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Summary of the

Draft Environmental Impact Statement

for the *Exxon Valdez* Oil Spill Restoration Plan

Prepared by:

***Exxon Valdez* Oil Spill Trustee Council**

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June 1994

Exxon Valdez Oil Spill Trustee Council

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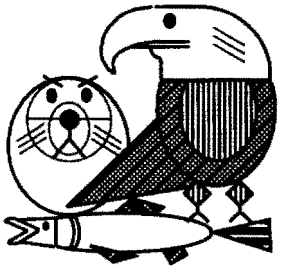


June 1994

Dear Interested Citizen:

We are soliciting your review and comments on this *Summary Draft Environmental Impact Statement* for the *Exxon Valdez Oil Spill Restoration Plan.* The entire *Draft Environmental Impact Statement* is available upon request at the address below. The comment period will extend for 45 days during June and July. Open House meetings to take public comments are scheduled as follows:

Date	Community	Time	Address
June 27, 1994	Anchorage	4:00-8:00 PM	EVOS Trustee Council Restoration Office 645 G Street, Suite 100
June 29, 1994	Seward	4:00-8:00 PM	Kenai Fjords National Park Visitor's Center 1212 4th Ave., Small Boat Harbor
July 1, 1994	Homer	4:00-8:00 PM	City Council Chambers 491 E Pioneer Ave.
July 5, 1994	Kodiak	4:00-8:00 PM	Alaska Dept. of Fish and Game Conference Room 211 Mission Rd.
July 7, 1994	Cordova	4:00-8:00 PM	U.S. Forest Service Third Floor Conference Room 612 Second Street
July 19, 1994	Valdez	4:00-8:00 PM	City Council Chambers 212 Chenega Ave.

Please send written comments to:

ExxonValdez Oil Spill Trustee Council
Attn: EIS Comments
645 G Street, Suite 401
Anchorage, AK 99501-3451

To conserve paper and save on postage costs, this document is also available on computer diskette. Contact the Oil Spill Public Information Center at the above address or by calling 907/278-8012, toll-free within Alaska at 1-800-478-7745, from outside Alaska at 1-800-283-7745 to request a diskette.

This is an important opportunity for you to comment on the restoration approaches the Trustee Council will be using. We look forward to receiving your comments.

Sincerely yours,

Exxon Valdez Oil Spill Trustee Council

Draft Environmental Impact Statement

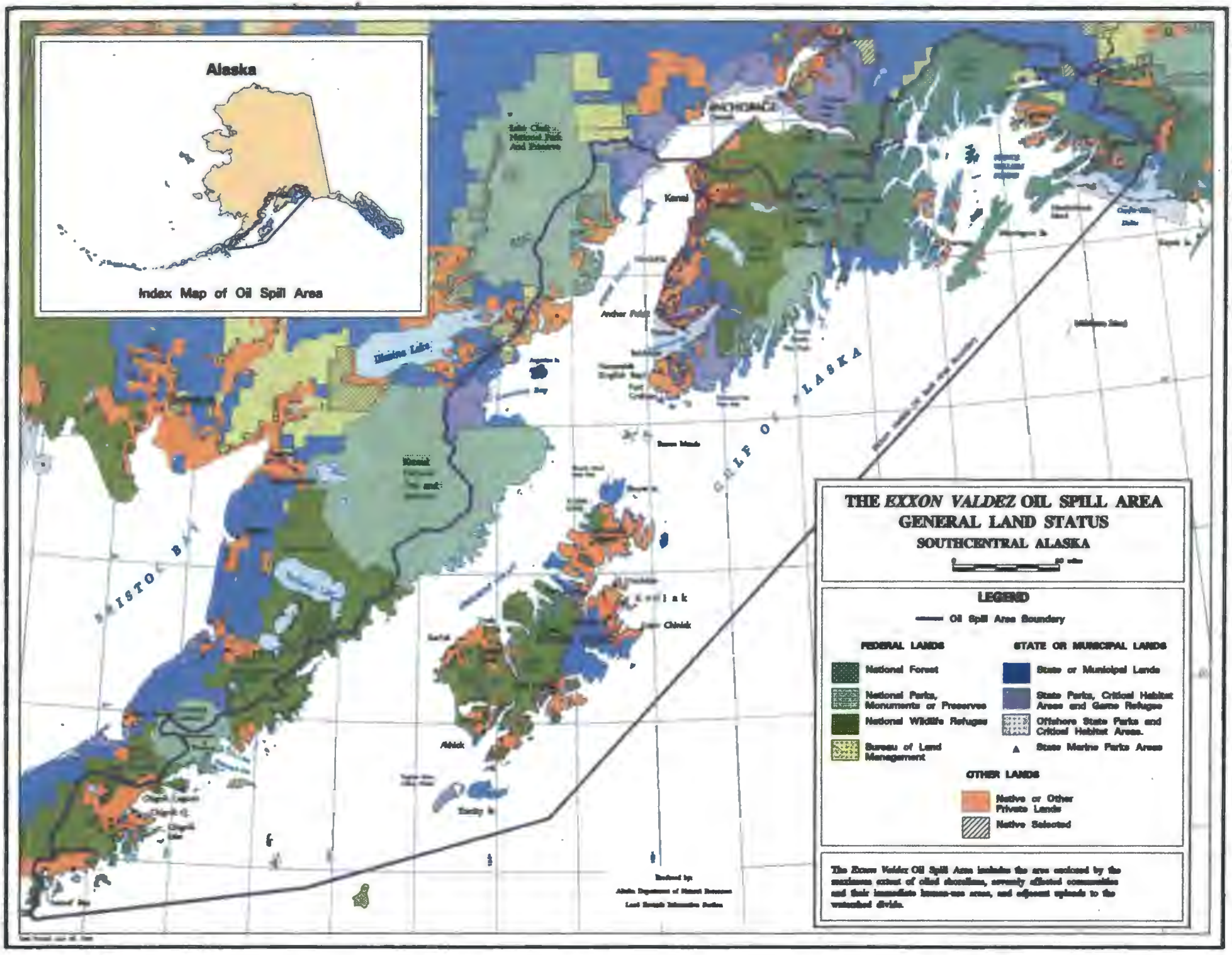
Exxon Valdez Resroration Plan

Lead Agency	U.S.D.A. Forest Service Alaska Region
Responsible Officials	The Secretary of Agriculture The Secretary of Commerce The Secretary of the Interior
For Further Information	Rod Kuhn EIS Project Manager *Exxon Valdez* Restoration Office 645 G Street, Suite 401 Anchorage, AK 99501-3451 907 278-8012

Abstract

The *Exxon Valdez* Trustee Council issued a draft Restoration Plan in November of 1993. The draft Restoration Plan provides long-term guidance for restoring the resources and services injured by the *Exxon Valdez* Oil Spill of March 24, 1989. This draft Environmental Impact Statement (DEIS) analyzes the potential environmental impacts of the draft Restoration Plan as the Proposed Action - Alternative 5, and four other alternatives that provide different policies and emphasis than the proposed action. The alternatives are: (1) No Action, normal agency management would occur, but no restoration actions would be funded from by the Trustees; (2) Habitat Protection, habitat acquisition and protection actions would be the only restoration actions pursued; (3) Limited Restoration, a mix of habitat protection, monitoring and research, and general restoration actions would be implemented for the most severely injured resources and services; (4) Moderate Restoration, habitat protection, monitoring and research, and general restoration would be used to restore all injured resources and services; (5) the Proposed Action (Draft Restoration Plan), uses all three restoration categories to restore the injured resources and services, but places a greater emphasis on monitoring and research than any other alternative, while still emphasizing habitat protection; general restoration actions would be used primarily for resources and services that are still not recovering.

Reviewers should provide the Trustees with their comments during the review period of the draft environmental impact statement. This will enable the Trustees to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental impact statement, thus avoiding undue delay in the decisionmaking process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions. Vermont Yankee Nuclear Power Corp. v. NRDC. 435 U.S. 519, 553 (1978). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final environmental impact statement. City of Angoon v. Hodel (9th Circuit, 1986) and Wisconsin Heritage, Inc. v. Harris, 490 F. Supp. 1334, 1338 (E.D. Wis. 1980). Comments on the draft environmental impact statement should be specific and should address the adequacy of the statement and the merits of the alternatives discussed (40 CFR 1503.3).


Alaska
Index Map of Oil Spill Area
ANCHORAGE
Kenai
Iliamna Lake
GULF OF ALASKA
BRISTOL BAY
Kodiak
Chignik
THE EXXON VALDEZ OIL SPILL AREA
GENERAL LAND STATUS
SOUTHCENTRAL ALASKA
LEGEND
Oil Spill Area Boundary
FEDERAL LANDS
National Forest
National Parks, Monuments or Preserves
National Wildlife Refuges
Bureau of Land Management
STATE OR MUNICIPAL LANDS
State or Municipal Lands
State Parks, Critical Habitat Areas and Game Refuges
Offshore State Parks and Critical Habitat Areas.
State Marine Parks Areas
OTHER LANDS
Native or Other Private Lands
Native Selected
The Exxon Valdez Oil Spill Area includes the area enclosed by the maximum extent of oiled shorelines, severely affected communities and their immediate resource areas, and adjacent uplands to the watershed divide.

Summary

Exxon Valdez Oil Spill Restoration Plan Draft Environmental Impact Statement

Background of the Proposed Action

The *Exxon Valdez* Oil Spill

On March 24, 1989, the tanker *Exxon Valdez* ran aground on Bligh Reef in Prince William Sound, Alaska, causing the largest tanker oil spill in U.S. history. Approximately 11 million gallons of North Slope crude oil subsequently moved through southwestern Prince William Sound and along the western coast of the Gulf of Alaska, causing injury to both natural resources and services (human uses) in the area. Figure S-1 shows the extent of surface oiling as recorded by satellite imagery and aerial observation at the time of the spill.

Because the weather for the first 3 days following the spill was calm, the oil did not move from the immediate area, although the slick expanded during that time. On the fourth day, however, a major storm moved oil through Prince William Sound to the southwest, where it reached beaches on Little Smith, Naked, and Knight Islands. Within 6 days of the spill, oil had reached the Gulf of Alaska. The leading edge of the oil slick reached the Chiswell Islands and the Kenai Peninsula by April 2 and the Barren Islands by April 11. By the middle of May 1989, some 470 miles of shoreline had been oiled, including parts of Prince William Sound, the Kenai Peninsula, the Kodiak Archipelago, and the Alaska Peninsula. During the summer of 1989, oil from the spill was found as far as 600 miles from Bligh Reef, the site of the grounding.

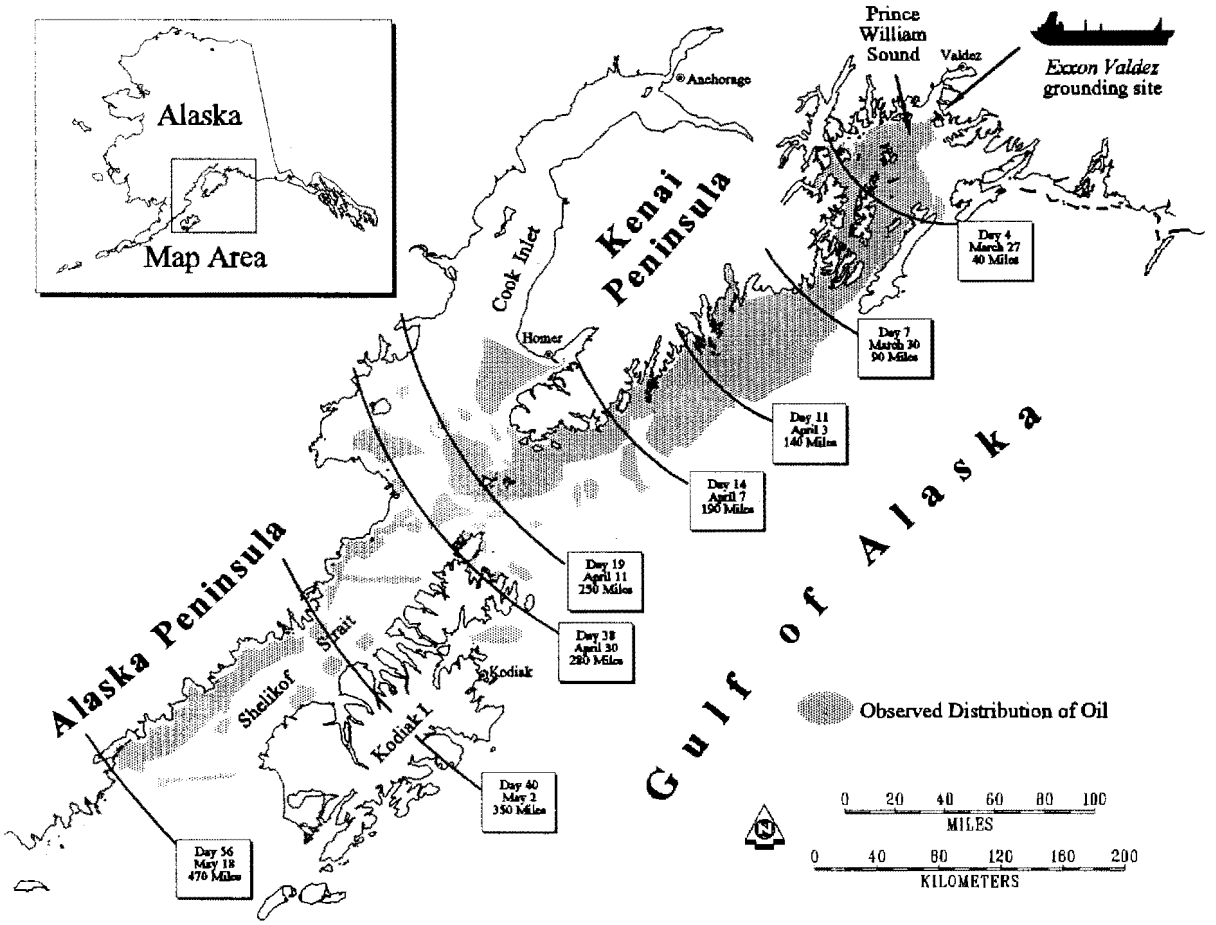
Immediately following the spill, efforts to clean the oiled beaches and to assess the extent of the damage began. Federal agencies, the State of Alaska, private citizens, and the Exxon Corporation and its contractors mobilized treatment efforts on the oiled shorelines. In the

Summary

water, containment booms were used to corral the oil. On the beaches, high-pressure hot-water washing, manual rock washing, and bioremediation techniques were among the methods used to remove oil from the shoreline.

Scientists initiated studies during the summer of 1989 to determine the nature and extent of injury to area plants and animals. Although studies began as soon as possible following the spill, some opportunities to gather data were lost; the shortage of resources and the difficulty of the work made immediate response impossible. In 1989, 72 studies were carried out in 10 categories of natural resources and related services. The number of studies in progress has decreased steadily since 1989, but research is continuing on the effects of residual oil in the ecosystem and on the natural recovery process.

Figure S-1



Purpose of the Proposed Action

The purpose of the proposed action analyzed in this draft environmental impact statement (DEIS) is to restore, in so far as possible, the injured natural resources and thereby the services they provide affected by the *Exxon Valdez* oil spill (EVOS). The purpose of this document is to analyze the effects of proposed uses of the remaining funds (approximately $620 million as of February 1994, after final reimbursements) in accomplishing the mission of the Trustee Council. The Trustee Council previously completed project-specific National Environmental Policy Act (NEPA) documentation on the time-critical restoration projects undertaken in the 1992 through 1994 Annual Work Plans. This DEIS will analyze the 1995 through 2002 program under which the Annual Work Plans will be developed.

The Draft Restoration Plan issued by the EVOS Trustee Council in November 1993 is one of five general approaches to restoration analyzed in this DEIS. The final restoration approach--which will be published in the Final Restoration Plan--will be decided by the Trustee Council. The impact analysis in this draft environmental impact statement (DEIS) will be considered in their decision. The Final Restoration Plan will provide broad, long-term guidance for implementation of restoration activities to restore resources and the services they provide that were injured during the EVOS in the area shown in the *Exxon Valdez* Oil Spill Area map preceding the first page of this document. (The EVOS area includes the area enclosed by the maximum extent of oiled shorelines, severely affected communities and their immediate human-use areas, and uplands adjacent to the watershed divide.)

Planning Process

Alternatives for the Draft Restoration Plan were prepared for public review and comment in the publication, Draft *Exxon Valdez* Restoration Plan Summary of Alternatives for Public Comment, EVOS Trustee Council, April 1993. The brochure described five alternative courses of action, including the no action alternative; explained the evaluation criteria used; and outlined the differences among each of the alternatives. It also discussed an approach to implementing the alternatives; and it covered administration, funding allocation guidelines and mechanisms, monitoring, and public participation.

This DEIS was written to inform public officials and citizens of potential environmental effects that could result from implementation of the Restoration Plan. This will allow decisions about the Restoration Plan to be based on an understanding of the environmental consequences. Because decisions made in the restoration process may authorize the use occupancy, or disposition of Federal public lands, the Draft Restoration Plan is also subject to evaluation with respect to its impact on subsistence uses in accordance with §810 of the Alaska National Interest Lands Conservation Act (ANILCA).

The DEIS is a requirement under Federal law (NEPA, 1969) for the Federal actions that will take place under the Restoration Plan. The State of Alaska is cooperating in this DEIS because the Trustee Council will implement actions that are jointly funded.

As a programmatic DEIS, this document does not address site-specific situations, proposals, or regulations. Such matters will be dealt with in subsequent Annual Work Plans issued by the Trustee Council. Such individual matters may also be subject to further review under NEPA as well as §810 of ANILCA.

Summary

A brief discussion of the environmental impact statement (EIS) process follows.

Notice of Intent

On April 10, 1992, a Notice of Intent to prepare an EIS for the development of a restoration plan following the March 24, 1989, *Exxon Valdez* oil spill was published in the Federal Register (57 FR 12473). This notice stated that public meetings would be held throughout the EVOS area to solicit comments on the Restoration Plan and possible effects on resources and services.

On January 14, 1994, a Revised Notice of Intent to prepare an EIS was published in the Federal Register (59 FR 2352). An opportunity to submit additional comments was opened through February 1994, and a public meeting was held in Anchorage on January 27, 1994.

Scoping

The Council on Environmental Quality defines scoping as "an early and open process for determining the scope of issues to be addressed in an EIS and for identifying the significant issues related to a proposed action" (40 CFR 1501.7). It is a means for early identification of important issues deserving analysis in an EIS. The scoping process for this EIS is discussed in greater detail later in this summary.

Preparation of the Draft Environmental Impact Statement (DEIS)

The DEIS has several parts. It describes the proposed action and alternatives and the potentially affected physical, biological, and human environments; provides an analysis of potential adverse effects; describes mitigating measures to reduce adverse effects; and presents a record of consultation and coordination with others during the DEIS preparation. The DEIS is filed with the Environmental Protection Agency (EPA), and its availability is announced in the Federal Register.

Public Comment Period

A 45-day public comment period follows the release of the DEIS. During this period, public meetings and at least one hearing are held, and oral and written comments are requested from the public. Specific dates and locations for the public meetings and hearing(s) will be announced.

Preparation of the Final EIS (FEIS)

Oral and written comments on the DEIS are addressed in the FEIS. Any needed revisions are made to the FEIS before it is filed with EPA and made available to the public by announcement in the Federal Register.

Record of Decision (ROD)

Oral and written comments on the DEIS are addressed in the FEIS. Any needed revisions are made to the FEIS before it is filed with EPA and made available to the public by announcement in the Federal Register.

Implementation

The selected alternative for the Final Restoration Plan are implemented after a final ROD has been signed.

Major Issues Addressed

The interdisciplinary team (IDT) assigned to write the DEIS reviewed and analyzed the concerns and ideas expressed in the public involvement and interagency scoping. The following issue statements describe those concerns and ideas in general terms. The issue statements were evaluated to decide which issues were significant and should be addressed in the DEIS.

The public, agencies, community leaders, and other knowledgeable individuals and organizations raised many issues during the scoping process. The agencies identified the significant issues based on "reviews of similar actions, knowledge of the area or areas involved, discussions with community leaders, and/or consultations with experts and other agencies familiar with such actions and their effects" (Forest Service Handbook 1909.15 [11.5]). These issues are addressed in this document.

Issues Addressed in the EIS

Five of the issues raised during scoping were determined to be relevant to the environmental impact analysis and will be used to evaluate each alternative. Brief explanations of these issues are presented below.

Issue 1: How would restoration activities contribute to restoring injured resources and services?

This issue is central to the analysis performed in the EIS and the evaluation of restoration option effectiveness presented in the Draft Restoration Plan. In particular, the public is interested in how the rate of recovery of the resources affected by the spill will be affected by implementation of the restoration activities. The rate and degree of recovery could be measured by changes in population or distribution of species, the time required for recovery, or other factors. Besides changes in population and diversity, habitat conditions, and acreage or sites protected from development or other physical encroachment, changes in human use or management or changes in aesthetic quality also could affect the rate and degree of recovery.

Issue 2: How would activities directed at injured resources and services affect other resources and services?

Each of the proposed restoration options aims to aid injured resources and services; however, the potential exists for other resources and services to be affected as well. Although an action could be designed to improve recovery of a specific resource, the same action also could indirectly affect other resources and services. Potential impacts include changes in the number or structure of other species populations as a result of restoration-associated changes in the amount or quality of available habitat or food sources.

There would be no adverse impacts to these other resources from any of the alternatives under consideration in this DEIS other than those shown in the economic analysis. The benefits to these other resources would be in the nature of restoring or protecting their habitat and/or increasing their food supply as secondary benefits of restoring or protecting the habitat of an injured resource.

Issue 3: What ecological change would occur in the spill area as a result of restoration activities?

Ecological recovery in the spill area is the intent of the proposed restoration activities. The anticipated result of the combined restoration efforts is recovery of the ecosystem to prespill conditions and overall biodiversity levels.

Issue 4: How would restoration activities affect land uses, local economies, and communities?

Some proposed restoration activities may result in the creation or elimination of jobs; and the number and kinds of new jobs, as well as the income associated with them, are of interest to the public. A concern is that employment could be reduced in some resource development industries that may be adversely affected by some restoration options. The effect of increased or decreased employment on the economy and services of the local communities also concerns the public, as well as government agencies and private industry.

For example, the public has anticipated that changes in land use could result from land acquisition for protection of habitat. Ownership of some land could move from the private sector to the public sector. Increased protection of lands already under public management may be considered. Some changes in existing land management strategies could decrease opportunity for such activities as logging and mining; others could increase access to recreation sites and maintain opportunities for commercial tourism. The economic and infrastructure implications of these changes are considered in this document.

Issue 5: What changes to subsistence uses would occur as a result of restoration activities?

Some of the proposed restoration options are directed at restoring subsistence uses of resources in the spill area. Subsistence use was affected by contamination of resources used for subsistence and by users' perception of contamination. Subsistence users also report declines in the abundance of many subsistence resources. Restoration activities may focus on increasing the abundance of natural resources in the area used for subsistence. Subsistence use also may be affected by the implementation of options that are not intended to specifically address subsistence use; this potential for secondary impact is considered in the analysis of the alternatives.

There are continuing human health and safety concerns that certain resources used for subsistence may have been contaminated. Eating oil-contaminated food is harmful to humans, as is direct physical contact with crude oil. To avoid injury to humans, fisheries were closed and harvesting of affected species was discouraged immediately after the spill occurred. Some of the restoration activities aim to decrease the levels of harmful hydrocarbons in resources used for subsistence. Others focus on obtaining information to determine the level of persistent contamination, if any, in harvested resources.

Impact Topics

The IDT considered the various proposed alternatives and the issues raised in public comment and selected the following impact topics to cover these issues analytically. Some of the key factors that were considered included: whether any actions are proposed that are likely to have an environmental impact; and, the issues and concerns raised by the public during scoping. This information along with the public comment, and the recovery status of

the resources and services is the basis for the decision to analyze the impacts to the following resources and services:

Fish

Pink Salmon	Sockeye Salmon
Pacific Herring	

Intertidal Resources (Such as Clams, *Fucus*, Mussels, Limpets, etc.)

Marine Mammals

Harbor Seals	Sea Otters

Birds

Common Murres	Harlequin Duck
Marbled Murrelet	Pigeon Guillemot

Other Resources

Designated Wilderness Areas	Archaeology

Services

Commercial Fishing	Sport Fishing
Recreation	Tourism
Subsistence	

In addition to the resources and services analyzed in this DEIS, the restoration program may include other resources with injuries related to the spill. These resources include killer whales, river otters, bald eagles, black oystercatchers, rockfish, and subtidal organisms. At this time, actions that have been identified for these resources are primarily monitoring and research activities, or management based actions. These types of actions are outside the scope of analysis in this DEIS.

The NEPA requires an analysis of impacts on the human environment. Some topics required to be studied by NEPA are not affected by the proposed action. These include land use plans and coastal zone management plans.

Alternatives

This summary describes the array of management alternatives considered in the development of the *Exxon Valdez* Restoration Plan. It covers the five alternatives for restoration, including the "no action" alternative. For more detailed information about the alternatives, please refer to the Draft *Exxon Valdez* Oil Spill Restoration Plan Summary of Alternatives for Public Comment (EVOS Trustee Council, April 1993; hereafter referred to as the brochure) and the Draft *Exxon Valdez* Oil Spill Restoration Plan (EVOS Trustee Council, November 1993).

Each of the alternatives addresses policies for selecting possible restoration activities. Each of the alternatives is made up of variations of four basic categories of activities: (1) Habitat Protection and Acquisition; (2) General Restoration of resources and services; (3) Monitoring and Research; and (4) Administration and Public Information. The General Restoration category contains general types of actions designed to achieve a particular

objective in relation to an injured resource. ("Actions" is the term used to refer to site-specific projects to be implemented to achieve the goals of the alternative.) The analysis in this draft environmental impact statement (DEIS) pertains to the alternatives and the their associated action patterns but does not consider individual actions. Appropriate site-specific environmental analysis will be conducted by the appropriate agencies for all future actions.

Alternative 5 contains an element not present in the other alternatives. In response to public comments that a fund should be set aside for long-term restoration and research activities, the proposed action includes the establishment of a Restoration Reserve.

Alternative 1: No Action

The "no action" alternative required by the NEPA consists entirely of normal agency management activities. If this alternative were implemented, current management would continue, no new activities or programs would be instituted as a result of the oil spill, and the scope of present activities and programs would not change. Agency monitoring of natural recovery would remain at present levels, and agency responsibilities would remain unchanged. None of the remaining funds from the civil settlement would be spent if this alternative were implemented.

Alternative 2: Habitat Protection

The goal of Alternative 2 is to provide maximum protection of strategic lands and habitats important to the long-term recovery of injured resources and the services they provide. Monitoring and Research and Habitat Protection and Acquisition are the only restoration actions included in this alternative. The primary means of protection in this alternative is the acquisition of private land interests or changes in the management of currently held public lands. Monitoring and Research would be conducted to evaluate the effectiveness of protection measures and to track the recovery of damaged resources and services. Actions that may be undertaken under this alternative would be confined to the area affected by the oil spill.

Policies

- Habitat of injured resources and the services they provide within the spill area will be protected from degradation or disturbance.
- Restoration actions will address all injured resources and the services they provide.
- Restoration actions for recovered resources will continue even after a resource has recovered.
- The location of restoration actions will be limited to the spill area.
- Habitat Protection will be used to protect or increase existing human use of the spill area.

Alternative 3: Limited Restoration

Alternative 3 focuses on accelerating recovery of the resources and services most severely injured by the oil spill. This alternative targets resources whose populations declined as a result of the spill and that have not yet recovered. Only actions determined to be most likely to produce significant improvements over unaided natural recovery are included in this alternative. All restoration actions included in Alternative 3 will be confined to the spill area.

Habitat Protection is a major part of this alternative; none of the proposed actions would substantially increase human use within the spill area. Monitoring and Research are also included in Alternative 3.

Policies

The most effective actions will be taken within the spill area to protect and restore all injured resources and thereby the services they provide except those biological resources whose populations did not measurably decline . The existing character of the spill area will be maintained.

- Restoration actions would address all resources ***except*** those biological resources whose populations did not measurably decline.
- Restoration actions for recovered resources will cease once a resource has recovered.
- Restoration actions will be conducted that provide substantial improvement over natural recovery.
- The location of restoration actions will be limited to the spill area.
- Restoration actions will be used to restore injured resources and thereby protect existing human use of the spill area.

Alternative 4: Moderate Restoration

This alternative is broader than Alternative 3 in that it aims to aid recovery of all injured resources and the services they provide; not just those with population level injuries. Restoration actions included in Alternative 4 address only those resources and services that have not yet recovered from the oil spill. It is also broader than Alternative 3 in terms of the resources addressed; in Alternative 4, measures would be taken to aid recovery of resources that sustained sublethal injuries. Actions that are judged to provide substantial improvements over unaided recovery would be implemented. The actions in this alternative would be confined to Alaska but could extend beyond the spill area. Habitat Protection is included in this alternative, but to a lesser extent than in Alternatives 2 and 3. This alternative may increase opportunities for human use to a limited extent. Monitoring and Research may be conducted.

Policies

- The most effective actions to protect and restore all injured resources and thereby the services they provide will be taken. Opportunities for human use of the spill area will be increased to a limited extent.
- Restoration actions will address all injured resources.
- Restoration actions for recovering resources will cease once a resource has recovered.
- Restoration actions will be conducted that provide substantial improvement over natural recovery.

- Restoration actions could occur anywhere there is a link to injured resources.

- Restoration actions would be used to restore injured resources and thereby protect or increase existing human use of the spill area.

Alternative 5: The Proposed Action Comprehensive Restoration

This represents a modification of the Alternative 5 shown in the Draft *Exxon Valdez* Restoration Plan Summary of Alternatives for Public Comment (EVOS Trustee Council, April 1993). Alternative 5 is the broadest in scope of the proposed alternatives. This alternative will help all injured resources and the services they provide within the spill area and, under specific circumstances, in other parts of Alaska. Unlike Alternatives 3 and 4, this alternative will allow actions to aid resources that have already recovered, as well as those that have not. Actions likely to produce some improvement over unaided recovery will be allowable under this alternative. Habitat Protection is the largest part of this alternative. Alternative 5 also allows for expansion of current human use and allows for appropriate new uses through the restoration of natural resources. Monitoring and Research will be at the highest levels in this alternative.

Alternative 5 contains an element not present in the other alternatives. In response to public comments that a fund should be set aside for long-term restoration and research activities, the proposed action includes the establishment of a Restoration Reserve.

Policies

- Restoration activities may be considered for any injured resource.

- Restoration activities will occur primarily within the spill area. Limited restoration activities outside the spill area, but within Alaska, may be considered under the following conditions:
  1) when the most effective restoration actions for an injured migratory population are in a part of that population's range outside the spill area, or
  2) when the information acquired from research and monitoring activities outside the spill area will be significant for restoration or understanding injuries within the spill area.

- Restoration activities will emphasize resources that have not recovered.

- Resources may be enhanced, as appropriate, to promote restoration. Restoration projects may not adversely affect the ecosystem.

- Projects designed to restore or enhance an injured service:
  1) must benefit the same user group that was injured, and
  2) should be compatible with the character and public uses of the area.

Comparison of Alternatives

The essential variation among the alternatives has to do with the balance between Monitoring and Research, Habitat Protection, and General Restoration activities. Alternative 2 principally consists of Habitat Protection with no restoration activities. Alternative 4 places the greatest emphasis on General Restoration activities. Alternative 5 proposes a greater emphasis on Monitoring and Research than the other alternatives while still emphasizing Habitat Protection.

Alternatives 3, 4, and 5 vary in terms of the scope of restoration activities proposed. Restoration in Alternative 3 would be limited to actions that would significantly aid natural recovery of the most injured resources; all actions would be taken only in the spill area.

Alternative 4 envisions actions that would aid recovery of all injured resources and services, not just the most injured. These actions could take place within or outside the spill area; none would occur outside the State of Alaska. Alternative 5 is the most comprehensive in its approach in that all injured resources and services could be aided, regardless of the degree of initial injury or recovery status. As in Alternative 4, actions could take place within the spill area or elsewhere in the State of Alaska. Under the Alternative 5 approach, not only would assistance to recovery of injured resources occur, but also actions to expand current uses and to encourage new uses would be taken.

Environmental Consequences

This section contains the analysis of the environmental consequences that could result from implementing the five alternatives described. In many EIS's the analysis focuses on the numbers or degree of loss to various resources. It is an important distinction of this EIS that with few exceptions, the impacts estimated to occur under the various alternatives are increases in populations or services from some existing injured level.

The analysis of impacts is based in large part upon what has been learned from studies carried on since the EVOS. Much of this research has focused on the area of Prince William Sound. As a result, most of the estimated impacts from actions in the alternatives are based on what we have learned from the Prince William Sound studies and extrapolated for analysis in the other areas of the EVOS.

The current situation provides the basis for comparing the effects of the action alternatives. In this programmatic document, it should be noted that the No Action Alternative consists of normal agency management activities and the assumptions that (1) natural recovery will be the only restoring agent at work and (2) private land owners will harvest their commercial timber lands in the long term.

If the No Action Alternative were implemented, current management would continue, no new activities or programs would be instituted as a result of the oil spill, and the scope of present activities and programs would not change. Agency monitoring of natural recovery would remain at present levels, and their responsibilities would remain unchanged. None of the remaining funds from the civil settlement would be spent at this time on restoration activities if this alternative were implemented.

Monitoring and research, as actions, generally do not impact resources and services and therefore are analyzed only for their economic impacts. It is recognized that the general restoration category also includes such actions as data gathering, surveys, and analysis that would not impact the resources--thus these activities would not be included in the EIS analysis except for the impacts on the economy.

"Recovery"

The definition of the term recovery has a significant bearing on the discussion of the various alternatives described in this summary. The settlement funds may be used for the purpose of, ". . . restoring, replacing, enhancing, rehabilitating, or acquiring the equivalent of natural

resources injured as a result of the *Exxon Valdez* oil spill and the reduced or lost services provided by such resources." The goal of restoration is recovery of all injured resources and services. For some resources, little is known about their injury and recovery, so it is difficult to define recovery or develop restoration strategies.

In the analysis of impacts to the various resources in the EIS, it may be that an action will accelerate the rate of recovery and not measurably impact the number of individuals in the population for several years. This is still viewed as having a significant beneficial impact on the resource analyzed.

In general, resources and services will have recovered when they return to conditions that would have existed had the spill not occurred. Because it is difficult to predict conditions that would have existed in the absence of the spill, recovery is often defined as a return to prespill conditions. For resources that were in decline before the spill, such as marbled murrelets, recovery may consist of stabilizing the population at a lower level than before the spill.

Alternative 1: No Action

Biological Resources

Intertidal Zone. With the exception of certain habitats and specific organisms, the intertidal zone has largely recovered from the effects of EVOS. *Fucus* and the organisms associated with the rockweed, still have not recovered in the upper intertidal zone, and many mussel beds are still contaminated with oil. With no intervention, it may take over a decade before the algal based communities resemble the prespill condition. The oil that is trapped beneath mussels is likely to remain unweathered for many years. The consequences of the presence of these sources of relatively fresh oil is unknown, but they may have negative impacts on other organisms that rely on mussels for prey.

Marine Mammals

Harbor Seals. At this time, there is too little information available to predict when the populations within the EVOS area will recover. Recovery is unknown for all regions of the spill area.

Sea Otters. Assuming moderate growth rates, a low immigration rate, and that the subsistence level remains negligible, sea otters in Prince William Sound could recover in 7 to 35 years after the population begins to increase. For other regions in the EVOS area, the populations should return to their prespill levels in less time.

Birds

Harlequin Duck In the short term through 1995, populations likely will remain at 1990 - 1993 levels in both oiled and nonoiled areas. However, if reproductive failure continues in harlequin ducks in the oiled area, natural mortality would cause the population to decrease. No measures to restore the injured harlequin duck population would be taken, nor would the status of the injured population be known. The long-term effects of this alternative would possibly be a loss of critical nesting habitat in forested riparian habitat and subsequent reduction of reproduction capacity in the EVOS area.

Murres. Over the long term, this alternative could take the Barren Islands population 20 to 80 years to recover fully. However, recent insight on population recovery of common murre populations, based on 20 years of data from the Bering Sea, suggests that the population at the Barren Islands may recover within 20 years (Roseneau, oral comm., 1994).

Pigeon Guillemot. The short-term effects of this alternative on the injured pigeon guillemot population in Prince William Sound through 1995 are expected to be negligible. Expected effects outside of Prince William Sound are unknown. The local population at Naked Island may continue to decrease slowly on the short term, but on the long term through 2001, the guillemot population for all of Prince William Sound should stabilize or slowly increase. This alternative would have a low-negative overall effect on recovery of the pigeon guillemot population.

Marbled Murrelet Projected logging with the accompanying loss of nesting habitat, on the long term, may have a low-to-moderate negative effect on recovery of the injured murrelet population.

Fish

Pink Salmon. No changes are expected within one life cycle, however, long-term recovery of the injured pink salmon resource is expected to require approximately 20 years (10 generations), however, the recovery of wild stocks may never recover to 100 per cent of the prespill population (EVOS Trustee Council, April 1993). Because of inheritable changes in egg survival, it is likely that there may also be a 10-percent reduction of the population of pink salmon within Prince William Sound (Spies, 1994). Fortunately, this reduction is not expected throughout the entire EVOS area. Wherever spawning habitat may become reduced as a result of developmental activities, however, pink salmon populations may be further affected.

Sockeye Salmon. No recovery can be expected to accrue in one life cycle, but a long-term recovery may be expected within 10 to 50 years and it is reasonable to expect that the injured populations may recover to prespill conditions (EVOS Trustee Council, April 1993). However, there also is a moderate risk that the zooplankton populations and populations of sockeye salmon fry may never achieve the same balance of prespill conditions or that some habitat degradation may occur because of developmental activities.

Pacific Herring. No improvements are expected to accrue within one life cycle. The long-term recovery of Pacific herring is unknown because, although there is evidence to suggest that the EVOS had an effect on Pacific herring reproduction, it is not possible to blame their population declines solely on the oil spill (Spies, 1994). Ultimately, however, some spawning groups may not recover to prespill conditions and some can be expected recover sooner than others.

Social and Economic Impacts

Archaeological Resources. Under this alternative, cultural resources in the spill area would not be protected, enhanced, or understood better than at present. Over the short term, the impacts of this alternative would be negligible since it is expected that any changes would be gradual. Over the long term, this would constitute a low negative impact to archaeological and historical sites and to the understanding and appreciation of cultural resource values as they apply to the spill area.

Subsistence. In the No Action Alternative, the existing trends in subsistence harvest species populations and subsistence use are likely to continue over the long term, though changes are expected to occur gradually. The continued hiatus in subsistence activities would have negligible short-term and potentially high, potentially permanent, long-term negative effects on the perpetuation of cultural values and subsistence uses within some of the villages in the spill area.

Recreation and Tourism. The short-term impacts of the No Action Alternative on recreation and tourism would be negligible since all changes are expected to be gradual. The long-term effects would be low level negative impacts to tourism and moderate negative impacts to recreation, these effects stemming from continued damage to the resources on which these service depend.

Wilderness. The short-term negative impact to Designated Wilderness and Wilderness Study Areas, and to the wilderness character of other lands, would be negligible because of the slow rate at which changes are expected to accrue. The long-term negative impact to Wilderness Areas and Wilderness Study Areas would be moderate, resulting from persistence of oil and of public perceptions of recovery of designated Wilderness Areas and Wilderness Study Areas, and a lack of protection for wilderness qualities in de facto wilderness.

Commercial Fishing. No observable improvements are expected within one life cycle of the commercially-important species, Pacific herring and pink and sockeye salmon. Long-term recovery can be expected through the natural process although some areas or commercial fisheries may never recover to pre-spill conditions and some populations may recover sooner than others.

Sport Fishing. No improvements are expected within one life cycle of the sport fish species. Long-term recovery to at or near prespill levels can be expected although some resources and some populations will recover sooner than others, and some resources or populations may never recover to pre-spill levels. Confidence in the rates of recovery will be low without monitoring. Real or perceived recovery of the injured resources and services may require 10 or more years (EVOS Trustee Council, April 1993).

Economy. Short-term impacts are anticipated to be negligible. For long-term impacts, qualitative analysis indicates that Alternative 1 will result in moderate negative effects in commercial fisheries and recreation. Quantitative analysis reflects effects resulting in several sectors from investment but not effects on commercial fishing or recreation. Quantitative analysis indicates that Alternative 1 results in annual averages in output for a 10-year period in increases of $1.6 million for the finance, insurance, and real estate sector; $0.76 million in the services sector; and $3 million for all other sectors. Employment increases jobs by 21 in the finance, insurance, and real estate sector; 15 in services; and 47 total.

Alternative 2: Habitat Protection

Biological Resources

Intertidal Zone. The short-term effects would be negligible. A change in ownership would not necessarily translate into a change in current activities.

The long-term effects would be moderately beneficial. The protection can span a large portion of the intertidal zone, but the potential for reducing disturbance or preventing additional injury would vary substantially between parcels.

Marine Mammals

Harbor Seals. The short-term effects would be negligible. Compared to the existing condition of the habitat, the protection of upland parcels is not expected to produce any notable change in the disturbance to harbor seals.

The long-term effects would have low to moderate benefits. Of the 81 parcels included in this analysis, over half include haulout sites near or on the parcels. Although the type of use at these haulout sites is not known, many of them may be used during pupping and molting.

Sea Otters. The short-term effects would be negligible. Compared to the existing condition of the habitat, the protection of upland parcels is not expected to produce any notable change in disturbance or in the health of the injured sea otter population.

The long-term effects would have low benefits to the sea otter populations throughout the EVOS area. Assuming that adverse effects of disturbance are likely to be most notable when large-scale disturbances are near concentrations of females and pups the benefits of habitat protection would be low. Of the 81 parcels included in this analysis, 25 percent are near known pupping concentrations. Of these, several are in areas where there is less risk of large-scale disturbances. However, because the effects of disturbance are unknown, the benefits may be greater than anticipated here.

Birds

Harlequin Duck. The short-term effects through 1995 of land acquisition on harlequin duck recovery are likely to be negligible, and populations would remain at levels observed during 1990 to 1993 surveys.

The highly beneficial long-term effects of this alternative would provide maximum protection of existing reproductive potential of harlequin ducks, therefore guarding against possible future loss of nesting habitat through development.

Murres. All large colonies of murres, and most smaller ones, are already protected, so the short-term effects of habitat protection to murres would be negligible.

The long-term effects of this alternative on murre populations throughout the EVOS area would be low. However, acquisition of Gull Island in Kachemak Bay would ensure protection of this colony, and thus may have a moderate long-term local benefit to murres.

Pigeon Guillemot. Habitat acquisition would have a negligible effect on pigeon guillemot population recovery on the short term, because there appears to be no development slated for private land with known colonies.

On the long term, protecting habitat where two of the largest colonies in Prince William Sound are located would be moderately beneficial in allowing population recovery and in preventing further inroads to the injured population through habitat degradation.

Marbled Murrelet. Depending on the potential for imminent logging on land parcels that contain prime habitat, the short-term effect of protecting habitat under this alternative could have high benefits.

The long-term effects would have very high benefits. On the long term, acquisition of old-growth forest habitat would have the highest possible benefit for ensuring murrelet population recovery.

Fish

Pink Salmon. The short-term effects would be negligible. No benefits from habitat protection would be accrued within one life cycle.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions would have a long-term benefit to pink salmon stocks in the EVOS area by helping to ensure maintenance of wild-stock production. More than half of the parcels that may be purchased have moderate or high value for pink salmon.

Sockeye Salmon. The short-term effects would be negligible. No benefits from habitat protection can be expected within one life cycle.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions would benefit sockeye salmon stocks in the EVOS area by helping to ensure maintenance of wild-stock production; however, fewer than one-fourth of the individual parcels that may be purchased are rated as moderate or high value for sockeye salmon.

Pacific Herring. The short-term effects would be negligible. No benefits would be accrued within one life cycle.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions would benefit Pacific herring stocks in the EVOS area by helping to ensure maintenance of production. Over half of the parcels that may be purchased have moderate or high value for Pacific herring.

Social and Economic Impacts

Archaeological Resources. The short-term direct benefit of habitat protection and acquisition on cultural resources would be low. Long term, this alternative would provide moderate benefit to the protection of archaeological and historical resources on acquired parcels.

Subsistence. Short-term impacts to subsistence-harvest species and subsistence users would be negligible because of no change in subsistence regulations, activities, or locations. Changes in subsistence uses are expected to occur gradually. Long term, the level of parcel acquisition possible in this alternative may allow for localized increases of populations of fish, wildlife, and intertidal resources important for the perpetuation of subsistence activities and their associated lifestyle in the spill area. This would be a long-term low to moderate benefit to subsistence.

Recreation and Tourism. Short-term benefits to recreation and tourism would be negligible because any changes are expected to take a considerable amount of time. Long-term benefits are likely to be low to moderate in terms of both direct effects on maintaining the quality of the landscape and indirect effects on maintaining stable ecosystems on which recreation and tourism depend in the spill area.

Wilderness. Short-term and long-term benefits to designated Wilderness would be negligible both in terms of restoring Wilderness pristine appearance and public perception of damage. Long-term moderate benefits are likely to result from greater protection of the wilderness-like setting of acquired lands and natural reduction of residual oil in designated Wilderness.

Commercial Fishing. The short-term effects would be negligible. No benefits will be accrued within one life cycle of the protected species.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions may have a long-term benefit to salmon and Pacific herring stocks in the EVOS area by helping to ensure maintenance of wild-stock production to support the commercial fishing industry.

Sport Fishing. The short-term effects would be negligible. No benefits will be accrued for sport fishing opportunities immediately upon a purchase.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions may have a long-term benefit to sport fish species in the EVOS area by helping to ensure maintenance of fish production and access for the sport-fishing activities.

Economy. Short-term impacts are anticipated to be negligible.

In long-term impacts, qualitative analysis indicates that Alternative 2 will result in moderate economic benefits in commercial fisheries and recreation and moderate negative effects in forestry. Quantitative analysis reflects effects resulting from habitat acquisition on forestry and other sectors but not effects on commercial fishing and recreation. Quantitative analysis indicates that Alternative 2 results, in annual averages for a 10-year period, in a loss of approximately $38 million in forestry industry output, an increase of $7 million in construction industry output, and $3 million in services. The corresponding changes in employment are a loss of 440 jobs in forestry, an increase of 65 in construction, and an increase of 959 in services.

Alternative 3: Limited Restoration

Biological Resources

Intertidal Zone. The short-term effects of the restoration actions would be negligible. All of the proposed actions would require some time before changes could be expected.

The combined long-term effects on intertidal organisms are unknown. For direct restoration actions, effects are unknown because both of the actions analyzed are still being tested. The long-term effects of the Habitat Protection actions for reducing disturbance or preventing additional injury to intertidal organisms are moderately beneficial and will vary substantially between parcels.

Summary

Marine Mammals

Harbor Seals. The short-term effects on harbor seals would be negligible. All of the proposed actions require some time after implementation before any changes could be expected.

The combined long-term effects would be moderately beneficial. The proposed actions could reduce negative impacts on harbor seals and may result in increased recovery rates in local areas.

Sea Otters. The short-term effects would be negligible. All of the proposed actions will take time before any results could be expected.

The combined long-term effects would be moderately beneficial. The proposed actions improve the habitat quality for sea otters through reducing the risk of exposure to oil, the potential for disturbance, and the impacts from subsistence harvest. These effects may produce a change in abundance of sea otters in some areas but are not likely to produce a notable increase on a regional scale.

Birds

Harlequin Duck. The short-term effects through 1995 of land acquisition on harlequin duck population recovery are expected to be negligible, and populations are expected to remain at 1990-1993 levels.

The long-term effects of this alternative would have a high benefit for maintaining, protecting, and increasing the reproductive potential of harlequin ducks. Cleaning oiled mussel beds would eliminate the source of hydrocarbon contamination of body tissues, and also enhance the food base of local populations.

Murres. All large colonies of murres, and most smaller ones, are already protected, so the benefit of habitat protection to murres would be negligible in the short-term.

The long-term effects of this alternative on murre populations throughout the EVOS area would be low. However, acquisition of Gull Island in Kachemak Bay would ensure protection of this colony, and thus may have a moderate long-term local benefit to murres.

Pigeon Guillemot. Because there appears to be no development planned on private lands with known colonies of pigeon guillemot, the short-term effects of this alternative on population recovery would be negligible.

The long-term effects would have moderate benefits. In the long term, acquiring habitat where two of the largest colonies in Prince William Sound are located would moderately benefit population recovery and prevent further inroads to the injured population through habitat degradation.

Marbled Murrelet. Depending on the potential for imminent logging on individual land parcels that contain prime murrelet nesting habitat (i.e., old growth coniferous forest), the short-term effects of land acquisition could be of high benefit.

In the long term, acquisition of old growth forest habitat would have the highest possible benefit for ensuring murrelet population recovery.

Fish

Pink Salmon. The short-term effects would be negligible. No benefits from habitat protection would accrue within one life cycle.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions would assist the recovery of the injured wild stocks of pink salmon by protecting important habitats.

Sockeye Salmon. The short-term effects would be low. Some benefits in some drainages may accrue within one life cycle.

The long-term effects would have high benefits. These actions will assist the recovery of the injured wild sockeye salmon stocks, however, some of these actions may be more beneficial in certain portions of the EVOS area and some other populations may not become restored.

Pacific Herring. The short-term effects would be negligible. No benefits will accrue within one life cycle.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions may have a long-term value to Pacific herring stocks in the EVOS area by helping to assure maintenance of reproductive potential.

Social and Economic Impacts

Archaeological Resources. Short-term effects of the proposed actions range from low to high benefit, or moderate benefit overall, stemming from habitat acquisition, site monitoring and stewardship, site monitoring, and salvage excavations. Long-term benefits are likely to be moderate because high benefits are expected locally.

Subsistence. Short-term benefits to populations of harvestable subsistence resources, and thus to subsistence users, would be low.

The proposed actions may help locally to reduce the negative impacts on species important to subsistence use, as well as improve subsistence user's confidence in determining the healthfulness of subsistence foods, which would be a long-term moderate benefit to subsistence uses.

Recreation and Tourism. The short-term benefits of both habitat protection and acquisition and general restoration actions would be low changes in numbers of visitors or locations of recreation/tourism activities .

The long-term benefits of habitat protection and acquisition would be moderate protection for lands against extractive activities. The long-term benefits of general restoration actions would be moderate stabilization of existing recreational opportunities.

Wilderness. Short-term effects on designated Wilderness would be negligible both in terms of restoring Wilderness pristine appearance and public perception of damage, though low

benefit to non-Wilderness lands may be derived from greater protection against extractive activities. Long-term moderate benefits are likely to result from greater protection of the wilderness-like setting of acquired lands and natural reduction of residual oil in designated Wilderness.

Commercial Fishing. The short-term effects would be negligible. New runs probably cannot be established within one life cycle to support new commercial fisheries to replace opportunities lost because of fishing closures or reduced harvests.

The long-term effects would have moderate benefits. These actions would assist the replacement of lost commercial fishing opportunities; however, some portions of the EVOS area would obtain greater benefits than others.

Sport Fishing. The short-term effects would be negligible. New sport fisheries probably cannot be established within one life cycle of sport fish species to replace lost sport fishing opportunities.

The long-term effects would have high benefits. After salmon and trout production is expanded, newly established sport fisheries can be expected to provide substantial recreational benefits.

Economy. Short-term impacts are anticipated to be negligible.

For long-term impacts, qualitative analysis indicates that Alternative 3 will result in moderate economic benefits in commercial fisheries and recreation and moderate negative effects in forestry. Quantitative analysis reflects effects resulting from habitat acquisition on forestry and other sectors but not effects on commercial fishing and recreation. Quantitative analysis indicates that Alternative 3 results, in annual averages for a 10-year period, in a loss of approximately $32 million in forestry industry output, an increase of $8 million in construction industry output, and $3 million in services. The corresponding changes in employment are a loss of 330 jobs in forestry, an increase of 70 in construction, and an increase of 766 in services.

Alternative 4: Moderate Restoration

Biological Resources

Intertidal Zone. The short-term effects of the restoration actions would be negligible. All of the proposed actions would require some time before changes could be expected.

The combined long-term effects on intertidal organisms are unknown. For direct restoration actions, effects are unknown because both of the actions analyzed are still being tested. The long-term effects of the Habitat Protection actions for reducing disturbance or preventing additional injury to intertidal organisms are moderately beneficial and will vary substantially between parcels.

Marine Mammals

Harbor Seals. The short-term effects would be negligible. All of the proposed actions require some time after implementation before any changes could be expected.

The long-term effects would be moderately beneficial. The proposed actions could reduce negative impacts on harbor seals and may result in increased recovery rates in local areas.

Sea Otters. The short-term effects would be negligible. All of the proposed actions will take time before any results could be expected.

The combined long-term effects would be moderately beneficial. The proposed actions improve the habitat quality for sea otters through reducing the risk of exposure to oil, the potential for disturbance, and the impacts from subsistence harvest. These effects may produce a change in abundance of sea otters in some areas but are not likely to produce a notable increase on a regional scale.

Birds

Harlequin Duck. The short-term effects through 1995 of this alternative on harlequin duck population recovery are expected to be negligible, and populations should remain at 1990-1993 levels.

The long-term effects of this alternative would have a high benefit for maintaining, protecting, and increasing the reproductive potential of harlequin ducks. Cleaning oiled mussel beds would eliminate the source of hydrocarbon contamination of body tissues, and also enhance the food base of local populations.

Murres. There would be a negligible short-term effect to the injured murre population from this action within the EVOS area.

Predator control outside of the EVOS area, and acquisition of carefully selected parcels would provide a low overall long-term benefit to murre populations.

Pigeon Guillemot. This alternative would likely have negligible short-term effects for pigeon guillemots through 1996.

In the long term, acquiring habitat where two of the largest colonies in Prince William Sound are located, one of which is included in the high-priority-acquisition package, would have a moderate effect on allowing population recovery and in preventing further inroads to the injured population through habitat degradation.

Marbled Murrelet. The short-term effects of land acquisition for the injured marbled murrelet population could have a high benefit if logging is imminent.

The long-term effects would have very high benefits. In the long term, land acquisition is the highest possible benefit to the injured murrelet population.

Fish

Pink Salmon. The short-term effects would be low. Although some benefits may be accrued quickly, it is not reasonable to expect substantial results within one life cycle.

The long-term effects would have moderate benefits. It can be expected that these actions may assist the recovery of the injured wild stocks of pink salmon. Long-term benefits, however, may be accrued in only portions of the EVOS area.

Sockeye Salmon. The short-term effects would be low. Some benefits in some drainages may be accrued within one life cycle.

The long-term effects would have high benefits. It can be expected that these actions would assist the recovery of the injured wild stocks of sockeye salmon. Certain actions, however, may be useful in only portions of the EVOS area, and not all populations may be totally restored.

Pacific Herring. The short-term effects would be negligible. No benefits would be accrued within one life cycle.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions can be expected to have a long-term value to Pacific herring stocks in the EVOS area by helping to assure maintenance of production potential.

Social and Economic Impacts

Archaeological Resources. The proposed actions would increase the level of protection for archaeological resources, and improve the understanding or appreciation of cultural resource values in the short-term. Since the degree of change is expected to increase gradually, the effect is estimated to be moderate benefits to archaeological resources in the short-term.

In the long-term, the proposed actions may increase protection for archaeological resources and substantially improve the understanding or appreciation of cultural resource values, creating moderate to high benefits.

Subsistence. The proposed actions require some time after implementation before any changes could be expected, so the short-term benefits to subsistence uses are expected to be low.

Moderate to high benefits to subsistence use is expected in the long-term. The proposed actions are expected to moderately increase populations of subsistence harvest species negatively affected by the EVOS and substantially increase the confidence of subsistence users in determining the healthfulness of subsistence foods.

Recreation and Tourism. The proposed actions may increase numbers of visitors, types of recreation opportunities available, and quality of experiences, but this is expected to occur gradually, accruing low benefits over the short-term.

Moderate to high benefits are expected over the long term because the proposed actions may increase recreational use levels, types, and opportunities. This is expected to occur locally in some cases and throughout the spill area in other cases.

Wilderness. Short-term effects on designated Wilderness and the wilderness character of non-designated wildlands would be low benefit from greater protection and removal of traces of residual oil. Long-term moderate benefits are likely to result from greater protection of the wilderness-like setting of acquired lands, reduction of residual oil, increased populations of wildlife, and increased public awareness of the level of recovery in designated Wilderness and wilderness-like areas.

Commercial Fishing. The short-term effects would be negligible. New runs of salmon probably cannot be established within one life cycle to support new commercial fisheries that would replace opportunities lost because of fishing closures or reduced harvests.

The long-term effects would have moderate benefits. These actions would assist the replacement of lost commercial-fishing opportunities; however, some portions of the EVOS area would obtain greater benefits than in other portions.

Sport Fishing. The short-term effects would be negligible. New sport fisheries to replace lost sport fishing opportunities probably cannot be established within one life cycle of sport fish species.

The long-term effects would have high benefits. After salmon and trout production is expanded, and newly-established sport fisheries can be expected to provide substantial recreational benefits.

Economy. Short-term impacts are anticipated to be negligible.

For the long-term impacts, qualitative analysis indicates that Alternative 4 would result in moderate economic benefits in commercial fisheries and recreation and moderate negative effects in forestry. Quantitative analysis reflects there would be effects resulting from habitat acquisition on forestry and other sectors but not on commercial fishing and recreation. Quantitative analysis indicates that Alternative 4 would result, in annual averages for a 10-year period, in a loss of approximately $23 million in forestry industry output, an increase of $11 million in construction industry output, and $2 million in government. The corresponding changes in employment would be a loss of 143 jobs in forestry, an increase of 96 in construction, an increase of 306 in services, and an increase of 45 in government.

The Proposed Action Alternative 5: Comprehensive Restoration

Biological Resources

Intertidal Zone. The short-term effects of the restoration actions would be negligible. All of the proposed actions would require some time before changes could be expected.

The combined long-term effects on intertidal organisms are Unknown. For direct restoration actions, effects are unknown because both of the actions analyzed are still being tested. The long-term effects of the Habitat Protection actions for reducing disturbance or preventing additional injury to intertidal organisms are moderately beneficial and will vary substantially between parcels.

Marine Mammals

Harbor Seals. The short-term effects would be negligible. All of the proposed actions require some time after implementation before any changes could be expected.

The long-term effects would be moderately beneficial. The proposed actions could reduce negative impacts on harbor seals and may result in increased recovery rates in local areas.

Sea Otters. The short-term effects would be negligible. All of the proposed actions will take time before any results could be expected.

Summary

The combined long-term effects would be moderately beneficial. The proposed actions improve the habitat quality for sea otters through reducing the risk of exposure to oil, the potential for disturbance, and the impacts from subsistence harvest. These effects may produce a change in abundance of sea otters in some areas but are not likely to produce a notable increase on a regional scale.

Birds

Harlequin Duck. The short-term effects through 1996 of the proposal on harlequin duck recovery would be negligible and populations would likely remain at 1990 to 1993 levels in both oiled and nonoiled areas.

The long-term effects of this alternative would have a high benefit to help maintain, protect the reproductive potential of harlequin ducks. Acquisition of the high priority package of land parcels would maximize the recovery potential of the injured harlequin duck population by guarding against loss of feeding and nesting habitat. Cleaning oiled mussel beds would eliminate the source of hydrocarbon contamination of body tissues that may be interfering with reproduction, and also enhance the food base of local populations.

Murres. There would be a negligible short-term benefit to the injured murre population from this action within the EVOS area.

Reducing disturbance that causes additional mortality at the Barren Islands would allow population recovery to proceed at a faster rate than otherwise possible, resulting in a low long-term overall benefit to the injured murre population.

Pigeon Guillemot. This alternative likely would have negligible short-term effects for pigeon guillemots through 1996.

On the long term, acquiring habitat where two of the largest colonies in Prince William Sound are located--one of which is included in the high priority acquisition package--would have a moderately beneficial effect on population recovery and in preventing further inroads to the injured population through habitat degradation.

Marbled Murrelet. The short-term effects of land acquisition for the injured marbled murrelet population could have a high benefit if logging is imminent.

On the long term, land acquisition is the highest possible benefit to the injured murrelet population.

Fish

Pink Salmon. The short-term effects would be low. Although some benefits may be accrued, it is not reasonable to expect substantial results within one life cycle.

The long-term effects would have high benefits. It is expected that these actions would assist the recovery of the injured wild stocks of pink salmon. The long-term effects of some or all of these actions may be realized in 6 to 10 years (3 to 5 generations of pink salmon). Certain actions, however, may be useful only in portions of the EVOS area, and not all populations may be totally restored.

Sockeye Salmon. The short-term effects would be low. Some benefits in some drainages may be accrued within one life cycle.

The long-term effects would have high benefits. It can be expected that these actions will assist the recovery of the injured wild stocks of sockeye salmon. Long-term effects of some or all of these actions may be realized in 10 to 50 years (2 to 10 generations of sockeye salmon). Certain actions, however, may be useful in only portions of the EVOS area, and all populations may not be totally restored.

Pacific Herring. The short-term effects would be negligible. No benefits will be accrued within one life cycle.

The long-term effects would have moderate benefits. Habitat protection and acquisition actions will have a long-term value to Pacific herring stocks in the EVOS area by helping to ensure maintenance of production. Over half of the parcels that may be purchased have moderate or high value for Pacific herring.

Social and Economic Impacts

Archaeological Resources. The proposed actions would increase the level of protection for archaeological resources, and improve the understanding or appreciation of cultural resource values in the short-term. Since the degree of change is expected to increase gradually, the effect is estimated to be moderate benefits to archaeological resources in the short-term.

In the long-term, the proposed actions may increase protection for archaeological resources and substantially improve the understanding or appreciation of cultural resource values, creating moderate to high benefits.

Subsistence. Short-term increases in populations of harvestable subsistence resources, and thus benefits to subsistence uses, would be low benefit.

The proposed actions may help locally to reduce the negative impacts on species important to subsistence use, as well as improve subsistence user's confidence in determining the healthfulness of subsistence foods, which would be a long-term moderate benefit to subsistence uses.

Recreation and Tourism. The proposed actions may increase numbers of visitors, types of recreation opportunities available, and quality of experiences, but this is expected to occur gradually, accruing low benefits over the short-term.

Moderate to high benefits are expected over the long-term because the proposed actions may increase recreational use levels, types, and opportunities. This is expected to occur locally in some cases and throughout the spill area in other cases.

Wilderness. Short-term effects on designated Wilderness and the wilderness character of non-designated wildlands would be low benefit from greater protection and removal of traces of residual oil. Long-term moderate to high benefits are likely to result from greater protection of the wilderness-like setting of acquired lands, reduction of residual oil, increased populations of wildlife, and increased public awareness of the level of recovery in designated Wilderness and wilderness-like areas.

Summary

Commercial Fishing. The short-term effects would be negligible. New runs to support new commercial fisheries probably cannot be established within one life cycle of salmon to replace opportunities lost because of fishing closures or reduced harvests.

The long-term effects would have moderate benefits. These actions would assist the replacement of lost commercial fishing opportunities. However, some portions of the EVOS area would obtain greater benefits than other portions.

Sport Fishing. The short-term effects would be negligible. New sport fisheries to replace lost sport fishing opportunities probably cannot be established within one life cycle.

The long-term effects would have high benefits. After salmon and trout production is expanded, newly-established sport fisheries can be expected to provide substantial recreational benefits.

Economy. Short-term impacts are anticipated to be negligible.

In long-term impacts, qualitative analysis indicates that Alternative 5 would result in moderate economic benefits in commercial fisheries and recreation and moderate negative effects in forestry. Quantitative analysis reflects there would be effects resulting from habitat acquisition on forestry and other sectors but not on commercial fishing and recreation. Quantitative analysis indicates that Alternative 5 would result, in annual averages for a 10-year period, in a loss of approximately $28 million in forestry industry output, an increase of $6 million in construction industry output, and $2 million in services. The corresponding changes in employment would be a loss of 279 jobs in forestry, an increase of 55 in construction, and an increase of 320 in services.

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