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Exxon Valdez Oil Spill Trustee Council

Restoration Office
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April 1, 1994

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The purpose of this letter is to:

- invite you to a two-part work shop to be held April 13-15 that will:
  - first (April 13-14), address a series of questions for the restoration process that can be used to guide development of the FY 95 Work Plan: that is, are the injured resources recovering? ... if not, why not? ... how can recovery be achieved or reasonably accelerated;
  - second (April 15), review draft recovery monitoring strategies for specific injured resources and services and other restoration strategies included in the *Draft Restoration Plan* (published in November 1993).
- provide you with an update regarding on-going efforts to develop a management structure to implement an ecosystem approach to restoration activities.

Implementation Management Structure — Update

In mid-January, and then again in mid-March, approximately forty individuals including state and federal resource specialists, peer review scientists, representatives of the Trustee Council's Public Advisory Group (PAG) and other public members, met to discuss the management and organization structure needed to implement an ecosystem approach to restoration activities.

The proposed stru re establishes interdisciplinary w groups organized by the major classes of injured resources (birds, fish, nearshore resources, marine mammals and archeological resources). These work groups — which will include not only resource specialists but scientists from other disciplines as well as public user group representatives — will work individually and collectively to identify strategies, research approaches and testable hypotheses for monitoring, research and general restoration. A fundamental responsibility of these work groups will be to move beyond the "single species" approach that has characterized much of the damage assessment work to date and to also focus attention on questions of concern to multiple injured resources and ecosystem processes that may be limiting recovery of injured resources. The work group efforts will help guide development of the annual work plans, starting in FY 95.

A draft organizational chart and more information concerning the work group responsibilities and role of the proposed Science Review Board (SRB) that would provide overall guidance and counsel regarding science planning and management is enclosed (Attachment A).

April 13-15 Workshop — Science Planning for the Restoration Process

On April 13 - 15, a workshop to continue the science planning effort will be held in Anchorage. [NOTE: The workshop location has not yet been determined. Please contact Rebecca Williams in the Anchorage Restoration Office for details regarding the location.] A broad cross-section of scientists, biologists, and agency resource specialists have been invited to attend along with members of the Public Advisory Group, representatives from spill affected communities and resource user groups. A draft agenda is enclosed (Attachment B). The workshop will consist of two parts:

Part 1 — Guidance for the FY 95 Work Plan and Beyond: This part of the workshop (April 13-14) will establish the injured resource working groups (birds, fish, nearshore resources, marine mammals and archeological resources) and move forward with the work of **identifying and prioritizing key research questions, concerns and testable hypotheses as guidance for the FY 95 work plan and beyond.** This "working group" effort will be the start of an on-going, iterative process that can be used to synthesize information acquired over time in order to update, revise and adapt monitoring and/or research priorities funded in any one annual budget cycle. To provide a common basis of understanding, this part of the workshop will start with short presentations and discussion of some sample hypotheses for consideration (Attachment C).

Recognizing that many research questions can only be addressed over the long-term and that budgets will be limited in any one fiscal year, it will be essential to set priorities to guide development of the scientific work effort in FY 95 and beyond. In particular, an effort will be made to identify research questions of common interest to multiple injured resources while recognizing that there will be work unique to certain injured resources that should be supported. Fundamentally,

the working group will be asked to identify research priorities that address why certain injured resources are not recovering (i.e., whether there are ecotoxicological effects and/or ecosystem processes limiting recovery) and what, if any, active restoration actions should be undertaken.

As you consider research questions, you should keep in mind that expenditure of *Exxon Valdez* Settlement funds must benefit injured resources or services. Also, the Trustee Council has indicated that restoration will emphasize injured resources and services that are not recovering (see Table B-1 from the *Draft Restoration Plan*, attached). As a legal matter, the purpose of the Settlement is restoration of injured resources and services, not study of the spill-area ecosystem for its own sake. Basic research, without a benefit to restoration of injured resources, is not eligible for funding from the Settlement.

Part 2 — Implementation of the *Draft Restoration Plan*: The purpose of the second part of the workshop will be to further develop the management-by-objective implementation structure that can be used in an on-going manner to implement the mission of the Trustee Council.

The second part of the workshop (April 15) will include:

- review of draft Recovery Monitoring Strategies for the injured resources and services as identified in the *Draft Restoration Plan* (November 1993); and

- review of the restoration strategies that have previously been endorsed by the Trustee Council and published in the *Draft Restoration Plan* (November 1993).

A draft set of Recovery Monitoring Strategies will be available for review at the meeting. A set of restoration strategies (excerpted from the *Draft Restoration Plan*) is enclosed, along with draft materials previously developed for inclusion in the Implementation Management Structure document (Attachment D).

Timeline for Development of the FY 95 Work Plan

Finally, I recognize that this is a very short notice for the workshop. It is important to put this work shop into the context of the timeline for development of the FY 95 Work Plan; the results of this work session will be used to help guide development of the Trustee Council work plan.

In mid-May, a general solicitation for a description of FY 95 restoration project proposals will be made by the Trustee Council. This solicitation will include research question identified through this work session process and other means. The response to this solicitation will be used as the basis for formulating a Draft FY 95 Work Plan that will be published for formal public review and comment in mid-August and September. Trustee Council action on the FY 95 Work Plan is scheduled for the end of October.

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Please contact Rebecca Williams in the Anchorage Restoration Office to indicate whether you will be able to attend so that we can provide details on the location and final agenda (local phone: 278-8012; Long Distance - Inside Alaska: 1-800-478-7745 or Outside Alaska: 1-800-283-7745). If you cannot attend, please feel free to send me written concepts or hypotheses that you wish to have considered at the workshop (fax: 907-276-7172). The workshop is open to the public, so please let others know about it if you believe their participation would be helpful. While limited, some funding for public (non-agency) travel is available; please contact Rebecca Williams in the Anchorage Restoration Office if you are in need of assistance.

I look forward to your participation in the work session.

Sincerely,

Molly McCammon
Director of Operations

attachments

ATTACHMENTS

Attachment A	Organization and Structure — Science Planning and Management
Attachment B	Draft Agenda — Research Priorities for Restoration (April 13-15)
Attachment C	Directing the Research: Examples of Hypotheses
Attachment D	— Implementation Management Structure (working document) — Strategies for Restoration (excerpted from the *Draft Restoration Plan*)
Attachment E	Mailing List

Appendix B. Draft Agenda 3/31/94

Research Priorities For Restoration
Anchorage, April 13-15, 1994

April 13 Part 1. Guidance for the 1995 Work Plan and Beyond

0830 Science Planning and Management for the Restoration Process
Jim Ayers, Executive Director for the Trustee Council

0900 Ecosystem Approach to Restoration
Dr. George Rose, OPEN Scientific Program Leader (if available)

0945 Game Plan for the Work Shop: Part 1
Molly McCammon, Operations Director for the Trustee Council

0955 Break

1015 Directing the Research: Examples of Hypotheses
Presentations by members of the Interdisciplinary Work Groups

1200 Lunch

1300 Interdisciplinary Work Groups Meet
- Selection of Coordinating Committee Representative
- Development of hypotheses list

1700 Break

1900 Interdisciplinary Work Groups Meet
-Continued development of hypotheses list

April 14

0830 Meeting of the Whole
-Coordinating Committee Representatives present hypotheses from Work Groups
- Discussion of classification of hypotheses by ecosystem component (nearshore, pelagic) and/or type of hypotheses (e.g. ecosystem processes, ecotoxicology)

1000 Break

1020 Interdisciplinary Work Groups Meet
·Classify, prioritize hypotheses

1200 Working Lunch

1400 Break

1430 Meeting of the Whole
·Coordinators present draft final lists for review by participants
·Revised lists are compiled as draft for mail-out review

1630 How We Get There From Here
Jim Ayers, Executive Director

April 15 Part 2. Revision of Draft Restoration Plan

0830 Management By Objective: Strategies for Restoration
Jim Ayers, Executive Director

0900 Game Plan for the Work Shop: Part 2
Molly McCammon, Operations Director

0910 Monitoring Strategies for the Restoration Plan
Byron Morris, NOAA

0935 Research/Restoration Strategies for the Restoration Plan
Veronica Gilbert, Alaska Department of Natural Resources

1000 Break

1020 Interdisciplinary Work Group Meetings
·Review Monitoring, Research, and Restoration Strategies
·Provide comments and revisions for inclusion in DEIS review document

1200 Working Lunch

1430 Revising the Injured Resource Listing
Bob Spies, Chief Scientist for the Trustee Council

1700 Closing Comments
Jim Ayers, Executive Director

Table B-1 from the *Draft Restoration Plan* (November 1993)

INJURED RESOURCES			Lost or Reduced SERVICES
Biological Resources		Other	
Recovering Bald eagle Black oystercatcher Intertidal organisms (some) Killer whale Sockeye salmon (Red Lake) Subtidal organisms (some)	**Not Recovering** Common murre Harbor seal Harlequin duck Intertidal org. (some) Marbled murrelet Pacific herring Pigeon guillemot Pink salmon Sea otter Sockeye salmon (Kenai River) Subtidal organisms (some)	Archaeological resources Designated wilderness areas	Commercial fishing Passive Uses Recreation and Tourism including sport fishing, sport hunting, and other recreation uses Subsistence
Recovery Unknown Clams Cutthroat trout Dolly Varden River otter Rockfish			

Directing the Research: Examples of Hypotheses
DRAFT 3/31/94

The following seven hypotheses were contributed by participants at the Implementation Management Structure work sessions. The scope of the hypotheses range from broad-based ecosystem research to toxicological and biological mechanisms impacting particular injured resources. No priority weighting is given to these particular hypotheses; they are meant to be examples of research approaches that could give guidance for research proposals for the 1995 Work Plan.

Example 1. The principal factor limiting the restoration of several injured resources (marbled murrelet, pigeon guillemot, and harbor seal) is food availability. Food limitation, in turn, may be caused by a recent ecosystem shift in the Gulf of Alaska and Prince William Sound which favors increased production of demersal fishes such as walleye pollack, cod, and flatfish at the expense of the forage species such as capelin, sandlance, and herring on which these injured resources feed.

Example 2. The decline in pinnipeds and several species of seabirds in Prince William Sound and the Gulf of Alaska during the last decade has occurred due to predation by killer whales (pinnipeds) or avian and mammalian predation at breeding colonies (seabirds); predation constrains recovery of these injured resources from the additional damage inflicted by the oil spill.

Example 3. Hydrocarbons present in nearshore sediments and organisms (e.g., mussels) are being consumed by injured resources such as harlequin ducks and sea otters that forage in the nearshore zone, and impair the recovery of these injured resources.

Example 4. The oil spill has modified the nearshore ecosystem. Variation and potential mechanisms responsible for variation in the recruitment, growth, condition, and survival of injured nearshore organisms must be determined to assess the magnitude of oil-related change, to measure and affect recovery of injured resources, and to evaluate the relative health and productivity of the nearshore ecosystem.

Example 5. Mortality and growth of pink salmon and herring in Prince William Sound are controlled by the standing biomass of zooplankton, as influenced by atmospheric and oceanic processes. The average residence time of the Sound's waters and the strength of advective transport of deeper waters from the Gulf of Alaska into the Sound, control the standing biomass of zooplankton. When zooplankton are abundant, predation pressure on juvenile salmon and herring is relatively low, and survival of the juveniles is higher. If zooplankton abundance is low, predatory fish and birds switch from a zooplankton diet to juvenile salmon and herring, thus reducing survival of the juveniles. Reduced survival of young fish results in lower adult population sizes available to apex predators such as birds, marine mammals, and humans.

Example 6. Pink salmon populations have incurred heritable damage due to exposure to oil during embryonic development resulting in a reduction in survival and increased straying from these populations, which limits the recovery of the exposed populations and may impact the health of adjacent populations.

Example 7. The overescapement of sockeye salmon into the Kenai River and Kodiak Island lakes have produced ecosystem-level effects on the lake rearing habitat associated with the freshwater component of their life history. Top-down predation from rearing juvenile sockeye salmon has resulted in sustained decreases in sockeye salmon production by one of the following mechanisms: alteration of the composition of the zooplankton community to a predation resistant form; reduction in zooplankton biomass through overcropping of the reproductive component of key zooplankton species; or increased mortality of juvenile sockeye salmon by increasing foraging time in high predation risk behavior.

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March 31, 1994

Attachment D

Materials for the
Implementation Management Structure
as drafted in the January 13-14, and March 21, 23 work sessions

The material in this attachment provides part of a structure that allows a restoration activities to be traced from the proposed activity through a strategy, to an approved restoration objective, to a restoration goal, to the mission of restoration. In this way, it will help ensure that all actions are consistent with the mission of the settlement, and that the Trustee Council's activities form a comprehensive, ecosystem-based program of addressing restoration created by the 1989 *Exxon Valdez* Oil Spill.

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Mission Statement	2
Guiding Principles	3
Definitions	5
Goals and Objectives	8
Restoration Strategies (from the Draft Restoration Plan)	13

The material in this attachment was discussed at a work session in Anchorage on January 13 and 14, 1994. Changes were made during review of the work session notes after the meeting. There was little group discussion at the March 21–23 meeting, but a few people made additional comments. The work sessions involved agency representatives, peer review scientists, and members of the public.

Mission Statement

The mission of the Trustee Council and all participants in Council efforts is to efficiently restore the environment injured by the *Exxon Valdez* oil spill to a healthy, productive, world renown ecosystem, while taking into account the importance of the quality of life and the need for viable opportunities to establish and sustain a reasonable standard of living.

The restoration will be accomplished through the development and implementation of a comprehensive, interdisciplinary recovery and rehabilitation program that includes:

- Natural Recovery
- Monitoring and Research
- Resource and Service Restoration
- Habitat Acquisition and Protection
- Resource and Service Enhancement
- Replacement
- Meaningful Public Participation
- Project Evaluation
- Fiscal Accountability
- Efficient Administration

— adopted by the *Exxon Valdez* Oil Spill Trustee Council on November 30, 1993.

Guiding Principles

General Principles

1. Restoration should contribute to a healthy, productive and biologically diverse ecosystem within the spill area that supports the services necessary for the people who live in the area.

2. Restoration will take an ecosystem approach to better understand what factors control the populations of injured resources.

Principles that Focus or Direct Restoration Activities

3. Restoration will focus upon injured resources and services and will emphasize resources and services that have not recovered. Resources and services will be enhanced, as appropriate, to promote restoration. Restoration actions may address resources for which there was no documented injury if these activities will benefit an injured resource or service.

4. Resources and services not previously identified as injured may be considered for restoration if reasonable scientific or local knowledge obtained since the spill indicates a spill-related injury.

5. Projects designed to restore or enhance an injured service:
   - must have a sufficient relationship to an injured resource,
   - must benefit the same user group that was injured, and
   - should be compatible with the character and public uses of the area.

6. 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:
   - when the most effective restoration actions for an injured population are in a part of its range outside the spill area, or
   - 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.

Principles Concerning Integration of Restoration Activities

7. Restoration will include a synthesis of findings and results, and will also provide an indication of important remaining issues or gaps in knowledge.

8. Restoration shall take advantage of cost sharing opportunities where effective.

9. Restoration should be guided and reevaluated as information is obtained from damage assessment studies and restoration actions.

Public Participation Principles

10. Restoration must include a meaningful public participation process at all levels — planning, project design, implementation and review.

11. Restoration must reflect public ownership of the process by timely release and reasonable access to information and data.

Principles concerning the Design of Restoration Projects

12. Proposed restoration strategies should state a clear, measurable and achievable end point.

13. Restoration must be conducted as efficiently as possible, reflecting a reasonable balance between costs and benefits.

Principles to Help Establish Priorities for Restoration Activities

14. Priority will be given to restoring injured resources and services which have economic, cultural and subsistence value to people living in the oil spill area, as long as this is consistent with other principles.

15. Possible negative effects on resources or services must be assessed in considering restoration projects.

16. Priority shall be given to strategies that involve multi-disciplinary, interagency or collaborative partnerships.

17. Restoration projects will be subject to open, independent scientific review before Trustee Council approval.

18. Past performance of the project team should be taken into consideration when making funding decisions on future restoration projects.

19. Competitive proposals for restoration projects will be encouraged.

20. Government agencies will be funded only for restoration projects that they would not have conducted had the spill not occurred.

These Guiding Principles reflect and elaborate on the Policies identified in Chapter 2 of the Draft *Exxon Valdez* Oil Spill Restoration Plan (November 1993). Further guidance regarding the categories of restoration action — General Restoration, Habitat Protection and Acquisition, Monitoring and Research, and Public Information and Administration — are provided in Chapter 3 of the Draft *Exxon Valdez* Oil Spill Restoration Plan (November 1993).

Definitions

Goal: A mental concept of what you want.

Objective: Pertaining to a material or measurable specific object (as distinguished from a mental concept)

Strategy: Activity or expenditure that is directed toward accomplishment of an objective (i.e., who, what, where, when, how).

Categories of Restoration Strategies:

- Monitoring and Research
- Habitat Protection
- General Restoration

Ecosystem Definitions. The two ecosystem types described below are not intended to have hard-and-fast, legally definable boundaries. Rather, they are intended to describe areas that generally contain similar biological and physical features that influence the relationships of the resources that exist there and the services they support. *[Note to participants in previous work sessions: At the March work session, the group combined the upland and near-shore ecosystems in the organization chart. Thus, they are combined here.]*

Pelagic Ecosystem. The deeper, open water region offshore that is not directly affected by wave action, terrestrial runoff, or other near-shore processes. Examples are the center of Prince William Sound and a few hundred yards beyond the steep cliffs and fiord mouths of the outer Kenai coast.

Sea-land Interface. Terrestrial and aquatic areas dominated by near-shore processes such as tidal movement, salt spray, intertidal and shoreline vegetation, wave action, and terrestrial runoff. Near-shore areas include the intertidal zone, salt marshes, and beach areas where salt and shoreline processes dominate, as well as shallower offshore waters that are greatly influenced by near-shore processes. It also includes narrow fjords and channels that occur in the spill area. The sea-land interface also includes extensions of injured resources' and services' habitat into the uplands.

INJURED RESOURCE — ECOSYSTEM MATRIX

	ECOSYSTEM	
	Pelagic (Off-shore)	Sea-land Interface
Harbor seal	X	X
Sea otter		X
Killer whale	X	
Sockeye salmon	X	X
Cutthroat trout		X
Dolly Varden		X
Rockfish	X	X
Pacific herring	X	X
Pink salmon	X	X
Common murre	X	X
Harlequin duck		X
Marbled murrelet	X	X
Pigeon guillemot		X
Bald eagle		X
Black oystercatcher		X
River otter		X
Clams		X
Mussels		X
Intertidal organisms		X
Subtidal organisms	X	X
Sediments	X	X
Other Resources		
Archeological Resources	X	
Designated Wilderness		X

List of Injured Resources by Ecosystem

Pelagic (Off-shore) Ecosystem

Sockeye salmon
Pink salmon
Pacific herring
Rockfish
Killer whale
Harbor seal

Common murre
Marbled murrelet

Subtidal organisms
Sediments

Sea-land Interface

Sockeye salmon
Pink salmon
Cutthroat trout
Dolly Varden
Pacific herring
Harbor seal
Sea otter
Clams
Mussels
Pigeon guillemot
Rockfish

Archaeologic resources

Bald eagle
Harlequin duck
Black oystercatcher
River otter
Intertidal organisms

Subtidal organisms

Marbled murrelet
Sediments
Common murre

Designated wilderness areas

GOALS

Pelagic (Off-shore) Ecosystem: A heathy, productive, pelagic (off-shore) ecosystem that supports resources and services injured by the oil spill, and that maintains naturally occurring biodiversity.

Sea-land Interface: Heathy, productive, near-shore and upland ecosystem that supports resources and services injured by the oil spill, and that maintains naturally occurring biodiversity.

OBJECTIVES

(In the table below, the first column shows the ecosystem to which the objective applies: P=pelagic (off-shore) ecosystem, S=Sea-land interface.)

The overall goal of restoration is recovery of all injured resources and services. Ecosystem goals are described above. This section defines objectives as measures of recovery to meet the overall restoration goal and ecosystem goals. For some resources, little is known about the extent of injury and recovery, so it is difficult to define recovery or develop restoration strategies.

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, like marbled murrelets, recovery may consist of stabilizing the population at a lower level than before the spill.

Where little prespill data exists, injury is inferred from comparison of oiled and unoiled areas, and recovery is usually defined as a return to conditions comparable to those of unoiled areas. Because the differences between oiled and unoiled areas may have existed before the spill, statements of injury and objectives for recovery based on these differences are often less certain than in those cases where prespill data exist. However, there can also be some uncertainty associated with interpreting the significance of prespill population data since populations undergo natural fluctuations. Indicators of recovery can include increased numbers of individuals, reproductive success, improved growth and survival rates, and normal age and sex composition of the injured population.

Natural Resources

S **Bald Eagle:** Bald eagle population and productivity comparable to prespill levels.

S **Black Oystercatchers:** Populations that attain pre-spill levels, and reproduction and growth rates in oiled areas that are comparable to those in unoiled areas.

S **Clam:** Clam populations and productivity that are at prespill levels.

P, S **Common Murre:** Prespill populations and fledgling productivity of common murres at all injured colonies.

S **Cutthroat Trout and Dolly Varden Trout:** Growth rates and survival for cutthroat trout and Dolly Varden trout within oiled areas that are comparable to those for unoiled areas.

S **Harbor Seal:** Population trends in harbor seals that are stable or increasing.

S **Harlequin Ducks:** For harlequin ducks, prespill populations or when differences between oiled and unoiled areas are eliminated.

S **Intertidal Organisms:** For each intertidal elevation (lower, middle, and upper), community composition, age class distribution, population abundance of component species, and ecosystem functions and services at levels that would have prevailed in the absence of the oil spill.

P **Killer Whale:** Recovery of the injured AB killer whale pod to the 1988 level (of 36 individuals).

P, S **Marbled Murrelet:** Population trends in marbled murrelets that are stable or increasing.

S **Mussel:** Mussel populations and productivity which are at prespill levels, and that do not contain oil that contaminates higher trophic levels.

P, S **Pacific Herring:** Populations of pacific herring that are healthy and productive and exist at prespill abundances.

P, S **Pigeon Guillemot:** Population trends in pigeon guillemots that are stable or increasing.

P, S **Pink Salmon:** Populations of pink salmon that are healthy and productive and exist at prespill abundances. (An indication of recovery is when egg mortalities in oiled areas match prespill levels or levels in unoiled areas.)

S **River Otters:** For river otters, population levels are unknown but indications of recovery are when use and physiological indices have returned to prespill conditions.

P **Rockfish:** Populations of rockfish levels are unknown, but indications of recovery are when habitat use and physiological indices have returned to prespill conditions.

S **Sea Otter:** A population abundance and distribution of sea otters comparable to prespill abundance and distribution, and when all ages appear healthy.

P, S **Sediments:** Sediments whose contamination, if any, causes no negative effects to the spill-affected ecosystem.

P, S **Sockeye Salmon (Kenai River):** Population of sockeye salmon (Kenai River) that is healthy, and productive and exists at prespill levels. (One indication of recovery is when Kenai and Skilak Lakes support sockeye smolt outmigrations comparable to prespill levels.)

P, S **Sockeye Salmon (Red Lake):** Population of sockeye salmon (Red Lake) that is healthy, productive, and exists at prespill levels in Red Lake.

P, S **Subtidal Organisms:** For subtidal organisms, community composition, population abundance and age distribution of component species, and ecosystem functions and services in each injured subtidal habitat that have returned to levels that would have prevailed in the absence of the oil spill.

Other Resources

S **Archaeological Resources:** For archaeological resources, an end to spill-related injury including looting and vandalism rates that are at or below prespill levels.

S **Designated Wilderness Areas:** Designated wilderness areas where oil is no longer encountered, and when the public perceives them to be recovered from the spill.

Services

Subsistence: Subsistence resources that are healthy and productive and exist at prespill levels, and people that are confident that the resources are safe to eat. (One indication that recovery has occurred is when the cultural values provided by gathering, preparing, and sharing food are reintegrated into community life.)

Commercial Fishing: Population levels and distribution of injured or replacement fish used by the commercial fishing industry match conditions that would have

existed had the spill not occurred. Because of the difficulty of separating spill-related effects from other changes in fish runs, the Trustee Council may use prespill conditions as a substitute measure for conditions that would have existed had the spill not occurred.

Recreation and Tourism: Recreation and tourism, fish and wildlife resources that are recovered; recreation use of oiled beaches that is no longer impaired, and management capabilities and facilities that can accommodate spill-related changes in human use.

Passive Use: A public that perceives that aesthetic and intrinsic values associated with the spill area are no longer diminished by the oil spill.

Management Processes Goals and Objectives

This attachment lists a goal and four objectives for management processes.

GOAL

A long-term, comprehensive and cost-effective restoration program comprised of integrated strategies that are a balanced combination of Monitoring and Research, Habitat Protection and General Restoration.

OBJECTIVES

Administration: Administrative costs that average no more than five percent of overall restoration expenditures over the remainder of the settlement period.

Integrated Research and Monitoring : A research and monitoring program that coordinates project development and design with goals and objectives; appropriately reflects and addresses ecosystem relationships; and ensures that collected data will be readily available and accessible to resource managers, policy makers and the general public.

Information Management: Information that is available in a timely manner and useable format to scientists, managers and the public.

Communication: A public involvement program that provides information and an opportunity for meaningful involvement in all levels of restoration — planning, project design, implementation, and review.

Restoration Strategies

Restoration strategies are presented under three headings: Natural Resources, Other Resources, and Services. The combination of individual restoration objectives and strategies into a unified restoration program will result in an ecosystem approach that recognizes the interconnections between species, and between species and their physical environment. The definitions of recovery and the restoration strategies also reflect consideration of ecosystem relationships. For example, recovery of intertidal and subtidal communities are defined, in part, as a return to ecosystem functions and services that would have existed in the absence of the spill; and the restoration strategy for some injured resources includes research into why they are not recovering, such as declining or contaminated food sources or disruption of ecosystem relationships.

Natural Resources

Because restoration strategies for natural resources differ according to the degree of recovery, they are subdivided into strategies for recovering resources, resources that are not recovering, and resources whose recovery is unknown. The table below lists injured species by status of recovery and indicates the pages on which the restoration strategy for that group of resources can be found.

Recovering (p. 14)	Not Recovering (p. 15)	Recovery Unknown (p. 16)
Bald eagles	Common murres	Clams
Black oystercatchers	Harbor seals	Cutthroat trout
Killer whales	Harlequin ducks	Dolly Varden
Sockeye salmon (Red Lake)	Intertidal organisms	River otter
	Marbled murrelets	Rockfish
	Pacific herring	
	Pigeon guillemots	
	Pink salmon	
	Sea otters	
	Sockeye salmon (Kenai	
	Subtidal organisms	

(Archaeology and Designated Wilderness Areas begin on p. 17; Services begin on p. 18.)

Recovering Resources

The following resources are believed to be recovering. This list is expected to change as the condition of injured resources changes and knowledge about them improves.

Bald eagles	Killer whales
Black oystercatchers	Sockeye salmon (Red Lake)

Restoration Strategy. Restoration of recovering resources will rely primarily on natural recovery because, for most recovering resources:

- They are expected to fully recover over time;
- People can do little to accelerate their recovery; and
- Waiting for natural recovery is not likely to significantly harm a community or industry in the long term. (Subsistence, commercial fishing, and recreation are addressed under "Services.")

However, if a resource is not expected to recover fully on its own or if waiting for natural recovery will cause long-term harm to a community or service, appropriate alternate means of restoration would be undertaken.

The restoration strategy for recovering resources has three parts:

Rely on natural recovery. Natural processes aided by protective measures will be the main agents of restoration.

Monitor recovery. For resources believed to be recovering, the monitoring program will track the progress of recovery and detect major reversals. If results of the monitoring program suggest that a resource may not recover as expected, alternate means of restoration will be considered.

Protect injured resources and their habitats. Recovering resources need protection from other sources of potential injury. Protection and acquisition of important habitat, protective management practices, and the reduction of marine pollution are principal ways of providing protection.

Resources Not Recovering

The following resources show little or no sign of recovery nearly five years after the spill. This list is expected to change as the condition of injured resources changes and knowledge about them improves.

- Common murres
- Harbor seals
- Harlequin ducks
- Intertidal Ecosystem
- Marbled murrelets
- Pacific herring
- Pigeon guillemots
- Pink salmon
- Sea otters
- Sockeye salmon (Kenai River)
- Subtidal Ecosystem

Restoration Strategy. Except for certain protective measures, attempts to restore these resources without knowing why they are not recovering may be ineffectual or even detrimental. For this reason, the restoration strategy for these resources emphasizes determining why they are not recovering and eliminating threats to the remaining populations. Where sufficient knowledge about the nature of injury exists, the restoration strategy also encourages actions to promote recovery because:

- The populations of some of these resources are in a steep decline and may not recover without help; and
- Some of these resources have subsistence or economic importance and their recovery is linked to the recovery of these services. (Restoration strategies under "Services" also apply to these resources.)

The restoration strategy for resources that are not recovering has four parts:

Conduct research to find out why these resources are not recovering. Effective restoration requires an understanding of why resources are not recovering. For some resources the reason is known; however, for most the reason is unknown. Suspected causes include declining or contaminated food sources and disruption of ecosystem relationships.

Initiate, sustain, or accelerate recovery. The primary objective is to initiate recovery if possible. Once a resource is recovering, decisions about continuing restoration to sustain or accelerate the rate of recovery would depend on such factors as the cost and benefits of additional restoration activities and the importance of the resource for recovery of a service. However, if a resource is expected to recover fully through natural recovery alone and waiting for natural recovery to occur will not cause long-term harm to a community or industry, the restoration strategy would rely primarily on natural recovery.

Monitor recovery. The monitoring program will track changes in the condition of these resources. The condition of these resources may change due to natural causes or restoration actions.

Protect injured resources and their habitats. While protective measures alone may not ensure the recovery of these resources, they may prevent additional impacts due to loss of habitat and other disturbances. Protection and acquisition of important habitat, protective management practices, or the reduction of marine pollution are principal ways of providing protection.

Recovery Unknown

It is not known whether the following resources are recovering because insufficient data are available. This list may be modified as knowledge about these resources improves.

Clams	River otter
Cutthroat trout	Rockfish
Dolly Varden	

Restoration Strategy. Until more is known about the nature and extent of injuries and the degree of recovery for these resources, restoration will rely primarily on natural recovery, aided by monitoring and protective measures.

The restoration strategy for resources whose recovery is unknown has three parts:

Rely on natural recovery. Natural processes aided by protective measures will be the main agents of restoration.

Monitor recovery. For resources whose recovery is unknown, the monitoring program will track the progress of recovery and detect major reversals. If results of the monitoring program suggest that a resource is not recovering, alternate means of restoration will be considered.

Protect injured resources and their habitats. All injured resources need protection from other sources of potential injury. Protection and acquisition of important habitat, protective management practices, and the reduction of marine pollution are principal ways of providing protection.

Other Resources

Archaeological Resources

Injury to archaeological resources stems from increased looting and vandalism of sites and artifacts, and erosion within and around the sites resulting from cleanup activities. In addition, archaeological artifacts may have been oiled. Injuries attributed to looting and vandalism still occur. These injuries diminish the availability or quality of scientific data and opportunities to learn about the cultural heritage of people in the spill area..

Archaeological resources cannot recover in the same sense as biological resources. Restoration cannot regenerate what has been destroyed, but it can prevent further degradation of both sites and the scientific information that would otherwise be lost.

Restoration Strategy. The restoration strategy for archaeological resources has three parts:

Repair spill-related injury to archaeological sites and artifacts. Injuries may be repaired to some extent through stabilizing eroding sites, or removing and restoring artifacts.

Protect sites and artifacts from further injury and store them in appropriate facilities. Archaeological sites and artifacts could be protected from further injury through the reduction of looting and vandalism, or the removal of artifacts from sites and storage in an appropriate facility. Opportunity for people to view or learn about the cultural heritage of people in the spill area would also provide protection by increasing awareness and appreciation of cultural heritage and would replace services lost as a result of irretrievable damage to some artifacts.

Monitor recovery. Monitoring of archaeological resources may detect increases or decreases in rates of looting, vandalism, and erosion of archaeological sites.

Designated Wilderness Areas

The oil spill delivered oil in varying quantities to the waters adjoining the seven areas designated as wilderness within the spill area. Oil was also deposited above the mean high tide line in these areas. During the intense clean-up seasons of 1989 to 1990, hundreds of workers and thousands of pieces of equipment were at work in the spill area. This activity was an unprecedented imposition of people, noise, and activity on the area's undeveloped and normally sparsely occupied landscape.

Restoration Strategy. Any restoration objective which aids recovery of injured resources, or prevents further injuries, will assist recovery of designated wilderness areas. No objectives have been identified which benefit only designated wilderness areas without also addressing injured resources.

Services

Subsistence

Subsistence users say that maintaining their subsistence culture depends upon uninterrupted use of subsistence resources. The more time users spend away from subsistence activities, the less likely they will return to it. Continuing injury to natural resources used for subsistence may affect the way of life of entire communities.

Residual oil exists on some beaches with high value for subsistence. Continued presence of hydrocarbons may contaminate subsistence food resources or, at a minimum, create uncertainty about the safety of subsistence food resources that reduces their use and value for subsistence.

Restoration Strategy. Restoration of fish and wildlife resources are covered elsewhere in this chapter. The restoration strategy for subsistence services has four parts:

Promote recovery of subsistence as soon as possible. Many subsistence communities will be significantly harmed while waiting for subsistence resources to recover through natural recovery alone. Therefore, an objective of restoration is to accelerate recovery of subsistence resources and services. This objective may be accomplished through increasing availability, reliability, or quality of subsistence resources, or increasing the confidence of subsistence users. Specifically, if subsistence harvest has not returned to prespill levels because users doubt the safety of particular subsistence resources, this objective may take the form of increasing the reliability of the resource through food safety testing. Other examples are the acquisition of alternative subsistence food sources and improved use of existing resources.

Remove or reduce residual oil if it is cost effective and less harmful than leaving it in place. Removing residual oil on beaches with high value for subsistence may improve the safety of foods found on these beaches. This benefit would have to be balanced against cost and the potential for disrupting recovering intertidal communities.

Protect subsistence resources from further degradation. Further stress on subsistence resources could impede recovery. Appropriate protection can take the form of habitat protection and acquisition if important subsistence areas are threatened. Protective action could also include protective management practices if a resource or service faces further injury from human use or marine pollution.

Monitor recovery. Monitoring the recovery of subsistence will track the progress of recovery, detect major reversals, and identify problems with the resources and resource management that may affect the rate or degree of recovery. Inadequate information may require managers to unduly restrict use of injured resources, compounding the injury to subsistence.

Commercial Fishing

Commercial fishing was injured through injury to commercial fish species and also through fishing closures. Continuing injuries to commercial fishing may cause hardships for fishermen and related businesses. Each year that commercial fishing remains below prespill levels compounds the injury to the fishermen and, in many instances, the communities in which they live or work.

The Trustee Council recognizes the impact to communities and people of the Prince William Sound region resulting from the sharp drop in pink salmon and herring fisheries in past years. In the 1994 work program, the Trustee Council has committed to the expenditure of five million dollars to help address these issues through the development of an ecosystem study for Prince William Sound. Some of the pink salmon and herring problems may be unrelated to the oil spill. However, the Council will continue to address these important problems as they relate to the oil spill.

Restoration Strategy. Restoration of fish and wildlife resources are covered elsewhere in this chapter. The restoration strategy for commercial fishing has three parts:

Promote recovery of commercial fishing as soon as possible. Many communities that rely on commercial fishing will be significantly harmed while waiting for commercial fish resources to recover through natural recovery alone. Therefore, an objective of restoration is to accelerate recovery of commercial fishing. This objective may be accomplished through increasing availability, reliability, or quality of commercial fishing resources, depending on the nature of the injury. For resources that have sharply declined since the spill, like pink salmon and Pacific herring in Prince William Sound, this objective may take the form of increasing availability in the long run through improved fisheries management. Another example is providing replacement fish for harvest.

Protect commercial fish resources from further degradation. Further stress on commercial fish resources could impede recovery. Appropriate protection can take the form of habitat protection and acquisition if a resource faces loss of habitat. Protective action could also include protective management practices if a resource or service faces further injury from human use and activities.

Monitor recovery. Monitoring the recovery of commercial fishing will track the progress of recovery, detect major reversals, and identify problems with the resources and resource management that may affect the rate or degree of recovery. Inadequate information may require managers to unduly restrict use of the injured resources, compounding the injury to commercial fishing.

Recreation and Tourism

The spill disrupted use of the spill area for recreation and tourism. Resources important for wildlife viewing include killer whale, sea otter, harbor seal, bald eagle, and various seabirds. Residual oil exists on some beaches with high value for recreation. It may decrease the quality of recreational experience and discourage recreational use of these beaches.

Closures on sport hunting and fishing also affected use of the spill area for recreation and tourism. Sport fishing resources include salmon, Rockfish, Dolly Varden, and cutthroat trout. Harlequin duck are hunted in the spill area.

Recreation was also affected by changes in human use in response to the spill. For example, displacement of use from oiled areas to unoiled areas increased management problems and facility use in unoiled areas. Some facilities like the Green Island cabin and the Flemming Spit camp area were injured by clean-up workers.

Restoration Strategy. Restoration of fish and wildlife resources are covered elsewhere in this chapter. The following strategy applies specifically to recreation and tourism services.

Preserve or improve the recreational and tourism values of the spill area. Habitat protection and acquisition are important means of preserving and enhancing the opportunities offered by the spill area. Facilities damaged during cleanup may be repaired if they are still needed. New facilities may restore or enhance opportunities for recreational use of natural resources. Improved or intensified public recreation management may be warranted in some circumstances. Projects that restore or enhance recreation and tourism would be considered only if they are consistent with the character and public uses of the area.

Remove or reduce residual oil if it is cost effective and less harmful than leaving it in place. Removal of residual oil on beaches with high value for recreation and tourism may restore these services for some users. However, this benefit would have to be balanced against cost and the potential for disrupting the recovering intertidal ecosystem.

Monitor recovery. Monitoring the recovery of recreation and tourism services will track the progress of recovery, detect major reversals, and identify problems with the resources and resource management that may affect the rate or degree of recovery.

Passive Uses

Passive use of resources includes the appreciation of the aesthetic and intrinsic values of undisturbed areas, the value derived from simply knowing that a resource exists, and other nonuse values. Injuries to passive uses are tied to public perceptions of injured resources.

Restoration Strategy. Any restoration objective which aids recovery of injured resources, or prevents further injuries, will assist recovery of passive-use values. No objectives have

been identified which benefit only passive uses, without also addressing injured resources. Since recovery of passive uses requires that people know when recovery has occurred, the availability to the public of the latest scientific information will continue to play an important role in the restoration of passive uses.

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