3	27	25	17	50

[a] Early winter survey, sex and age ratios unreliable.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M5AYFC5A Date: 18 January, 1989

Comment: Moose/Unit 5A/Yakutat Forelands/Historical Harvest

	Data source # 1 = Registration permits						Data source # 2 = Harvest Ticket Reports						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1974-77[a]																
1978	20	0	0	28	123	23							28	0	0	28
1979	20	0	0	20	167	12							20	0	0	20
1980							28	0	0	28	175	16	28	0	0	28
1981							27	0	0	27	180	15	27	0	0	27
1982	49	0	0	49	199	25							49	0	0	49
1983	47	0	0	47	235	20							47	0	0	47
1984	49	0	0	49	230	21							49	0	0	49
1985	46	0	0	46	129	36							46	0	0	46
1986	54	0	0	54	198	27							54	0	0	54
1987	38	0	0	38	199	19							38	0	0	38
1988	47	0	0	47	153	31							47	0	0	47

Comments (include comments on aberrations in data collection procedures):

[a] Season closed.

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M5AYFC5E

Date: 15 January 1989

Comment: Moose/Unit 5A/Yakutat Forelands/Hunter Success

Data Source(s): Registration permit reports

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1982	49	137	2.8	150	697	4.6	199	834	4.2
1983	47	87	1.9	188	967	5.1	235	1054	4.5
1984	49	132	3.7	181	972	5.4	230	1104	4.8
1985	44	128	2.9	84	457	5.4	128	585	4.6
1986	54	131	2.4	143	522	3.6	197	653	3.3
1987	38	109	2.9	161	954	5.9	199	1063	5.3
1988	47	95	2.0	106	280	2.6	153	375	2.5

AGE STRUCTURE OF HARVEST
BGDIF C5g

Document No.: M5AYFC5G

Date: 19 January 1989

Comment: Moose/Unit 5A/Yakutat Forelands/Age Structure

Sex: Male

Year	Age Class																Total kill	% aged	Mean age
	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5			
1981	0	0	4	6	5	4	1	1	1	1	0	0	1	0	0	0	27	89	6.0
1982	0	2	10	13	8	5	6	1	2	0	0	0	0	0	0	0	49	96	4.3
1983	0	0	9	8	10	6	4	2	2	0	1	0	0	0	1	0	47	91	4.9
1984	2	13	11	6	7	3	2	3	0	0	0	0	0	0	0	0	49	96	3.2
1985	1	15	10	10	2	1	3	1	0	1	1	1	0	0	0	0	46	100	3.4
1986	3	10	13	8	4	9	3	1	0	2	0	0	0	0	0	0	54	98	3.6
1987	1	14	7	3	7	2	1	0	1	0	0	0	0	0	0	0	38	95	3.0
1988	0	17	16	5	2	3	1	0	1	0	1	0	0	0	0	0	47	98	2.9

Strategic Plan for Management of Moose on the Nunatak Bench, Unit 5(A)

1990-94

Introduction

This strategic plan sets the direction for the management of moose on the Nunatak Bench by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management on the Nunatak Bench during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Moose emigrated from Canada via the Alsek/Tatshenshini corridor onto the Yakutat Forelands during the late 1920's and early 1930's. Available information suggests that moose probably reached Nunatak Bench sometime in the late 1940's to early 1950's. Moose population levels probably reached high numbers coincident with the Yakutat Forelands herd in the late 1960's. Peak moose numbers on the bench perhaps approached 100.

Prior to 1974, the hunting season for the Nunatak Bench was the same as that for the Yakutat Forelands herd. Hunters, however, apparently did not hunt the bench. The first documented kill was one moose in 1976. The Nunatak Bench remained open to hunters during the four-year closure of the Yakutat Forelands. A bulls-only, one month season was in effect. In 1978 and 1979, Nunatak was again managed with the rest of unit 5(A). Beginning in 1980, the bench had its own late season, Nov. 15-Dec. 15 with a quota of 10 bulls. From 1982 through 1985, the season was lengthened to 3 months, Nov. 15-Feb. 15, with a quota of 10 moose of either sex. In 1986, the season was closed after 3 weeks by emergency order when aerial surveys found the moose population significantly reduced compared to previous years. The low population was attributed to the emigration of moose from the area following the flooding caused by the advance of Hubbard Glacier earlier that year (see below). The season remained closed in 1987 and 1988.

The Board of Game has determined that only Yakutat residents have subsistence uses of moose on the Nunatak Bench.

Physiographic Features and Habitat Description

Nunatak Bench is bordered by Hubbard Glacier to the west, Art Lewis Glacier to the east, and Nunatak/Russell Fjord to the south. It lies within the Russel Fjord Wilderness Area of the Tongass National Forest. The area is estimated to cover over 200 square miles. The area occupied by moose on the Nunatak Bench is included in ADF&G wildlife analysis area 4607 (Fig. 12). Only a small portion of the area is usable moose habitat. The majority consists of glacial ice and rock. The prime winter browse area is the outwash plain of the Butler Glacier. No study has been conducted on the condition of the moose range on Nunatak Bench, and no estimate of the habitat capability of the area exists.

The advancing Hubbard Glacier temporarily closed Russell/Nunatak Fjord in 1986 inundating the immediate shoreline. The ice dam burst a few weeks later allowing water levels to recede. Although

the glacier has remained stable since then, glaciologists predict it will likely advance again in the near future. This reclosure of the fjord will, it is thought, be more permanent and the subsequent rising of "Russell Lake" by 39 meters is expected to inundate nearly all high quality moose habitat on the bench.

Population Status

In 1975, the first documented population survey enumerated 40 moose of undetermined sex and age. In the early 1980's, surveys found between 22 and 27 moose, suggesting a population of about 50 animals. The most recent survey was conducted in December of 1986 following the flooding of portions of the area caused by the advance of Hubbard Glacier. Only 10 moose were seen. The low population was attributed to the emigration of moose from the area. No surveys have been conducted since and it is not known if moose have repopulated the area in their previous numbers. The future of moose on the Nunatak Bench is dependent on how the habitat is affected by the actions of the Hubbard Glacier. If the Hubbard advances again and recloses the fjord, moose habitat on the Nunatak Bench will be greatly reduced and moose will likely persist only in reduced numbers.

Objectives (These are specific targets which can be used to measure the success of moose management on Nunatak Bench.)

	Current 1988	Objective 1994
Post-hunt moose numbers	N.A.	50
Annual hunter kill	0	5
Number of hunters	0	10
Hunter-days of effort	0	60
Hunter success	0	50%

Discussion: The moose population and hunter participation objectives represent levels that were obtained before flooding of the area in 1986. It has been assumed that those levels were desirable.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: The recovery of the moose population to its pre-1986 levels is dependent on sufficient habitat capability in the area. No data on habitat capability exist. Monitoring of the population and assessment of the habitat are essential to making management decisions.

Strategies:

Work with the USDA Forest Service to estimate moose habitat capability on the Nunatak Bench and study the effects of the 1986 flooding on moose habitat.

Conduct periodic aerial surveys of the moose population.

Consider opening season when about 20 moose are seen in aerial surveys.

MOOSE SEX AND AGE COMPOSITION AND RATIOS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M5ANBC2D Date: 19 January, 1989

Comment: Moose/Unit 5A/Nunatak Bench/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100 ♀	Calves per 100 ♀	Calves % in herd	Moose per hour
1982	4	4	8	14	0	0	14	0	22	0.6	57	0	0	37
1983			5	2	6	2	10	10	25	0.8	50	100	40	31
1984	3	7	10	10	3	0	13	4	27	0.5	77	31	15	54
1986	5	0	5	3	1	0	4	1	10	0.5	125	25	10	20
1987[a]														
1988[a]														

[a] No survey.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M5ANBC5A Date: 15 January, 1989

Comment: Moose/Unit 5A/Nunatak Bench/Historical Harvest

	Data source # 1 = Registration permits						Data source # 2 =						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1980	1	0	0	1	7	14							1	0	0	1
1981	4	0	0	4	12	33							4	0	0	4
1982	3	6	0	9	14	64							3	6	0	9
1983	2	0	0	2	9	22							2	0	0	2
1984	3	3	0	6	14	43							3	3	0	6
1985	2	0	0	2	3	67							2	0	0	2
1986[a]	0	0	0	0	0	0							0	0	0	0
1987[a]	0	0	0	0	0	0							0	0	0	0
1988[a]	0	0	0	0	0	0							0	0	0	0

Comments (include comments on aberrations in data collection procedures):
[a] Season closed.

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M5ANBC5E

Date: 15 January 1989

Comment: Moose/Unit 5A/Nunatak Bench/Hunter Success

Data Source(s): Registration permit reports

Year	Successful Hunters			Unsuccessful Hunters			Total Hunters		
	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1980	1	5	5.0	6	35	5.8	7	40	5.7
1981	4	13	3.0	8	28	3.5	12	41	3.4
1982	9	95	10.6	5	13	2.6	14	108	7.7
1983	2	21	10.5	7	84	12.0	9	105	11.7
1984	6	27	4.5	8	24	3.0	14	51	3.6
1985	2	44	22.0	1	10	10.0	3	32	10.7
1986[a]	0	0	0	0	0	0	0	0	0
1987[a]	0	0	0	0	0	0	0	0	0
1988[a]	0	0	0	0	0	0	0	0	0

[a] Season closed.

Strategic Plan for the Management of Moose on the Malaspina Forelands
Unit 5(B)

1990-1994

Introduction

This strategic plan sets the direction for the management of moose on the Malaspina Forelands by the Alaska Department of Fish and Game/Division of Wildlife Conservation (ADFG/DWC). It is the product of participation by the general public and the ADFG/DWC.

This plan presents the expressed desires of the participants as to what objectives ADFG/DWC should pursue in moose management on the Malaspina Forelands during the next 5 years. All desired objectives expressed by the public that were consistent with ADFG/DWC's statutory mission were included in this plan. Year-to-year operational plans will be developed to establish specific projects designed to meet the objectives of this plan. The specifics of the operational plans will be dependent upon budget constraints and management priorities. Progress toward meeting objectives will be reviewed annually and this plan will be revised no less than once every 5 years.

Background

Population Origins, Human Use, and Management History

Available information suggests that moose reached the Malaspina Forelands in the late 1950's from the Yakutat Forelands after moving there from Canada two decades earlier. Moose numbers on the Malaspina Forelands probably reached their peak at the same time that they peaked on the Yakutat Forelands, during the late 1960's. The population also crashed about the same time.

Until 1973, seasons on the Malaspina Forelands were the same as on the Yakutat Forelands and were open as long as 3 months. During the years 1974 through 1977 when the Yakutat Forelands season was closed, the season in Unit 5(B) was open for 3 to 4 weeks. For three years beginning in 1978, the 5(B) season was one month long. In 1981, it was extended to two months, and in 1987 to two-and-a-half months (Sept. 1-Nov. 15). Either sex hunts were held until 1978; after that, hunts were limited to bulls only. The hunt became a registration hunt in 1978 with a quota of 25 bulls.

Prior to the early 1970's, reported kill in this area was combined with that of the Yakutat Forelands. Since 1971, the Malaspina kill has been reported separately. During the period 1972 through 1988, the annual hunter take ranged from 8 to 96. The average annual number of moose killed since 1980 is about 14. From 1980 through 1985, an average of 62 people a year hunted Malaspina Forelands moose. Since 1986 hunter numbers have dropped off sharply to an average of 36. Hunter success has remained about the same, however. From 1980 through 1987 the hunter success rate averaged 27%. The recent decline in the number of hunters in Unit 5(B) could be tied to a subsistence priority for the Yakutat Forelands hunt established in 1987. Local hunters may be satisfying their demand for moose on the more easily accessible Yakutat Forelands.

The difficulty and expense of access, poorer habitat, and lower density of moose compared to the neighboring Yakutat Forelands, and the exclusion of non-local hunters in some areas may all be factors keeping the harvest of Malaspina Forelands moose lower than what is expected given the population estimate.

The Board of Game has determined that only Yakutat residents have subsistence uses of moose on the Malaspina Forelands.

Physiographic Features and Habitat Description

Game Management Unit 5(B) extends from Disenchantment Bay and Hubbard Glacier in the east to the west side of the Guyot Hills in Icy Bay in the west; a total area of 2,500 square miles. Most of the

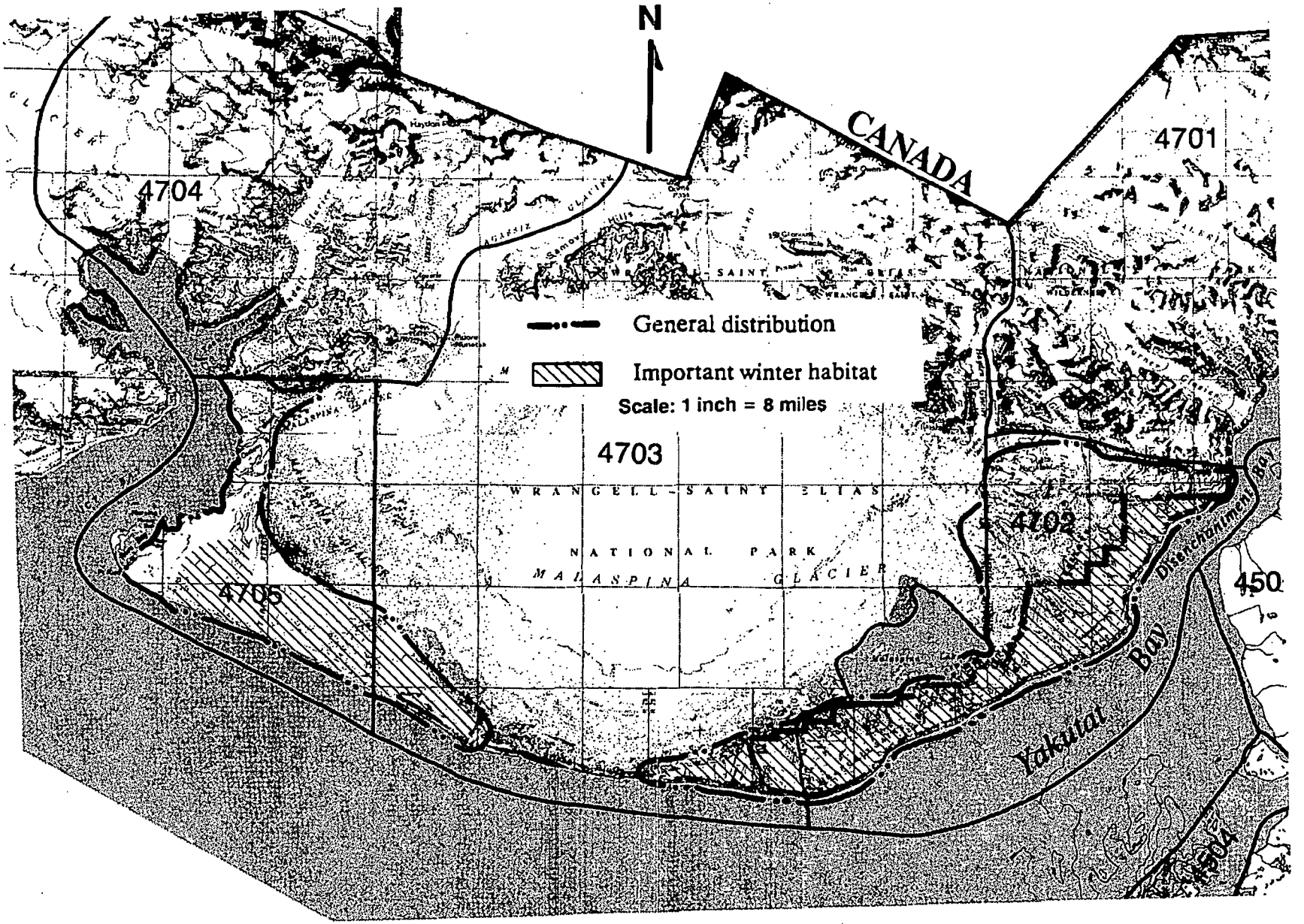

Figure 13. Moose distribution and important habitat on the Malaspina Forelands, Unit 5B.

area is covered by glaciers, notably the Malaspina and including the Hubbard, Lucia, Tyndall, and Yahtse. Only about 300 square miles is moose habitat, including both meadows and forested habitats, mostly on the Malaspina Forelands which are the outwash plains of the Malaspina Glacier. The area is frequently subject to winters of heavy snowfall. The area occupied by moose in Unit 5(B) includes parts of ADF&G wildlife analysis areas 4702, 4703, and 4705 (Fig. 13).

All of Game Management Unit 5(B) is either in Wrangell-St. Elias National Park and Preserve or is owned by the Chugach Native Regional Corporation. Most moose habitat is within national park preserve boundaries where regulations allow any hunter to hunt. Most of the best moose habitat on the western portion of the forelands near Pt. Riou is on land owned by the Chugach Corporation. Hunting has been permitted there and access has not been an issue to date.

As on the Yakutat Forelands, moose range on the Malaspina Forelands was probably overbrowsed when the moose population peaked in the late 1960's. During the subsequent populaton decline the range partially recovered. No detailed study of the extent or condition of moose range in Unit 5(B) has been conducted. General observations indicate that the moose habitat is in post-glacial climax vegetation for the most part and probably declining as the vegetation progresses to a stage less valuable to moose.

Population Status

In recent years, only a part of Unit 5(B) has been surveyed for moose. The most recent survey, in February 1988, was of the eastern portion of the forelands. About 70 moose were seen; 20% were calves. The last survey of the complete area was in 1982 when 145 animals were seen. At that time the portion of calves in the population was only 11%. The evidence suggests that the current population of the Malaspina Forelands is stable and numbers about 250 moose.

Objectives (These are specific targets which can be used to measure success in moose management on the Malaspina Forelands.)

	Current 1988	Objective 1994
Post-hunt moose numbers	250	250
Annual hunter kill	11	25
Post-hunt bull:cow ratio	N.A.	20:100
Number of hunters	40	50
Hunter-days of effort	159	200
Hunter success	28%	50%

Discussion: Current moose numbers are based on a best estimate. Moose numbers are assumed to be near the capability of the habitat, and habitat capability should remain relatively constant during the next 5 years. The annual kill objective is based on an assumed sustainable level over the long term. Because of the high cost and difficulties of access to the area, a realistic objective for number of hunters is only slightly higher than current numbers. Continued low hunter numbers and a kill objective higher than current harvest will result in a hunter success rate of 50%. The objective for hunter days of effort is based on providing an average of 4 days afield per hunter.

Problems and Strategies

The following have been identified as current or potential problems in the way of achieving the proposed management objectives. Each is accompanied by suggested strategies to deal with it.

Problem: Moose habitat may be declining as a result of plant succession.

Strategies:
Using vegetation mapping or other techniques, estimate the long-term habitat capability of the moose range on the Malaspina Forelands to make sure that population objectives are realistic.

Work with the U.S. Park Service on habitat evaluation if possible.

Work with private landowners to maintain moose habitat in a productive condition.

Problem: All moose habitat lies within National Park or Preserve boundaries or on private land. There is a possibility that future park policies and land use decisions may limit access for hunting or that other resource development may reduce habitat on private land.

Strategies:
Work with National Park Service to maintain hunter access to Wrangell-St. Elias National Park and Preserve.

Work with private landowners to maintain hunter access and monitor land use practices to determine extent of any impacts on moose habitat and population status.

MOOSE SEX AND AGE COMPOSITION AND RATICS, FALL COUNTS
BGDIF C2d
Historical Totals of All Count Areas Surveyed

Document No.: M5BMFC2D

Date: 19 January 1989

Comment: Moose/Unit 5B/Malaspina Forelands/Sex and Age

Year	Large ♂	Ylg ♂	Total ♂	♀ w/0	♀ w/1	♀ w/2	Total ♀	Total calves	Total moose	Count time (hrs)	Tot ♂ per 100♀	Calves per 100♀	Calves % in herd	Moose per hour
1981[a]	16	5	21	65	21	2	88	25	134	3.1	24	28	19	43
1982	20	6	26	88	14	1	103	16	145	8.4	25	16	11	17
1983								21	66	1.8			32	37
1987[b]								14	69	2.8			20	25

[a] Bancas Point to Sitkagi Bluffs only.
[b] Early winter survey, sex and age ratios unreliable.

Historical Harvests, Number of Hunters, Percent Success
BGDIF C5a

Document No.: M5BMFC5A

Date: 24 March 1989

Comment: Moose/Unit 5B/Malaspina Forelands/Historical Harvest

	Data source # 1 = Registration permits						Data source # 2 =						Total Harvest			
Year	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	No. ♂	No. ♀	No. unk.	Total kill	No. hunters	% success	♂	♀	??	All
1980	18	0	0	18	66	27							18	0	0	18
1981	26	1	0	27	86	32							26	1	0	27
1982	18	0	0	18	53	34							18	0	0	18
1983	11	0	0	11	55	20							11	0	0	11
1984	15	0	0	15	50	30							15	0	0	15
1985	13	0	0	13	62	21							13	0	0	13
1986	9	0	0	9	34	26							9	0	0	9
1987	8	0	0	8	34	24							8	0	0	8
1988	11	0	0	11	40	28							11	0	0	11

HUNTER SUCCESS BY EFFORT
BGDIF C5e

Document No.: M5BMFC5E

Date: 24 March 1989

Comment: Moose/Unit 5B/Malaspina Forelands/Hunter Success

Data Source(s): Registration permit reports

	Successful Hunters			Unsuccessful Hunters			Total Hunters		
Year	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg. # days	No. hunters	Total # days	Avg.# days
1980	15	49	3.3	66	273	4.1	81	322	4.0
1981	27	90	3.3	59	228	3.9	86	318	3.7
1982	18	54	3.0	35	171	4.6	53	215	4.1
1983	11	27	2.4	44	178	4.0	55	205	3.7
1984	15	40	2.7	40	191	4.8	55	231	4.2
1985	13	34	2.6	49	226	4.6	62	260	4.2
1986	9	40	4.4	27	139	5.1	36	179	5.0
1987	8	56	2.8	16	83	5.2	24	139	5.8
1988	11	39	3.5	29	120	4.1	40	159	4.0

Appendix

Moose Management Policies

from

ADF&G Species Management Policies (1980)

MOOSE MANAGEMENT POLICIES

Species Background

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

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

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

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

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

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

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

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

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

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

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

Species and Habitat Management Policies

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

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

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

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

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

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

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

Species Use Management Policies

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

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

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

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

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

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

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

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

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

Problems

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

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

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

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

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

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