United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RF(S)/8622r

TAKE PRIDE IN AMERICA

FINDING OF NO SIGNIFICANT IMPACT

Environmental Assessment for the Kenai National Wildlife Refuge Furbearer Management Plan

Based on a review and evaluation and the information contained in the supporting references listed below, I have determined that the implementation of Alternative B (modified) of the Environmental Assessment for the Kenai National Wildlife Refuge Furbearer Management Plan is not a major Federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969. The environmental assessment (Reference 1) supports the conclusion that no impact exceeds a threshold of significance. This environmental assessment is based on the Kenai Comprehensive Conservation Plan, Environmental Impact Statement, Wilderness Review (Reference 2) and the Kenai National Wildlife Refuge Furbearer Management Plan (Reference 4) which discusses the overall impacts of various management alternatives on refuge resources. Accordingly, the preparation of an environmental impact statement on the proposed action is not required.

Supporting References

1. Environmental Assessment for the Kenai National Wildlife Refuge Furbearer Management Plan (July 1988)
2. Kenai National Wildlife Refuge Comprehensive Conservation Plan, Environmental Impact Statement, and Wilderness Review (January 1985)
3. Record of Decision, Kenai National Wildlife Refuge Comprehensive Conservation Plan, Environmental Impact Statement, and Wilderness Review (June 1985)
4. Kenai National Wildlife Refuge Furbearer Management Plan

10/21/88
Date

Walter D Steudtz
Regional Director

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RF(S)/8622r

TAKE PRIDE IN AMERICA

ENVIRONMENTAL ACTION MEMORANDUM

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and have determined that the action of the Kenai National Wildlife Refuge Furbearer Management Plan Environmental Assessment:

____ - is a categorical exclusion as provided by 516 DM 6 Appendix 1. No further documentation will be made.

XX - is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact.

____ - is found to have special environmental conditions as described in the attached Environmental Assessment. The attached Finding of No Significant Impact will not be final nor any actions taken pending a 30-day period for public review (40 CFR 1501.4 (e)(2).

____ - is found to have significant effects, and therefore a "Notice of Intent" will be published in the Federal Register to prepare an Environmental Impact Statement before the project is considered further.

____ - is denied because of environmental damage, Service policy, or mandate.

____ - is an emergency situation. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to environmental review.

Walter O. Stieglitz — Regional Director — 10/20/88 Date

(1) Paul R. Schmidt — Initiator — 6/3/88 Date

(2) John P. Rogers — Assistant Regional Director — 9-6-88 Date

(3) Ronald L. Garrett — Regional Environmental Coordinator — 9-19-88 Date

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RF(S)/8760r

TAKE PRIDE IN AMERICA

Dear Reader:

Enclosed is a final environmental assessment for the Kenai National Wildlife Refuge Furbearer Management Plan.

The Kenai Refuge Furbearer Management Plan is an outgrowth of the Final Kenai National Wildlife Refuge (Refuge) Comprehensive Conservation Plan. That plan called for development of a more detailed management plan to address specific public comments regarding furbearer management changes on the refuge. The Furbearer Management Plan is intended to provide specific guidance for the management of furbearers and their uses, including trapping.

In August 1987, the U.S. Fish and Wildlife Service (Service) prepared a draft Furbearer Management Plan for the Kenai Refuge guided by the Kenai Refuge Comprehensive Conservation Plan and Service policy. Public comments on the draft management plan revealed major differences among various interest groups about how furbearers should be managed on the refuge. Because of the importance of furbearers as a wildlife resource and the local and national interest in their management and use, the Service determined under the provisions of the National Environmental Policy Act that an environmental assessment should be prepared.

In an attempt to resolve differences among interest groups on the draft plan, and, at the same time, ensure that the wildlife resource would be properly managed within Service authorities, the Service sponsored a "charrette." This is a problem-solving process in which representatives of the essential publics participate in a highly intense effort to reach agreement on an overall plan. Proceedings of the charrette were recorded and a report was made available to the public. The charrette produced recommendations for me to consider. These recommendations, along with public comments received on the draft plan, were used to develop the alternatives considered in the draft environmental assessment.

The draft environmental assessment was distributed to over 700 individuals and organizations on January 8, 1988. Comments were accepted until February 26, 1988. Over 1,100 letters of comment were received. In preparing a final environmental assessment, comments received on the draft assessment were considered and modifications were made where appropriate.

In accordance with an interagency Memorandum of Understanding between the Service and the Alaska Department of Fish and Game, the Service, in March 1988, made proposals to the Alaska Board of Game for their consideration in

developing regulations for Kenai furbearers. The Board of Game adopted regulations that were generally consistent with the recommendations of the charrette. These differ somewhat from those recommended by the Service and reflected in the preferred alternative shown in the final environmental assessment. For example, the Board of Game chose to have a trapping season of November 10 to February 28 for wolves, wolverines, coyotes, and foxes, whereas the Service recommended a season of November 10 to February 15.

Given the relatively small differences in season dates between the Service and Board of Game and the fact that a harvest quota system will be used to manage wolves (therefore rendering season dates less important), the Service believes that the Board of Game regulations should be implemented and evaluated before making a determination about their effectiveness. The Service will evaluate the effectiveness of the regulations passed by the Board of Game in meeting the objectives of the Kenai Refuge Comprehensive Conservation Plan and the Furbearer Management Plan. Should the regulations not adequately meet the objectives, the Service will reconsider the more restrictive measures for the Kenai Refuge as expressed in the environmental assessment preferred action and will request the Board of Game to address this matter again.

Those aspects of furbearer management that were not addressed by the Board of Game, yet are a part of the Furbearer Management Plan environmental assessment, will be implemented as stated in the preferred action. One exception will be the modification of the three-day trap check requirement for the accessible areas of the refuge to a four-day trap check requirement beginning with the 1988-89 season. A second exception will affect the trapper orientation program which will not begin until the 1989-90 season due to development time required.

Based on the above considerations, I have issued a finding of no significant impact.

Sincerely,

Walter D. Sturgulewski

Regional Director

Enclosures

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RF(S)/9037r

TAKE PRIDE IN AMERICA

MEMORANDUM

DEC 22 1988

TO: All Refuge Managers

FROM: Deputy Assistant Regional Director, Refuges and Wildlife

Paul R. Schmidt

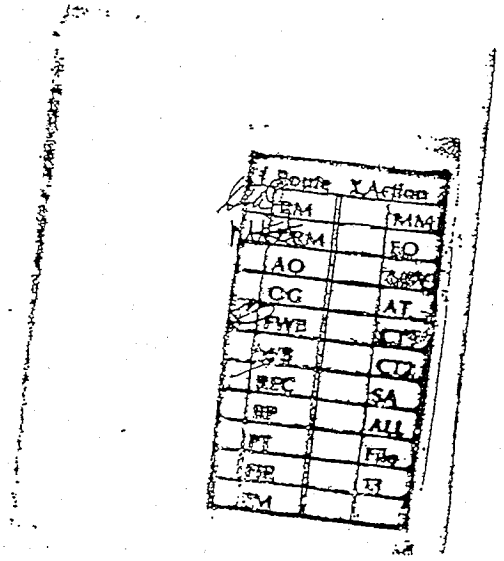
SUBJECT: Step-down Management Plans

Attached, for your information, is a copy of the final furbearer management plan/environmental assessment for the Kenai National Wildlife Refuge. This is the first "step-down" management plan to be completed in Region 7. Although we do not expect that all step-down management plans will be this long, complex, or controversial (over 1,100 letters were received on the draft environmental assessment), the Kenai plan does serve as a good example for the preparation of other step-down management plans.

We will forward other examples of step-down management plans, as they become available.

Attachment

DEPARTMENT OF THE INTERIOR
RECEIVED
DEC 27 1988
KENAI NWR
SOLDOTNA ALASKA
FISH AND WILDLIFE SERVICE



FINAL ENVIRONMENTAL ASSESSMENT FOR THE KENAI NATIONAL WILDLIFE REFUGE FURBEARER MANAGEMENT PLAN

Region 7
U.S. Fish and Wildlife Service
Kenai National Wildlife Refuge
P.O. Box 2139
Soldotna, Alaska 99669-2139

August, 1988

Prepared by
Kenai National Wildlife Refuge
U.S. Fish and Wildlife Service
Soldotna, Alaska

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PURPOSE AND NEED FOR ACTION

The Kenai National Wildlife Refuge was redesignated on December 2, 1980, by the Alaska National Interest Lands Conservation Act. The statute established five primary purposes for the refuge: 1) to conserve fish and wildlife populations and their habitats in their natural diversity including but not limited to, moose, bears, mountain goats, Dall sheep, wolves and other furbearers, salmonids and other fish, waterfowl and other migratory and nonmigratory birds; 2) fulfill international treaty obligations; 3) ensure water quality and quantity; 4) provide opportunities for scientific research, interpretation, environmental education and land management training; and 5) provide compatible opportunities for fish and wildlife-oriented recreation.

In 1986, the U.S. Fish and Wildlife Service (Service) approved the Final Kenai Refuge Comprehensive Conservation Plan. That plan directed a more detailed management plan be prepared to address specific public comment regarding furbearer management changes on the refuge. In addition, the Service's Refuge Manual (7 RM 15.8) requires that a refuge trapping plan be prepared to provide an overall description of a refuge trapping program.

The management of furbearers on the Kenai Refuge is a controversial issue. Trapping has occurred on the Kenai Refuge since before it was established as a refuge. Local residents, trappers, refuge users, conservation groups, and concerned citizens have varying, often conflicting, views on trapping in national wildlife refuges. Questions are raised regarding season lengths, humaneness of trapping, the capture of non-target species, conflicts between trappers and other refuge users, the status of some furbearer populations, and the level of harvestable surpluses, among other issues. Some trappers believe there are already too many regulations limiting their use. Many people, however, believe trapping is not an appropriate useon the refuge and should be banned. As a well-known and intensively-used national wildlife refuge, furbearer management on the Kenai Refuge has attracted national interest.

In August 1987 the Service prepared a draft furbearer management plan for the Kenai Refuge under the management constraints and direction provided by the Kenai Refuge Comprehensive Conservation Plan and Service policy. The Kenai Refuge Furbearer Management Plan is intended to provide specific guidance for the management of furbearers and their uses, including trapping. Because of the importance of furbearers as a wildlife resource and the local and national interest in their management and use, the Service determined under the provisions of the National Environmental Policy Act (NEPA) that an environmental assessment needed to be prepared.

It is the intention of the Service to prepare furbearer management plans for each refuge in Alaska in accordance with the specific guidance provided by the respective Comprehensive Conservation Plans and other pertinent Service policy. Thus each plan will address the specific resources and conditions of that refuge. Requirements of one refuge furbearer plan should not be viewed as precedent for other refuge furbearer plans.

It should be noted that the Service has modified its preferred alternative (Alternative B) for managing furbearers on the Kenai Refuge from proposals in the draft Furbearer Management Plan. The Service took this action in response to the public comments received on the draft plan, draft environmental assessment, and recommendations from the Kenai Refuge furbearer management charrette.

The following federal laws and regulations apply to trapping on Alaska national wildlife refuges:

- o The Alaska National Interest Lands Conservation Act
- o The National Wildlife Refuge System Administration Act
- o Title 43 CFR 24.3 (provides for trapping)
- o The Refuge Recreation Act
- o Title 50 CFR 31.2 (permit requirements)
- o The Refuge Revenue Sharing Act
- o Title 50 CFR 29.1 (public economic use)
- o The Fish and Wildlife Coordination Act

Summary of Comments Received Following the Review of the Draft Environmental Assessment of the Kenai Furbearer Plan and Changes Made in the Preferred Alternative

The draft Environmental Assessment for the Kenai National Wildlife Refuge Furbearer Management Plan was made available for public review on January 8, 1988. The comment period closed on February 26, 1988.

A total of 1,101 letters were received during the formal comment period. All correspondence received is on file at the Refuge Office in Soldotna. Of these written comments, one was from a member of congress, one was from a state agency, one was from a Native group, twelve were from organizations, and the remaining 1,086 were from individuals.

Written comments generally expressed a preference for a particular alternative, of those expressing such a preference, 10 favored Alternative A, all from Alaska; 9 favored Alternative B, 3 from Alaska; 4 favored Alternative C, all from Alaska; 1,069 favored Alternative D, 93 from Alaska; 9 expressed support for trapping as an appropriate activity, but did not choose an alternative. Of these, two were from Alaska. While the Service appreciates these individuals' preferences, it must be stressed that the selection of the final alternative is <u>not</u> based on how many people prefer a given alternative, or where they reside. Public comment is but one of several criteria used to evaluate alternatives and select the final preferred one because the Service is mandated to conserve furbearers on the Kenai National Wildlife Refuge.

The Service studied <u>all</u> of the comments it received in response to the draft document. A response was prepared for five general categories which received significant comment. These responses follow:

1) Large numbers of comments were received supporting Alternative D which proposed to close the Refuge to trapping. The Service, after consideration of these comments, rejected this alternative and reaffirmed Alternative B with several modifications as the final course of action. If properly conducted, trapping is recognized as an appropriate recreational activity

and management tool on wildlife refuges by the Service. The Service believes Alternative B as modified, provides the proper balance of trapping recreation, effective management of furbearer populations, promotes ethical, practical and humane trapping practices while minimizing impacts on other refuge activities.

2) Several commenters expressed the opinion that the refuge trapping program and problems associated with this activity, both real and perceived, could be reduced in part by a structured trapper orientation program. The Service agrees and has modified Alternative B to reflect this change. The Service believes trapper orientation to be a cornerstone in maintaining trapping as a viable and desirable activity on the refuge in the future. It further offers the opportunity for the Service to work with trappers and the Alaska Department of Fish and Game in a positive endeavor to improve the refuge trapping program.

3) Significant numbers of commenters addressed the interval in which traps should be checked. The majority of these commenters felt that traps should be checked every 24 hours in accessible areas of the refuge and every three days or less in the more remote areas of the refuge. Other comments expressed the opinion that particular devices such as conibear traps or drowning sets, need only have a seven-day trap check requirement. Some comments advanced the opinion that the present seven-day trap check requirement should be retained refuge-wide for the convenience of trappers and because of the impracticality of checking more often in remote areas of the refuge. After consideration of all these comments, the Service is changing the trap check requirement as proposed in Alternative B to every four days with the modification to allow a seven day trap check for those devices such as conibear traps or drowning sets over the entire refuge. The Service policy is to inspect traps as often as practical for humane reasons and to reduce adverse impacts on non-target species. Therefore in the accessable portions of the refuge [Game Management Unit 15A and 15B (West)] the Service will require that traps be checked every four days while the remainder of the refuge will require traps be checked every seven days. As access improves throughout the refuge in the future, trap check requirements will be reviewed and shortened as practicable.

4) Several commenters offered input on the Service's proposal to close the trapping season on furbearer species such as wolverine, wolf, coyote, fox, etc. on February 15 as opposed to February 28 or January 31. The proposal to close trapping on February 15 is particularly important in relation to wolverine. Historical harvest data indicated wolverine populations throughout Southcentral Alaska declined substantially since the early 1970's. Areas with rapid human development had the greatest declines. Wolverine population declines throughout Europe, Canada, Alaska, and the continental United States were believed caused by excessive human exploitation. Humans appear to be the primary predator on wolverine, accounting for nearly all the documented mortality of tagged study animals in North America. As wolverine became scarce the remaining animals were typically found in rugged mountains or other areas inaccessible to humans. Wolverine habitat is believed to be primarily dependent on the presence of ungulate carrion, rather than its inaccessibility to humans.

Wolverine population dynamics on the Kenai Peninsula are probably most similar to those in the Yukon Territory. Recent research in the Yukon recommended that if there was concern about overharvest, two options were available; a complete closure or not trapping wolverine after January 31. These data suggested, as have other studies, that females most often have young in February and March. Because of the nutritional demands of pregnancy and raising young, denning females are less wary, more active, more dependent upon carrion, and repeatedly use carcasses and trails. All these factors increase their vulnerability to trapping. High harvests of pregnant and denning females in February indicated these behavioral changes may precede the actual birth of most kits in mid-February and March.

Harvest data on the Kenai Peninsula from 1974-5 through 1986-7 indicated a nearly 50% decline in wolverine harvest while trapping effort increased about 75% Recovery of wolverine populations will depend primarily upon reducing human-caused mortality. Increasing the survival rates of breeding females will produce the greatest benefit. The chronology of Kenai Peninsula wolverine harvest indicates shortening the season from March 31 to February 28 would reduce harvest about 21%, if trapper effort does not change in response to shorter seasons. Reducing the season to February 15 or January 31 could reduce harvest 28% and 44%, respectively. A season closure would result in the most rapid occupancy of vacant habitat, which is primarily in the lowlands or near roads and trails. The Service concluded that on practical and effective method to have both wolverine population recovery, and a viable trapping program, would be to reduce harvest on denning females by closing the trapping season on February 15 and thus has retained that date in the final alternative. Season length on other terrestrial furbearers should be as consistent as possible to reduce incidental catch.

5) Many comments were received on the management of wolves on the refuge. The majority expressed a desire to see wolves protected completely and expressed dissatisfaction with the Service's past management of this species. There were also several letters expressing concern that wolves could become too abundant and adversely impact other wildlife species. While the Service appreciates these concerns there are several management considerations concerning wolves on the refuge that must be taken into account. These are:

A) Wolves are readily harvested on the refuge because a high proportion of the refuge's wolf habitat is readily accessible to hunters and trappers using aircraft, vehicles, snowmobiles, and dog teams. All known wolf packs in the northern part on the refuge are subjected to hunting and trapping pressures annually.

B) Trapping and hunting are the major sources of known mortality on the refuge's wolf population and are the only form of wolf mortality that can be easily regulated by man.

C) Human harvest has already reduced average pack size and age structure of refuge wolves and has been documented to disrupt behavior of packs in the northern refuge (Peterson et al. 1984). Some packs have been completely eliminated or reduced to 1-2 individuals by the end of a trapping season.

D) Only one litter is usually produced per wolf pack per year.

E) At least 10 wolves per pack during the breeding season is suggested from reproductive studies to allow for replacement by one or two wolves of each sex of socially dominant, breeding alpha wolves if they are killed (Packard et al. 1983). The current average wolf pack size in the northern refuge during the breeding season is 6 wolves or less with 5-6 wolves/pack, post-season, the refuge objective for a minimum of 10 packs on the refuge.

F) The breeding period for wolves on the refuge occurs from February through early-March (Peterson et al. 1984).

G) The major prey of wolves on the refuge are moose and other ungulates.

To minimize the adverse effects of harvest on the reproductive segment of the refuge's wolf population during the breeding period, it is recommended to close the season by February 15. With these considerations and the public input in mind, the Service has concluded the wolf objectives, season, and harvest strategy outlined in Alternative B provides adequate protection for refuge wolf populations while providing a wide variety of uses of these populations. Thus the wolf objectives and season length remains unchanged from Alternative B in the final course of action.

In addition to the above changes, editorial and factual changes have been made throughtout the text. Tables and figures have been corrected where necessary.

ALTERNATIVES

Four alternatives were developed by the Service for the management of furbearers on the Kenai Refuge. These alternatives were developed based on objectives of the refuge comprehensive conservation plan, Service policy, available resource data, wildlife management principles, and public input. Table 1 at the end of this section summarizes and compares the four alternatives.

Alternative A (Seasons, bag limits and refuge trapping permit stipulations in effect November, 1987)

This alternative reflects seasons and bag limits in effect on the refuge on November 10, 1987, the beginning of the last furbearer season, and 1987-88 refuge trapping permit stipulations.

Wolf

a) The trapping season was from November 10 through March 15 (126 days) with no bag limit.

b) The hunting season was from August 10 to April 30 (264 days) with a bag limit of 4 wolves per hunter per year.

c) Regulations did not limit the number of trappers, traps or sets on the refuge for wolves, with the exception of those areas that were closed to trapping.

d) The Service and the Alaska Department of Fish and Game (Fish and Game) jointly conducted wolf surveys and censuses in Game Management Unit 15A.

e) The Service and Fish and Game agreed to maintain a minimum of 25 wolves in the northern lowlands region (Game Management Unit 15A) of the refuge after the hunting and trapping seasons have closed. This number includes all wolves observed, and excludes the Big Indian and Quartz Creek wolf packs. Similar wolf management agreements were not reached for the remainder of the refuge.

f) Wolf pelts had to be sealed within 30 days after the close of the season.

Wolverine

a) The trapping season was from November 10 through March 15 (126 days) with no bag limit.

b) The hunting season was from November 10 to February 15 (98 days) with a season bag limit of one per year.

c) Regulations did not limit the number of trappers, traps, or sets on the refuge for wolverine, except for those areas closed to trapping.

Marten

a) The trapping season was from November 10 through January 31 (83 days) with no bag limit.

b) There was no limit on the number of trappers, traps, or sets on the refuge for marten, except for those areas closed to trapping.

c) The Service continued its ongoing marten study in the refuge in 1988.

d) There was no hunting season for marten.

Red Fox

a) The trapping season was from November 10 through February 28 (111 days), with no bag limit.

b. The red fox hunting season was from November 1 through February 15 (107 days), with a season bag limit of two foxes per year.

c) Regulations did not limit the number of trappers, traps, or sets on the refuge for red foxes, except for those areas closed to trapping.

Beaver

a) The trapping season was from February 1 to March 31 (59 days).

b) The bag limit was 20 beavers per season per trapper.

c) Regulations did not limit the number of trappers, traps, or sets for beavers on the refuge, except for those areas closed to trapping.

d) The Service requested trappers to voluntarily take only one beaver per lodge, and to leave a pole on the ice or on the lodge to mark where a beaver has been taken.

e) The Service conducted periodic beaver inventories in areas of concern on the refuge.

Coyote

a) The trapping season was from November 10 to March 15, with no bag limits.
b) The hunting season was from September 1 to April 30, with a season bag limit of 2 coyotes per hunter per year.
c) Regulations did not limit the number of trappers, traps, or sets for coyotes on the refuge, except for those areas closed to trapping.

Lynx[a/]

a) The refuge was closed to lynx trapping. In the future, the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game agreed that the lynx hunting and trapping season will be closed for 3 to 5 years during declines or lows in the snowshoe hare cycle. The closing and opening dates, and length of the lynx hunting and trapping season at other times will be determined by specific criteria (i.e., phase of their population cycle, lynx distribution, percentage of kittens in the population) agreed to by the Service and the Alaska Department of Fish and Game.

Mink[a/]

a) The trapping season was from November 10 to January 31, with no bag limit.
b) Regulations did not limit the number of trappers, traps, or sets for mink on the refuge, except for areas closed to trapping.
c) There was no hunting season for mink.

Weasel[a/]

a) The trapping season was from November 10 to January 31, with no bag limit.
b) Regulations did not limit the number of trappers, traps, or sets for weasels on the refuge, except for areas closed to trapping.
c) There was no hunting season for weasel.

Muskrat[a/]

a) The trapping season was from November 10 to May 15, with no bag limit.
b) Regulations did not limit the number of trappers, traps, or sets for muskrats on the refuge, except for areas closed to trapping.
c) There was no hunting season for muskrat.

River Otter[a/]

a) The trapping season was from November 10 to February 28 with no bag limit.

b) Regulations did not limit the number of trappers, traps, or sets for river otters on the refuge, except for areas closed to trapping.

c) There was no hunting season for river otter.

Trap Checks

Trappers had to make a mandatory check of their traps/snares at least once every seven days throughout the refuge.

Land and Shoot Trapping

Taking wolves on the refuge by land and shoot trapping was prohibited. The remainder of the furbearer species on the refuge could be taken using land and shoot trapping (i.e., using aircraft to track, locate, land near, then shoot free-roaming furbearers).

Number of Trappers in the Refuge

Under Alternative A the number of trappers in the refuge was not restricted, except in areas that were closed to trapping. The number of trappers permitted in the refuge Canoe System (i.e., the Swan Lake Canoe and Swanson River Canoe routes) was not limited.

Pelt Sealing/Carcass Collection

Wolf, wolverine, lynx, beaver, and otter pelts taken on the Kenai Peninsula had to be sealed by Fish and Game. The Service compensated trappers for voluntarily providing wolf skulls ($5) and wolverine carcasses ($25) to the refuge. Wolf, coyote, otter, marten and lynx carcasses also have been purchased on a voluntary basis in the past.

Skilak Loop Special Management Area, Road and Campground Restrictions[a/]

All trapping and hunting of furbearers was prohibited within the Skilak Loop Special Management Area. Trapping within one mile of all maintained public roads and two miles of major trailheads and campgrounds on the Kenai Refuge was restricted to mink and muskrat trapping only. These restrictions amounted to 2% and 2.57% of refuge lands, respectively. Typical home ranges of all furbearers except weasel, muskrat and beaver were larger than these restricted areas.

Trap Identification[a/]

The Service required that all trap sets and snares on the refuge have a mark identifying the owner. Free trap tags were provided to trappers wishing to use them.

[a/] These management actions are the same for Alternatives A, B and C. They are only listed under Alternative A.

Cubby and Flag Sets[a/]

A flag set is the use of a visual hanging attractor to capture the attention of furbearers, particularly lynx. A cubby set is a trap set in a small, protected shelter with generally only one entrance. The Service via refuge trapping permit stimulations does not permit the use of cubby or flag sets on the refuge when the lynx season is closed.

Exposed Bait Sets[a/]

The Service prohibits setting traps or snares within 30 feet of exposed bait on the refuge primarily to reduce the incidental capture of non-target species especially raptors and other birds.

Alternative B (The Preferred Alternative)

Alternative B remains the preferred alternative for managing furbearers on the Kenai Refuge after consideration of public input. The Service believes of the four alternatives considered, Alternative B as modified best satisfies the purposes for which the refuge was established and the objectives established in the Kenai Refuge Comprehensive Conservation Plan.

Wolf

a) There would be no regulations limiting the number of trappers, traps, or sets on the refuge for wolves (with the possible exception of the Canoe System).
b) The wolf trapping season would open November 10 and close on February 15 to protect breeding female wolves.
c) The hunting bag limit of wolves on the refuge would be lowered to one wolf per hunter per season refuge-wide, with a season from August 10 to February 15.
d) Wolf pelts would be sealed within 5 days.
e) The Service and Fish and Game would jointly conduct wolf surveys and censuses in Game Management Units 15A and 15B.
f) The Kenai Refuge Comprehensive Conservation Plan set an overall objective of maintaining 90 wolves on the refuge. To meet this objective, in Game Management Units 15A and 15B the wolf population would be managed using a quota system. The post-harvest (i.e., after trapping and hunting) population level in Unit 15A would be 25 to 35 wolves; in Unit 15B the post-harvest population level would be 15 to 19 wolves. These population levels are not population estimates, but instead are actual census figures (i.e., documented wolves, not including the Big Indian and Mystery Creek/Quartz Creek packs). (In Unit 15C the post-harvest population level would be at least 9 animals; this is a population estimate). Subsequent annual wolf reproduction should ensure that the overall refuge objective is met. The Service would request Fish and Game to issue emergency closures if

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[a/] These management actions are the same for Alternatives A, B and C. They are only listed under Alternative A.

the wolf population falls below 28 animals in Unit 15A, and 15 animals in 15B. Fish and Game and the Service would jointly determine when a modification in the refuge harvest is required until these figures can be refined through a more complete population dynamics analysis. This analysis would occur between 1988-1990.

Wolverine

a) The wolverine hunting bag limit would remain at one wolverine per hunter per season, with a November 10 to February 15 season.

b) Wolverine trapping would be closed in the northern part of the refuge (i.e., Game Management Unit 15A) for up to 3 years; during that time the Service and Fish and Game would jointly evaluate the population status and determine whether or not a harvestable surplus exists.

c) In the rest of the refuge the wolverine trapping season would open November 10 and close on February 15 to assure protection of most denning females; there would be no regulations limiting the number of trappers, traps, or sets for wolverine (with the possible exception of the Canoe System).

d) The Service, in cooperation with Fish and Game, would initiate a population study to determine the applicability of several wolverine census techniques, and to determine the distribution, status, ecology, and available harvestable surplus within the refuge's wolverine population.

e) Mandatory sealing of wolverine pelts would continue. Also, to gain further biological information (age, sex, reproductive rates, etc.), the Service would request that the Alaska Board of Game require all wolverine carcasses harvested on the Kenai Peninsula be turned in to Fish and Game or the Service. (For wolverine taken either on or off the refuge the Service would compensate trappers $10 per carcass. The purpose of this action is to assure that an adequate sample of Kenai Peninsula wolverine is obtained during the study period.)

Marten

a) The marten trapping season would run from November 10 to January 31, with no bag limit--the same as Alternative A.

b) The Service would continue the marten study on the refuge and further evaluate the taxonomic status of marten if necessary.

c) The current "study area" in Game Management Unit 15B east of Skilak River and Skilak Glacier would be closed to the taking of marten.

d) The Service and Fish and Game would work cooperatively to determine areas where marten reintroductions are feasible in the refuge. If such reintroductions occur, the surrounding game management subunit(s) would be closed to marten trapping. The reintroduction would be subsequently evaluated to determine future harvest levels.

e) Outside of the study area there would be no regulations limiting the number of trappers, traps, or sets for marten (with the possible exceptions of the subunit(s) if a reintroduction is done and the Canoe System).

f) To collect additional biological information, the Service would require all marten carcasses taken on the refuge be turned in to Fish and Game or the Service. All trappers on the Kenai Peninsula would be requested to voluntarily turn in marten carcasses taken off the refuge to Fish and Game or the Service. (For marten taken either on or off the refuge the Service would compensate each trapper $10 per carcass. The purpose of this action is to assure that an adequate sample of Kenai Peninsula marten is obtained during the study period.)

Red Fox

a) The Kenai Refuge would be closed to the taking of red foxes with firearms.

b) The fox trapping season would open on November 10 and close on February 15 and a catch limit would be instituted of one red fox per trapper per year; there would be no regulations limiting the number of trappers, traps, or sets for red foxes (with the possible exception of the Canoe System).

c) A 3-year red fox population study would be initiated beginning in 1989 to determine the refuge's population status and distribution, the taxonomic status of the population, and the optimum fox population level, and establish the level of sustained harvest (if any).

d) To collect additional biological information, the Service would require that all red fox carcasses taken on the refuge be turned into Fish and Game or the Service. All Kenai Peninsula trappers also would be requested to voluntarily turn in red fox carcasses taken outside the refuge to Fish and Game or the Service. (For foxes taken either on or off the refuge the Service would compensate each trapper $10 per carcass. The purpose of this action is to assure that an adequate sample of Kenai Peninsula red foxes is obtained during the study period.)

Beaver

a) The beaver trapping season would run from February 1 to March 31, with a bag limit of 20, the same as Alternative A.

b) In the refuge portion of Unit 15A the Service would allow only one set (i.e., one conibear or leg-hold trap, or one pole with a configuration of snares) per lodge, and require that trappers visually mark each trapped colony with an easily seen marker such as a tall pole.

c) In the Swan Lake Canoe Area the Service would allow trappers to take only one beaver per colony; until the optimum number of trappers is determined in the entire Canoe System there would be no regulations limiting the number of trappers set traps for beavers.

d) In the Swanson River Canoe Area and the remainder of the refuge in Game Management Unit 15A the Service would request that trappers voluntarily remove no more than one beaver per colony per year; until the optimum number of trappers is determined in the entire Canoe System there would be no regulations limiting the number of trappers trapping for beavers.

e) The Service and Fish and Game would conduct cooperative detailed inventories for 3 years in the above areas to 1) evaluate colony size, 2) evaluate the number of beaver colonies, 3) evaluate suitable beaver habitat, and 4) determine the optimum range of populations. At the end of the 3-year period additional recommendations would be made for future beaver management on the refuge.

Coyote

a) The trapping season would run from November 10 to February 15 to coincide with the wolf trapping season; the current hunting season would continue from September 1 to April 30, but there would be no bag limit.

b) There would be no regulations limiting the number of trappers, traps, or sets for coyotes (with the possible exception of the Canoe System).

Trap Checks

The Service would require trap checks every 4 days, (except for drowning and conibear sets which may be checked every 7 days) in the accessible northern (i.e., Game Management Unit 15A) and west-central portions of the refuge (i.e., Unit 15B(West)), and traps be checked every 7 days in the more remote portion of the refuge (i.e., Unit 15B (East) and 15C).

Land and Shoot Trapping

Land and shoot trapping of all furbearers would be prohibited. Shooting of furbearers in traps would not be affected by this management action. Also, coyote hunters would continue to be able to use airplanes to land on the refuge and take coyotes using predator calls, provided the hunter is at least a quarter-mile from the airplane. In this case airplanes only provide a means of access for hunters.

Number of Trappers in the Refuge

The Service would determine jointly with Fish and Game and the Kenai Trappers Association, and with appropriate public involvement, the optimum number of trappers that can be accommodated in the entire Canoe System to minimize the potential for conflicts between refuge users in the future. In the rest of the refuge there would be no regulations limiting the number of trappers, except in areas that are closed to trapping.

Pelt Sealing/Carcass Collection

The Service would request the Alaska Board of Game to require that fox pelts taken on the Kenai Peninsula be sealed, and marten and red fox carcasses taken on the refuge be turned in to Fish and Game or the Service. The Service also would request the Alaska Board of Game to require that wolverine carcasses taken on the Kenai Peninsula be turned in to Fish and Game or the Service. The Service would compensate trappers for the carcasses. There would be a 5-day sealing requirement for wolves taken on the refuge under Alternative B.

Trapper Orientation

Prior to obtaining a permit to trap on the Kenai National Wildlife Refuge, prospective trappers will be required to attend an approved trapper orientation program. A curriculum will be developed by the Fish and Wildlife Service in cooperation and consultation with the Alaska Department of Fish and Game, Kenai Peninsula Trappers and the Alaska Trappers Association. The program will be offered each year in October or November and January. Completion of the orientation program will be required of all existing and future refuge trappers beginning in 1989.

Primary Management Differences from Alternative A

The following are the primary differences between Alternative B and Alternative A. Alternative B would:

- o Close the wolf season on February 15; reduce the hunting bag limit from 4 to 1; manage wolf populations in Units 15A and 15B using a quota system, with the post-harvest levels set at 25 to 35 and 15 to 19 wolves, respectively; alternative A would allow wolves to be harvested an additional 13 days during the breeding period.
- o Close the northern portion of the refuge to wolverine trapping for 3 years; for the remainder of the refuge the wolverine trapping season would close by February 15; alternative A would allow wolverine trapping to continue in the northern part of the refuge and allow wolverine to be harvested an additional 13 days during a period when females may be nursing young.
- o Close a study area within the central portion of the refuge to marten trapping, and reintroduce marten on the refuge in feasible areas; alternative A would continue the marten season throughout the refuge.
- o Prohibit taking red fox with firearms, limit trappers to one fox per year, close season on February 15, and require the sealing of all pelts of red fox pelts taken on the refuge; alternative A would continue the red fox season throughout the refuge.
- o Limit trappers to one set per beaver lodge throughout Game Management Unit 15A, and one beaver per colony per year within the Swan Lake Canoe Route area of the refuge; alternative A would not place a limit on the number of traps or sets per lodge or the number of beaver removed per lodge.
- o Require trap checks every four days in the accessible northern and west-central portions of the refuge; alternative A requires traps be checked once every 7 days.
- o The Service would work with the Alaska Department of Fish and Game, refuge users, and other interested parties to determine the optimum number of trappers which can be accommodated in the Canoe System. Alternative A allows for an unlimited number of trappers to operate on the Canoe System.
- o Require the completion of an approved trapper orientation program prior to obtaining a refuge trapping permit. Alternative A does not require a trapper orientation program.

Alternative C

On December 2-4, 1987 representatives of the National Audubon Society, Alaska Wildlife Alliance, Alaska Outdoor Council, Kenai Peninsula Trappers

Association, Alaska Board of Game, Alaska Department of Fish and Game, local public, and the U.S. Fish and Wildlife Service met in Soldotna to try and develop a mutually acceptable set of strategies for the management of furbearers and their uses on the Kenai Refuge.[a/] Alternative C generally reflects the recommendations of the majority at this meeting.

Wolf

a) In Game Management Unit 15 the bag limit for wolves as a big game species would be lowered from four wolves to one wolf [per hunter per year].
b) The trapping season would close no later than February 28.
c) Mandatory pelt sealing would be required within 5 days of a wolf being harvested.
d) [The Service and Fish and Game would] conduct annual joint surveys and censuses of the wolf population.
e) [The two agencies would] establish the optimum post-season wolf population levels, consistent with sustained yield principles.
f) [In Unit 15A] the wolf population would continue to be managed on a quota system, using Fish and Game emergency closures when appropriate, for both trapping and hunting seasons.

Wolverine

a) For the entire refuge the trapping season would close on February 28.
b) The trapping season would be closed in Game Management Unit 15A for up to 3 years while a determination of what constitutes a harvestable surplus is jointly made by Fish and Game and the Service.
c) Mandatory sealing would continue, and [for informational purposes] carcasses from the Kenai Peninsula would be required to be turned in to either agency.
d) A cooperative study of the population would be conducted with Fish and Game, and possibility the U.S. Forest Service, with an emphasis on evaluating census techniques to determine wolverine distribution and population size.
e) As part of this study, the agencies would jointly determine what constitutes a harvestable surplus.

Marten

a) That portion of Game Management Unit 15B east of Skilak River and Skilak Glacier would be closed to marten trapping.
b) A joint Fish and Game/Service marten population survey would be conducted to identify both known and potential habitat refuge-wide.
c) Both agencies would jointly determine suitable habitat for transplant [i.e., reintroduction] areas on the refuge.

[a/] All statements in brackets in this alternative, were not stated in the charrette recommendations, but can be inferred or are implied. A summary of the Kenai Furbearer Management Charrette appears in the Appendix.

d) The Service would work cooperatively with Fish and Game and the Kenai Trappers Association on a refuge marten transplant [reintroduction].
e) At the time of the transplant [reintroduction], potential habitat in the refuge, jointly determined by the two management agencies, would be closed to marten trapping.
f) The transplant area would be reopened to marten trapping when both agencies jointly determine there is a harvestable surplus.

Red Fox

a) A catch limit of one fox per trapper per year would be instituted in the refuge.
b) The refuge would be closed to the take of red foxes by firearm.
c) The optimum red fox population range would be determined.
d) The level of sustained yield would be established.
e) A mandatory reporting requirement [i.e., sealing] would be instituted in the refuge.
f) If feasible, [the Service would] consider reintroducing "native" red foxes into the refuge.

Beaver

1. In the Canoe System:
   a) on an experimental basis, [the Service would] request that trappers limit their harvest to one beaver per colony;
   b) [the Service would] allow only one set per colony (a set being one device used to catch one beaver, such as one steel trap or one pole with a configuration of snares);
   c) [trappers would] mark the lodge once a beaver has been taken;
   d) if the voluntary take system does not work, [the Service would] move to beaver management units with a limited number of trappers; and
   e) [the Service would] use volunteers in 1988 to inventory lodges, colony size, and habitat quality, and repeat the inventory in 3 to 5 years.

2. In the entire refuge:
   a) [the Service would] recognize isolated lakes--not stream-connected--as sensitive beaver habitat and to the extent possible transplant problem beavers to them; and
   b) [the Service would] conduct cooperative inventories with Fish and Game, and jointly determine the optimum range of populations.

Trap Checks[a/]

Mandatory checks of traps every 24 hours would be required, except for checks every 3 days on remote traplines (to be determined by the agencies working with the trappers).

Land and Shoot Trapping[a/]

Land and shoot trapping, of all furbearers would be prohibited, except that coyotes may be taken by hunters using predator calls. [In this case airplanes only provide a means of access for hunters.]

Number of Trappers in the Refuge

The Service would determine jointly with Fish and Game and the Kenai Trappers Association, and with appropriate public involvement, the optimum number of trappers that can be accommodated in the entire Canoe System so as to minimize the potential for conflicts between refuge users in the future.

Pelt Sealing/Carcass Collection

Wolverine carcasses taken on the refuge would be required to be turned in to Fish and Game or the Service. Red fox pelts taken on the refuge would be required to be sealed. There would be a 5-day sealing requirement for wolves taken on the refuge under Alternative C.

Management Differences From Alternative A

The following are the primary differences between Alternative C and Alternative A. Alternative C would:

- Close the wolf trapping season no later than February 28; in Unit 15 lower the bag limit for wolves as a big game species to one; establish optimum post-season wolf population levels consistent with sustained yield principles; and require mandatory sealing within 5 days; alternative A keeps the wolf season open until March 15, has a limit of four wolves per hunter and does not establish a post-season wolf population level.
- Close wolverine trapping for up to 3 years in Game Management Unit 15A, and close the trapping season refuge-wide on February 28; alternative A does not close the wolverine season in Game Management Unit 15A and keeps the wolverine season open to March 15, when some female wolverine may be nursing young.
- Close a study area within the central portion of the refuge to marten trapping, and transplant [i.e., reintroduce] marten on the refuge if determined to be feasible; alternative A does not close marten trapping anywhere on the refuge nor does it consider a transplant if feasible.
- Prohibit taking red fox with firearms, limit trappers to one fox per year, consider reintroducing "native" fox into the refuge, and require all red fox pelts taken on the refuge be sealed; alternative A does not prohibit the taking of red fox with a firearm, places no limit on the number of red fox taken by trappers and does not require red fox pelts to be sealed.
- In the entire Canoe System, on an experimental basis request trappers to take only one beaver per colony, and require that only one set be made per beaver colony; alternative A places no limit on number of beaver taken per lodge but merely requests that trappers voluntarily limit their catch on the refuge to one per colony.
- Require trap checks every 24 hours in the refuge, except for checks every 3 days on remote traplines[a]; alternative A requires traps be checked at least once every 7 days.

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[a] This was one of the proposed recommendations at the December furbearer charrette, but a consensus was not reached favoring this action. It is included here for purposes of analysis of the range of alternatives.

- o Initiate the Service working with Fish and Game, refuge users, and other interested parties to determine the optimum number of trappers in the Canoe System. Alternative A allows an unlimited number of trappers to operate in the refuge Canoe System.

Alternative D

This alternative was developed in response to the majority of over 400 letters the Service received on the draft furbearer management plan (which recommended no trapping on the Kenai Refuge). In Alternative D the entire Kenai Refuge would be closed to trapping of all furbearers. Hunting would continue to be permitted.

Management Differences From Alternative A

The primary differences between Alternative D and Alternative A is that Alternative D would close the Kenai Refuge to trapping of all furbearers.

AFFECTED ENVIRONMENT[a/]

The Kenai National Moose Range was established in 1941 by executive order of President Franklin Roosevelt, primarily to protect the natural breeding and feeding grounds of the giant Kenai moose. It was redesignated the Kenai National Wildlife Refuge on December 2, 1980 under provisions of the Alaska National Interest Lands Conservation Act (the Alaska Lands Act). In addition to changing the name of the refuge, the Alaska Lands Act enlarged the size of the refuge, designated 1.35 million acres as wilderness (69% of the refuge), traded surface and subsurface rights with Native villages and corporations, and broadened the purpose of the refuge to include the conservation of all wildlife species, specifically including wolves and other furbearers.

The Kenai Peninsula is located between Prince William Sound and Cook Inlet in southcentral Alaska (latitude 60°N, longitude 150°W), and lies just south of Anchorage (Figure 1). Slightly over 10,000 square miles in area, the peninsula is connected to mainland Alaska by a narrow neck of land and ice only 10 miles wide. Two major landforms characterize the peninsula: the rugged Kenai mountains rising to 6,000 feet (with major icefields) dominate the eastern half; the Kenai lowlands, a rolling plateau ranging from sea level to about 1,500 feet, form the western half. Numerous bedrock fault-lines cross the landscape, the most notable separating the Kenai lowlands from the mountains. Patterns of uplift and subsidence are pronounced, with the lowlands generally rising and the mountains settling.

[a/] For more details on the Kenai Refuge and its environment, see the Kenai National Wildlife Refuge Comprehensive Conservation Plan/Environmental Impact Statement/Wilderness Review.

Table 1. Summary of management alternatives for the Kenai Refuge furbearer management plan environmental assessment.

RESOURCE/ MANAGEMENT	ALTERNATIVE A (as of Nov 1987)	ALTERNATIVE B (Preferred Alternative)	ALTERNATIVE C (Overrette Alternative)	ALTERNATIVE D
Wolf	Trapping season from 11/10 to 3/15; no bag limit; quota system set on Unit 15A (Fish & Game emergency closure when 25 wolves are left in the unit); 5-day sealing requirement in Unit 15A; hunting season runs from 8/10 to 4/30 with a bag limit of 4/hunter; annual wolf surveys and censuses conducted jointly by the Service and Fish & Game in Game Management Unit 15A; the Service compensates trappers for voluntarily providing wolf skulls and carcasses	Close trapping and hunting season by 2/15 to minimize the harvest of breeding females; lower hunting bag limit in Unit 15 from 4 to 1 wolves; initiate a 5-day wolf sealing requirement; in Units 15A and 15B the population would be managed using a quota system; the post-harvest population level in 15A would be 25 to 35 wolves (excluding the Big Indian and Mystery Creek/Quartz Creek packs) and 15 to 19 wolves in 15B; Fish & Game and the Service would jointly agree on closure levels within this range until the figures can be refined; in Unit 15C the post-harvest population level would be 9 animals[a/]	Close trapping season no later than 2/28; require mandatory sealing within 5 days; conduct annual joint Service/Fish & Game surveys and censuses; establish optimum post-season wolf population levels consistent with sustained yield principles; in Unit 15 lower the bag limit for wolves as a big game species to one; continue to manage wolf on a quota system using Fish Game emergency closures, when appropriate, for both trapping and hunting seasons (in Game Management Unit 15A)	No trapping permitted; hunting would continue to be permitted
Wolverine	Trapping season runs from 11/10 to 3/15; no bag limit; mandatory sealing requirement; hunting season runs from 11/10 to 2/15 with a bag limit of one/hunter	Close trapping season on 2/15 to protect denning females; in Unit 15A close the trapping season for up to 3 years until Fish & Game and the Service can jointly determine whether a harvestable surplus exists; initiate a cooperative Fish & Game/Service population study with emphasis on census techniques; request the Board of Game to require all wolverine carcasses taken on the Kenai Peninsula be turned in to Fish & Game or the Service; the Service would pay $10 per carcass	Close trapping season on 2/28; in Unit 15A initiate a temporary closure (not to exceed 3 years) until it is determined whether or not a harvestable surplus exists; a joint agency determination would be required at the end of the 3-year period; initiate a cooperative Fish & Game/Service population study with emphasis on census techniques; determine what constitutes a harvestable surplus; continue mandatory sealing and require carcasses be turned in	No trapping permitted; hunting would continue to be permitted
Marten	Trapping season runs from 11/10 to 1/31; no bag limit; the Service would continue its ongoing study of marten on the refuge; starting in 1988 marten taken on the Kenai Peninsula must be sealed by Fish & Game; the Service purchases marten carcasses on a voluntary basis	Trapping season would run from 11/10 to 1/31; the current marten study area would be closed to marten trapping; contine the study and jointly determine with Fish & Game a potential area for reintroductions; work cooperatively on a marten reintroduction if determined to be feasible; close game management unit to marten trapping if marten are reintroduced; require all marten carcasses taken on the refuge be turned into Fish & Game or the Service and request all marten taken on the rest of the Kenai Peninsula be turned into Fish & Game or the Service; in both cases the Service will pay $10/carcass; the trapping season would be the same as Alternative A	Close the current study area (i.e., that portion of Unit 15B east of Skilak River and Skilak Glacier) to trapping of marten; conduct a joint Service/Fish & Game population survey and identify both known/potential habitat refuge-wide; the agencies would jointly determine suitable habitat/transplant areas on the refuge; the Service, Fish & Game and the Kenai Trappers Association would work cooperatively on a marten transplant; at the time of the transplant, potential habitat jointly determined by the Service and Fish & Game would be closed to marten trapping; the area would be reopened to trapping when both agencies jointly determine there is a harvestable surplus	No trapping permitted
Red Fox	Trapping season runs from 11/10 to 2/15; no bag limit	Trapping season would run from 11/10 to 2/15; Initiate a 3-year study to determine the optimum fox population range and establish the level of sustained yield; retain the present trapping season, but institue a bag limit of 1 fox/trapper per year; require all red fox carcasses taken on the refuge be turned in to Fish & Game or the Service, and request all carcasses taken on the rest of the Kenai Peninsula be turned in to Fish & Game or the Service; the Service in both cases would pay $10 per carcass; seal all pelts taken on the Kenai Peninsula; close the refuge to the take of red fox by firearm	Initiate a study to determine the optimum population range and establish the level of sustained yield; institute a catch limit of one fox per trapper per year; institute a mandatory reporting requirement; close the refuge to the take of red fox by firearm; if feasible, consider reintroducing "native" fox into the refuge	No trapping permitted

[a/] The post-harvest population levels in 15A and 15B are not population estimates, but instead are census figures (i.e., documented wolves); the post-harvest population level for 15C, however, is a population estimate.

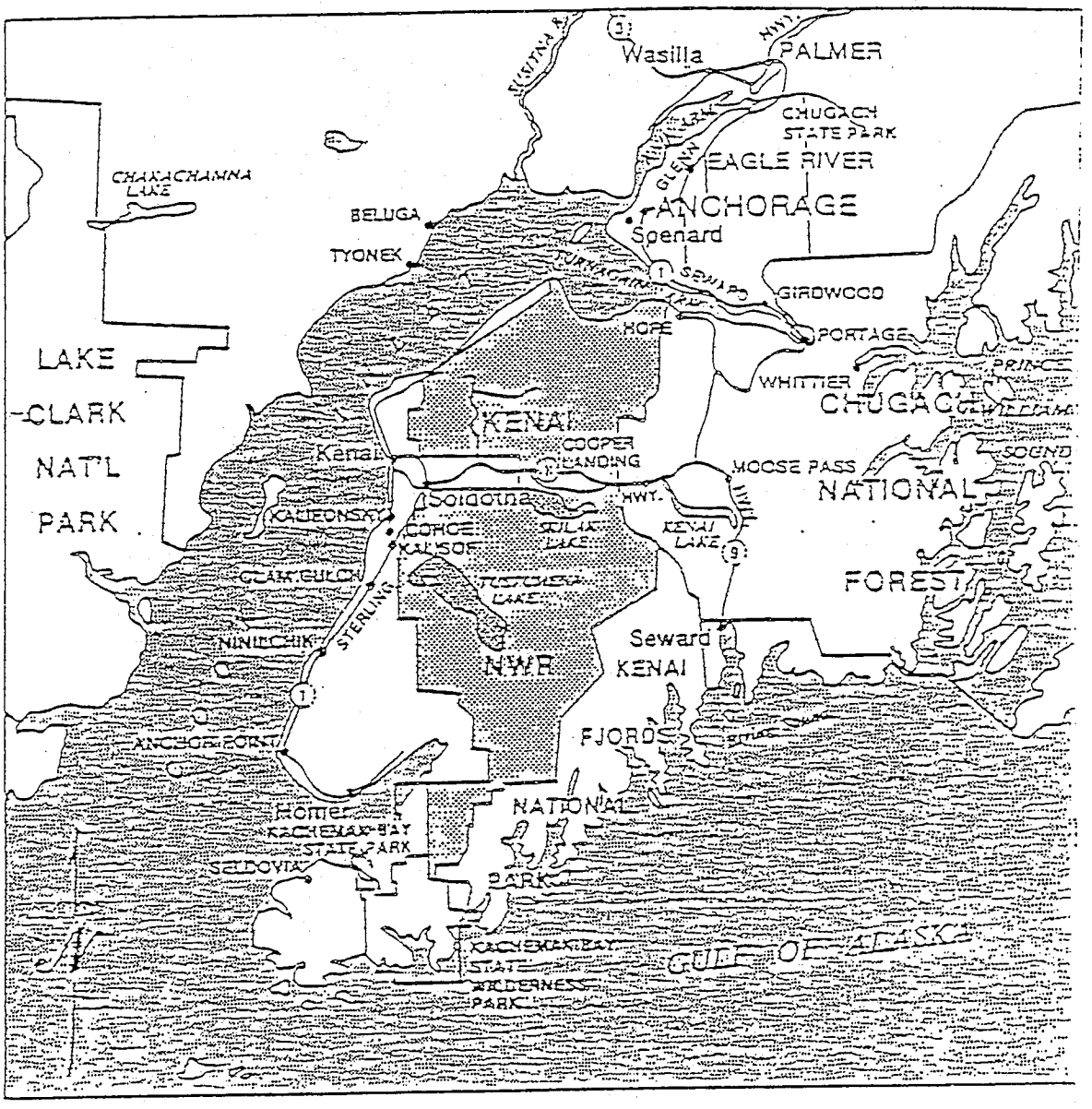
RESOURCE/ MANAGEMENT	ALTERNATIVE A (CURRENT SITUATION)	ALTERNATIVE B (PREFERRED ALTERNATIVE)	ALTERNATIVE C (CHARRETTE ALTERNATIVE)	ALTERNATIVE D
Beaver	Trapping season runs from 2/1 to 3/31; the bag limit is 20 per trapper per year; all pelts must be sealed; the Service requests all trappers to take only one beaver per colony, and to leave the pole on the ice or on the lodge to mark where a beaver has been taken	Trapping season would run from 2/1 to 3/31; allow (on the permit) in Unit 15A only one set per lodge; allow (on the permit) the taking of no more than one beaver per colony in the Swan Lake Canoe Route (serves as a "control area" in the study below); request only one beaver be taken per colony in the rest of the refuge; leave a pole on the ice or lodge to mark where a beaver has been taken; conduct cooperative Fish & Game/ Service inventories, and jointly determine the optimum range of populations in the Canoe System; use colonies as the basis for management	In the Canoe System: also on an experimental basis, request in the trapping permit that harvests be limited to one beaver per colony, and allow only one set be made per colony (a set being one device intended to catch one beaver); b) mark the lodge once a beaver has been taken; c) if the voluntary take system does not work, move to beaver management units with a limited number of trappers; and d) use volunteers in 1984 to inventory lodges, colony size, and habitat quality, and repeat in 3 to 5 years; in the entire refuge: a) recognize isolated lakes as sensitive habitat and to the extent possible transplant problem beaver to them, and b) conduct cooperative Fish & Game/Service inventories, and jointly determine the optimum range of populations	No trapping permitted
Coyote	Trapping season runs from 11/10 to 3/15; no bag limit; hunting season runs from 9/1 to 4/30 with a bag limit of 2/hunter; the Service purchases carcasses on a voluntary basis	The trapping season would run from 11/10 to 2/15; hunting season would run from 9/1 to 4/30, with no bag limit	Same as Alternative A[a/]	No trapping permitted; hunting would continue to be permitted
Lynx	Season varies depending on the status of the snowshoe hare population; all pelts must be sealed; the Service purchases carcasses on a voluntary basis	Same as Alternative A	Same as Alternative A[a/]	No trapping permitted; hunting would continue to be permitted (depending on season restrictions)
Mink	Trapping season runs from 11/10 to 1/31; no bag limit	Same as Alternative A	Same as Alternative A[a/]	No trapping permitted
Weasel	Trapping season runs from 11/10 to 1/31; no bag limit	Same as Alternative A	Same as Alternative A[a/]	No trapping permitted
Muskrat	Trapping season runs from 11/10 to 5/15; no bag limit	Same as Alternative A	Same as Alternative A[a/]	No trapping permitted
River Otter	Trapping season runs from 11/10 to 1/31 in Units 15A and 15B, and from 11/10 to 2/28 in the rest of the refuge; no bag limit; pelts must be sealed; the Service purchases carcasses on a voluntary basis	Same as Alternative A	Same as Alternative A[a/]	No trapping permitted
Trap Check	7 days refuge-wide	3 day checks in Units 15A and 15B(West); 7 days in the remainder of the refuge	Mandatory 24-hour checks, except for 3-day checks on remote traplines (to be determined by the agencies working with the trappers)[b/]	Not applicable
Land & Shoot Trapping of Furbearers	Prohibited for all furbearers except for land otter and coyote	Prohibited for all species; however, coyote hunters would continue to be able to use airplanes to land on the refuge and take coyotes 1/4 mile from the airplane using predator calls	Same as Alternative B[b/]	Not permitted
Number of Trappers in the Refuge	No restrictions on number of trappers	The Service, Fish & Game, and the Kenai Trappers Association, with appropriate public involvement, would determine the number of trappers in the entire Canoe System so as to minimize potential conflicts between refuge users in the future; no restrictions elsewhere except in areas that are closed to trapping	Same as Alternative B	Not applicable
Skilak Loop, Road, and Campground Restrictions	Skilak Loop closed to all trapping; trapping of all furbearers except mink and muskrat prohibited within 1 mile of maintained roads and 2 miles of campgrounds and trailheads; restrictions on trap type and size for mink and muskrat	Same as Alternative A	Same as Alternative A[c/]	X
Trap Identification	All traps and snares must have identification	Same as Alternative A	Same as Alternative A[c/]	Not applicable
Cubby and Flag Sets	Not permitted during periods when lynx season is closed	Same as Alternative A	Same as Alternative A[c/]	Not permitted
Exposed Bait Sets	Traps or snares cannot be set within 30 feet of exposed bait	Same as Alternative A	Same as Alternative A[c/]	Not permitted
Trapper Education	Not required	Require the completion of an approved trapper education program prior to obtaining a refuge trapping permit	Not required	Not applicable

[a/] No objections were expressed at the charrette over the management of these species.

[b/] This was one of the proposed recommendations at the charrette, but a consensus was not reached favoring this action. It is included here for purposes of analyzing the range of alternatives.

[c/] No recommendations were made on these management actions at the charrette. They are included here for purposes of analyzing the range of alternatives.

Figure 1. Location of the Kenai National Wildlife Refuge.



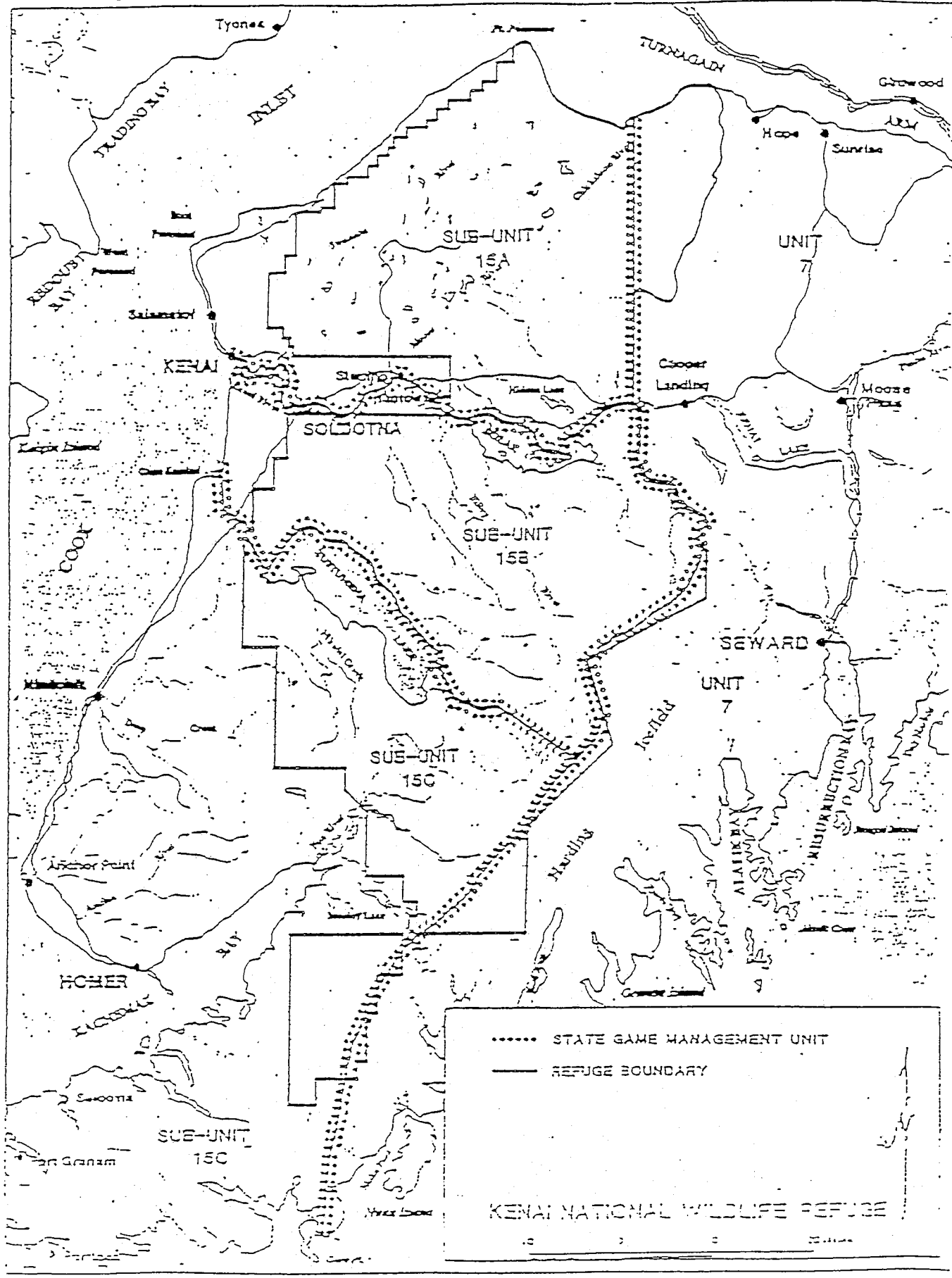
Of the 10,038 square miles that make up the Kenai Peninsula, 5,787 square miles are included in the following federal land units: Kenai Refuge (3,078 square miles), Chugach National Forest (1,679 square miles), and Kenai Fjords National Park (1,030 square miles). The refuge is divided into two Alaska Department of Fish and Game Management Units, Units 7 and 15. Game Management Unit 15 is further divided into 15A, 15B, and 15C (Figure 2). The Kenai Refuge encompasses the Kenai lowlands and adjacent mountains. Most of the area was burned by wildfires during the last 100 years (Spencer and Hakala 1964, Davis and Franzmann 1979). Much of the 270 square mile "benchland" between Skilak and Tustumena Lakes burned between 1885 and 1890. Large fires in 1947 and 1969 were accidentally started by humans. The 1947 fire burned 483 square miles in the northern lowlands and the 1969 fire covered an additional 136 square miles of mature forest just northeast of the town of Kenai.

Forest vegetation includes white and black spruce (Picea glauca and P. mariana), white birch (Betula papyrifera), aspen (Populus tremuloides), and willow (Salix spp.), with black cottonwood (Populus trichocarpa) in stream bottoms and Sitka spruce (Picea sitchensis) in coastal areas and mountain hemlock (Tsuga mertensiana) at higher elevations. Treeline in the mountains is approximately 1,600 feet in elevation.

The refuge supports over 199 wildlife species, including moose, Dall sheep, grizzly bear, black bear, mountain goat, caribou, four species of Pacific salmon, and many other species of resident fish, resident and migratory birds, and mammals. Furbearers found on the refuge include beaver, coyote, river otter, lynx, mink, marten, muskrat, red fox, weasel, wolf, and wolverine. None of the species on the refuge are known to be threatened or endangered.

Exact, quantitative population numbers for most of the furbearers on the Kenai Refuge are not available. The taxonomic status of the refuge's red fox, wolverine and marten also is uncertain--these species have been given subspecific status by some taxonomists in the past. Most of the data below are population estimates prepared by Service biologists. In the early 1980's the refuge wolf population was estimated at 82, with the majority (about 60%) in the northern part of the refuge (Game Management Unit 15A). Annual, pre-trapping wolf numbers in the northern lowland portion of the refuge, obtained from either visually observed or radio-collared wolves, between 1980 and 1987 indicated a minimum population of 32 to 47 wolves per year. If wolverine densities on the refuge are comparable to those reported in the Susitna Basin, and assuming wolverine are found only in remote, mountainous areas, the refuge may be presently supporting less than 30 adult wolverine within its boundaries. Marten and red fox are rare on the refuge with only 10 marten and 12 red foxes taken from the entire refuge over the past 26 years. Studies of marten since 1985 suggest that 27 to 40 marten may be present in an area east of Skilak River and Skilak Glacier--the only portion of the refuge currently known to support marten. Red foxes may be even less abundant and tend to be observed primarily in alpine areas. The refuge's lynx population varies depending on the cycle of its prey populations, primarily snowshoe hare. Between 1977 and 1982, 25 lynx were estimated to reside in the northern part of the refuge. However, by 1987 densities had risen in some areas three-fold after a lynx trapping closure in 1984. Beaver colony densities in lakes on the refuge in 1977 averaged 33 square miles per colony;

Figure 2. State game management units on the Kenai National Wildlife Refuge.



beaver densities in streams in 1962 and 1977 were 9 and 17 miles per colony, respectively. Observed beaver colony densities in lakes in good habitat in the Canoe System varied from 5 to 14 square miles per colony between 1983 and 1987. No population surveys or estimates are available for the refuge's coyote, river otter, mink, muskrat, and weasel populations.

Because of its location near Anchorage, and its many resources, the Kenai Refuge has become a popular outdoor recreation area. Visitors come to the refuge to hunt, fish, trap, boat, hike, camp, and observe wildlife. In 1987, the Service estimated over 383,000 people visited the refuge; many other people enjoyed the refuge's wildlands and wildlife as they drove the Sterling Highway to other destinations on the peninsula. This level of visitation and the primary purposes of the refuge (see page 3) make the management of the Kenai Refuge unique compared to other Alaska refuges.

The refuge has many backcountry and established recreation sites. There are over 200 miles of established trails and routes, including two national trails: the Swanson River Route and Swan Lake Route. The Kenai Refuge has more roads and trails and is accessible by more people using aircraft than any other refuge in Alaska. In addition, the public can use over 1,000 miles of seismic lines north of the Kenai River to access refuge lands. The Skilak Loop area is a designated wildlife viewing area.

All trapping on the refuge has been by permit since 1960, when 16 permits were issued. Currently there is no limit on the number of permits that may be issued. For the 1960-1961 season, when the permit system began, 16 trapping permits were issued on the refuge. For the 1986-1987 season the Service issued 109 permits for trapping.

The most intensively used portions of the Kenai Refuge (i.e., between 1 and 2 miles of maintained roads and campgrounds) are closed to trapping. The Skilak Loop Special Management Area is a designated wildlife viewing area, and is closed to trapping and hunting with firearms. Figure 3 shows the portions of the refuge that are presently closed to trapping.

ENVIRONMENTAL CONSEQUENCES

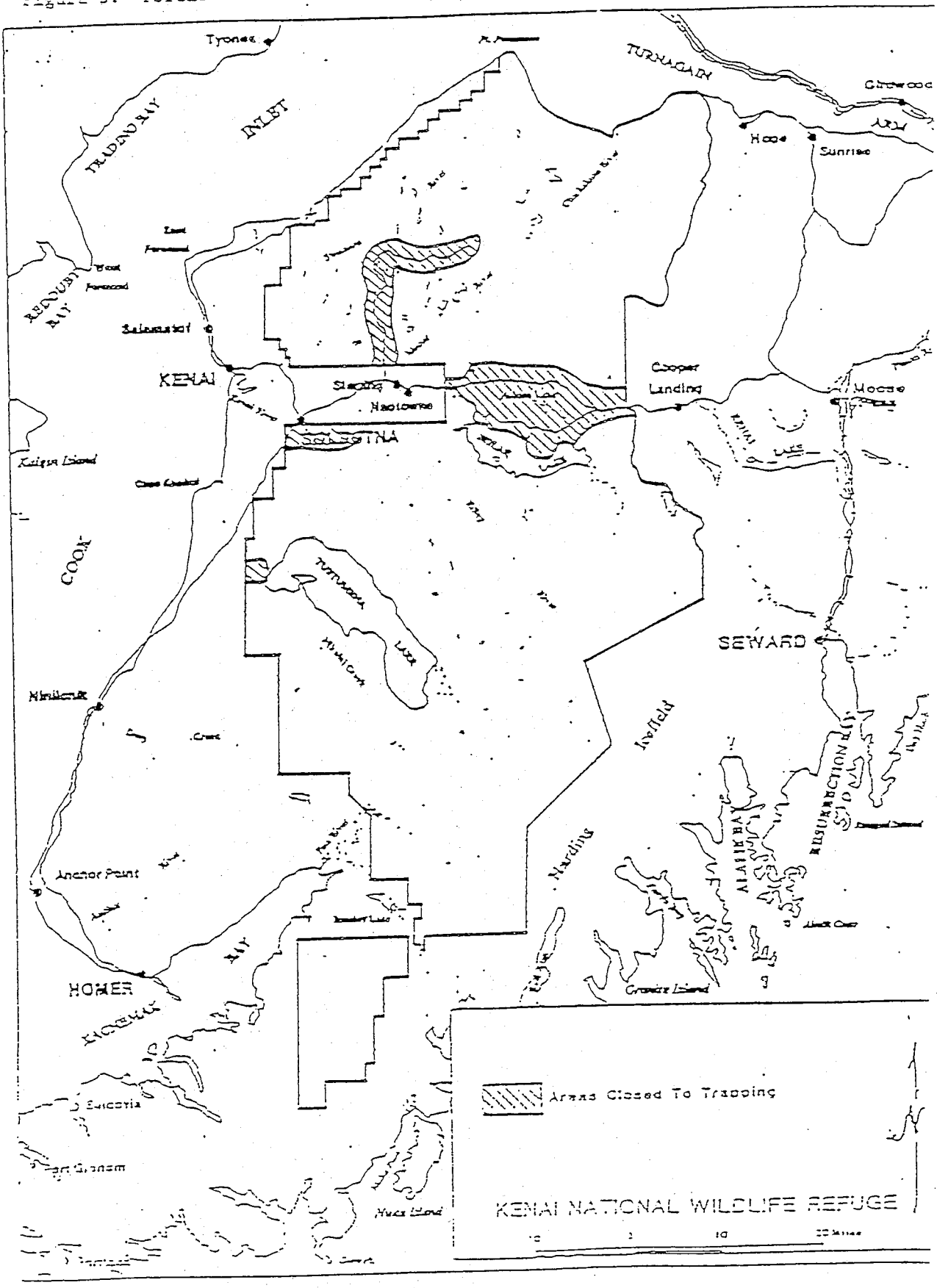
This section identifies, analyzes and compares the biological and socioeconomic impacts that would result from implementing each of the management alternatives. Table 2 at the end of this section summarizes and compares the environmental consequences of the four alternatives.

Effects of Alternative A

Biological Effects of Alternative A

Wolf - Under Alternative A wolves could be trapped for 126 days throughout the refuge, except for Game Management Unit 15A (where the season would be shortened by emergency order if the wolf population drops below 25 animals). Depending on the harvest level, Alternative A could adversely affect wolf numbers, social structure and productivity. Breeding female wolves could be

Figure 3. Portions of the Kenai Refuge presently closed to trapping.



harvested late in the trapping season, reducing the productivity of the refuge wolf population, and reducing population levels and potential harvest levels the following year.

Harvest levels of wolves in the northern portion of the refuge (Game Management Unit 15A) each season could reduce wolf numbers down to the established, minimum acceptable population levels. The number and condition of wolves taken from the refuge each year would be known precisely, and in a timely manner, assuming those taking wolves accurately report and seal pelts within the required 5-day interval. This would, however, require constant, costly, and time-consuming techniques to ensure that the minimum population levels are maintained. Inaccurate reporting and sealing of wolf pelts in adjacent units could complicate management under the quota system.

The post-harvest population minimum of 25 wolves in Game Management Unit 15A would ensure that other Service objectives (i.e., moose population goals) are not adversely affected.

Overall, under Alternative A the wolf population in the refuge would remain at about its current level, assuming the level of harvest pressure does not change and prey populations remain at about current levels. Population and allowable harvest levels may be temporarily reduced if breeding females are harvested late in the season. If trapping pressure increases, additional management actions will be required or the current wolf population would likely decline in some portions of the refuge.

Wolverine - Wolverines could be trapped anywhere on the refuge during the open trapping season in Alternative A. Maintenance of a moderate wolverine population on the refuge and colonization of unoccupied, suitable habitat on the refuge by wolverine may be jeopardized if future harvest levels remain the same or increase. Harvest late in the season may remove some denning females after young are born or remove some dispersing wolverine that may have colonized suitable habitat.

Overall, if harvest pressures remain at current levels under Alternative A the refuge's wolverine population would be expected to continue to exist at low levels into the foreseeable future, and some suitable habitat would remain vacant. If trapping pressure increases, additional management actions will be required or the current wolverine population would likely decline.

Marten - In this alternative the relatively few marten currently known on the refuge could be harvested during the legal trapping season and incidentally trapped during other furbearer seasons as the number of trappers and access into remote areas on the refuge increase. The potential for adverse impacts would be greatest in the mountainous wilderness areas where most marten habitat occurs. Marten may not be able to recolonize suitable habitat without special management action.

Overall, if harvest pressures remain at current levels under Alternative A the refuge's marten population would be expected to remain at very low levels into the foreseeable future, leaving some suitable habitat unused. If trapping pressure increases and no other management actions are taken, the current marten population would likely decline.

Red Fox - Red foxes are believed to be precluded from recovering to historic population levels on the refuge because of habitat and competition with other predators (i.e., coyote). None of the management actions in Alternative A would affect this.

Under Alternative A the relatively few red foxes that are present on the refuge could be harvested during the open red fox season and incidentally trapped during other terrestrial furbearer (wolf, wolverine, coyote, lynx) seasons as the number of trappers and access into remote areas on the refuge increase. The potential for adverse impacts would be greatest in the southern areas of the refuge where most red fox habitat occurs and a small fox population still exists. If the remaining red foxes on the refuge and the peninsula were extirpated a possible unique subspecies may be lost.

Overall, if natural conditions do not change (e.g., the number of coyotes in the refuge), under Alternative A the refuge's red fox population would continue to exist at very low levels into the foreseeable future. If trapping pressure increases and no other management actions are taken, the current red fox population would likely decline further.

Beaver - Beavers would continue to be harvested refuge-wide under this alternative at an unpredictable rate and pattern of harvest. The refuge's beaver population growth rate and the rate at which suitable, unoccupied refuge habitat is colonized by beavers would be slow and dependent on the harvest level and natural population regulating factors. The activities of beavers can increase available habitat for certain species, such as aquatic furbearers, waterfowl,and shorebirds. These benefits for other refuge wildlife species would fluctuate with changes in the beaver population levels in this alternative.

In summary, assuming harvest levels and natural conditions remain as they are, under Alternative A the refuge's beaver population would remain at near its current low level or slowly increase in the foreseeable future. Potential beaver habitat would remain unoccupied for some time. If trapping pressure increases and no other management actions are taken, the current beaver population would likely decline.

Coyote - Coyotes would continue to be harvested at existing rates, which is not considered to be adversely affecting the refuge's coyote population. Thus, under Alternative A the refuge's coyote population would remain at its current level, depending upon the prey populations and possibly competition with wolves. The relatively high population of coyotes may adversely affect expansion of the red fox population.

Lynx - Under Alternative A the lynx population on the refuge would not be harvested throughout those portions of the cycle when lynx recruitment is low or negative; populations should approximate near-natural numbers during most years.

Lynx would continue to be incidentally taken in traps and snares set for other terrestrial species even when lynx seasons are not open. The incidental take of lynx would be higher than in the other alternatives because the open seasons for other terrestrial furbearers would be open longer and would extend past mid-February (when lynx begin to disperse and breeding begins). This take may slightly impact harvest levels during open seasons, but is not expected to significantly affect the refuge's lynx population.

In summary, assuming the level of trapping and natural conditions do not change, it is expected that under Alternative A the lynx population would be near natural numbers, increasing and decreasing in synchrony with its prey populations.

Mink - The refuge's mink population is thought to be determined by habitat conditions. If mink trapping increases in the refuge, the increase in take would not be expected to adversely affect the refuge's mink population--the refuge's mink population would continue to remain at about its current level.[a/]

Weasel - The refuge's weasel population is thought to be determined by habitat conditions. If weasel trapping increases in the refuge the increase in take would not be expected to adversely affect the refuge's weasel population--the refuge's weasel population would continue to remain at about its current level.[a/]

Muskrat - Muskrats under Alternative A might be harvested at a slightly reduced rate compared to past levels of harvest. This would probably have little impact on the refuge muskrat population because the muskrat population is thought to be primarily habitat regulated. Thus, the refuge's muskrat population would continue to remain at about its current level. If trapping pressure increases and no other management actions are taken, the current muskrat population may decline.[a/]

River Otter - Under the management actions in Alternative A river otters should be harvested at reduced rates compared to past levels of harvest. This should allow the refuge's otter population to maintain its present levels and perhaps increase, particularly in the most accessible northern portions of the refuge. If trapping pressure increases and no other management actions are taken, the current river otter population would likely decline.[a/]

Effects on Other Species - With the exception of wolves, predatory furbearers covered in this assessment do not significantly affect prey population levels--other environmental conditions are the primary limiting factors affecting the populations. Wolf populations under this alternative are not expected to adversely affect the achievement of the population objective of their primary prey, moose.

[a/] The same effects for these species would occur under Alternatives B and C. The effects are not repeated under the description of the environmental consequences for these alternatives.

The take of non-target species by trappers, such as birds of prey, would continue under Alternative A. Current state and federal regulations and federal permit conditions, however, would minimize the effect of this take to the extent practical.

In summary, Alternative A would have a negligible effect on the population of prey populations and non-target populations in the Kenai Refuge.

Socioeconomic Effects of Alternative A

The Kenai Refuge Comprehensive Conservation Plan estimated in 1981 that trapping had a direct monetary value of $25,000. Even if the number of trappers continues to increase on the refuge and the value of pelts increases, the impact of Alternative A on the local economy would be expected to be negligible.

Trapping is primarily a recreational activity on the Kenai Refuge. This use has been increasing over the past 20 years, and is expected to continue to rise with the growth in the peninsula's human population. The management actions in Alternative A would not be expected to adversely affect current opportunities for trapping. With the increase in numbers of trappers, however, the potential for competition for readily accessible resources between trappers also would increase, thus trapper-trapper conflicts would increase.

Under Alternative A the trapping restrictions near roads and campgrounds would continue. This would help reduce the potential for conflicts between trappers and other refuge users. However, with increased numbers of trappers and other refuge users, such as cross-country skiers, the potential for other refuge users encountering trappers or signs of trappers (e.g., animals caught in traps) would increase. This in turn would increase the potential for conflicts between trappers and other refuge users. Opportunities to view furbearers would remain at about current levels.

Effects of Alternative B

Biological Effects of Alternative B

Wolf - Under Alternative B the chances of taking a breeding female wolf from a pack in this alternative would be minimized with a hunting and trapping closure date of February 15. This action would help ensure pack recruitment each year. Fewer wolves would be taken per hunter during the open hunting season. The harvest of wolves in the northern (Game Management Unit 15A) and central portions of the refuge (Game Management Unit 15B) each season could lower the population to the established, minimum acceptable level. To ensure that the population does not fall below the minimum population, however, would require constant, costly, and time-consuming management techniques. Once the effects of season changes can be evaluated, the intensive level of monitoring initially required may not be needed. The number and condition of wolves taken from the refuge each year would be known precisely, and in a timely

manner, assuming those taking wolves accurately report and have pelts sealed within the required 5-day interval. The numbers of wolves taken from the refuge during the relatively long season (98 days) still would occasionally necessitate emergency closures.

The trap check requirement in Alternative B may increase trappers' wolf harvests, as well as other furbearers.

Under Alternative B the post-harvest population range of 25 to 35 wolves in Game Management Unit 15A would ensure that other Service objectives (i.e., moose population objectives) are not adversely affected.

Overall, under Alternative B the wolf population in the refuge would eventually increase to the Service's objective level and harvest levels would be more predictable, assuming prey populations remain at about current levels.

Wolverine - Under Alternative B the potential for trapping of denning female wolverine with young would be considerably reduced with the February 15 closure date. Wolverine within the northern region of the refuge (Game Management Unit 15A) in this alternative would be protected from intentional harvest for 3 years, but still may be incidentally harvested during open seasons for other furbearers. The wolverine population may increase and colonize unoccupied lowland habitat if human-caused mortality is reduced and the habitat is suitable. The harvest of wolverine throughout the remainder of the refuge still would be significant because of the length of the season. This change may reduce the wolverine harvest on the remainder of the refuge by an average of 25% per year, and may increase wolverine colonization of suitable habitat.

Wolverine management may change in the future, depending on the results of the study called for under Alternative B. However, given the other actions outlined under Alternative B (and assuming the level of harvest pressure and natural conditions remain as they are now) the refuge's wolverine population would be expected to slowly increase and expand into suitable habitat (particularly in the northern portion of the refuge and western portions of Game Management Units 15B and 15C). Increased trapping pressure would likely require additional management action to adjust harvest levels.

Marten - The only currently known viable population of marten on the refuge would be protected from trapping under Alternative B. Marten still may be incidentally harvested during other furbearer seasons.

The study called for in this alternative would answer the question of the taxonomic status of the refuge's marten population.

If a reintroduction of marten is feasible and successful, the marten population and harvest could be increased on the refuge. Reintroduced marten would be given maximum protection from trapping by closing the management subunit to marten trapping.

Marten management may change in the future, depending on the results of the study called for under Alternative B. However, given the other actions outlined under Alternative B (and assuming the level of harvest pressure and natural conditions remain as they are now) the refuge's marten population would be expected to increase, particularly if a reintroduction is successful. Increased trapping pressure would likely require additional management action to adjust harvest levels.

Red Fox - Under Alternative B some red foxes on the refuge would survive that otherwise would be taken with firearms. The number and distribution of red foxes harvested off the refuge would be known because of the sealing requirement. This may indicate a larger fox population than is believed to exist. The few red foxes that are present would be subject to trapping during the open trapping season, but with a limit of one fox per trapper per season, intentional trapping for red fox would likely decline. Red foxes also may be incidentally caught during open seasons for other terrestrial furbearers on the refuge.

Red fox management may change in the future, depending on the results of the study called for under Alternative B. However, given the other actions outlined under Alternative B (assuming natural conditions do not change (e.g., the number of coyotes in the refuge), the refuge's red fox population would continue to exist at low levels into the foreseeable future. If coyote populations are reduced in some areas because of competition with wolves, fox populations may increase. Increased trapping pressure would likely require additional management action to adjust harvest levels.

Beaver - Under Alternative B fewer beavers would be harvested in the Swan Lake Canoe Route area and potentially in the remainder of the refuge in the short-term (assuming trappers harvest only one beaver per colony). This would allow for a moderate rate of population growth and habitat occupancy if the average colony size is 5 or more beavers per colony. After several years the increased beaver population would result in higher harvest levels.

Beaver management may change in the future, depending on the results of the study called for under Alternative B. However, given the other actions outlined under Alternative B (and assuming harvest pressures are temporarily reduced and natural conditions do not change), the refuge's beaver population would increase and occupy most suitable habitat. Increased trapping pressure would likely require additional management action to adjust harvest levels.

Coyote - Trapping has a negligible effect on the refuge's coyote population. Although fewer coyotes would be harvested with a reduction of two weeks in the trapping season (assuming the number of trappers does not change), this would have a negligible effect on the population--environmental conditions would continue to be the primary limiting factor for the coyote population. Thus, under Alternative B the refuge's coyote population would remain at its current level and would fluctuate depending upon natural factors such as prey population cycles. The relatively high population of coyotes could adversely affect expansion of the refuge's red fox population.

Effects on Other Species - With the exception of wolves, predatory furbearers covered in this assessment do not significantly affect prey population levels--other environmental conditions are the primary limiting factors affecting population levels. Wolf populations under this alternative are not expected to adversely affect the achievement of the population objective of their primary prey, moose.

Expansion of the beaver population under Alternative B would improve habitat conditions for other fish and wildlife species such as aquatic furbearers, waterfowl, shorebirds, and fish such as rainbow trout and salmon. The beaver population is not expected to increase, however, to the point where salmon spawning is adversely affected in the refuge.

The take of non-target species by trappers, such as birds of prey, would continue under Alternative B. Current state and federal regulations, trapper education, and federal permit conditions, however, would minimize the effect of this take to the extent practical.

In summary, Alternative B would have a negligible effect on the population of prey populations and non-target populations in the Kenai Refuge. The increase in the beaver population could in turn benefit other fish and wildlife populations in the refuge.

Socioeconomic Effects of Alternative B

Under Alternative B trapping would continue to have a negligible effect on the local economy. In the Canoe System, depending on the results of the study to determine the optimum number of trappers, the number of permitted trappers could increase or decrease. For the refuge as a whole, in the short-term (3 to 5 years) the proposed restrictions in this alternative would decrease opportunities for trapping of certain species (i.e., wolverine, marten, beaver). Some people might stop trapping or be displaced to other areas outside of the refuge. In the long-term, however, if furbearer populations increase as expected, opportunities for trapping and harvest would increase. The trap check requirement of Alternative B would probably slightly decrease the number of trappers--some weekend or casual trappers who are unwilling or unable to check their traps every four days would cease to trap on the refuge. Most trappers, however, in accessible areas already check their traps at least once every four days. This requirement also may increase the trappers' harvests by increasing the length of time traps are effective.

Like Alternative A, Alternative B would continue the trapping restrictions near roads and campgrounds. This would continue to reduce the potential for conflicts between trappers and other refuge users. In the rest of the refuge in the short-term, the decrease in trapping effort would decrease the potential for conflicts with other refuge users. In the long run, however, the potential for conflicts between trappers and other refuge users would increase as more and more trappers and other visitors use the refuge. Opportunities to view furbearers would increase as populations increase.

Alternative B would require the completion of an approved trapper orientation program for all refuge trappers. Trapper education should reduce incidental catch of non-target species, increase compliance and awareness of applicable regulations and reduce conflicts with other refuge users. This requirement may cause a short-term decrease in refuge trappers. However, it is not expected to decrease trapper numbers in the future.

Effects of Alternative C

Biological Effects of Alternative C

Wolf - Under Alternative C fewer wolves would be taken per hunter during the open hunting season. The wolf season harvest levels in the northern portion of the refuge (Game Management Unit 15A) would ensure that the population is not reduced below minimum acceptable levels. To ensure that the population does not fall below the minimum acceptable level, however, would require constant, costly, and time-consuming techniques. Cost could be reduced over time if harvest effects become more predictable. The numbers of wolves taken from the refuge during the relatively long season (111 days) still would occasionally necessitate emergency closures. The number of wolves taken from Unit 15A each year would be known precisely, and in a timely manner, assuming those taking wolves accurately report and seal pelts within the required 5-day interval.

Wolves could be harvested throughout the central and southern portions of the refuge (Game Management Units 15B and 15C) during the relatively long open trapping season. This could adversely impact wolf numbers, population structure and productivity.

The 15 day reduction in season length would have some impact on reducing the refuge wolf harvest, especially in the northern part of the refuge (Game Management Unit 15A) where trappers have already demonstrated they can remove twice the recommended harvest in the present 126 day season. Breeding female wolves also could be harvested late in the trapping season, thus reducing the productivity of affected packs, preventing the population from replacing losses, and reducing future harvest levels.

Alternative C would ensure that other Service objectives (i.e., moose population goals) are not adversely affected.

Overall, under Alternative C the wolf population in the refuge would remain at or slightly above its current level, assuming the level of harvest pressure does not increase, the quota system continues to work, and prey populations remain at about current levels. If trapping pressure increases, outside of Game Management Unit 15A (where there would be a quota system) additional management actions may be required to adjust harvest levels.

Wolverine - Under Alternative C wolverine within the northern portion of the refuge (Game Management Unit 15A) in this alternative would be protected from intentional harvest for 3 years, but still would be subject to incidental harvest during open seasons for other furbearers. The wolverine population

may increase and colonize unoccupied lowland habitat if human-caused mortality is a limiting factor and if suitable habitat is available. Wolverine throughout the remainder of the refuge still would be harvested at a significant rate because the season would be shortened only 15 days. This may reduce the wolverine harvest on the remainder of the refuge by an average of 10 to 15%. Some denning female wolverine still may be taken under this alternative during the open trapping season, potentially affecting population growth and expansion.

Wolverine management may change in the future, depending on the results of the study called for under Alternative C. However, given the other actions outlined under Alternative C (and assuming the level of harvest pressure and natural conditions remain as they are now) the refuge's wolverine population would be expected to slightly increase over the current level, primarily in Game Management Unit 15A. Increased trapping pressure would likely require additional management action to adjust harvest levels.

Marten - The only currently known viable population of marten on the refuge would be protected from trapping under Alternative C. Marten would be incidentally harvested during other furbearer seasons.

The study called for in this alternative would answer the question of the taxonomic status of the refuge's marten population.

If a reintroduction of marten occurs, the reintroduced marten would be protected from trapping in the habitats where they are introduced. If the reintroduction is successful, the marten population and harvest could be increased on the refuge, and eventually the marten harvest could be increased. Defining the habitat where reintroduced marten occur would be difficult, however, and protecting reintroduced marten might not be successful because of movement of marten outside of the closed area.

Marten management may change in the future, depending on the results of the study called for under Alternative C. However, given the other actions outlined under Alternative C (and assuming the level of harvest pressure and natural conditions remain as they are now) the refuge's marten population would be expected to increase, particularly if a reintroduction is successful. Increased trapping pressure would likely require additional management action to adjust harvest levels.

Red Fox - Under Alternative C some red foxes on the refuge which may have been taken with firearms would survive. The number and distribution of red foxes harvested on the refuge would be known because of the pelt sealing requirement. The few red foxes that are present would be subject to trapping during the open season, but with a limit of one fox per trapper per season intentional trapping for red fox could decline. Red foxes also may be incidentally caught during open seasons for other terrestrial furbearers on the refuge.

Under Alternative C red foxes could be reintroduced into the refuge. However, red foxes are believed to be limited on the refuge because of habitat and competition with other predators (i.e., coyote). Thus, it would be expected that such a reintroduction would not be feasible or practical on the Kenai Refuge (unless coyote populations are reduced by natural factors such as competition with wolves).

Red fox management may change in the future, depending on the results of the study called for under Alternative C. However, given the other actions outlined under Alternative C (and assuming harvest pressures remain at current levels and natural conditions do not change (e.g., the number of coyotes in the refuge)), the refuge's red fox population would remain at its current low level into the foreseeable future. Increased trapping pressure would likely require additional management action to adjust harvest levels.

Beaver - Alternative C would have about the same effect on the refuge's beaver population as Alternative B, assuming the harvest is reduced to one beaver per colony. Beaver management may change in the future, depending on the results of the study called for under Alternative C. However, given the other actions outlined under Alternative C (and assuming harvest pressures are slightly reduced and more evenly distributed compared to the past, and assuming natural conditions do not change), under Alternative C the refuge's beaver population should increase slowly. Increased trapping pressure would likely require additional management action to adjust harvest levels.

Coyote - Alternative C would have the same effect on the refuge's coyote population as described under Alternative A: assuming natural conditions do not change, the refuge's coyote population would remain controlled by natural forces. The relatively high population of coyotes may adversely affect expansion of the refuge's red fox population.

Effects on Other Species - With the exception of wolves, predatory furbearers covered in this assessment do not significantly affect prey population levels--other environmental conditions are the primary limiting factors affecting population levels. Wolf populations under this alternative are not expected to adversely affect the achievement of the refuge's population objective of their primary prey, moose.

Expansion of the beaver population under Alternative C would improve habitat conditions for other fish and wildlife species such as aquatic furbearers, waterfowl, shorebirds, and fish such as rainbow trout and salmon. The beaver population is not expected to increase, however, to the point where salmon spawning is adversely affected in the refuge.

The take of non-target species by trappers, such as birds of prey, would continue under Alternative C. Current state and federal regulations and federal permit conditions, however, would minimize the effect of this take to the extent practical.

In summary, Alternative C would have a negligible effect on the population of prey populations and non-target populations in the Kenai Refuge. The increase in the beaver population could in turn benefit other fish and wildlife populations in the refuge.

Socioeconomic Effects of Alternative C

Alternative C generally would have the same socioeconomic effects as noted under Alternative B: the effect on the local economy would be negligible; the number of trappers in the Canoe System may increase or decrease depending on the results of the study; the number of trappers in the refuge as a whole would decrease in the short-term with the proposed closures, but in the long-term the number of trappers would increase; opportunities for trapping would increase in the long-term if the populations increase; the decrease in trappers in the short-term would decrease the potential for conflicts with other refuge users, but in the long-term the increase in trappers and other refuge users would increase the potential for conflicts; and if the furbearer populations increase, opportunities to view wildlife would increase.

One difference between Alternative C and Alternative B is the trap check requirement. A 24-hour trap check requirement in accessible areas in Alternative C could significantly reduce the number of recreational trappers using the refuge in the short-term. These trappers would either stop trapping or be displaced elsewhere on the Kenai Peninsula. In the long-term, however, the number of trappers would increase, in spite of the trap check requirement, as more people move into the area. This requirement also may increase the trappers' harvests by increasing the length of time traps are effective.

Effects of Alternative D

Biological Effects of Alternative D

Wolf - The present wolf population on the refuge would receive maximum protection from human-caused mortality associated with trapping and hunting. The refuge wolf population would be limited by natural factors and hunting on the refuge, and habitat loss and human-caused mortality adjacent to the refuge boundaries. The potential for exotic diseases and parasites in wolves could increase, relative to Alternative A, as greater numbers of wolves come into contact with domestic dogs along the refuge's boundary.

If human-caused mortality of wolves off the refuge and diseases or parasites are not a significant factor(s), the refuge's wolf population would in the short-term increase above its present level. The wolf population could eventually exceed the Service's population objective of maintaining 90 wolves in the refuge. If this occurs, wolves could become a more significant predator on moose and possibly caribou in the refuge. The wolf population on the refuge may exceed a moose:wolf ratio (30:1), which was found to cause declines in moose populations in another part of Alaska. While caution must be exercised in applying these ratios to the Kenai, it may mean the Service would not meet its refuge moose population objective--with the increase in the

wolf population fewer moose would be available to predators and hunters to harvest, and for other refuge users to view. In the long-term, there could be a decrease in both the moose and wolf populations in the refuge. Very high wolf numbers also have the potential to adversely affect the refuge's caribou population and the expansion of the beaver population.

Wolverine - Under Alternative D the present wolverine population on the refuge would have no human-caused mortality associated with trapping. The refuge wolverine population would be limited by natural factors and hunting on the refuge, and by habitat loss, human-caused mortality, and natural factors adjacent to the refuge boundaries.

If human-caused mortality of wolverine off the refuge is not a significant factor, the refuge's wolverine population would increase above its current level; all suitable wolverine habitat eventually would be occupied. More wolverine would be available to hunters to harvest and for other refuge users to view. Available habitat would eventually limit the expansion of the wolverine population into the refuge.

Marten - The present refuge marten population would have no human-caused mortality associated with trapping under Alternative D. The refuge marten population would be limited only by natural factors to grow and occupy all suitable habitat on the refuge. Availability of suitable habitat may, however, significantly restrict expansion of the marten population in the refuge.

Red Fox - The red fox population on the refuge would have no human-caused mortality associated with trapping. Although the red fox population may consequently slowly expand on the refuge, other factors such as habitat and competition with coyotes may limit expansion of the population. Thus, under Alternative D the refuge's red fox population would probably continue at its existing low level. If competition with wolves reduced coyote numbers, red foxes may become more abundant and widespread than at present.

Beaver - With a trapping closure, in the short-term the beaver population would be expected to significantly expand and occupy suitable, vacant habitat at its most rapid rate. The beaver population would be limited only by natural factors. Beavers would be abundant, alternate (buffer) prey for other carnivres, such as wolves, coyotes, wolverine, and lynx. In the long-term, the refuge's beaver population would be expected to occupy all suitable habitat and stabilize at a level higher than the current population. These population levels may decrease spawning habitat for species such as salmon and increase damage to refuge facilities.

Coyote - The present coyote population on the refuge would have no human-caused mortality associated with trapping. It is unlikely that trapping mortality is influencing the refuge-wide population. Thus, eliminating trapping would have a negligible effect on the refuge's population. The refuge's coyote population would be limited by natural factors and hunting. It is expected that the coyote population would continue at its carrying capacity unless increased wolf numbers affect coyote distribution. The relatively high population of coyotes may adversely affect expansion of the refuge's red fox population.

Lynx - Under Alternative D the lynx population would be protected from all trapping. Natural factors and hunting on the refuge, and habitat loss, human-caused mortality and natural factors adjacent to the refuge boundaries would be expected to limit the increase in the refuge's lynx population. The refuge's lynx population would be expected to increase and decrease in synchrony with its prey populations.

Mink - With a trapping closure, the refuge's mink population would not be expected to increase significantly. In areas where trapping has been concentrated in the refuge (i.e., portions of the Kenai River, Swanson River, and Kasilof River drainages) mink populations may slightly increase. Natural factors would continue to limit the population.

Weasel - Because most weasels harvested on the refuge are probably trapped incidentally and their densities are probably relatively high compared to the larger carnivores, trapping is believed to have little impact on the refuge-wide population. A trapping closure would have a negligible impact on the refuge's population--natural factors would continue to limit the increase in the weasel population.

Muskrat - The Kenai Refuge does not support a large muskrat population due to suitable, available habitat. A trapping closure may have little impact on population levels. In limited areas in the refuge, such as a small portion of the Swanson and Moose river drainages, some slight increases in muskrat populations might occur. However, overall, Alternative D would be expected to have a negligible effect on the refuge's muskrat population.

River Otter - Under Alternative D the river otter population would not be impacted by trapping on the refuge. With a trapping closure, the refuge's otter population would be expected to increase slightly, particularly in areas where trapping has been concentrated in the refuge (i.e., the readily accessible northern part of the refuge). Eventually environmental factors would limit the increase of the population.

Effects on Other Species - With the exception of wolves, predatory furbearers covered in this assessment do not significantly affect prey population levels--other environmental conditions are the primary limiting factors affecting population levels. As noted above, wolf populations under this alternative could adversely affect the achievement of the Service's moose population objective for the refuge.

Maximum expansion of the beaver population in Alternative D would improve habitat conditions for other fish and wildlife species such as aquatic furbearers, waterfowl, shorebirds, and fish such as rainbow trout and salmon. On the other hand, increased number of beaver dams on streams could present obstacles for migrating and/or spawning resident and anadromous species of fish, and if not circumvented, could reduce spawning areas available to these species.

The take of non-target species by trappers, such as birds of prey, would not occur in the refuge under Alternative D and therefore these species would benefit from a closure.

In summary, Alternative D would have a negligible effect on the populations of most prey populations and would benefit non-target populations in the Kenai Refuge. The increase in the wolf population, however, could adversely affect the refuge's moose and caribou populations. The increase in the beaver population would increase some fish and wildlife populations in the refuge, but could reduce available spawning areas.

Socioeconomic Effects of Alternative D

Under Alternative D all trapping of furbearers would cease on the Kenai Refuge. It would eliminate trapping as a recreational uses of the refuge. All trappers would either stop trapping or be displaced to other areas on the Kenai Peninsula. Banning recreational trapping could conflict with one of the primary purposes of the Kenai Refuge mandated in Section 303(4)(B)(v) of the Alaska National Interest Lands Conservation Act (providing this use is compatible with the other primary purposes of the refuge). This action would have a negligible effect on the local economy.

Alternative D would eliminate conflicts between trappers and other refuge users. It also would increase opportunities for refuge users to view furbearers if the populations increase.

Table 2. Summary of the environmental consequences of the management alternatives.

RESOURCE/ USE	ALTERNATIVE A (CURRENT SITUATION)	ALTERNATIVE B (PREFERRED ALTERNATIVE)	ALTERNATIVE C (UNAFFECTED ALTERNATIVE)	ALTERNATIVE D
Wolf	The population would remain at or about its current level	The population would eventually increase to reach the Service's management objective	The population would remain at or about its current level	In the short-term the population would increase, possibly exceeding the Service's management objective; objective; such an increase would keep the refuge's moose population down; in the long-term it is likely that the moose and wolf populations would decrease
Wolverine	The population would continue to exist at very low levels	The population would slowly increase, particularly in the northern part of the refuge	The population would slightly increase over current levels	The population would increase, although available habitat would eventually limit the increase
Marten	The population would continue to exist at very low levels	The population would increase	The population would increase	The population would increase
Red Fox	The population would continue to exist at very low levels	The population would continue to exist at low levels	The population would continue to exist at low levels	The population would continue to exist at low levels
Beaver	The population would remain at its current level or slowly increase	The population would increase	The population should increase	The population would significantly increase in the short-term; in the long-term the population would occupy all available habitat and stabilize
Coyote	The population would continue at its current level	Same as Alternative A	Same as Alternative A	Same as Alternative A
Lynx	The population would be close to near natural numbers, varying in cycle with its prey populations	Same as Alternative A	Same as Alternative A	Same as Alternative A
Mink	The population would continue at about its current level	Same as Alternative A	Same as Alternative A	The population would increase in certain areas until natural factors limit the population
Weasel	The population would continue at about its current level	Same as Alternative A	Same as Alternative A	Same as Alternative A
Muskrat	The population would continue at about its current level	Same as Alternative A	Same as Alternative A	Same as Alternative A
River Otter	The population would maintain its present level, or perhaps increase	Same as Alternative A	Same as Alternative A	The population would increase in areas where trapping has been concentrated until natural factors limit the population
Other Species	Negligible effect on prey and non-target populations	Negligible effect on prey and non-target populations; the increase in the beaver population could increase other fish and wildlife populations	Negligible effect on prey and non-target species; the increase in the beaver population could increase other fish and wildlife populations	Negligible effect on most prey populations and no effect on non-target populations; the increase in the wolf population could adversely affect the refuge's moose and caribou populations; the increase in the beaver population could increase some fish and wildlife populations; the increase in the beaver population also could reduce available spawning areas
Trappers	No effect on trapping opportunities; with the expected increase in the number of trappers the potential for competition between trappers would increase	The number of trappers would decrease in the short-term; in the long-term if the furbearer populations increase there would be increased opportunities for trappers	The number of trappers would decrease in the short-term with the bag check and other requirements; in the long-term the number of trappers probably would increase and opportunities for trapping would increase	All trapping would be eliminated
Other Refuge Users	With the increase in trappers and other refuge users (e.g., skiers) there would be an increase in the potential for user conflicts in the refuge away from the roads and campgrounds; opportunities to view furbearers would remain at about current levels	In the short-term the potential for conflicts would decrease with the decrease in trappers; in the long-term, conflicts between trappers and other refuge users would increase; opportunities to view furbearers would increase if the populations increase	Same as Alternative B	Potential conflicts between trappers and other refuge users would be eliminated; opportunities to view furbearers would increase if the populations increase

SECTION 810 EVALUATION AND FINDING

Under the preferred alternative public use and other activities affecting fish and wildlife habitats would be restricted to perpetuate habitat values for fish and wildlife within all management categories. Alternative B would close portions of the refuge to all trapping of wolverine and marten for a limited time and restrict the harvest of wolf, red fox and beaver. None of these species are present in sufficient numbers that local residents subsist on their harvest. Furthermore, in the long-term if the proposed management actions are successful and the populations increase, there would be additional opportunities for local residents to harvest these species. Based on the items considered in the preparation of the Kenai Refuge Comprehensive Conservation Plan, including the detailed Section 810 evaluation found in the Record of Decision, the Service has determined that implementation of the preferred alternative will not significantly restrict subsistence uses on the refuge.

CONSULTATION AND COORDINATION

In developing the draft Kenai Refuge Furbearer Management Plan the Service extensively coordinated with the Alaska Department of Fish and Game. The Service prepared a public release on the draft plan, published notices in the local paper, and sent copies of the draft out to the public for review and comment. The Service received over 400 comment letters from the public on the draft plan. The Service also held a charrette on furbearer management for the Kenai Refuge on December 2-4, 1987, in Soldotna. Representatives of the National Audubon Society, Alaska Wildlife Alliance, Alaska Outdoor Council, Kenai Peninsula Trappers Association, Alaska Board of Game, Alaska Department of Fish and Game, local public, and the U.S. Fish and Wildlife Service met to try and develop a mutually acceptable set of strategies for the management of furbearers and their uses on the Kenai Refuge.[a/]

In response to the public comments on the draft plan and the recommendations of the charrette the Service has substantially modified its preferred alternative (Alternative B) for managing furbearers on the Kenai Refuge from the recommendations in the draft Furbearer Management Plan.

The Service accepted comments, suggestions and recommendations from the public on this environmental assessment for 45 days. The comment period ended on February 26, 1988. A decision document on the action taken by the Service, a summary of the comments on the draft environment assessment, and a description of how the assessment was modified, if necessary, to address the public comments will be sent to all those individuals and groups that commented on the environmental assessment or expressed an interest.

[a/] A summary of the Kenai Furbearer Management Charrette is available at the refuge headquarters in Soldotna and in the Service's Anchorage regional office.

Based on its selection of Alternative B (modified) as the final prefered alternative, the Service will be forwarding recommendations to the state Board of Game as appropriate. Under its Memorandum of Understanding with the Alaska Department of Fish and Game, the Service cooperatively manages the fish and wildlife resources of the Kenai Refuge. The desired approach of the Service is for the Board of Game to implement any proposed closures or changes in harvest regulations on the Kenai Refuge. If this is not possible, the Service will consider other alternatives such as modifying permit conditions or establishing appropriate federal regulations.

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