Information Session Summary

A. GROUP: Exxon Valdez Oil Spill Public Advisory Group (PAG)

B. DATE/TIME: March 5-6, 1997

C. LOCATION: Anchorage, Alaska

D. MEMBERS IN ATTENDANCE:

<u>Name</u>

D) ECEIVED APR 1 5 1997

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL

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Principal Interest

Rupert Andrews Torie Baker Chris Beck Pam Brodie Sheri Buretta Chip Dennerlein Eleanor Huffines James King Mary McBurney Brenda Schwantes Stacy Studebaker Howard Valley Nancy Yeaton

E. NOT REPRESENTED:

Name

Dave Cobb Chuck Meacham Chuck Totemoff Vacant Loren Leman (*ex officio*) Alan Austerman (*ex officio*)

F. OTHER PARTICIPANTS:

Name

Veronica Christman Dave Gibbons Bob Henrichs Don Kompkoff Gary Kompkoff Pete Kompkoff Sport Hunting and Fishing INISTRATIVE RECORD Commercial Fishing Public-at-Large Environmental Public-at-Large Conservation Commercial Tourism Public-at-Large Aquaculture Public-at-Large Recreation Users Forest Products Subsistence

Principal Interest

Local Government Science/Academic Native Landowners Public-at-Large Alaska State Senate Alaska State House

Organization

Trustee Council Staff U.S. Forest Service Eyak, Public Chenega, Public Tatitlek, Public Chenega, Public Molly McCammon Doug Mutter Eric Myers Theresa Obermeyer Bud Rice Sandra Schubert Stan Senner Craig Tillery Cherri Womac Trustee Council Executive Director Designated Federal Officer, Dept. of Interior Trustee Council Staff Anchorage, Public National Park Service Trustee Council Staff Trustee Council Staff AK. Dept. of Law, Trustee Designated Alternate Trustee Council Staff

G. SUMMARY:

The session was opened March 5 at 10:15 a.m. by Molly <u>McCammon</u>. New PAG members were provided an overview and orientation of the EVOS restoration process and the role of the PAG. The settlement agreements are in the PAG notebooks (Tab IV). She noted that there are different settlement "pots" of money; this program is funded by the civil settlement. The Trustee Council just received the fifth payment from Exxon. The Trustee Council, made up of three federal and three state Trustee representatives, must act unanimously on all issues. Federal and State laws apply to Trustee Council actions. The Restoration Office staff reports to the Trustee Council, but (for administrative purposes) are ADFG employees. McCammon reviewed the habitat protection projects and the restoration reserve.

Stan <u>Senner</u> presented information on the status of restoration and the scientific review process. He noted that it was difficult to identify impacts to resources and services when little baseline information was available. Sandra <u>Schubert</u> discussed the annual work plan process. The invitation for proposals for federal fiscal year 1998 has just gone out, with a due date of April 15. About one-third of the funded projects are carried out by non-trustee organizations.

Joe <u>Hunt</u> outlined the public outreach program (Handouts #3-10). Work has begun for the 1999 ten-year anniversary of the spill. Radio spots are being played and a proposal for a documentary film is in the works. Torie <u>Baker</u> suggested looking at ways to use the University Marine Advisory Program to get information about restoration to people. One aim is to get information to resource managers so they can take advantage of the knowledge gained from restoration projects.

<u>McCammon</u> discussed the PAG budget. The PAG is scheduled to have four meetings and a field trip each year. Cherri <u>Womac</u> reviewed PAG travel policies and procedures. Doug <u>Mutter</u> discussed his role as the Designated Federal Official pursuant to the Federal Advisory Committee Act.

The PAG toured the Oil Spill Public Information Center, then adjourned for the day.

The session reconvened March 6 at 9:00 a.m. Rupert <u>Andrews</u> served as the Interim Chairperson.

<u>McCammon</u> provided the Executive Director's report. She reported on the last PAG meeting and the fall 1996 field trip. The work plan (PAG Notebook Tab VIII) includes \$16.2 million

in projects. The SeaLife Center is ahead of schedule and on budget (it is expected to open in October 1997). An environmental assessment is underway for the Chenega oiled beaches cleanup project. Planning has begun for the tenth anniversary of the spill. Joint sessions with the Prince William Sound Regional Citizen's Advisory Council will be held. Vice President Gore has been invited, as have the Trustees. About 1,500 attendees and substantial media coverage are anticipated. She reported on the large- and small-parcel habitat protection efforts (PAG Notebook Tab IX). The next large-scale priorities are Afognak Joint Venture and Eyak. Andrews asked if surface versus subsurface ownership rights have been purchased and/or resolved. McCammon said that they had not in all cases.

Craig <u>Tillery</u> outlined the history of the settlement. He noted that four settlements were made: the civil settlement with Exxon (which this program implements), the criminal settlement with Exxon, the settlements with Alyeska, and individual claims with the Trans Alaska Pipeline Liability Fund. Each supports different types of actions by either federal or state governments. A \$100 million re-opener clause for 2002, in the civil settlement, is available to pursue if injury not known at the time of the settlement is discovered and of additional restoration is required. It is too early to tell if this will be pursued. He discussed restrictions on the use of funds, resources versus services, reimbursements to governments, and types of restoration. The Restoration Reserve Fund will be a key issue for PAG discussion and recommendation during the coming two years. Issues include: how the fund will be used, what it will be used for, and who will control the fund. <u>Tillery</u> encouraged the PAG to suggest what they thought was the best way to go with the fund, and to not worry about potential legal issues, which would be covered by trustee lawyers.

<u>McCammon</u> and Veronica <u>Christman</u> discussed the status of planning for archaeological repositories for artifacts recovered in Prince William Sound and Lower Cook Inlet (Handout #11). The PAG discussed this at length. Artifacts are closely related to culture. The Trustee Council funded the Alutiiq museum in Kodiak to handle EVOS-related artifacts for the Kodiak area. Proposals under consideration include: a regional repository, repositories in each village, and roving displays. A major issue is how much is appropriate to spend for the 1,500 artifacts from 16 sites. Other issues include: where artifacts should be stored, where they should be displayed, keeping artifacts for a site together, keeping artifacts in the area for local access, the amount to spend, legal requirements since these are public artifacts, and who owns the artifacts, who will maintain new facilities. A number of public meetings have been held to discuss this. Generally local villages want a facility in each village under their control.

Pam <u>Brodie</u> asked about consolidating some individual village facilities into one regional. Mary <u>McBurney</u> asked about use of schools for repository/display facilities. Sheri <u>Buretta</u> noted the costs for repositories in eight villages were double that for the Kodiak museum, but were far less than that for the Seward SeaLife Center. Bud <u>Rice</u> suggested an exhibit-quality catalog as one way to distribute information about the artifacts. Nancy <u>Yeaton</u> said she supports repositories in each village. Brenda <u>Schwantes</u> said that a village consensus was needed if there was to be a consolidation. Several PAG members were concerned about the high costs for maintaining the few number of artifacts. Howard <u>Valley</u> suggested using a facilitator in a session with village and regional interests. <u>Schwantes</u> suggested using the Kodiak facility as a regional repository with displays in the villages. The session was opened for public comment (see Handouts #12-14). Pete <u>Kompkoff</u> presented Chenega's support for archaeological repositories in each village. Theresa <u>Obermeyer</u> discussed her concerns. Bob <u>Henrichs</u> said Eyak supports local repositories and wants the restoration reserve held until damaged resources are restored. Gary <u>Kompkoff</u> said Tatitlek supports village repositories. Don <u>Kompkoff</u>, of Chenega, supports local repositories and does not want the restoration reserve to go to any specific group.

<u>Schubert</u> presented the plan to develop the FY 1998 annual work plan. The Restoration Plan (see PAG Notebook Tab VII) guides each year's work plan. Proposals for projects are due April 15. June 9 is when a draft plan is expected. Public comments are due July 15. A Trustee Council decision is expected around August 4. The PAG can participate in the work plan work session on May 28, will review the draft during June and can give their recommendations to the Trustee Council by August. The funding target for next year's projects is a total of \$14 million, including continuing and new projects.

<u>Senner</u> noted that about half of the \$10.8 million in anticipated continuing project funds go to the three ecosystem projects. He gave examples of projects from each of the project clusters of the work plan. He reviewed the scientific review and publication process for reporting project results (See PAG Notebook Tab III). He and <u>McCammon</u> responded to the *Scientific American* article in the PAG Notebook, Tab XI. An effort is underway to encourage principal investigators to publish results of their studies. Some 80 final study reports are now completed.

<u>McCammon</u> asked if the PAG knew of other examples or models that might be used to help define the restoration reserve. <u>Brodie</u> asked for dollar figures as an aid in examining alternatives. <u>Baker</u> remarked that the application of research efforts should be kept in mind. Jim <u>King</u> outlined his proposals for university endowed chairs.

<u>Andrews</u> said he supported getting information out about restoration efforts through the video film project. <u>Schwantes</u> likes the WEB site, and suggested putting actual reports on-line.

The meeting adjourned at 4:05 p.m.

H. FOLLOW-UP:

- 1. PAG members are encouraged to provide <u>Hunt</u> with suggestions for newsletter issues.
- 2. <u>Womac</u> will send calendars of events and PAG members resumes to PAG members.
- 3. The PAG will elect a chair and vice-chair at the next meeting.
- 4. PAG members are asked to get suggestions to McCammon if they know of a worldrenowned speaker on the status of the oceans for the tenth anniversary program.
- 5. Eleanor <u>Huffines</u> and Sheri <u>Buretta</u> volunteered to participate as PAG representatives in the work plan work session May 21.
- 6. <u>McCammon</u> will provide the PAG with estimated dollar figures for the restoration reserve under various scenarios of financing and use.
- 7. PAG members should think about the direction for the restoration reserve over the next year.

I. NEXT MEETINGS:

- --May 28 (tentative)
- --July 16 (tentative)
- --September field trip
- --November

J. ATTACHMENTS:

(Handouts, for those not present):

- 1. Meeting Summary for the August 7, 1996 Meeting
- 2. Past and Estimated Future Uses of Civil Settlement
- 3. Alaska Coastal Currents Log
- 4. Restoration Update: August 1996
- 5. Restoration Update: October 1996
- 6. Draft Restoration Notebook: Harbor Seal
- 7. Draft Kenai Peninsula Projects
- 8. The Exxon Valdez Oil Spill Trustee Council
- 9. Habitat Protection
- 10. Restoration Research, Monitoring & Management
- 11. Memorandum on Archaeological Resource Restoration Planning Project
- 12. Letter from the Chenega IRA Council
- 13. Letter from the Native Village of Eyak
- 14. Obermeyer Handout
- 15. Natural and Social Scales in Ecosystem Management, speech by Kai Lee

K. CERTIFICATION:

PAG Chairperson

Date

Meeting Summary

A. GROUP: Exxon Valdez Oil Spill Public Advisory Group (PAG)

B. DATE/TIME: August 7, 1996

C. LOCATION: Anchorage, Alaska

D. MEMBERS IN ATTENDANCE:

Name

Rupert Andrews Kim Benton Pam Brodie Sheri Buretta Dave Cobb Jim Diehl John French James King Vern McCorkle Brenda Schwantes Chuck Totemoff Gordon Zerbetz

E. NOT REPRESENTED:

<u>Name</u>

Chris Beck Chip Dennerlein Nancy Lethcoe Mary McBurney Thea Thomas Georgianna Lincoln (*ex officio*) Alan Austerman (*ex officio*)

F. OTHER PARTICIPANTS:

<u>Name</u>

Ann Brunner Veronica Christman Hank Eaton Dave Gibbons Bill Hauser Molly McCammon Rita Miraglia Doug Mutter **Principal Interest**

Sport Hunting and Fishing Forest Products Environmental Public-at-Large Local Government Recreation Users Science/Academic Public-at-Large Subsistence Native Landowners Native Landowners Public-at-Large

> EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL ADMINISTRATIVE RECORD

Principal Interest

Public-at-Large Conservation Commercial Tourism Aquaculture Commercial Fishing Alaska State Senate Alaska State House

Organization

Public Trustee Council Staff Kodiak Community Involvement Facilitator U.S. Forest Service AK Dept. Fish and Game Trustee Council Executive Director AK Dept. Fish and Game Designated Federal Officer, Dept. of Interior

Eric Myers Ernie Piper Bud Rice Patty Brown-Schwalenberg Sandra Schubert Stan Senner Bob Spies Joe Sullivan Ray Thompson Martha Vlasoff Cherri Womac Trustee Council Staff AK Dept. of Envir. Conservation National Park Service Chugach Natives Trustee Council Staff Trustee Council Staff Chief Scientist AK Dept. Fish and Game U.S. Forest Service EVOS Community Coordinator Trustee Council Staff

G. SUMMARY:

The meeting was opened August 7 at 8:15 a.m. by Vern <u>McCorkle</u>, Chairperson. Roll call was taken, a quorum was not present until later in the morning. The summary of the March 13, 1996, meeting was modified and accepted. The summary of the June 5, 1996, meeting was accepted.

Molly <u>McCammon</u> provided the Executive Director's report. The Trustee Council met in Kodiak on June 15 (attachment #1) and participated in the Near Island Research Facility groundbreaking and toured the Alutiiq Archaeological Repository. Molly reviewed the status of habitat protection actions, including the small parcel project and the large parcel effort. The Chenega Board of Directors has approved the proposed Chenega habitat protection project, which must now be voted on by the shareholders. Dave <u>Cobb</u> asked about the status of the Hayward parcel near Valdez--it is progressing, although taking longer than expected. Pam <u>Brodie</u> asked why the State withdrew its support for the Perl Island acquisition--it is not a priority area for future State management. <u>Brodie</u> asked if the Termination Point parcel will become part of the State Park System--yes.

<u>McCammon</u> reported that the Trustee Council asked State and Federal attorneys to request a refund of past fees and a waiver of future fees charged by the Court Registry Investment System for managing EVOS funds. Molly asked the PAG to continue to support this elimination of excess fee charges. <u>Brodie</u> moved (second by <u>Cobb</u>) and it was passed unanimously, that the Trustee Council strive to eliminate court fees for management of EVOS funds (see attachment #3).

<u>McCammon</u> noted that the PAG membership is due up in February 1997, but, if agreeable with the PAG, the membership term would be altered to coincide with the PAG charter renewal in October (attachment #2). There were no objections. The PAG discussed options for changing the group size and composition (e.g., adding a seat for rural communities), but no recommendation was made other than to increase outreach efforts with smaller communities in the spill area to get more participation on the PAG. John <u>French</u> moved (second by Gordon <u>Zerbetz</u>), and it was passed unanimously, to recommend to the Trustee Council that the PAG quorum be changed from 12 to 10 voting members (ref. page 7, EVOS PAG Background and Guidelines, March 1995). Martha <u>Vlasoff</u> reviewed activities related to community involvement (attachment #4). It is proposed that Seldovia have a community involvement facilitator. She also discussed the Traditional Ecological Knowledge project.

Chuck <u>Totemoff</u> thanked the EVOS staff for efforts on the Chenega beach cleanup project. Jim <u>King</u> praised the addition of news clippings in the PAG mailout.

<u>McCammon</u> introduced LJ <u>Evans'</u> replacement, Joe <u>Hunt</u>. Joe reviewed the draft Media Plan (attachment #5). He will focus on the public audience. He noted the need to stabilize the newsletter and the success of the radio spots.

Eric <u>Myers</u> discussed food policy issues. The PAG supported providing food for efficient running of meetings, but stated that prudence and common sense should apply. <u>French</u> suggested that for larger meetings (e.g., the symposium) meal tickets could be sold to cover food costs.

<u>McCammon</u> reported that a revision of the Trustee Council Operating Procedures has been given initial review by agencies. The PAG felt that public involvement and notices have been adequate. It was suggested by <u>McCorkle</u> that the Community Involvement Facilitators be invited to occasionally attend PAG meetings.

Stan <u>Senner</u> outlined the status of plans for the 10th anniversary of EVOS in March 1999. A Steering Committee is coordinating planning (French and Jim King are PAG representatives). Organized field trips are a question-local charter companies may be given the opportunity to carry these out. The PAG suggested that tour operators be given guidance in what to see and do on an oil spill tour. They also suggested considering the whole year as an anniversary, thus promoting summer tours of the EVOS area. <u>Cobb</u> suggested the Community College at Valdez as a possible tour organizer. <u>Cobb</u>, <u>McCorkle</u>, and <u>Zerbetz</u> volunteered to assist with 10th anniversary planning.

<u>Senner</u> and Bob <u>Spies</u> discussed the updated list of injured resources and services. This will go to the Trustee Council for consideration at their next meeting. <u>French</u> asked why intertidal organisms were clumped as an ecosystem rather than listed singly. <u>Brodie</u> asked if crab were injured--no linkage to the spill was provable. <u>King</u> said it was his impression that Kenai sockeye were recovered--they will be closed out as a project.

<u>Senner</u> discussed a request for the collection of Barrow Goldeneye ducks in support of studies for the APEX project. About 50 birds from Prince William Sound would be collected, with negligible impact to the population. After discussion, the PAG generally supported the study.

King moved (second by Rupert <u>Andrews</u>) that the PAG recommend the EVOS Trustee Council invite/request the President of the University of Alaska, in cooperation with the Restoration Office, to prepare a study on the benefits and feasibility of the use of the restoration reserve to continue restoration/enhancement of injured resources and services in perpetuity through endowed programs at the University of Alaska. <u>King</u> said the University would not approach the Trustees with a proposal unless requested to do so. <u>McCammon</u> recommended against preceding with a project to look at reserve funds until the Trustee Council was ready to take up the issue and thoroughly examine all the alternatives in a comprehensive fashion. After discussion, the motion was defeated (4 in favor, 7 opposed, 1 abstain).

At 11:50 public comment was taken. Theresa <u>Obermeyer</u> commented and distributed a handout.

<u>McCammon</u> highlighted public comments from the public meeting held August 6 (attachment #6) and those received in writing (attachment #7). She then introduced the Executive Director's preliminary recommendations for restoration projects in FY 1997 (attachment #8).

<u>Spies</u> outlined the pink salmon, herring, SEA and related projects, sockeye salmon, cutthroat trout and dolly varden, marine mammals, and nearshore ecosystem project clusters. Discussion ensued about the utility of management tools developed with EVOS funds if they were not to be used by resource agencies. <u>Andrews</u> noted that harbor seals were healthy in Southeast and could be used for comparisons. <u>French</u> questioned the timeline for intertidal studies.

<u>Senner</u> reviewed the seabird/forage fish project cluster.

Veronica <u>Christman</u> outlined the archaeological project cluster. The Chenega artifact repository is on hold pending an area-wide review of needs.

Sandra <u>Schubert</u> reviewed the subsistence cluster. Dave <u>Gibbons</u> said that project #97222 was feasible if the road by the dump was relocated. <u>Benton</u> asked about interest in the project #97281 workshops, noting that not all landowners want to sell lands, other habitat protection options should be examined.

<u>Christman</u> outlined the marine pollution cluster. Project #97115 is recommended by the Executive Director for funding outside the work plan. <u>Cobb</u> supports project #97229.

<u>Senner</u> presented the habitat improvement cluster. <u>Brodie</u> questioned the success of boardwalks for control of riverbank fishing on the Kenai.

<u>Senner</u> discussed the ecosystem synthesis, public education and information, and research facilities clusters. <u>French</u> raised a question about funding for add-ons at the SeaLife Center (projects #97197 and #97252) since so much money was going there already, <u>Cobb</u> concurred. <u>McCammon</u> said that interest earned on the monies already going to the SeaLife Center was about \$1.5 million and might provide possible funding for added work. <u>Brodie</u> stated that she hoped those funds went to high priority projects, not just the SeaLife Center.

<u>McCammon</u> discussed the project management element. This replaces agency management costs in individual projects; it was decided to separate this administration/management from each project and lump it here. This action was recommended by the audit.

McCammon reviewed the administrative budget element. This will total about \$3.0 million in FY 97. The Trustee Council decided to go to ½ time liaisons and the Restoration Office staff

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has been reduced by 2. OSPIC is still included, but is expected to be merged with the Anchorage natural resources libraries consortium next spring, which will reduce funding needs. She noted that the Juneau office has moved to less expensive space in the federal building. She also said the lower floor conference room would be given up in January 1997 to save space costs.

<u>Cobb</u> moved (second by <u>Andrews</u>), and it was passed unanimously, that the PAG approve the workplan, in concept, as recommended by the Executive Director. PAG members will provide individual comments on the work plan as well.

<u>Schwantes</u> moved (second by <u>Cobb</u>) that the PAG recommend the Trustee Council restructure the PAG to include two village representatives. After discussion, the motion was tabled (motion to table by <u>Zerbetz</u>). The general feeling of the PAG was that village representatives should participate and could participate in the PAG, as currently structured, and through other avenues (e.g., community involvement project, public meetings). <u>Schwantes</u> said there is something to be said for having a title and being able to vote.

King moved (second by <u>Brodie</u>), and passed unanimously, that the PAG praise the staff for their good work.

<u>French</u> suggested the endowment idea be brought back up when the Trustee Council was ready to discuss long-term efforts. Jim <u>Diehl</u> likes having several subsistence projects in the work plan. Sheri <u>Buretta</u> likes the community involvement effort.

<u>Brodie</u> moved (second by <u>Benton</u>) that the PAG encourage the Trustee Council to consider restructuring the PAG for increased effectiveness. After discussion, the motion was withdrawn.

<u>Benton</u> thanked all for the opportunity to participate over the last 4 years, she will not reapply for a seat.

<u>McCammon</u> stated that the PAG is a useful tool if it is given good, concise information. She appreciates the spectrum of views.

The meeting adjourned at 3:00 p.m.

H. FOLLOW-UP:

1. <u>McCammon and Mutter will initiate PAG Charter renewal and the nomination process</u> for the next two-year PAG membership.

I. NEXT MEETINGS:

--PAG field trip to Homer, Port Graham, Seldovia, overflight of Port Dick: September 18-19, 1996

J. ATTACHMENTS:

- 1. Exxon Valdez Oil Spill Trustee Council Public Hearing in Kodiak June 15, 1996
- 2. *Exxon Valdez* Oil Spill Public Advisory Group Procedure for Member Nomination and Appointment

(for those not present):

- 3. Resolution to Eliminate Court Fees
- 4. Community Involvement Report, July 30, 1996
- 5. Draft Media Plan Projects and Priorities
- 6. Public Comments from the 8/6/96 Public Hearing
- 7. Public Comment Received FY 97 Work Plan
- 8. Executive Director's Preliminary FY 97 Recommendation (8/6/96)
- 9. Memo from Chris <u>Beck</u> and Mary <u>McBurney</u> on the Admin Budget

K. CERTIFICATION:

PAG Chairperson

Date

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Past and Estimated Future Uses of Civil Settlement

(in millions \$)

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EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL ADMINISTRATIVE RECORD

Reimbursements for Damage and Response	213.6	Payments	by Exxon
Governments (includes litigation and cleanup)	173.7 (a)	Contember 1001	¢ 00:'ll'
Exxon (for cleanup after 1/1/92)	39.9	September 1991	
Research, Monitoring and General Restoration	180.0	September 1992	\$150 million
• FY 1992 Work Plan	19 /	September 1993	\$100 million
• FY 1993 Work Plan	8.8 (b)	September 1994	\$ 70 million
FY 1994 Work Plan	15.2	September 1995	\$ 70 million
FY 1995 Work Plan	17.1	September 1996	\$ 70 million
FY 1996 Work Plan (authorized)	18.2	September 1997	\$ 70 million
• FY 1997 Work Plan (authorized)	15.4 (C)	September 1998	\$ 70 million
FY 1998 - FY 2002 Work Plans (estimate)	66.2	September 1999	\$ 70 million
Alaska SeaLife Center	25.5	September 2000	\$ 70 million
Reduction of Marine Pollution	1.2	September 2001	\$ 70 million
Habitat Protection Large Parcel and Small Parcel habitat protection programs (past expenditures, outstanding offers, estimated future commitments and parcel evaluation costs)	381.5		
Restoration Reserve	108.0		
• FY 1994 — FY 1997	48.0		
 FY 1998 — FY 2002 (anticipated) 	60.0	Exxon Vald	ez
Public Information, Science Management & Administra Actual expenditures:	tion 30.9	Oil Spill Fai	ets:
FY 1992 Work Plan	4.3	Date and Time:	
FY 1993 Work Plan	2.7 (b)	12:04 a m	
FY 1994 Work Plan	4.1	12.04 0.111.	
• FY 1995 Work Plan	3.2	Amount spilled:	
FY 1990 WOR Flan (authorized) FY 1997 Work Flan (authorized)	3.4 2 Q	10.8 million gallon	S
	2.0	257,000 barreis	
FY 1998 - FY 2002 Work Plans (estimate)	10.3	Tanker loaded w	vith:
TOTAL	914.0	53.1 million gallon	S
Exxon Payments	900.0	1.2 million barrels	
Interest on Court Registry Investment System (minus fees)	12.0		
Interest on federal and state acounts	2.0	Utied Shoreline:	•
(a) Reimbursement to governments reduced by \$2.7 million		189.8 miles heavy	oiling
(b) 1993 Work Plan was funded for only 7 months during		165.3 miles moder	ate oiling
 transition to the federal fiscal year (October 1 - September 30). (c) As of October 1, 1996. Additional \$ 1.1 million in projects 		850.6 miles very li	nng ght oiling
pending further review for FY 97 funding.			

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Alaska Coastal Currents Log A-Series D 臣C匡IV匡 April through June, 1996

A-series	Topic	Researcher in EXXIE werda 80 Briefildessoription
1a -	Giant Pacific Octopus	David Scheel. PWSSCADULATION COUNCIL with help of TEK.
2a	Mussel beds	Malin Babcock. Scientists, Chenega residents clean oiled mussel beds.
3a	Harbor Seals	Monica Reidel & Don Kompkoff. Harbor Seal Commission forms, local knowledge helps scientists work on seal study.
4a	Intertidal Zone	Mike Stekoll. Fucus severely injured from spill and cleanup, many species depend on fucus for survival.
5a	Pink Salmon eggs	Ron Heintz. Oiled eggs can result in altered growth rate. No hydrocarbons can be detected, but result in smaller fish, less likely survival.
6a	Seabirds	Dan Roby. Study of seabird diets. High lipid or fat content preferred food and better for survival, versus low fat species such as cod.
7a	Nearshore Predators	Leslie Holland-Bartels. NVP project to monitor several species in a nearshore ecosystem
8a	Sockeye (over escapement)	Dana Schmidt. Scientists discover the timing of copopod production plays big role in carrying capacity of Kenai, Red and Akalura Lakes
9a	Guif of Alaska changes	Paul Anders describes decline of shrimp, crab numbers while cod numbers increased and ocean temps changed.
10a	Plankton bloom	Ted Cooney talks about role of plankton bloom as high energy food source for many species
11a	Pink Salmon (otolith)	Tim Joyce. Marking hatchery pink salmon through otolith marking helps identify stocks and helps preserve wild stock
12a	Killer Whales	Craig Matkin talks about two distinct types of killer whale groups, residents that eat fish & transients eating mammals
13a	Harbor Seals (blood)	Kathy Frost. Poor seal blood coincides with herring decline, fatty acids tell scientists what seals are eating.

Alaska Coastal Currents Log B-Series July through September, 1996

B-series	Topic	Researcher interviewed & Brief description
1b	Youth Area Watch	Kids join in with scientists to study injured species.
2b	Sockeye (genetics)	Lisa Seeb. Cook Inlet sockeye populations identified through genetics allowing better fisheries management.
3b	PWS Herring (virus)	Gary Marty. Herring virus identified, population recovering, looking for stress factors.
4b	Pink Salmon (genetics)	Jim Seeb. Maintaing genetic diversity in wild fish is big concern, genetic variations discovered.
5b	Murres	Scott Hatch & John Piatt. Murres hit hardest by spill, scientists concerned about forage fish supplies.
6b ·	Seabirds	John Piatt. Ecosystem changes unrelated to spill leading to decline of injured species. Forage fish supplies a concern.
7b	Marbled murrelets	Kathy Kuletz. Locating nests a challenge, data on MaMus is scarce.
8b	Harbor Seals (diets)	Kathy Frost. Long term data on harbor seal diets available by studying fatty acids, don't have to harm seals to know diet
9ab	Pristane	Naturally occuring hydrocarbon found in mussels collected before oil spill; produced by calenoid copopods.
10b	Archaeology (excavations)	Linda Yarborough. Recent excavations reveal early history of PWS.
11b	Chenega Cleanup	Evanoff & Ernie Piper. Chenegans ask for more cleanup to improve subsistence confidence.
12b	Bald Eagles	Tim Bowman. Eagles appear to have recovered from the spill's effects.
13b	Sound Waste Management	Paul Roten. Waste streams create a steady source of ocean pollution. Project in Sound to manage waste in all villages.

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Alaska Coastal Currents Log C-Series October through December, 1996

C-series	Topic	Researcher interviewed & Brief description		
1c	Eelgrass	Steve Jewett. Spill and spill cleanup destroyed eelgrass beds, but recovery doing well.		
2c	Archaeologiy (monitoring)	Doug Reger. Locals monitor and protect nearby archaeologic sites.		
3c	Herring (juveniles)	Evelyn Brown. Research focuses on herring juvenile survival		
4c	Littleneck clams	Patti Brown Schwallenberg. Seward hatchery raising littleneck clams for seeding subsistence beaches.		
5c	Pink Salmon (subsistence)	Patti Brown Schwallenberg. Port Graham community welcomes enhanced pink salmon back to subsistence streams.		
6c	Harlequin Ducks	Dan Esler. Harlequins have poor reproduction success, radio transmitters used to track them.		
7c	River Otters	Gail Blondell. Otters difficult to find and study, stress factors studied, transmitters used.		
8c	Sea Otters	Brenda Belatchy. Blood samples show differences in spill area and non-spill area otters.		
9c	Kitletz Murrelets	Robert Day. Impacts unknown because species is still a mystery		
10c	Pink Salmon	Jim Seeb. Genetic effects from spill identified. Possible mutation. (pulled due to lack of peer review on this project)		
11c	Little Waterfall Creek	Steve Honnold. Fish ladder help increase spawning habitat.		
12c	Cutthroat Trout	Dan Gillikin. Helping juvenile survival through habitat improvement could also help competitors.		
13c	Killer Whales	Craig Matkin. Transient pods show less mixing then resident pods		

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Vol 3 No. 3

Exxon Valdez Oil Spill Trustee Council

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Council offers to purchase, protect high-value land in western PWS

The Offer

Cost \$34 Million

Fee Simple 38,000 acres

Conservation Easement 23,000 acres

> Shoreline 100+ miles

Exclusions Old Chenega Village site, small development sites & land on Evans and Latouche Islands E shamy Bay and Jackpot Bay have long been known as the most valuable salmon producing systems in western Prince William Sound. Together they contain 22 anadromous streams producing wild sockeye and pink salmon.

These areas, valuable for commercial, sport, subsistence and recreational uses, are targeted for permanent protection if a \$34 million land deal offered by the Trustee Council is approved by the Native shareholders of Chenega Corporation.

The Trustee Council formally made the offer May 31 to purchase conservation easements and fee-simple land totalling 61,000 acres, including more than 100 miles of shoreline, much of it once covered by oil from the *Exxon Valdez*. The Chenega Corporation board of directors unanimously endorsed the deal, but it must also be approved by two-thirds of the village corporation's shareholders.

"Western Prince William Sound was hardest hit by the oil and continues to suffer lingering effects from the original injuries," said Molly McCammon, the Trustee Council's executive director. "This is valuable habitat for many of the species injured by the spill and it will go a long way toward long-term recovery in this area."

Eshamy Bay and Jackpot Bay are Continued on page 5

FY 97 Draft Work Plan

The Trustee Council Restoration Office received 120 proposals requesting \$33 million in funding for research, monitoring and general restoration projects during the next fiscal year. The Council has targeted approximately \$16 million for these projects during Fiscal Year 1997.

The FY97 Draft Work Plan, released June 25, provides an abstract of each proposal, along with draft recommendations from Executive Director Molly McCammon and Chief Scientist Dr. Robert Spies.

McCammon has recommended that 71 projects totalling \$16.7 million be given further consideration at the late August Council meeting. Of those, 48 are continuing projects and 23 are new. Communities from the spill area submitted 35 proposals, in part due to an outreach program initiated by the Council. Nearly two-thirds of those proposed projects were recommended for further consideration.

In addition to project proposals, the FY97 Draft Work Plan includes

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Oil removal to boost confidence in subsistence, recreational uses



Oil residues remain on popular subsistence beaches like this one on Evans Island. Above, ADEC's Diane Munson, Department of Interior Trustee Alternate Deborah Williams, Larry Evanoff of Chenega Bay and ADEC's Mark Broderson check the beach for oil during a 1994 survey. Below is a small sample of asphalt-like oil found on the beach.



More than 7 years after the *Exxon Valdez* spilled its cargo in Prince William Sound, restoration crews will be returning to selected beaches in a final effort to remove tar-like pockets of oil.

The Exxon Valdez Oil Spill Trustee Council approved expenditures up to \$1.9 million to conduct a targeted cleanup near the Village of Chenega Bay in western Prince William Sound. Detailed plans for the cleanup are due to be finalized by the end of this year with the actual work scheduled to begin next summer.

Residents of Chenega Bay, which is centered in the area of the Sound hardest-hit by the spill, requested the cleanup, saying the presence of residual oil is a significant problem for the community. Residents told the Trustee Council that remaining oil affects the recovery of injured resources and confidence in subsistence use of the shorelines.

The residual oiling is not considered a high environmental risk to the resources, but the Council endorsed the plan in an effort to boost public confidence in the subsistence and recreational use of the tidelands.

For Chenega villagers, the tar-like remains have been compared to litter in a food-gathering area or patches of asphalt and mousse in a garden.

"It's clear that the impact of this spill on local residents is still hard-felt," said Molly McCammon, executive director of the Trustee Council.

"We will never be able to remove 100 percent of the oil from these beaches," she said. "However, we can target some of the most significant areas in terms of public use and make significant improvements."

A 1993 shoreline survey of Prince William Sound identified 225 locations with residual surface oiling, asphalt or mousse. The Chenega-area cleanup will target surface oil found at eight sites on Latouche, Evans and Elrington Islands. Those shorelines are covered with heavy boulders which hide the oil and protect it from the natural cleaning action of waves.

Tentative plans call for using all available cleaning methods on the selected beaches, including intensive manual cleanup, use of cleaning agents, cold-water flushing and bioremediation. One possibility could be to spread a commercial product known as PES-51 over some areas to help break up the oil. Cold water would be used to flush the oil and the surfactant to the tideline where both would be trapped by booms and scooped up. The advantage of PES-51 over other chemicals is that it can easily be removed from the water.

The Department of Environmental Conservation will oversee the cleanup. The Prince William Sound Economic Development Corporation will coordinate contracting for the cleanup, using local companies and local labor. The corporation is the Alaska Regional Development Organization for the area.

A significant number of Pacific herring sampled from one spawnon-kelp pound fishery in Southeast Alaska have been shown to carry the same deadly and contagious virus associated with the 1993 crash of the herring fishery in Prince William Sound.

After the Prince William Sound herring fishery crashed, it was determined that Viral Hemorrhagic Septicemia Virus (VHSV) exists at background levels in many populations of herring. But what caused the sudden spread of the disease?

Gary Marty, of the University of California—Davis, looked to stress as a major contributing factor.

"It's like cold sores in humans," he said. "We carry around the herpes virus with no troubles, but under stress we exhibit cold sores. When the herring are stressed, they begin to exhibit lesions from VHSV and they die."

Stress can be caused in several ways, such as lack of food, pollution, and crowded conditions. Marty, in a study funded by the Trustee Council, decided to look for stress in the high-density environment of a pound fishery, in which several tons of herring are captured and placed in cages to spawn on a limited supply of kelp. The herring are then released back to the general population. Marty sampled herring from the pound fishery in Craig and estimated that approximately 15 percent of the herring being released may have had the virus. "In my opinion, VHSV prevalence of 15 percent in released fish would be a serious threat to the fishery," he said.

Marty cautioned that the results are preliminary. The data demonstrate a strong need for further study, but no real conclusions, he said.

Regardless of whether further studies conclude

Virus found in herring pound fishery

Dage 3

that disease outbreaks associated with pounds is a problem, it should not be considered a threat to the pound fishery, Marty said. According to John Wilcock, ADF&G research biologist, there are management alternatives that would allow permit holders to continue the fishery, including open pounding, in which the kelp is moved to the fish instead of the fish moved to the kelp.

In managing the herring, ADF&G already assumes 100 percent mortality from the pound fishery, so another alternative is to not release the fish placed in the pounds.

Draft Work Plan

Continued from Page 1

information regarding proposals for archeological repositories, reduction of marine pollution, support for the habitat protection program and public information, science management and administration.

Comments on the draft work plan should be received at the Restoration Office by the end of the day August 9, 1996. A public meeting on the work plan will be held at 7 p.m. August 6 at the Oil Spill Public Information Office, 645 G Street in Anchorage. The public can participate via teleconference through local Legislative Information Offices or by calling Rebecca Williams at the Council office (278-8012).

Category	Explanation	No. of Projects	FY96 Cost
Fund	Project has high technical merit with significant contribution toward achieving restoration objectives.	13	\$1,882,400
Fund Contingent	Same as above except that certain issues need to be resolved. Project recommended for approval if these issuse can be resolved.	43	\$12,732,800
Defer Decision	A decision on funding cannot be made without more information. Defer decision until November or December 1996.	15	\$2,129,000
	TOTAL	71	\$16,744,200
Do Not Fund	Project is not legally permissable, has technical problems, or would not significantly contribute to restoration objectives.	49	\$13,978,200

This table summarizes the executive director's preliminary recommendations on the research, monitoring, and general restoration projects.





The formal groundbreaking for the Near Island Research Facility in Kodiak was part ceremony and part celebration.

Construction on the \$18 million saltwater research facility was made possible through a cooperative effort between seven federal, state and local agencies. About half of the funds will come from criminal and civil fines levied against Exxon after the 1989 oil spill.

Deborah Williams, assistant to Secretary of Interior Bruce Babbitt, said the event illustrated the resurrection occurring throughout the spill area. "We've been able to turn this disaster into remarkable things," she said. "We've taken a death and made something alive."

Williams noted that the trustees have focused strongly on protecting the habitat of the Kodiak area. So far, the trustees have spent \$170 million protecting 279,000 acres of land on Kodiak, Afognak and Shuyak Islands. "And we're not done yet," she said.

The research facility will house offices and laboratories for the National Marine Fisheries Service, Alaska Department of Fish and Game, University of Alaska, and the National Park Service. The Trustee Council's purchase of 26,665 acres on Shuyak Island from the Kodiak Island Borough included an agreement that \$6 million of the purchase price would be contributed to the research facility.

The Alaska Legislature appropriated \$3 million using money from the criminal settlement with Exxon. The remaining \$9 million will be financed through revenue bonds to be paid from the long-term lease with the NMFS.

Near Island Research Facility Underway

Dage 5



Photo by Cecil Ranney, Kodiak Daily Mirror

Construction of the Near Island Research Facility officially began with ceremonial shoveling by, from left, Don Collinsworth, Senator Ted Stevens, Borough Mayor Jerome Selby, Lt. Governor Fran Ulmer, University President Jerome Komisar, Fish and Game Commissioner Frank Rue and Katmai National Park Superintendent Bill Pierce.

Chenega

Cont. from Page 1

among the highest ranked parcels in the oil spill area for restoration of injured resources. The area has important restoration value for many of the species hit hardest by the spill, including harbor seals, harlequin ducks, marbled murrelets, pigeon guillemots, sea otters, sockeye salmon, Dolly Varden and cutthroat trout. The lands include most of Chenega Island, Flemming Island, the northern half of Evans Island and the southern tip of Knight Island.

The habitat package would include the outright purchase of nearly 38,000 acres, a portion of which would be managed as part of the Chugach National Forest. Other portions would be managed by the State of Alaska as a marine park. Conservation easements would protect another 23,000 acres.

The Native village corporation would keep the original village site of Chenega, which was destroyed in the 1964 earthquake. The rest of Chenega Island would be protected through conservation easements with the southern quarter of the island being off limits to the public. Chenega Corporation would also keep several small development sites ranging in size from 30 acres to 1.5 acres, with any future development consistent with restoration objectives.

If approved, the purchase will be the seventh in a series of large habitat protection agreements stemming from the *Exxon Valdez* oil spill. The Trustee Council has already purchased title, conservation easements or timber rights to 361,790 acres in the Kodiak, Cook Inlet and Prince William Sound regions. The area has important restoration value for many of the species hit hardest by the spill, including harbor seals, harlequin ducks, marbled murrelets, pigeon guillemots, sea otters, sockeye salmon, Dolly Varden and cutthroat trout.

Community Notes

Local Community **Facilitators**

> Gary Kompkoff Tatitlek 325-2311

> Don Kompkoff Chenega Bay 573-5132

Walter Meganack, Jr. Port Graham 284-2227

> Tina Wheeler Valdez Native Tribe 835-5589

> > Hans Petersen Nanwalek 281-2275

Victor Ashenfelter Qutekcak (Seward) 224-3118

Bob Henrichs Eyak Tribal Council (Cordova) 424-7739

> Hank Eaton Kodiak Tribal Council 486-4449

> > Virginia Aleck Chignik Lake 845-2212

C cientists and Presearchers have come to understand that traditional knowledge is a valuable tool in studying the ecosystems damaged by the *Exxon Valdez* oil spill. But how do researchers go about tapping into the wealth of insights from local residents? In April, that

question was discussed during a twoday workshop on how to best use Traditional Ecological Knowledge. The workshop resulted in development of draft protocols, which included the following statement:

"Working in, around, and with communities requires sensitivity to their cultures, customs, and traditions. Successful working relationships are built on mutual respect and trust. These protocols describe major elements of a research partnership, but their application depends on using common sense and acting with common courtesy."

The draft protocols were circulated in the spring. A revised version incorporating comments received will be circulated later this summer.

Executive Director Molly McCammon and community coordinator Martha Vlasoff visited Kodiak Island villages in March to hold informational meetings about ongoing restoration efforts.

The overriding concern expressed by



Taking a break during a visit to Kodiak Island communities, from left to right, Executive Director Molly McCammon, Kodiak-area Community Involvement Facilitator Hank Eaton, PAG member Brenda Schwantes, Community Coordinator Martha Vlasoff and ADF&G biologist Dan Moore.

the communities was their concern to be prepared for the next oil spill. The lifting of the oil export ban means oil tankers will be passing by Kodiak on their way to North Pacific Rim countries and villagers said they are incapable of protecting themselves from another spill. Linda Freed, of the Kodiak Island Borough, has been working on acquiring oil spill response equipment to help villagers protect subsistence resources.

Crab enhancement was another big concern. Several villagers wanted to know if aquaculture programs could help bring crab populations back to prespill levels. Crab populations were on the decline before the spill, but completely disappeared after the spill, they said. They wondered why crab and shrimp have not been put on the list of injured resources. McCammon directed Science Coordinator Stan Senner to work with ADF&G to prepare a report on the status of crab populations in the oil spill area.

Hunt Council staff

oe Hunt, a former reporter with the joins Anchorage Times and the Peninsula Clarion, has joined the Exxon Valdez Oil Spill Trustee Council as communications coordinator.



Joe Hunt

While writing for the Anchorage Times, Hunt spent three years reporting on Alaska's natural resources and

environmental issues. He served as lead reporter for the Exxon Valdez oil spill before moving to Kenai to open the Times' Kenai Peninsula Bureau. Most recently, Hunt served as public information officer and constituent relations assistant for Governor Tony Knowles.

As communications coordinator, Hunt will oversee development of publications and work with media representatives worldwide to provide information on restoration efforts.

New In Print

These documents and reports are available at the Oll Spill Public Information Center, 645 G St, Anchorage, AK 99501, or by calling 907/278-8008, toll-free within Alaska at 800/478-7745, or toll-free outside Alaska at 800/283-7745.

Reports • Archaeology

1994 EVOS report. spill area site and collection plan. Restoration Project Final Report, Bittner, J.E. and D.R. Reger.

Archaeological site monitoring and restoration. Restoration Project 1994 Annual Report, Reger, D. et al.

Birds

Experimental harlequin duck breeding survey in Prince William Sound, Restoration Project 1994 Annual Report, Rosenberg, D.H.

Harbor Seals

- Habitat use, behavior, and monitoring of harbor seals in Prince William Sound. Restoration Project 1994 Annual Report. Frost, K.F. et al.
- Habitat use, behavior and monitoring of harbor seals in Prince William Sound, Restoration Project 1993 Annual Report, Frost, K.F. and L.F. Lowry.

Herring

- The impact of adult pre-spawn herring on subsequent progeny, Restoration Project 1994 Annual Report, Carls, M.G. et al.
- Forage fish study in Prince William Sound. Restoration Project 1994 Annual Report, UAF School of Fisheries.

he Restoration Update is published approximately six times a year by the Exxon Valdez Oil Spill Trustee Council. Its purpose is to update interested members of the public about actions, policies and plans of the Trustee Council to restore resources and services injured by the Exxon Valdez oil spill.

For more information, mailing address correction or to request future articles on specific subjects, contact:

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Pink Salmon

- Injury to pink salmon eggs and preemergent fry incubated in oiled gravel (laboratory study), Restoration Project 1994 Annual Report, Heintz, R.A. et al.
- Instream habitat and stock restoration for salmon. Otter Creek Barrier bypass subproject, Restoration Project 1994 Final Report, Wedemeyer, K. and D. Gillikin.
- Instream habitat and stock restoration for salmon. Shrode Creek barrier bypass subproject, Restoration Project 1994 Final Report, Wedemeyer, K. and D. Gillikin.
- Use of aerial photograph, channel-type interpretations to predict habitat availability in small streams, Restoration Project 1994 Final Report, Olson, R.A.

Injury to salmon eggs and preemergent fry in Prince William Sound, Natural Resource Damage Assessment Final Report, Sharr, S. et al, 1994.

Shellfish

- Injury to crabs outside Prince William Sound. Damage Assessment Final Report, Freese, J.L. and C.E. O'Clair.
- Recovery monitoring and restoration of oiled mussel beds in Prince William Sound, Restoration Project 1993 Annual Report, Babcock, M. et al.
- Recovery monitoring and restoration of oiled mussel beds in Prince William Sound, Restoration Project 1994 Annual Report, Babcock, M. et al.

Sockeye Salmon

- Kenai River Sockeye salmon restoration, Restoration Project 1994 Annual Report, Tarbox, K.E. et al.
- Restoration of Coghill Lakes sockeye salmon: 1994 annual report on nutrient enrichment restoration, Restoration Project 1994 Annual Report. Edmundson, J.A. et al.
- Kenai River sockeye salmon restoration, Damage Assessment 1993 Annual Report, Tarbox, K.E. et al.

Chinook Salmon

Chenega chinook releae program, EVOS Restoration Project Annual Report, Ferren, H. and J. Milton

Subtidal

- Fate and toxicity of spilled oil from the Exxon Valdez. EVOS Damage Assessment Final Report, Wolf, D.A.
- Petroleum hydrocarbons in near-surface sea water of Prince William Sound, Alaska, following the EVOS, Report number II: Analysis of caged mussels, Damage Assessment Final Report, Short, J.W. and P. Rounds.
- Hydrocarbon mineralization potentials and microbial populations in marine sediments following the EVOS, Damage Assessment Final Report. Braddock, J.F. et al.
- Nearshore transport of hydrocarbons and sediments following the EVOS, Damage Assessment Final Report, Sale, D.M. et al.
- Microbiology of subtidal sediments: monitoring microbial populations, Restoration Project 1993 Final Report, Braddock, J.F. and Z. Richter.

Subtidal monitoring: recovery of sediments in the

Northwestern Gulf of Alaska, Restoration Project 1994 Annual Report, O'Clair, C.E. et al.

Dage 7

Assessment of oil spill impacts on fishery resources: measurement of hydrocarbons and their metabolites, and their effects, in important species, Natural Resource Damage Assessment Final Report, Varanasi, U., et al. 1995.

Whales

- Assessment of injuries and recovery monitoring of Prince William Sound killer whales using photoidentification techniques, 1994 Restoration Project Final Report, Dahlheim, M.E. and C.O. Matkin.
- Assessment of injuries to killer whales in Prince William Sound, Natural Resource Damage Assessment Final Report, Dahlheim, M.E. and C. O. Matkin. 1993.
- Effects of the Exxon Valdez oil spill on the abundance and distribution of humpback whales in Prince William Sound, Natural Resource Damage Assessment Final Report, Dahlheim, M.E. and O. von Ziegesar, 1993.



August 6, 7 p.m.

Public Meeting to comment on the FY 97 Draft Work Plan. To participate via teleconference, contact your local Legislative Information Office or Rebecca Williams at the Restoration Office at 278-8012 or 800/478-7745.

August 7

Public Advisory Group will meet to discuss FY 97 Draft Work Plan. Contact Doug Mutter at 907/271-5011 for more information.

August 29*

Trustee Council meeting on FY97 Final Work Plan. Contact Rebecca Williams for more information at 907/ 278-8012.

* Tentative date

September 18-19

Public Advisory Group field trip to Port Graham and Lower Cook Inlet area. Open houses are tentatively scheduled as follows:

September 18

Port Graham Community Center	11 am
Seldovia Multi-Purpose Room	6:30 pm
September 19	





Knowles applauds Kenai River protections



Trustees voted during their June 28 meeting to offer to buy this 76-acre parcel on the Kenai River. Executive Director Molly McCammon, Department of Law Trustee Alternate Craig Tillery and Assistant Attorney General Alex Swiderski check out the property before making their recommendations to the Council.

Dage 8

vital components of a wide-ranging effort to protect the Kenai River, Governor Tony Knowles said recently in dedicating the new Kenai River Center.

"This dedication marks the culmination of a great deal of effort by many people to respond to the need for protection and enhancement of the Kenai River," Knowles said.

He pointed out that the Trustee Council has dedicated more than \$11 million to purchase nearly 17,000 acres of land important to keeping the Kenai River healthy. The first two Kenai River parcels, valued at more than \$2.4 million, were recently concluded. Offers are pending on several other parcels.

The Council also funded a key study to identify sockeye salmon using genetics. This information will allow fisheries managers to accurately identify salmon stocks by river system, therefore allowing better management of the commercial catch to ensure proper escapement to each system.

Another Councilfunded science project is looking at the relationship between over-escapement and the effect on survival of salmon fry.

The Kenai River Center, located on the Kenai Spur Highway in Soldotna, provides visitors with information about the river and need for habitat protection and restoration. The center also houses state, federal and borough agencies and provides residents with a single location where they can get projects reviewed and assistance in complying with needed permits.



Restoration Office 645 G Street, Ste. 401 Anchorage, AK 99501-3451

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Christopher Beck Anchorage

Pamela Brodie Homer

Sheri Buretta Anchorage

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Exxon Valdez Oil Spill Trustee Council



'Creative' Tatitlek package approved

A fter two years of negotiations, the Trustee Council recently agreed to purchase 66,000 acres of Tatitlek Corporation lands in a package praised by both sides for its creativity and its flexibility. Trustees agreed to spend \$33 million to protect the valuable habitat in eastern Prince William Sound.

A variety of methods were used in the package, including fee simple purchase, conservation easements with and without public access, and timber easements. "This is the most creative package the Trustee Council has seen by far," Trustee Deborah Williams told the Tatitlek Board of Directors. "It represents, I think, your unique needs and the ecological management needs that we felt were important."

"What is particularly interesting about this transaction," she said, "is that it does provide Tatitlek not only the kind of environmental protection around your lands that will sustain your shareholders for generations, but will also allow economic development."

Carroll Kompkoff, president of Tatitlek Corporation, thanked the Council for persevering through long and difficult negotiations. "We believe the results will provide long-term benefits to the public and the Tatitlek shareholders, as well as to the resources injured by the spill," Kompkoff said. Continued on Page 2

Work plan set for FY97

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The work plan for FY97 will provide \$15.4 million for research, monitoring and general restoration projects for the Kodiak Island, Kenai Peninsula and Prince William Sound regions. Additional projects will be considered at the Trustee Council's December meeting.

The FY97 Work Plan is the document that sets the Trustee Council budget and identifies community projects, scientific studies and administrative duties for the fiscal year beginning October 1.

In addition to the work plan, the Council approved several capital projects, including \$545,600 to the Alaska SeaLife Center to

Continued on Page 3

Kenai Peninsula

Exxon Valdez settlement funds benefit residents and visitors

Editor's Note: Restoring an injured ecosystem after a major oil spill is a task never before attempted on the scale now being done in Prince William Sound, lower Cook Inlet and the Kodiak Archipelago. Restoration efforts also include revitalizing human services such as subsistence, commercial fishing, and recreation.

The Exxon Valdez Oil Spill Trustee Council, funded by the \$900 million civil settlement with Exxon, is bound by the courts and its trust responsibilities to restore both the environment and the human services injured by the spill. In addition, the federal and state governments are each investing \$50 million from the Exxon criminal settlement into the spill region.

This is the first of a three-part series describing how that money is being spent in each region. This issue will focus on the Kenai Peninsula. Future issues will focus on Kodiak Island (including the Alaska Peninsula) and Prince William Sound.



The 20-acre Kobylarz parcel near Soldotna includes an estuary valuable for salmon rearing.

A laskans who enjoy outdoor activities on the Kenai Peninsula are starting to see the benefits from dozens of projects funded by the *Exxon Valdez* criminal and civil settlements.

Kachemak Bay State Park has been unified through the purchase of 23,800 acres of park inholdings and fortified with new trails, public use cabins, campsites and mooring buoys.

Protection of the Kenai River has

taken a big step forward, with progress on habitat protection, sockeye management, riverbank restoration and fisher education. The Council has purchased and protected several miles of Kenai River shoreline, financed important research into sockeye salmon genetics, sockeye overescapement, and restoration of shoreline habitat destroyed by overuse.

The \$55 million Alaska SeaLife Continued on Page 3



Tatitlek

Continued from Page 1

The entire package must be approved by two-thirds of the Native cor-poration's shareholders.

The protection package includes a conservation easement covering Bligh Island, the closest point of land to the reef where the *Exxon Valdez* ran aground. Bligh Island is considered one of the most valuable parcels in Prince William Sound for its habitat and its importance as a subsistence harvest area.

A portion of the land would be administered as part of the Chugach

National Forest. The remainder would be managed by the Alaska Division of Parks and Outdoor Recreation.

Executive Director Molly McCammon said the protection package represented a cooperative effort in which each side worked hard to make the best agreement possible. Under the agreement, Tatitlek Corporation would retain lands for future development and their shareholder land program. "It's a winwin opportunity," McCammon said.

Numerous species injured by the oil spill use the area for nesting, feeding, molting and wintering. The area is important to harlequin ducks, bald eagles, black oystercatchers, marbled murrelets, pigeon guillemots, harbor seals, sea otters and river otters.

Bligh Island has the highest nesting concentrations of pigeon guillemots in eastern Prince William Sound. The Hell's Hole area is highly productive for salmon, cutthroat trout and Dolly Varden and sees significant sport fishing use. The entire region is popular for recreational purposes and subsistence food gathering.

The Trustee Council will provide \$23 million toward the purchase. The remaining \$10 million will come from the federal portion of the *Exxon Valdez* criminal settlement.

October 1996 Restoration Update

Kenai Peninsula

Continued from Page 1

Center, now under construction in Seward, will improve our scientific understanding of the North Pacific, educate Alaskans and visitors about the marine environment and provide an economic boost to the community.

Residents of Port Graham and Nanwalek who subsist on local resources will see enhanced runs of pink and silver salmon to nearby streams. A pilot project is underway, working with the Qutekcak hatchery in Seward, to re-establish littleneck clams on some south peninsula beaches.

In addition to Kachemak Bay State Park improvements, recreational users will find better access to lands, a new 20-unit



Many believe the real legacy of the Council's action will be our increased knowledge about our environment. The Council has funded hundreds of scientific studies throughout the spill region and has dedicated much of its funding for this purpose. The result will be better fisheries management and sustained use of our resources for generations to come.

Genetic research now allows biologists to clearly identify where the salmon passing along Cook Inlet beaches are heading. This will allow fisheries managers to open and close fisheries to ensure optimum escapement to all rivers.

Another study has provided valuable

information about how overescapement affects future salmon returns.

By design, funding for administration of the Council is dwindling each year. When the money runs out, the Council will cease to exist. But as part of its legacy, it will leave behind about \$150 million (including interest) in a reserve fund to continue restoration efforts.

Kenai River habitat protection includes restoration of damaged river banks, public education and construction of fishing platforms, such as this one funded by the Kenai River Sportfishing Association,

Work Plan

Continued from Page 1

design and build a fish pass, allowing salmon to enter the center for educational and scientific purposes. The Council provided \$1.17 million to support a waste management program for Cordova, Valdez, Whittier, Chenega and Tatitlek in an effort to reduce chronic sources of marine pollution. Kodiak Island Borough recieved \$267,500 to support planning for a similar waste management program for island communities.

As part of the work plan, chinook salmon fry reared at the Wally Noerenberg Hatchery will continue to be released into Crab Bay near Chenega Bay to establish a subsistence fishery for that community.

Research into overescapement of sockeye salmon into Skilak and Akalura

lakes has been ongoing for three years. The Council authorized \$214,000 to finish the project during 1997 and produce a final report. The Council also approved a third year of funding for an attempt to establish subsistence clamming near Port Graham, Nanwalek, and Tatitlek. This project will receive \$365,000 in 1997 to seed juvenile littleneck clams on lower Cook Inlet and Prince William Sound beaches.

For the third consecutive year, the Council has authorized \$248,400 to fund a community involvement program which hires local residents in 10 spillarea communities to serve as liaisons between the Trustee Council, researchers, and communities.

The Council approved an additional \$12 million to go into a restoration reserve account and \$2.86 million for administration, science management and public information efforts.



Overlook Park, a 99-acre scenic overlook above Homer, includes upland ponds and rich tidal pools. This parcel is currently under consideration for protection.

In time, with the Alaska SeaLife Center, the Near Island Research Center in Kodiak, the Prince William Sound Science Center in Cordova, and the Auke Bay Laboratory in Juneau, some think Alaska will become a mecca for cold-water marine science. This wealth of knowledge will help maintain our rich fisheries and our rich marine ecosystems and buoy our two leading industries, fishing and tourism.

It's been said many times that if one can find a silver lining in the oil spill, this is it. The action of the Trustee Council translates into vital habitat protection, more recreational access to lands, better fishing success, improved subsistence harvests, and a world of scientific knowledge once thought unachievable due to funding constraints.

The Restoration Update is published six times each year by the *Exxon Valdez*. Oil Spill Trustee Council. Its purpose is to update interested members of the public about actions, policies and plans of the Trustee Council to restore resources and services injured by the *Exxon Valdez* oil spill.

For more information, mailing address correction or to request future articles on specific subjects, contact:

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October 1996 Restoration Update

Habitat protection, recreation and scientific research

Exxon civil, criminal penalties to provide long-term benefits for Kenai Peninsula

The following projects are in various stages of completion. Many acquisition projects depend on successful negotiations with the private land owners. Trustee Council projects (civil settlement) are in black. Projects using state or federal criminal settlement funds are shaded in gray.

Civil Settlement

The Exxon Valdez Oil Spill Trustee Council, funded by the \$900 million civil settlement with Exxon, was created to help restore natural resources injured by the spill through habitat protection and scientific studies. This fund is limited to restoration activities in the oil spill region.

Criminal Settlement

The State of Alaska received half of the \$100 million criminal restitution resulting from the spill. This money has been designated for many uses in the spill region, including recreational facilities, interpretive programs and habitat improvements on the Kenai River. Federal agencies are also using some of their \$50 million criminal fund on Kenai Peninsula projects.

- Cone Parcel \$600,000 100 acres near the mouth of the river along the Kenai River flats. Acquistion complete.
 - **Oberts Parcel (The Pillars)** 30-35 acres with 1400 feet of undisturbed shoreline in vital habitat area. Appraisal under review.
- Oberts Parcel (Honeymoon Cove)
 4.22 acres of undisturbed shoreline in high-impact recreational area. Appraisal under review.
- Oberts Parcel (Big Eddy)
 31.7 acres with about 1,200 feet of riverbank adjacent to the
 Kobylarz Parcel. Appraisal under review.
- Kobylarz Parcel \$320,000 20 acres with 1100 feet of riverbank frontage located on the Kenai River at Big Eddy. Offer accepted.
- Girves Parcel \$1,835,000 110 acres in a high use area of Soldotna. Acquisition complete.
- Schilling Parcel 5.9 acres at confluence of the Kenai River and the Sterling Highway. Offer from landowner under consideration.
 - Patson Parcel \$375,000 76 acres on the Kenai River by the Soldotna Airport with 1/ 4-mile of river frontage. Offer under consideration.
- Salamatof Parcel \$2,540,000
 1,377 acres on the Kenai River with approximately 2 miles of riverbank frontage. Offer accepted.
- River Ranch Parcel \$1,650,000
 146 acres with more than one mile of Kenai River Frontage.
 Offer under consideration.
- **Stephanka Parcel** 803 acres with 2-3 miles of Kenai River frontage. Part of the KNA package below.
- Kenai Native Association \$4,000,000 To partially fund acquisition of 15,091 acres in the Kenai River/Moose River drainage area north of the Sterling Highway. Currently under consideration by Congress.
 - Slikok Creek Access \$265,000 Ladders and boardwalks to and along river for fishing access, interpretive displays. (ADNR)

13

- 14 Habitat Restoration \$50.000 Contribution toward project to restore and protect severely damaged riparian habitat at Riverbend Campground. (ADF&G) 15 Soldotna Creek Park \$300.000 Restoration of heavily damaged park at Soldotna Creek. Includes elevated grate walk, vegetated biogrid, rootwad installation, bank revegetation. (ADF&G) 16 Morgan's Landing Access \$50,000 Ladders and boardwalks to and along river for fishing access, interpretive displays. (ADNR) \$200,000 17 **Bing's Landing Access** Ladders and boardwalks to and along river for fishing access, interpretive displays. (ADNR) 18 **Private Waterfront Projects** \$60.000 Small-scale demonstration projects, restoration and protection of riparian habitat on Kenai River frontage parcels using elevated walks, bio-engineering, revegetation, with monitoring. (ADF&G) 19 **Public Lands Protection** \$250.000 Restoration of public riverbank damaged by use: Endicott sonar site, Kenai Keys site, Slikok Park, Centennial Park, the Sportsman's Lodge site, Ciechanski, and various campsites. (ADF&G) 🖸 Coal Creek Moorage \$260,000 53 acres located at the confluence of Coal Creek and Kasilof River. Offer accepted. Cooper Parcel \$ 48,000 The Ninilchik River flows through this 20 acre parcel two miles upstream from mouth. Offer under consideration. 🗠 Tulin Parcel \$1.200.000 220 acres with 3/4 mile of shoreline and 1/4 mile along Diamond Creek. Acquisition complete. PR) **Overlook Park** \$244.000 97 acres just below scenic overlook, with 3/4 mile of shoreline near tidal pools. Offer under consideration. Kachemak Bay State Park \$7.500.000 \mathbf{C}
 - Provided partial funding of \$22 million package to acquire 23,800 acres of park inholdings. Acquisition complete. Criminal fund provided another \$7 million and state's settlement with Alyeska provided \$7.5 million.

Trampling of the river banks due to fishing pressure results in erosion and loss of habitat.

Habitat Protection and Recreation Projects, continued

33	Kachemak Bay State Park Impro	vements (ADNR)
	21 new campsites throughout the pa forms, food caches, fire rings and toi	rk with tent plat- lets.
	Public Use Cabins 5 new public use cabins for Halibut Co Moose Valley, Sadie Cove.	\$200,000 ove, Leisure Lake,
	Trail System Construct hiking trails in Kachemak E	\$310,000 Bay State Park.
	Mooring Buoys New buoys in Tutka, China Poot, Malla but Cove areas	\$20,000 rd Bays and Hali-
	Grewingk Creek Bridge Suspension bridge to link popular a and the trail system. Cabin Acquisitions	\$100,000 reas of the park \$350,000
24	Acquire 5 private cabins suitable for p	CUDIIC USE.
34	Construct public dock in Halibut Co Kachemak Bay State Park. (ADNR)	a 190,000 ve for access to
35	Port Graham Coho Project Restore the natural run of coho in P stream to improve subsistence harves	\$438,800 Port Graham area st. (DCRA)
36	Nanwalek Sockeye Project Sockeye salmon project on English Bay subsistence resource and restores a na	\$424,000 River provides a Atural run. (DCRA)
37	Resurrection Bay Cabins Construct cabins, buoys, trails and la Cove. (ADNR)	\$159,000 atrines in Thumb
38	Caines Head Alpine Trail Construct hiking trail from North Bea (ADNR)	\$50,000 ch to alpine area.
39	Resurrection Bay Trail Develop day use parking, beach trailhea exhibits. Requires acquistion of 20 acre negotiation with landowners. (ADNR)	\$200,000 ad and interpretive as and is subject to
40	Interpretive Displays Construct interpretive exhibits at Kel Center and at SeaLife Center. (ADNR)	\$40,000 nai Fjords Visitor
41	Darling Parcel 99 acre parcel along the Snow River in the	\$35,000 e Chugach National

Forest. Acquisition complete. (USFS)

Science, Subsistence and Archaeology

The following symbols represent science, subsistence and archaeology projects funded by the Trustee Council from Exxon civil funds. The numbers are the actual file numbers for each of the projects.

Archaeological Site Monitoring

Monitoring of archaeological sites on public land injured by vandalism and oiling.

Community Involvement/Traditional Ecological Knowledge

Community facilitators in Port Graham, Nanwalek, Seldovia, Seward and six other communities in spill region serve as liaisons between the Trustee Council, researchers, and communities.

Clam Restoration

Pilot project to establish subsistence clam populations near Native villages in the oil spill region. The Qutekcak hatcherv in Seward is rearing littleneck clams to be seeded near Nanwalek and Port Graham. Success could lead to similar clam seeding near other communities.

Port Dick Creek restoration will increase spawning habitat to strengthen native salmon stocks.

Common murres were hit hard by the oil spill. This project provides information about their

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Archaeological Site Stewardship

Common Murre Population Monitoring

recovery by counting murres at Barren Islands.

Port Dick Creek Restoration

Provides training and coordination for volunteers in Port Graham and Nanwalek to monitor vandalized sites in the oil spill area. Vandalism was a serious problem after the spill. Long term protection and restoration will be most successful if undertaken by local people.

Kenai Habitat Restoration/Recreation Enhancement

Approximately 19 miles of the Kenai River's 166 miles of shoreline have serious habitat loss. Public lands have 5.4 miles of degraded shoreline. This 3-year project restores and protect ssalmon habitat on public lands.

180

Youth Area Watch

Involves local youth with ongoing restoration projects, giving them the skill and knowledge to participate in restoration activities now and in the future.

Port Graham Pink Salmon Subsistence Project

Enhances the Port Graham hatchery's ability to produce pink salmon for subsistence purposes. Because local runs of coho and sockeye salmon are at low levels, subsistence users are relying more on pink salmon.

Community Based Harbor Seal Management

Biological sampling of harbor seals is being done in Prince William Sound and Lower Cook

Inlet. Village technicians in Port Graham, Seldovia, Nanwalek and six other communities are trained by the Harbor Seal Commission to collect samples for analysis.

Five-year project identified genetic differences in Cook Inlet sockeye salmon. Information provided by this project is being used by fisheries managers to modify fishing areas and openings in order to improve management of Kenai River and other Upper Cook Inlet sockeye salmon stocks.

Sockeye Salmon Overescapement

Four-year project has produced scientific evidence to help evaluate the effects of overescapement.

Assessment, Protection, Enhancement of Salmon Streams

Provides inventory and assessment of four major salmon streams in Lower Cook Inlet with intent to improve habitat for better spawning success.

Construction of the Alaska SeaLife Center in Seward got underway this summer with opening scheduled for May 1998.

Researchers save eight in rescues at sea

S cience came to the rescue twice this summer when U.S. Fish and Wildlife Service researchers on Trusteefunded APEX projects responded to mayday calls, saving eight people from disaster at sea.

On June 17, John Maniscalco and Bill Ostrand were collecting data from a USFWS vessel in Fish Bay off Port Fidalgo in Prince William Sound. They monitored a mayday from the *Wind Song* which was on fire near Goose Island, about 15 nautical miles away.

Maniscalco and Ostrand were the first to reach the scene and could see smoke coming from the engine room of the 40-foot wooden boat. Four people were on board with two survival suits. All four transferred to the rescue boat.

"About a minute after we moved away, we saw flames beginning to shoot out of the engine room and the entire boat engulfed in smoke," they said in a written report on the incident. "The

Comprehensive book on spill injuries published

A new book documenting the injuries caused by the *Exxon Valdez* oil spill has just been released providing the most comprehensive collection of Trustee-funded scientific papers published to date on the spill.

The *Exxon Valdez* Oil Spill Symposium Proceedings contains 61 scientific papers originally presented at a 1993 symposium organized by the Trustee Council. The volume is 996 pages and was edited by Bob Spies, Bruce Wright, Stanley (Jeep) Rice, and Doug Wolfe.

More than 150 authors contributed to the book and another 100 peer reviewers evaluated the sci-entific papers, making it asignificant record of effort to determine the extent of the inuries caused by the spill. Publication costs

were partially underwritten by the Trustee Council to allow a lower sale price for this volume.

This book can be purchased by contacting the American Fisheries Society, Publication Fulfillment, P.O. Box 1020, Sewickley, PA 15143, phone: (412) 741-5700, fax: (414)741-0609. The cost is \$35 for the book plus \$4 for shipping inside the U.S. or \$6 for shipping outside of the U.S.

Join the PUBLIC ADVISORY GROUP

The *Exxon Valdez* Oil Spill Trustee Council is seeking nominations for members of the PAG

The term for all 17 members of the Public Advisory Group will end soon. Nominations for membership will be accepted until the close of business on Monday, October 14, 1996. The PAG consists of 5 members selected from the public at large and 1 member representing each of the following user groups. Nominations are being sought for all categories.

- aquaculture
- commercial tourism
- conservation
- local government
- recreation users
- subsistence
- commercial fishing
 environmental
- forest products
- native landowners
 - sport hunting/fishing
 - sport nunning/nsning
 - science/academic

For more information, contact the Trustee Council Restoration Office at 907-278-8012 or 800-478-7745.

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The *Tiglax*, another USFWS vessel, was doing hydroacoustic studies July 25 near

Wind Song sank about an hour later."

Chisik Island in Cook Inlet when researchers heard a mayday from a 20foot Bayliner taking on water nearby. The caller reported his position as five miles north of Chisik Island before transmissions abruptly stopped, said John Piatt, lead researcher aboard the *Tiglax*.

The ADF&G vessel *Pendalus* was north of Chisik and did not see the vessel. On a hunch, *Tiglax* skipper Kevin Bell turned south toward Homer instead of north. The crew eventually spotted the capsized vessel bobbing in the waves about three miles away.

"When we got there, we found two adults and two children, wet and trying desperately to stay on the hull," Piatt said. "They're just darn lucky we happened to be in the area and then searched in the right direction." They had lifejackets but no survival suits.

The crew launched a Zodiak from the deck of the 125-foot *Tiglax* and quickly rescued all four. Piatt credited the crew for spotting the boat from so far away. A Coast Guard C-130 flew between the capsized boat and the *Tiglax* without spotting the vessel, he said.

Kodiak taxpayers get relief through refuge land purchase

Taxpayers in the Kodiak Island Borough received an unexpected bonus from the sale of Native corporation land to the Kodiak National Wildlife Refuge. The Trusteefunded habitat protection program returned 109,000 acres of Native-owned land to the refuge in 1995.

In July, Refuge Manager Jay Bellinger presented the borough with a check for \$240,000 in lieu of taxes on the newly acquired land, even though the land was not taxed under Native ownership.

Federal law requires the payment in lieu of taxes when the federal government acquires land from private sources. The borough will receive similar checks each year from now on, Bellinger said.

"And the amount is only going to increase as more land is added to the refuge," he said. "This is a real boon to the borough out here and will take the pressure off the taxpayers."

This year's payment was calculated using three-fourths of one percent of the fair market value for the land.

Borough Mayor Jerome Selby said the check was a pleasant surprise that proves the land sales were a win-win situation for everyone.

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Advisory group hosts town meetings on lower peninsula

Residents of Seldovia told members of the Public Advisory Group (PAG) to continue long-term funding of science in the spill area to provide a foundation for better management of all species in the North Pacific.

In Homer, city planners asked for advice on how to apply for Council funding to reestablish tidal flushing on the mud flats near Mariner Park at the base of Homer Spit.

Residents of Port Graham hosted a potlatch luncheon, complete with young dancers, and asked questions about the habitat protection program and the process for funding restoration projects.

PAG members visited the lower Cook Inlet region September 18-19 to hear directly from those residents most affected by the oil spill. Last year, the group traveled to Prince William Sound and hosted meetings in Valdez and Chenega Bay.

A better understanding of the marine environment will help protect fisheries and wildlife and help maintain Alaska's commerical fishing and tourism industries, Seldovia residents said. One former commercial fisherman asked that the

Public Advisory Group members and agency staff walk the 220-acre Tulin parcel near Homer. The bluff property was recently acquired by the Trustee Council.

Council consider establishing a permanent fund to continue the scientific studies indefinitely

Executive Director Molly McCammon reminded residents that Trustees are creating areserve of approximately \$150 million (including interest) and continuous financial support for science is one possible use for that fund.

Natural flushing of the mud flats on the east side of the Homer Spit has been non-existent since a 1994 storm closed a vital channel. City Council member Jack Cushing told the PAG that without the flushing, the area will become stagnant and the natural intertidal habitat will suffer.

Exxon Valdez Oil Spill Trustee Council

Bruce Botelho Attorney General State of Alaska

Michele Brown Commissioner Alaska Dept. of Environmental Conservation George T. Frampton, Jr. Assistant Secretary US Dept. of Interior

Phil Janik Regional Forester Alaska Region US Dept. of Agriculture Steve Pennoyer Director, Alaska Region National Marine Fisheries Service

Frank Rue Commissioner Alaska Dept. of Fish & Game

Restoration Office 645 G Street, Ste. 401 Anchorage, AK 99501-3451 Bulk Rate U.S. Postage **PAID** Permit #1013 Anchorage, AK

Trustee Council Meeting Tuesday, October 15 2 p.m.

The EVOS Trustee Council will meet for approximately two hours via teleconference, primarily to discuss the Small Parcel habitat protection program.

The public is invited to participate in Anchorage at 645 G Street, 4th Floor Conference Rm or in Juneau at the US Forest Service Conference Room, Federal Building, Room 541A. For information on how to participate from other locations contact Rebecca or Cherri at 278-8012.

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL

Harbor Seal

Phoca vitulina richardsi

Photo by Kathy Frost

By Kathryn J. Frost Alaska Department of Fish and Game

Harbor seals, *Phoca vitulina richardsi*, are medium-sized "earless" seals belonging to the Family Phocidae.

They are usually found in nearshore coastal waters, often in estuaries or protected coves. They are commonly seen along the shores of the northern hemisphere. Harbor seals are found in both the North Atlantic and the North Pacific. In the eastern North Pacific, their distribution is nearly continuous from Baja, California to Bristol Bay, Alaska.

Harbor seals are one of the most common marine mammals in Prince William Sound (PWS) and the Gulf of Alaska (GOA), where they occur throughout the year. The exact number of harbor seals in these areas is unknown. In 1973 the Alaska Department of Fish and Game estimated there were about 125,000 seals in this area based on harvest data, observed densities, and the amount of available habitat.¹

In the early 1990s, the National Marine Mammal Labora-

tory counted approximately 12,000 harbor seals in this same area.² If this number is adjusted for the seals that weren't counted because they were in the water (multiplied by 1.74, based on tagging studies), this would still result in a population estimate of only 21,300 -- a decline of over 80% in the last 20 years. Although these numbers are not exact, they indicate a large decline in harbor seal numbers in PWS and the GOA. Counts at individual haulout sites or along survey routes established to mericar there are form this dealine. At Turgidal

tablished to monitor trends confirm this decline. At Tugidak Island, south of Kodiak, the average counts declined by 85% from 1976 to 1988 and have continued to decline since then.^{2,3} In other parts of the Kodiak Archipelago, counts declined by 89% between 1978 and 1992.^{2,4} In PWS, the number of seals at 25 indicator sites declined by 42% between 1984 and 1988.⁵ In 1995, there were 65% fewer seals at these haulouts than there were in 1984.⁶ The reasons for the decline are unknown and are the subject of ongoing studies by the Alaska Department of Fish and Game, the National Marine Fisheries Service, and the University of Alaska.

Harbor seals are found primarily in the coastal zone where

Vital Statistics

Population

Approx. 34,400 in GOA/PWS (1993)

Population Trend 70% decline during previous 20 years

<u>Lifespan</u>

30 years, maximum recorded age - 32

Adult Size 5 feet, 175 pounds

Mating Season

July, two weeks after previous pup weaned

Gestation Period 11 months

Number of Pups

one per year

Size at Birth 30 inches, 26 pounds

Maturity

Pups weaned 3-6 weeks after birth; Sexual maturity at 3-7 years

<u>Diet</u>

Pollock, octopus, capelin, cod and herring they feed, haul out to rest, give birth, care for their young, and molt. Hauling out areas include intertidal reefs, rocky shores, mud and sand bars, floating glacial ice, and gravel and sand beaches. Pups are born in the same general locations that are used as haulouts at other times of year.

Harbor seals tend to use haulout sites where they have protection from predators approaching over land, direct access to deep water, proximity to food, and protection from strong winds and high surf.⁷ Based on satellite tagging studies in PWS, most adult harbor seals use the same few sites for most of the year. During spring and summer, each tagged seal used an average of four different haulouts, while in fall and winter they used an average of only two. Over half the time, they used one "preferred" site for hauling out.⁶

Movements

The distribution and movements of harbor seals at sea are not as well understood. Recently, however, some information about at-sea behavior has become available through the use of satellite-linked tags. These tags allow scientists to track seals and monitor their diving behavior when they are in the water.

Most satellite-tagged seals did not travel far to feed. Generally, they stayed within about 20 miles of their haulouts. A few seals, especially juveniles, traveled long distances from the location where they were tagged.

One subadult seal tagged at Channel Island

200

hoto by Lloyd Lowry

Alaska Department of Fish and Game Biologist Kathy Frost glues a satellite tag on a harbor seal at Seal Island. making repeated trips from there to the GOA, 60-100 miles away.⁶ Another adult male swam to Middleton Island and made feeding trips in the GOA all winter, returning to PWS in the spring.

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in PWS swam over

Yakutat Bay where

it spent the winter

miles

to

Within PWS, seals used particular areas. Seals in central PWS rarely used haulout areas in southern PWS, and vice versa. Similarly, seals in eastern PWS did not haul out in either central or southern PWS.

Reproduction

Harbor seal females give birth to single pups once a year, usually on land or glacial ice. In PWS and the GOA, peak pupping occurs in the first half of June, although some pups may be born in mid-May and some as late as July. Pregnant females usually move to isolated sites or to the edge of large groups to give birth and remain there while the pups are very young. Later, they rejoin the group at the main haulout area. Newborn harbor seal pups are born with their eyes open, with an adult-like coat, and are immediately able to swim. Pups are weaned when they are 3-6 weeks old.⁷

Adult females breed about two weeks after their pups are weaned. The embryo remains dormant for about 6-12 weeks after breeding, then implants in the uterus and begins to grow. Female harbor seals first become pregnant when they are about 3-7 years old and give birth about 11 months later. The age of sexual maturity varies depending on whether populations are high and close to the carrying capacity of their habitat (causing seals to mature later), or populations are low and there is plenty of food and other resources (causing seals to mature earlier).

Molting

Once each year, harbor seals shed their old hair and grow a new coat. During this molting period, the seals spend more time hauled out than they do at other times. This is probably because the new hair grows faster when the seals are out of the water and the skin is warmer.⁷

While seals are molting, their metabolism is almost 20% lower than it is at other times.⁸ This lowers their food requirements and allows them to spend long hours hauled out. The shedding of hair takes about 4-6 weeks and occurs at slightly different times for seals of different ages and sex. Yearlings (which don't molt during their pup year) usually molt first, followed by mature females and then mature males.⁹

In PWS and the GOA, shedding seals are seen from late June to early October, with peak molting in late July and August.⁴ Because seals spend more time hauled out during the molting period, it is a good time to do surveys and count seals to estimate population trends.

Predator/ Prey

Most information about the foods of harbor seals in PWS and the GOA was collected in the mid-1970s and was based on stomach con² tents.⁴ The major prey in both PWS and the GOA included pollock, octopus, capelin, Pacific cod, and herring. Pollock was eaten most often, but even so, over 50% of the samples contained prey items other than pollock. Young seals ate mostly pollock, capelin, eulachon, and herring.

Harbor seals are one of the top predators in the marine ecosystem of PWS and the GOA. They eat many of the same prey (e.g. pollock, capelin, herring) that are also eaten by seabirds, fishes, and other marine mammals. In addition, harbor seals become food for other species. Known predators include killer whales, Steller sea lions, and sharks. The impact of these predators on harbor seal populations is unknown, but may be significant. In PWS alone, killer whales may eat up to 400 harbor seals per year.¹⁰ The incidence of sharks caught on halibut longlines in the GOA has increased greatly in the last decade. The degree to which these sharks prey on harbor seals is unknown, but seals have been found in their stomachs.¹⁰

Human Factors

Harbor seals also compete with humans for food, and in turn are eaten for food. In PWS and the GOA, major fisheries occur for pollock, herring, and salmon. All of these also are food for seals. The interactions between seals and fisheries are poorly understood, but it is likely that each may affect the availability of certain fish to the other. In addition to competition for

Photo by Kathy Frost

Pathology and Hydrocarbons

In the first few months after the EVOS, 18 harbor seals were found dead or died in captivity. Fifteen of these were externally oiled and 3 were pups. Bleeding in internal organs was found in four seals, severe skin irritation in two, inflamed eyes in two, and symptoms of malnutrition in three. In three seals, pathologists found evidence of nerve damage in the brain. Firm conclusions about the degree and significance of brain damage in these recovered carcasses were not possible because of tissue breakdown between the time of death and necropsy.

In 1989, 20 harbor seals were collected from PWS and the GOA to obtain complete, high-quality tissue samples to learn about the effects of the oil spill on seals. Of these, 11 were heavily oiled, 3 were lightly or moderately oiled, and 6 were not externally oiled. Thirteen were from oiled areas of PWS and the other seven from the GOA. In April 1990 six additional seals were collected in PWS; all were collected in areas that had been heavily oiled, but none showed external signs of oiling. Two seals were collected in the Ketchikan area in August 1990 to serve as reference specimens.

Bile from the gall bladders of 33 seals was analyzed for hydrocarbons.¹³ Con-

centrations of hydrocarbon metabolites in the bile clearly indicated that most seals from oiled areas had been exposed to and had assimilated hydrocarbons. The mean concentration of phenanthrene equivalents was more than 70 times greater for oiled seals from PWS than for two seals collected near Ketchikan, and approximately 20 times greater than for unoiled PWS seals or those from the Gulf. The highest phenanthrene equivalent concentrations in oiled PWS seals were more than 1000 times greater than for unexposed seals. The low concentrations of hydrocarbon metabolites in GOA seals, and their similarity to levels recorded for seals from unoiled areas, suggests that either the GOA seals that were sampled had little exposure to oil, or that most of the aromatic fraction of the oil had evaporated by the time it reached the GOA.

All seals collected from the GOA and near Ketchikan had non-detectable or very low parts per billion (ppb) levels of polynuclear aromatic hydrocarbons (PAHs) in liver, blubber, muscle, and brain tissue. PAH values in seals from oiled areas of PWS were also non-detectable or low for all tissues except blubber. Total PAH values in blubber were greater than 100 ppb and ranged as high as 800 ppb in 8 of 17 seals sampled from oiled areas of PWS in April-June 1989, and one of 6 in April 1990. Milk from a pup had the highest PAH value of any tissue in any seal that was analyzed. There is little information available about the effects of hydrocarbons on seals. Health implications of these toxicological findings are unknown.

Microscopic examination of seal tissues (histopathology) revealed severe lesions in the midbrain of a heavily oiled seal collected 35 days after the spill.14 Similar but milder lesions were found in the brains of seals collected three or more months after the spill. Lesions were not present in the Ketchikan seals or in the PWS seals collected in 1990. Overall, neurological lesions that may have been associated with oil toxicity were found in the brains of 9 of 12 oiled seals and 2 of 13 unoiled seals. These lesions are characteristic of hydrocarbon toxicity, and may explain the disorientation and lethargy observed in seals immediately following the spill. The thalamus where the lesions were located is responsible for relaying messages from sensory systems to other parts of the brain. If the lesions interfered with transmission of these messages, they may have caused abnormal behavior. Severe lesions may have caused the seals to have difficulty with such normal tasks as breathing, swimming, feeding, and diving.

the same fish, seals may be incidentally killed (e.g., tangled and drowned in nets) during commercial fisheries.

Harbor seals are an important food and handicraft resource for Native subsistence hunters in PWS and the GOA. The average annual harvest of harbor seals during 1992-1994, was approximately 450 seals in PWS and 350 for Kodiak, Cook Inlet-Kenai, and the south Alaska Peninsula combined.¹¹

Effects of the spill

Following the *Exxon Valdez* oil spill (EVOS) in March 1989, harbor seals were exposed to oil both in the water and on land. In the early weeks of the spill they swam through oil and inhaled aromatic hydrocarbons as they breathed at the air/water interface. On haulout sites in oiled areas, seals crawled through oil and rested on oiled rocks and algae throughout the spring and summer. Oiling was most severe in central PWS,

Restoration EXXON VALDEZ OIL

Harbor seal numbers have dropped dramatically since 1984 with the sharpest oneyear drop immediately following the oil spill. the region from Eleanor Island through the north part of Knight Island, and the west side of Knight Island Passage. More than 80% of the seals seen in these oiled areas in May 1989 were observed with oil on them.¹² Some seals also became oiled in the GOA west of PWS, but the degree of oiling was less well documented.

Pups were born on haulout sites in May and June, when some of the sites still had oil on them, and many

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pups became oiled shortly after birth. In Bay of Isles and Herring Bay in PWS, 89%-100% of all seal pups seen were oiled.¹² Some of this contamination was probably from contact with oiled mothers. When pups were entirely coated with thick, heavy tar it probably came from oil on the rocks and seaweed. Mothers and their pups often hauled out high on the beach where popweed (Fucus) grows. Popweed remained oiled long after other seaweed and rocks appeared clean.

Abnormal behavior by oiled harbor seals in oiled areas was observed on many occasions in April-June 1989.¹² Oiled seals were reported to be sick, lethargic or unusually tame. Excessive tearing, squinting, and disorientation were also observed in oiled seals. The lethargy and disorientation may have led directly to the deaths of pups due to abandonment and of older seals due to drowning.

Post-spill aerial surveys

In August-September following the EVOS, the Alaska Department of Fish and Game conducted aerial surveys of harbor seals in oiled and unoiled areas of PWS.¹⁵ Results of these surveys were compared to earlier surveys of the same haulouts conducted in 1983, 1984, and 1988. Before the EVOS, counts in oiled and unoiled areas of PWS were declining at a similar rate, about 12% per year. From 1988 to 1989, however, there was a 43% decline in counts of seals at oiled sites compared to 11% at unoiled sites. This difference was statistically significant.

Aerial surveys were also conducted during the pupping season following the EVOS. In the spill year, pups made up a smaller percentage of seals in the oiled area than they did in later years. In the unoiled area, the percentage of pups did not differ significantly between 1989 and post-spill years. Together with the fetuses and dead pups found following the spill, this suggests that pup mortality was higher than normal in oiled areas in 1989.

Harbor seal biologists estimated that approximately 300 seals died in PWS due to the EVOS.¹⁵ The number of deaths was estimated mathematically by comparing counts and proportions of seals at oiled and unoiled sites before and after the spill. Information such as the lack of sightings of oiled seals in unoiled areas, the strong fidelity of harbor seals to particular haulouts, the abnormal behavior of oiled seals, and the brain lesions found in oiled seals suggests that these seals died rather than left the area.

Long-term effects

By early September 1989, many visible effects of the EVOS on harbor seals were gone. Less than 20% of the seals observed in the oiled area were oiled. Most seals older than pups had molted, shed-

ding their oil-stained hair. They did not become re-oiled, since most of the oil was gone from the water and most major haulouts had been cleaned. By April and June 1990, no sign of external oiling was observed on any seals. During September 1989 and April 1990, seals were no longer observed acting lethargic and sick. They were noticeably more wary and difficult to approach than they had been immediately following the spill.

One year after the EVOS, none of the tissues from seals collected in the spill area showed significantly elevated concentrations of oil-related hydrocarbons.13 However, average concentrations of hydrocarbon metabolites in bile were still significantly higher than they were in seals from the GOA, Ketchikan, or unoiled PWS areas. Since elevated levels of hydrocarbons in bile indicate recent exposure to oil, the higher levels found in spring 1990 suggest that seals were still encountering oil in the environment or that they were metabolizing stored fat reserves that had elevated levels of hydrocarbons. The effects of these elevated levels, if any, are unknown. Fish collected in PWS during spring 1990 also had elevated levels of hydrocarbon metabolites. The presence of hydrocarbon metabolites was not surprising, since shoreline surveys in spring 1990 documented oil remaining on many beaches.

Aerial surveys of harbor seals and their pups only detected differences in adult-to-pup ratios between oiled and unoiled locations in the spill year. In 1990-1995, the percentage of seal pups at oiled sites appeared to be normal. From 1990-1994, the population trend was similar in oiled and unoiled areas, as it was before the spill. During those four years, the harbor seal population continued to decline at about 6% per year in both oiled and unoiled areas.

Restoration activities

Since the oil spill in 1989, the EVOS Trustee Council has funded studies of harbor seals to monitor their status and to learn more about their habits. The continuing harbor seal decline in PWS and the GOA concerns researchers, resource managers, and the public. One of the goals of harbor seal restoration studies, as well as studies funded by other institutions, is to learn about the causes of the long-term decline. Possible causes include By gluing satellite tags to their backs, it is possible to track the movements of seals using NOAA satellites. Each symbol on the map represents a tagged seal, showing its

Photo by Kathy Frost

movement over time. Harbor seals tend to stick close to home, but occasionally wander great distances, such as the Yakutat seal (indicated by the half-moon symbol).

EXXON VALDEZ OIL SPILL TRUSTER COUNCIL Restoration


Harbor seals spend more time at haulout sites during summer molting periods. Photo by Lloyd Lowery

disease, food limitation, predation, or mortality caused by people.

Annual aerial surveys have been conducted since 1989 to monitor the status of harbor seals in PWS and to determine if and when the decline stops. The surveys cover the same 25 haulouts that ADF&G began monitoring in 1984. Because these surveys have been done for nine years using consistent methods, researchers have been able to use the data to develop new ways to analyze survey data. These techniques will be useful not only in PWS, but for seal surveys around the world.

Tracking

As part of restoration studies funded by the EVOS Trustee Council, researchers are using satellite tags to learn about the distribution, movements, and diving behavior of harbor seals in PWS. For the first time it is possible to measure how deep and for how long seals dive and where they go when they leave their haulout sites.

Researchers have learned that harbor seals normally use only a few adjacent haulout sites and that they have very small home ranges. Some seals, especially young ones, may make longer trips away from home, but most of them eventually return to the location where they were tagged. This information is useful for determining how much interchange there is between seals in PWS and elsewhere, and whether seals from PWS should be managed as part of the same stock as other seals in Alaska. It also helps to identify important habitat for seals, such as feeding and haulout areas.

Biological Samples

As part of their field studies, researchers catch seals from PWS, the GOA, and southeast Alaska.^{6,16} They measure and weigh each seal and take samples for studies of blood chemistry, blubber composition, disease, genetics, and diet.

Blood is being analyzed to determine whether or not seals are healthy, and so comparisons can be made between seals from declining and increasing populations.¹⁷ Blood is also being analyzed to learn whether harbor seals in Alaska have been exposed to diseases like influenza, herpes, and distemper. So far, there is no indication that diseases are a problem in Alaskan harbor seals.

Genetics studies examine the DNA of seals from different parts of Alaska and around the world to learn about the population structure of harbor seals and how seals in different areas are related. So far they have discovered no major genetic differences between PWS and other Alaska seals.16

Measurements from seals in the 1990s are being compared to seals in the 1970s to look for any changes in body condition, which might affect survival. Researchers use ultrasound to measure the seal's blubber thickness.¹⁷

Diet

Researchers are using exciting new techniques to study the diets of harbor seals and to compare the diets of seals from different areas. One of these analyzes the fat in seal blubber. The fats can contains about 70 different fatty acid building blocks in different proportions. It is possible to match the fatty acid signature of the blubber with the fatty acids in prey species to estimate the seals' diets. "You are what you eat" as the saying goes. Early analysis of fatty acids show that harbor seals feed differently at each haulout.⁶ Seals from haulout sites only a few miles apart may have very different diets.

Another new technique for studying diets and food webs involves the analysis of stable isotope ratios. Scientists analyze and compare the carbon and nitrogen in seal whiskers and different food items to learn if seals from different age groups or areas are eating different kinds of prey. This technique doesn't tell exactly what the seal eats, but gives information about whether they feed high or low on the food chain. For example, in Steller sea lions, stable isotopes have shown that young sea lions feed lower on the food chain than do the adults.



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Subsistence hunting

Alaska Native hunters from PWS and the GOA are very concerned about harbor seals. The serious decline in the past 10-20 years has made it much more difficult for them to successfully hunt harbor seals, which are an important part of their diet and cultural traditions. Because of their interest and concern about harbor seals, Alaska Natives formed the Alaska Native Harbor Seal Commission (ANHSC) in May 1995. The purpose of the ANHSC is to increase the role of Alaska Natives in research and resource policy affecting harbor seals and their uses, and to address concerns about the harbor seal decline in PWS and the GOA.

Since 1995, the ANHSC has received funds from the EVOS Trustee Council to conduct a biosampling program in PWS and the GOA. Hunters collect samples from subsistence-caught seals and provide them to researchers to be analyzed for disease, genetics, fatty acids, and stable isotope ratios. They also contribute information about the distribution, abundance, and health of seals in areas where they live and hunt.

Conclusion

Studies of harbor seals conducted following the EVOS were the first detailed investigations of the effects of an oil spill on seals in the wild. These studies conclusively demonstrated that harbor seals did not avoid oil, but that they swam and surfaced to breathe in oil-covered waters and hauled out on oil-covered rocks and seaweed. Both pups and adults in oiled areas became coated with oil.

Many oiled seals acted sick and lethargic for the first few months after the spill. Based on aerial surveys, it was estimated that at least 300 seals died in PWS following the EVOS. Microscopic examination indicated that some oiled seals had brain damage that was probably caused by oil. It is likely this damage occurred in the first few days or weeks after the spill, and was due to breathing airborne hydrocarbons that evaporate quickly. This type of brain damage would likely interfere with normal functions such as breathing, swimming, diving, and feeding. In severe cases, seals probably died. Seals that survived the first few weeks probably recovered.

Marine mammals are very efficient at eliminating hydrocarbons from their system, and blubber was the only tissue that showed increased levels of hydrocarbons after the EVOS. However, the bile of oiled seals contained byproducts of hydrocarbon metabolism as much as one year later, confirming that seals were still being exposed to oil. The effects of these hydrocarbon by-products, if any, are unknown.

Seal deaths caused by the oil spill contributed to a widespread decline of harbor seals in PWS and the GOA that began before the spill and has continued since. Any time a wildlife population declines it is a cause for concern. For harbor seals in PWS and the GOA, this concern is magnified because the causes for the decline are unknown. Seals are a key part of the marine ecosystem, and they are an important resource for Alaska Natives, for the tourism industry, and for everyone who enjoys watching wildlife. If the decline of harbor seals continues much longer, the fishing industry and others could be impacted by regulations designed to protect the seals and stop the decline.

For these reasons, the EVOS Trustee Council and NOAA are continuing to fund a variety of studies to monitor harbor seals in PWS and the GOA and to better understand the causes for the ongoing decline.

Kathy Frost has been a marine mammals biologist with the Alaska Department of Fish and Game for 20 years. She is affiliate faculty at the University of Alaska in Fairbanks and Anchorage. She has conducted research on a variety of marine mammals in Alaska, especially seals and beluga whales. Her studies have included the food habits, ecology, natural history and distribution and abundance of these species. The Restoration Notebook series is published for educational purposes. Persons wishing to cite this material in scientific publications should refer to the technical reports and literature listed at the end of each account.

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Large Parcel Program

The Large Parcel Program works with willing sellers to protect blocks of land in excess of 1,000 acres. Negotiations with landowners have resulted in creative habitat protection measures that include fee simple purchases, conservation easements, and timber easements. The Council is working with 12 landowners to protect approximately 760,000 acres of uplands, 1,000 miles of shore-

line and hundreds of miles of anadromous rivers.

Environmental protection and economic benefit

Nearly all the large parcel landowners the Trustee Council is negotiating with are Alaska Native corporations. The Alaska Native Claims Settlement Act of 1972 allowed Native villages to select 44 million acres of public lands in Alaska and set up corporations to manage those lands and provide economic benefits for their Native shareholders. Land was selected for its proximity to the village, historical use and future development opportunity. Large blocks of land were selected, including some of the finest timber tracts, most popular estuaries and bays, and valuable salmon streams. These lands provide critical habitat for many of the fish and wildlife resources injured by the 1989 oil spill.

The Trustee Council works with willing sellers to craft protection packages that provide for public use for camping, hunting and fishing, restricted development and continued subsistence use, while protecting injured resources and services and strengthening the economic health of Alaska Natives.



Habitat Protection

Habitat protection is considered to be the most effective long term method to restore the environment and protect injured species and has broad support among residents of the spill area, other Alaskans, the country's top scientists, and individuals across the nation.

The Trustee Council has underway two habitat protection programs for willing sellers, one to evaluate and acquire large parcels in excess of 1,000 acres and another to acquire small parcels strategically chosen for their restoration value.

When the job is done, the Trustee Council hopes to have purchased and protected nearly 760,000 acres of land important for restoration and threatened by development. This will include at least 1,000 miles of shoreline and several hundred miles of riverbank needed for successful rearing of salmon. XXON VALDEZ OIL SPILL TRUSTEE COUNCIL STRATIVE RECORD

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Bruce Botelho Attorney General State of Alaska



On October 9, 1991, the U.S. District Court approved a plea agreement that resolved various criminal charges against Exxon as well as a civil settlement for recovery of natural resource damages resulting from the oil spill.

The Criminal Plea Agreement. Exxon received a fine of \$150 million -- the largest fine ever inposed for an environmental crime. The courts remitted \$125 million in recognition of Exxon's cooperation in cleaning up the spill and paying private claims. Of the remaining \$25 million, \$12 million went to the North American Wetlands Conservation Fund and \$13 million went to the Victims of Crime Fund. In addition, Exxon agreed to pay restitution of \$50 million to the United States and \$50 million to the State of Alaska.

Civil Settlement and Restoration Fund. Exxon agreed to pay \$900 million with annual payments stretched over a 10-year period. The agreement requires that the funds be used first to reimburse the federal and state governments for the costs of cleanup, damage assessment and litigation. The remaining funds are to be used for restoration. The settlement also has a provision allowing the governments to claim up to an additional \$100 million to restore resources that suffered a substantial loss, the scope of which could not have been anticipated from data available at the time of the settlement.

The Exxon Valdez Oil Spill Trustee Council was formed to oversee restoration and consists of three state and three federal trustees (or their designees).



George T. Frampton, Jr. Assistant Secretary US Dept. of Interior



Steve Pennoyer Director, Alaska Region National Marine Fisheries Service



Michele Brown Commissioner Alaska Dept. of Environmental Conservation



Phil Janik Regional Forester Alaska Region US Dept. of Agriculture



Frank Rue Commissioner Alaska Dept. of Fish & Game

II AIMA

Construction of the Alaska SeaLife Center in Seward got underway this summer with completion scheduled for January 1998.





Beluga Slough Trail Trail construction for wildlife view benches in Homer slough. (ADNR)	\$300,000 wing, interpretation,
Mud Bay Boardwalk Construct boardwalk and viewing o base of Homer Spit. (ADNR)	\$150,600 decks on Mud Bay at
Kachemak Bay State Park Imp Campsites 21 new campsites throughout the forms, food caches, fire rings and Public Use Cabins 5 new public use cabins for Halibut Moose Valley, Sadie Cove. Trail System Construct hiking trails in Kachema Mooring Buoys New buoys in Tutka, China Poot, Mu but Cove areas. Grewingk Creek Bridge Suspension bridge to link popula and the trail system. Cabin Acquisitions Acquire 5 private cabins suitable f	Irovements (ADNR) \$60,000 park with tent plat- toilets. \$200,000 Cove, Leisure Lake, \$310,000 ak Bay State Park. \$20,000 allard Bays and Hali- \$100,000 ar areas of the park \$350,000 for public use.
Halibut Cove Lagoon Dock Construct public dock in Halibut Kachemak Bay State Park. (ADNR)	\$190,000 Cove for access to
Port Graham Coho Project Restore the natural run of coho in stream to improve subsistence har	\$438,800 n Port Graham area vest. (DCRA)
Nanwalek Sockeye Project Sockeye salmon projecton English subsistence resource, restoring a na	\$424,000 Bay River provides a tural run. (DCRA)
Resurrection Bay Cabins Construct cabins, buoys, trails an Cove. (ADNR)	\$159,000 In d latrines in Thumb
Caines Head Alpine Trail Construct hiking trail from Nort (ADNR)	\$50,000 th Beach to alpine.
Resurrection Bay Trail Develop day use parking, beach trail exhibits. Requires acquistion of 20 a negotiation with landowners. (ADNR	\$200,000 Thead and interpretive Incres and is subject to
Interpretive Displays Construct interpretive exhibits at Center and at Seal.Ife Center (ADM	\$40,000 Kenai Fjords Visitor _{VR)}

Darling Parcel 41

99 acre parcel along the Snow River in the Chugach National Forest. Parcel acquired through federal criminal funds. (USFS)

Science, Subsistence and Archaeology

The following symbols represent science, subsistence and archaeology projects funded by the Trustee Council from Exxon civil funds. The numbers are the actual file numbers for each of the projects.



Archaeological Site Monitoring

Monitoring of archaeological sites on public land injured by vandalism and oiling.



Community Involvement/Traditional Ecological Knowledge

Community facilitators in Port Graham, Nanwalek, Seldovia, Seward and six other communities in spill region serve as liaisons between the Trustee Council, researchers, and communities.



Clam Restoration

Pilot project to establish subsistence clam populations near Native villages in the oil spill region. The Qutekcak hatchery in Seward is rearing littleneck clams and cockles to be seeded near Nanwalek and Port Graham.



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Common Murre Population Monitoring

Common murres were hit hard by the oil spill. This project will provide information about their recovery by counting murres at Barren Islands and, possibly, Chiswell Islands.



Archaeological Site Stewardship

Provides training and coordination for volunteers in Port Graham and Nanwalek to monitor vandalized sites in the oil spill area. Vandalism was a serious problem after the spill. Long term protection and restoration will be most successful if undertaken by local people.



APEX - Alaska Predator Ecosystem Experiment

This project will compare reproductive abilities and diets of seabirds in Prince William Sound with similar data from Cook Inlet, considered a more suitable food environment.





Approximately 19 miles of the Kenai River's 166 miles of shoreline have serious habitat loss. Public lands have 5.4 miles of degraded shoreline. This 3-year project will restore and protect salmon habitat on public lands.



Youth Area Watch

Involves local youth with ongoing restoration projects, giving them the skill and knowledge to participate in restoration activities now and in the future.



Port Graham Pink Salmon Subsistence Project

Enhances the Port Graham hatchery's ability to produce pink salmon for subsistence purposes. Because local runs of coho and sockeye salmon are at low levels, subsistence users are relying more on pink salmon.

Community Based Harbor Seal Management

Biological sampling of harbor seals is being done in Prince William Sound and Lower Cook Inlet. Village technicians in Port Graham, Seldovia, Nanwalek and six other communities are trained by the Harbor Seal Commission to collect samples for analysis.



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Kenai River Sockeye Salmon Genetics

Five-year project identified genetic differences in Cook Inlet sockeye salmon. Information provided by this project is being used by fisheries managers to modify fishing areas and openings in order to improve management of Kenai River and other Upper Cook Inlet sockeye salmon stocks.

Sockeye Salmon Overescapement

Four-year project has produced scientific evidence to help evaluate the effects of overescapement.

Assessment, Protection, Enhancement of Salmon Streams

Provides inventory and assessment of four major salmon streams in Lower Cook Inlet with intent to improve habitat for better spawning success.



Two views of Overlook Park, a 99-acre scenic overlook with tidal pools near Homer.





















Habitat protection, recreation and scientific research

Exxon civil, criminal penalties to provide long-term benefits for Kenai Peninsula

A laskans who take part in outdoor activities on the Kenai Peninsula are starting to see the benefits from dozens of projects funded by the Exxon Valdez criminal and civil settlements. If you enjoy a wilderness retreat in Kachemak Bay State Park, take part in the bounty of the Kenai River, tour the Alaska Sea Life Center in Seward, or set up camp along the Anchor River, you will find better facilities, better fishing success and more educational opportunities due to the many programs made possible by these funds.

<u>Civil Settlement</u>

The Exxon Valdez Oil Spill Trustee Council, funded by the \$900 million civil settlement with Exxon, was created to help restore natural resources injured by the spill through habitat acquisition and scientific studies. This fund is limited to restoration activities in the oil spill region.

Criminal Settlement

The State of Alaska received half of the \$100 million criminal restitution resulting from the spill. This money has been designated for many uses in the spill region, including recreational facilities, interpretive programs and habitat improvements on the Kenai River. Federal agencies are also using some of its \$50 million criminal fund on Kenai Peninsula projects. The following projects are in various stages of completion. Many acquisition projects depend on successful negotiations with the private land owners. Trustee Council projects (civil settlement) are in black. Projects using state or federal criminal settlement funds are shaded in gray

- Cone Parcel \$600,000 100 acres near the mouth of the river along the Kenai River flats. Acquisiton complete.
- Oberts Parcel (The Pillars) 30-35 acres with 1400 feet of undisturbed shorelline in vital habitat area. Appraisal under review.
- Oberts Parcel (Honeymoon Cove)
 4.22 acres of undisturbed shoreline in high-impact
 recreational area. Appraisal under review.
- Oberts Parcel (Big Eddy) 31.7 acres with about 1,200 feet of riverbank adjacent to the Kobylarz Parcel. Appraisal under review.
- Kobylarz Parcel \$320,000
 20 acres with 1100 feet of riverbank frontage located on the Kenai River at Big Eddy. Offer accepted.
- Girves Parcel \$1,835,000 110 acres in a high use area of Soldotna. Acquisition complete.
 - **Schilling Parcel** 5.9 acres at confluence of the Kenai River and the Sterling Highway. Offer from landowner under consideration.
- Patson Parcel \$375,000
 76 acres on the Kenai River by the Soldotna Airport with
 1/4-mile of river frontage. Offer under consideration.
- Salamatof Parcel \$2,540,000 1,377 acres on the Kenai River with approximately 2 miles of riverbank frontage. Offer accepted.

River Ranch Parcel \$1,650,000 146 acres with more than one mile of Kenai River Frontage. Offer under consideration.

Stephanka Parcel 803 acres with 2-3 miles of Kenai River frontage. Part of the KNA package below. \$4.000,000 Kenai Native Association To partially fund acquisition of 15,091 acres in the Kenai River/Moose River drainage area north of the Sterling Highway. Currently under consideration by Conaress. 13 Slikok Creek Access \$265.000 Ladders and boardwalks to and along river for fishing access, interpretive displays. (ADNR) Habitat Restoration \$50.000 14 Contribution toward project to restore and protect severely damaged riparian habitat at Riverbend Campground. (ADF&G) Soldotna Creek Park \$300.000 15 Restoration of heavily damaged park at Soldotna Creek. Includes elevated grate walk, vegetated biogrid, rootwad installation, bank revegetation. (ADF&G) Morgan's Landing Access \$50,000 16 Ladders and boardwalks to and along river for fishing access, interpretive displays. (ADNR) \$200,000 **Bing's Landing Access** 17 Ladders and boardwalks to and along river for fishing access, interpretive displays. (ADNR) 18 Private Waterfront Projects \$60,000 Small-scale demonstration projects, restoration and protection of riparian habitat on Kenai River frontage parcels using elevated walks, bio-engineering, revegetation, with monitoring. (ADF&G) **Public Lands Protection** \$250.000 19 Restoration of public riverbank damaged by use: Endicott sonar site, Kenai Keys site, Slikok Park, Centennial Park, the Sportsman's Lodge site, Ciechanski, and various campsites. (ADF&G)

Coal Creek Moorage

and Kasilof River. Offer accepted.

53 acres located at the confluence of Coal Creek

ED

\$260.000

KENAI PENINSULA



Exxon Valdez settlement funds Denefit peninsula residents and visitors

Habitat protection

Research/Restoration

Subsistence

Commercial fishing

Archaeology

Recreation

Exxon Valdez Oil Spill Trustee Council

Large Parcel Program

(Status as of January 1, 1997)

Parcel Description	Acreage	Total Price	Trust Fund	Other Sources
Acquisitions Complete				
Kachemak Bay State Park inholdings	23,800	\$22,000,000	\$7,500,000	\$14.500.000 ²
Seal Bay/Tonki Cape	41,549	\$39,447,600	\$39,447,600	\$0
Orca Narrows (timber rights)	2,052	\$3,650,000	\$3,650,000	\$0
Akhiok-Kaguyak	118,674	\$46,000,000	\$36,000,000	\$10,000,000 3
Old Harbor ¹	31,609	\$14,500,000	\$11,250,000	\$3,250,000 3
Koniag (fee title)	59,689	\$26,500,000	\$19,500,000	\$7,000,000 3
Koniag (limited easement)	57,082	\$2,000,000	\$2,000,000	\$0
Shuyuk Island	26,665	\$42,000,000	\$42,000,000	
Subtotal:	361,120	\$196,097,600	\$161,347,600	\$34,750,000
Offers Pending				
Chenega	60,997	\$34,000,000	\$24,000,000	\$10,000,000 ³
Tatitlek	<u>66.443</u>	\$33,000,000	\$23,000,000	\$10,000,000 3
Subtotal:	127,440	\$67,000,000	\$47,000,000	\$20,000,000
TOTAL:	488,560	\$263,097,600	\$208,347,600	\$54,750,000
Negotiations Continuing	1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 - 1971 -			
Afognak Joint Venture	112.827	<\$70.000.000	<70.000.000	\$0
English Bay	33,350	····		· · · · ·
Evak	72.000			
Koniag (fee title) ⁴				
Port Graham	46,170			
Subtotal:	264,347			
Total Acreage to be Protected:	752.907			

1. As part of the protection package, the Old Harbor Native Corporation agreed to protect an additional 65,000 acres of land on Sitkalidak Island as a private wildlife refuge.

2. State of Alaska contribution using \$7 million from the Exxon plea agreement and \$7.5 million from the civil settlement with Alyeska Pipeline Service Company.

3. Federal contribution from the Exxon plea agreement.

4. Negotiations with Koniag concern fee title to the 57,082 acres that are currently protected under a limited conservation easement.



Prince William Sound Clearcut

Private lands within state and national parks, refuges, and forests are being slated for logging. Landowners, in need of economic opportunities, are willing to sell the land or timber rights rather than carry through with logging plans, in order to promote the restoration effort.

Small Parcel Program

A small tract of land can play a powerful role in an overall ecosystem. For instance, a 1,000-acre parcel on the popular Kenai River, with more than two miles of river frontage, provides a rare opportunity to protect valuable habitat for rearing king and red salmon. Placing this land under the protection of the Kenai National Wildlife Refuge will help maintain the health of the river and the subsistence, sport and commercial fishing economies that



depend on the river for survival.

In recognition of the unique habitat qualities and strategic value of smaller tracts of land (less than 1,000 acres), the Council initiated the Small Parcel Program in 1994. The public has nominated 299 parcels for consideration in this program. Each parcel is

evaluated, scored and ranked based on resource value, recreational value and either the threat of or the potential for development. The Council is currently considering about 50 parcels.

The Kenai River property cited above received a high score based on its value for salmon (an injured resource) and will be protected as habitat. Another parcel, 66 acres of road acces-

sible lakefront property, received a high ranking because it is ideally suited for recreation (an injured service) and it has been



added to the Chugach National Forest for use as a campground and recreation site.



Highlights of the small parcels to be protected

Kenai National Wildlife Refuge

The Department of Interior is working with two landowners to pick up 4,600 acres on the popular Kenai River and its drainage area. These tracts include about five miles of Kenai River habitat essential for successful rearing of salmon. The Kenai River is world renowned for its fishery resources.

Chugach National Forest

The U.S. Forest Service is negotiating for 1,000 acres of prime recreational land in Prince William Sound. One site near Valdez could be used for a visitor center and public education program in a prime habitat area that is road accessible. The Forest Service has completed acquisition of a 66-acre lakefront site along the road system to Seward. This property is considered valuable for its fish resources and for its potential as a campground and recreation site.

Kodiak National Wildlife Refuge

Twelve parcels that provide critical habitat for salmon and the Kodiak brown bears that feed on them are currently being considered for acquisition. These sites total 1,125 acres and many are located at the mouths of rivers with access by boat or float plane only. In addition, the Kodiak Island Borough has offered 150 parcels of approximately 10 acres each, which are currently being appraised and evaluated.

Alaska Parks and Critical Habitat Areas

The State of Alaska has acquired or is evaluating 23 sites totaling 2,400 acres throughout the spill area, to be preserved as critical habitat areas, added to the park system or developed into recreation sites. This includes 514 acres of Kenai River front, providing large critical stretches of undisturbed habitat for salmon and other fish and wildlife resources. Kenai Peninsula

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ANCHORAGE

Gulf of Alaska

SEWARD

The Spill Region

VALDEZ

CORDON

Prince William

Sound

The October 9, 1991 court-approved agreement called for the settlement money to be used to benefit the injured resources in the spill region. The spill region encompasses Prince William Sound, Cook Inlet, the Kodiak-Afognak Archipelago, the coastal portions of the Alaska Peninsula, and the lower two-thirds of the Kenai Peninsula. Anchorage is not included in the spill region.



Prince William Sound



Kenai Peninsula



(indicated by acreage amount)

Kodiak-Alognak Archipelago



Kestoration

XXON VALDEZ OIL SPILL TRUSTEE COUNCIL ADMINISTRATIVE RECORD

Research, Monitoring & Management

The North Pacific is a vast cold-water environment, rich in marine life and poorly understood. The lack of good scientific data knowledge will help protect our marine life, provide for better fisheries management and allow for sustained use of our

became a severe handicap in understanding the true impacts of the Exxon Valdez oil spill. With funding from the Exxon Valdez Oil Spill



ocean resources for generations to come. It's been said many times that if one can find a silver lining in the oil spill, this is it. The action of the Trustee Council

Trustee Council, scientists are taking a giant leap forward in their understanding of the intricate North Pacific ecosystem. The Council has funded hundreds of scientific studies throughout the spill region with the expectation that increased translates into vital habitat protection, more recreational access to lands, better fishing success, sustained subsistence harvests, and a world of scientific knowledge once thought unachievable due to funding constraints.

Research & Monitoring



The challenge to scientists is to look at the spill region as a single ecosystem, taking into account the complex interrelationships among species as well as the oceanic physical factors.

The Trustee Council is providing long term funding for three projects that explore the natural dynamics of the North Pacific. They are known by their acronyms: NVP, SEA, and APEX.

The Nearshore Vertebrate Predator project began in 1995, using four indicator species to study recovery factors in shallow waters along the shore. This project focuses on two fish eaters -- river otters



Vladimir Burkanov, Russia, and Lloyd Lowry, Alaska Department of Fish and Game, weigh a harbor seal in Prince William Sound. Burkanov was assisting the restoration project as part of a cooperative exchange program on marine mammals.

and pigeon guillemots -- and two species which feed on shellfish -harlequin ducks and sea otters.

The Sound Ecosystem Assessment project was initiated in 1994 to understand the dynamics influencing pink salmon and Pacific





herring productivity in Prince William Sound. Local populations of both species are highly variable and herring crashed in 1993. This study considers currents, water mixing, and ocean temperatures as well as plantlife, prey and predators in the food chain.

The Apex Predator Experiment concentrates on recovery of seabirds based on the availability of forage fish as a food source. Three species -- pigeon guillemots, common murres and black-legged kittiwakes -- are being studied as key indicators of a healthy ecosystem.



As part of the APEX project, veterinarians surgi cally implanted very small satellite-linked radi transmitters into common murres and tufted puj fins (top left) in the Barren Islands. Jim Murphy (to right) retrieves a recorder during a SEA researc cruise. Dave Tessler (above) measures the wing of pigeon guillemot chick while Lindsey Hayes weigh another chick as part of the APEX project.

A science team (left) reviews each project prior t Council approval and provides peer review of the re sults. Standing left to right, Science Coordinatc Stan Senner; Pete Peterson, marine biologist; Chi Scientist Robert Spies. Sitting are Chris Haney, wild life ecologist; Andy Gunther, marine biologist; Ph Mundy, fisheries biologist; George Rose, fisherie biologist.

Injured Species

To date, 28 species or resources have been classified as injured by the oil spill. Only one, the **bald eagle**, is considered to be healthy and has been officially declared as "recovered" by the Trustee Council.

Marine Mammals

Sea otters, which became the symbol of oil's destruction during the early days of the spill, are recovering well, although their numbers in the hard-hit portions of western Prince William Sound remain low.

The well-known and intensively studied AB pod of killer whales—a group of 36 animals inhabiting the Gulf of Alaska—lost 14 of its members and produced no young in the two years following the spill. The pod still has more losses than births, and its complex social structure is deteriorating.

Harbor seals in the Gulf of Alaska were known to be in decline before the oil spill, with populations down 80 percent over the last 20 years. An estimated 300 harbor seals died during the spill and rates of decline continue to be higher in oiled areas than in non-oiled areas. Natural



Harbor Seal

changes in food supplies (especially "bait" fishes) may account for the long-term decline.

Seabirds

Pigeon guillemots nesting on Prince William Sound's Naked Island have declined by 40 percent since 1981. It's estimated that the oil spill claimed 10-15 percent of the pigeon guillemots in the region. There is no evidence of a post-spill recovery, and, as is the case for harbor seals, natural changes in food supplies may play a role.

Marbled murrelets, a species listed as threatened in the Pacific Northwest, is still abundant in Alaska

waters. The marbled murrelet, however, is another species that had declined before the oil spill. As much as 7 percent of the spill-area population was killed during the spill, and there is no evidence yet of recovery.



Marbled Murrelet

Common murres took the brunt of the oil, accounting for about 74 percent of the 30,000 oiled bird carcasses recovered. Actual deaths may have been about 185,000 murres. Productivity at key colonies was within normal bounds by 1993.

Most of the oil was initially

stranded in shallow subtidal



Common Murre

areas where harlequin ducks feed. The spring spill hit over-wintering birds, so its impacts may extend far beyond the Gulf of Alaska coast. There continues to be concern about poor reproduction and a possible decline in numbers of molting birds in western versus eastern portions of Prince William Sound.

Intertidal, Subtidal and Sediments

Detailed coastline surveys found varying degrees of oiling on 1,500 miles of coastline. Impacts to intertidal and subtidal flora and fauna occurred at all tidal levels and to depths of up to 20 meters. Many species of algae and invertebrates were less abundant at oiled than at unoiled sites. In some cases, oil-tolerant species increased greatly, changing the composition of the biological communities. Intertidal and subtidal communities are recovering from the spill and the cleanup activities that followed, but some effects linger.

Exxon Valdez oil penetrated deeply into cobble and boulder beaches and the underlying sediments that are common on shorelines throughout the spill area. Some of that oil remains, especially in sheltered habitats and underneath rocks. The oil that remains is relatively stable. In 1995, a shoreline survey team visited previously oiled sites in the Kodiak Archipelago and found no oil or only trace amounts.

Though the residual oil is not considered an environmental risk, the Trustees approved a \$1.9 million cleanup plan in Resources and Services Injured by the Spill

A. A. Gold and



the Chenega area in an effort to boost confidence in subsistence and recreational use of the tidelands.

A 1993 shoreline survey of Prince William Sound identified 225 locations with residual surface oiling, asphalt or mousse. The Chenega-area cleanup, to take place in the summer of 1997, will target surface oil found at eight key sites on Latouche, Evans and Elrington Islands. These sites are on beaches where residents go to gather food from the rich tidelands.



Common murre colony at Barren Islands

Fisheries

Many commercial fisheries were closed in 1989 due to concern about oil contaminating fish bound for human consumption. By 1990, most of those fisheries had reopened, but oil's impact on the fish themselves lingered.

Both wild and hatchery-reared **pink salmon** swam through oiled waters in 1989 as they foraged in Prince William Sound and emigrated to the sea. The result was reduced growth rates in young salmon and increased egg mortality in oiled streams. By 1994, differences in egg mortalty between oiled and unoiled streams had disappeared. Wide swings in returns of pink salmon may largely be a function of natural conditions in the Sound and in the Gulf of Alaska.

The oil spill caused a different problem for sockeye salmon. Because commerical fisheries were closed, more sockeye reached the Kenai River (and other rivers) to spawn. As a result, a super abundance of juveniles "overgrazed" their food supply. The effect of a large overescapement can ripple through a system for years. Although the returns per spawning adult have been lower than normal, productivity is now acceptable.

In 1993, there was an unprecedented crash of adult **Pacific herring** in Prince William Sound and



Spawning Sockeye Salmon

the commercial fishery has been closed ever since. A viral disease and fungus were the probable agents of mortality, and stress is a possible connection between the oil spill and the disease outbreak.

Prince William Sound is at the northwestern limit of the range of the **cutthroat trout**, a prized sport fish. There are few local stocks and numbers are small. Following the oil spill, cutthroat trout grew more slowly in oiled than in unoiled streams, possibly as a result of reduced food supplies or exposure to oil.

Scientific and Resource Management Highlights

 In-stream improvements are increasing the quality and quantity of spawning and rearing habitat for pink and Coho salmon and cutthroat trout to benefit subsistence, commercial, and sport users.

• Development of a 48-hour technique to genetically identify the origins of sockeye salmon in Cook Inlet enables fisheries managers to adjust harvests to ensure adequate returns of injured stocks.

• Studies underway to describe the genetic makeup of Pacific herring and pink salmon in Prince William Sound will enable fisheries managers to better protect and sustain individual stocks, thus conserving genetic diversity.

 Harvest of harlequin ducks in Prince William Sound has been restricted since 1991. Studies now underway seek to identify why reproduction in western Prince William Sound is so low and to indicate when it is appropriate to lift sport hunting restrictions. • Disease (a virus and a fungus) has been identified as the cause of the collapse in the Pacific herring population in Prince William Sound in 1993. Studies now underway on the nature and incidence of the disease already have alerted fisheries managers to the possibility that some types of commercial herring fisheries may promote the spread of disease through overcrowding and stressing the herring.

 A pilot project to train and coordinate volunteers to monitor archaeological sites vandalized in the aftermath of the spill should lead to long-term protection of these sites by local communities.

 Studies now underway on the status and health of still-declining harbor seals actively involve Alaskan Native subsistence hunters with a direct stake in the sustained management of a resource which has been so valuable to them for many generations.



Otolith marks accurately identify pink stocks

 Installation of thermal equipment to mark the otoliths (ear bones) of every hatchery-reared pink salmon in Prince William Sound enables fisheries managers to regulate harvests to better protect injured wild stocks.

• Several species of marine birds and marine mammals had declined before the oil spill, and the effects of the spill itself added to these declines. Studies now in progress will yield insights on the causes underlying the declines and help resource managers develop an effective long-term approach to restoration needs.

Archaeology

It's estimated that there are more than 3,000 significant archaeological sites in the oil spill region. During the early days of the cleanup, with thousands of people

working at remote beaches, many archaeological sites were discovered and 24 sites on public land were looted



This archaeological site on Kodiak Island was identified as a result of oil spill cleanup surveys. Restoration projects enabled excavation and stabilization of the site. Above, the well-preserved stone ulu was excavated at an archaeological site in Prince William Sound by Linda Yarborough of the U.S. Forest Service.

or vandalized. Artifacts were stolen, burial sites were violated and valuable historical evidence of North America's earliest human inhabitants was destroyed.

The Trustee Council has funded a monitoring program using local residents to check on known sites and report any suspicious activities. In 1993, only two of 14 sites visited showed continued signs of vandalism and no new damage has been reported since then.

Native communities in the spill area have expressed a strong desire to have artifacts collected during the spill returned to them for storage and display. The Alutiiq Archaeological Repository in Kodiak, whose construction costs were partly funded by the Trustee Council, is the only artifact storage facility in the spill area. In 1995, the Council approved funds for development of a comprehensive community plan for restoring archaeological resources in Prince William Sound and lower Cook Inlet, including strategies for storing and displaying artifacts at appropriate facilities.

Alaska Sealife Center

The Alaska SeaLife Center in Seward will provide much needed marine research facilities to support restoration work in the spill region. The Trustee Council contributed \$25 million toward construction of the facility, which is scheduled to open in spring of 1998.

The center will include public educa-

tion components, marine life interpretive programs and full research laboratories. The scientific program will be guided by the University of Alaska School of Fisheries and Ocean Science and will provide technologically advanced facilities previously unavailable for research on marine mammals, fish and seabirds.



The Alaska SeaLife Center in Seward is scheduled to open in spring 1998.

Subsistence and Community Involvement

Fifteen predominantly Alaskan Native villages in the spill area rely heavily on harvests of subsistence resources such as fish, shellfish, seals and ducks. Subsistence harvests in most of these villages declined substantially following the spill. The harvest, as measured in pounds per person, appears to have returned to pre-spill levels in some communities, but some resources remain scarce and residents are still concerned about the food safety of fish and other wildlife resources. In addition, the spill's interruption of the subsistence lifestyle caused a cultural disruption which subsistence users report still continues.

The Trustee Council has made a special effort to listen to subsistence users and closely involve them in

the restoration process. The Council funds a local facilitator in most spill-area villages to serve as a liaison between the village, the Council, and the scientists conducting restoration projects. Public hearings are held annually throughout the spill area and staff assist village representatives in developing restoration proposals. Each year, an increasing number of the proposals funded by the Council are initiated by the villages.

The Council funded routine testing of subsistence foods for evidence of hydrocarbon contamination through 1994. Since then, a process for testing abnormal resources found during the harvest has been in place. Efforts to use traditional knowledge of the area's ecosystem to benefit restoration are also underway.

Marine Pollution

In an effort to reduce pollutants entering Prince William Sound and the Gulf of Alaska, the Trustees are funding two programs to stop marine pollution at its source.

Many villages in the spill region are not accessible by the road system. Sanitary landfills are often inadequate and hazardous waste facilities non-existent. important habitat.

The programs will use a regional approach, coordinating efforts among communities for temporary storage and then transferring waste for proper disposal at a central facility. The Prince William Sound program will receive \$2.1 million this year to implement its plan. Another \$267,000 will go toward creating a waste management plan for Kodiak communities.

The Sound Waste Management Program and its sibling, the Kodiak Waste Management Program, are designed to reduce chronic sources of marine pollution by providing facilities and services to properly dispose of used oil, household hazardous waste and scrap metals. These continuous waste streams are affecting fish, wildlife and human services injured by the spill, including disruption of



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CHENEGA IRA COUNCIL P.O. BOX 8070 CHENEGA, ALASKA 99574 TEL-907-573-5132-FAX-907-573-5126 March 5, 1997 APR 1 5 1997

Public Advisory Group EVOS Trustees Council Anchorage, Alaska

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL ADMINISTRATIVE RECORD

Public Advisory Group Members

Chenega Village IRA Council and the residents support scenario number one, local repository facilities in each of the seven Chugach villages. The repositories would be used for curation and display.

The EVOS Trustees should reserve \$500,00-\$1,00,000 per community. We feel this is a small price to pay to preserve the Native Culture and Heritage in the Oil Spill Region..

The Tribes should decide among themselves, where the artifacts should be returned.

EVOS and the State and Federal Agencies should fund the final planning stages to assist the communities in preparing their local facility plans.

The Restoration Reserve should not be given to any group and should be held in reserve for future restoration.

Sincerely yours Donald P. Kompkoff Sr President IRA Council.

cc: Patty Schallenburg, CRRC Dr. Lora Johnson ,Chugachmiut Chugach Village Councils

NATIVE VILLAGE OF EYAK

P.O. BOX 1388, CORDOUA, ALASKA 99574 TEL 907-424-7738/FAX 907-424-7739

March 4, 1997

Public Advisory Group Exxon Valdez Oil Spill Trustees Council 645 G Street, Suite 401 Anchorage, Alaska 99501-3451

14.2.26C

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL ADMINISTRATIVE RECORD

PAG Members

Concerning the EVOS Archaeological Restoration planning for PWS and Lower Cook Inlet.

Our Tribe supports Scenario number one, Local repository facilities in each of the seven Chugach Communities and possibly one in Seldovia. These repositories would be used for curation and display.

We think the Trustees should reserve or set aside \$500,00- \$1,000,000 per community. With the hundreds of millions EVOS Trustees Council is spending to buy Native Corporation lands, we feel this is a small price to pay to help preserve Native Culture in the oil spill region.

The Tribes would decide among themselves, where the artifacts should be returned.

EVOS and the State and Federal Agencies should fund the final planning stages to assist the communities in preparing their local facility plans.

Concerning the Restoration Reserve.

We feel this money should be held in reserve, until the damages from the Exxon Valdez oil spill are restored. This money should not be given to the University of Alaska or any other group.

Sincerely yours Bob Henrichs President, Traditional Council

Qutekcak Native Tribe

Changing with the tides, in harmony with our people, long and heritage VE

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Resolution NO. 97-02

Requesting TRUSTEE COUNCIL Funding in support of the Comprehensive Community Plan for the Restoration of Archaeological Resources in Prince William Sound and Lower Cook Inlet

WHEREAS, A \$900 Million Fund was set up as a result of the 1989 Excon Valdez Oil Spill to address the problems of injured and diminished natural resources and to institute a restoration program to aide in this process; and

WHEREAS, the Alaska Native Villages in the oil spill impacted region have suffered a tremendous loss in subsistence resources, cultural ties with the land, increased social ills due to the devastation of the oil spill, and loss of archeological resources due to vandalism and looting in various archaeological sites; and

WHEREAS, the Excon Valdez Oil Spill Board of Trustees was

established to address these and other issues directly related to the restoration of the resources and is comprised of federal and state government representatives that have these recovered artifacts; and

WHEREAS, the return of Excon Valdez Oil Spill artifacts to the local communities is important both to Natives living in the region as well as Natives who trace their ancestry to the region; and

WHEREAS, the Excon Valdez Trustee Council members have recognized the need to support long term curation for the archeological collections in the spill area and also have recognized the desirability of keeping collections near their origin.

WHEREAS, at present, none of the Native archaeological collections obtained during the spill response, damage assessment, or restoration are stored within the project area.; and

WHEREAS, the communities have all voiced an opinion that they support scenario one, listed in the Comprehensive Community Plan in question; now, therefore be it

RESOLVED that the Qutekcak Native Tribe support scenario one listed in the Comprehensive Community Plan for the Restoration of Archaeological Resources in Prince William Sound and Lower Cook Inlet.

Adopted by the Qutekcak Native Tribal Council this day of March 11, 1997.

Arne Hatch, Vice Chair for Kenneth Blatchford, Chair

NATURAL AND SOCIAL SCALES IN ECOSYSTEM MANAGE

Kai N. Lee[§]

EXXON VALDEZ OIL SPILL TRUSTEE, COUNCIL I'm delighted to visit Alaska at a time of year when none ministration of the second will accuse me of playing rather than working. I'm pleased to be invited to this gathering which Exxon has funded with such reluctant generosity.

[ecosys mgt = realignment]

14.2.26A

I'd like to put a simple hypothesis before you: ecosystem management is an attempt to realign the scales of human activities so that they become compatible with the scales and rhythms of ecosystems valuable to humans. I'd like to consider this hypothesis by exploring three ideas learning, scales, and communities.

Your work deals with two kinds of communities — ecological and human. You engage with human communities mainly through archaeology and public participation. I suggest that that isn't enough. (The trustee council's logo, like the research most of you do, focuses only on the *non*-human elements of the ecosystem.) A striking feature of the trustee council's work is that the large stream of resources it administers will mostly come to an end, for practical purposes, in the foreseeable future. But the burden of responsibility will not end. Rather, stewardship will

⁴ Center for Environmental Studies, Williams College, Williamstown MA 01267 USA; http://www.williams.edu:803/CES/ (World Wide Web). Voice: (413)597-2358; fax: (413)597-3489; e-mail: Kai.Lee@Williams.edu.



^{*} Keynote Lecture, annual restoration workshop, *Exxon Valdez* Oil Spill Trustee Council, Anchorage, Alaska, January 24, 1997. I am grateful to Stan Senner and Molly McCammon for their hospitality and good sense. Many of these ideas were developed while I served on the Committee on Protection and Management of Pacific Northwest Anadromous Salmonids, National Research Council. I am indebted to Courtland L. Smith, Bonnie McCay, Peter A. Bisson, and David Policansky for helpful conversations and criticism during our work on that committee. John Volkman's salutary influence is also apparent in this essay. Criticisms and comments welcome, at the address below.

Exxon Valdez Oil Spill Trustee Council

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return to the humans of Prince William Sound — the folks who did that job, largely unassisted, until March 24, 1989. I shall return at the end of my talk to this point: that the transition from today's trustee council to a sustainable management for the indefinite future is a task that you should begin now to design.

"Ecosystem management" is a label for a set of controversial purposes — the notion that humans should take responsibility for whole habitats, even when they cross property lines and governmental jurisdictions, even when taking responsibility forces people to acknowledge their own destructive effects upon the natural world, even when taking responsibility means that we must address conflicts that make all – disputing parties uncomfortable. Ecosystem management is not a simple thing to strive to do; the alternative — to abandon our responsibilities to natural habitats — may often be easier.

I have found the idea of scale helpful in organizing the difficulties of ecosystem management. I'd like to begin by saying what I mean by that word, since I mean something similar to what ecologists mean, but not exactly the same. Second, I'd like to illustrate the problems that ecosystem management encounters as a social activity, and finish with some comments about the historical process of redefining stewardship after a major social transition like the one triggered by the oil spill.

Let me say that the questions about ecosystem management raised in my talk are not arguments *against* an ecosystem approach. Rather, my purpose is to improve the probability of success in the difficult challenge of seeking to manage at the ecosystem scale by sharing experience and potential lessons.

comments welcome

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Exxon Valdez Oil pill Trustee Council

Scale mismatches

Environmental problems result from mismatches between the scale of human utilization of natural resources and ecosystem function. These mismatches occur in three dimensions. (Lee 1993b)

[scale mismatches]

In his famous paper on the tragedy of the commons, Garrett Hardin (1968; cf. McCay and Acheson 1987) observed that overuse of common-pool resources reflects institutional failure. If no single person or organization owns a resource to which all have access, then no exploiter of that resource has reason to conserve. That which belongs to all is cared for by none.

SCALE MISMATCH	CHARACTERISTIC PROBLEM
Spatial	Pollution, e.g., release of combustion products into air.
Functional	Deadlock, e.g., misallocation of water.
Temporal	Unsustainable harvest, e.g., catch in excess of reproduction rates.

Human responsibilities often do not match natural scales.

This table generalizes that argument: when human responsibility does not match the spatial, temporal, or functional scale of natural phenomena, unsustainable use of resources is likely, and it will persist until the mismatch of scales is cured. Because the natural world is rich in patches, unsustainable use can continue for long enough for humans to assume it can be permanent, as in the case of our institutionalized dependence on fossil fuels. The risk that became reality in March 1989 is one consequence of that dependence. Yet the recipe for reform implicit in this analysis — to get the scales right — is made considerably harder by the



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fact that our knowledge of natural processes is limited. (National Research Council 1995)

Hardin's parable of the pasture depicts a spatial mismatch. Shepherds own their animals but not the land that nourishes them. It is accordingly rational for individuals to overexploit the range, reaping a positive return until the land is ruined. Similarly, pollution is the dumping of waste products into air, land, or water because the dumper has no responsibility to care for these commons to which there is unrestrained access.

Pollution has been restrained by a variety of social controls. Your work here is the enactment of one of them — the idea that pollution can be restrained by having those guilty of pollution pay to compensate those who have suffered from it.

A second form of mismatch is functional. Because the natural world is complex, human activities in it are specialized. These specialized activities generally owe much to tradition and precedent and little to science or efficiency. An example is the allocation of water. A doctrine called "prior appropriation" runs through western water law: it says that the water user with the older claim on water diverted from a stream must be fully satisfied before a more-junior user may receive any water (see Wilkinson 1989).

Prior appropriation made sense under conditions in which water was the key to farming and the stability of agricultural settlement was highly valued by an expanding, colonizing society. Today, virtually all agriculture is maintained, regulated, and manipulated by policy and subsidies. Western water law has become an anachronism, providing

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incentives to waste water so that one's claims will be preserved in future years. That waste deprives watercourses of their natural flow because water in a streambed has no legal claim — it is a commons, to be overexploited.

The critique that functional responsibilities are drawn too narrowly leads naturally toward comprehensive control. Yet Big Government has toppled in once-socialist states and retreats in nominally capitalist ones. Comprehensive control is neither politically feasible nor believed to be workable even if it could be established. How to manage the problems of functional mismatch in protecting environmental quality over time remains an open question.

Third, consider temporal mismatches, especially the overexploitation of living populations: harvesting at rates that cannot be sustained because inadequate time is permitted to regrow the populations that are depleted. A student writing about forestry put it this way: trees may grow faster in bank accounts than they do in the woods. Harvesting populations at unsustainable speed — mining the resource — can be rational if the earnings from harvest produce financial assets whose value appreciates more rapidly than the resource would regenerate.

Deliberate social strategies for restraining the mismatch between biological time and human time remain underdeveloped, and notions of property in industrialized nations have not often put high value on stewardship, the idea that present generations owe their descendants something beyond goods that can be reduced to financial measurements.



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comments welcome

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Illustrations from the salmon ecosystem

What I've said about scale is abstract. Let me illustrate some concrete scale mismatches by discussing the Columbia River salmon ecosystem (see National Research Council 1995) not far south of here. It's a situation that is importantly different from the one you face here — a point to which I'll return in a few minutes.

[slide: France]

[slide: salmon]

The Columbia basin has a land area roughly the size of France. It's roughly twice the size of the oil spill affected area.

The Columbia and other rivers draining into the North Pacific have been colonized by seven species of anadromous salmonids, genus *Oncorhynchus*, the fish that displays a hook-nosed appearance when it enters the freshwater breeding phase of its life-cycle.

[slide: Indians fishing]

Salmon in the Northwest were so plentiful that the first people to inhabit this landscape did not practice agriculture. Their harvests swam in each year, worshipped but not cultivated, in runs that ranged to more than 10 million fish in a single year.

[slide: fishing boat]

Columbia River fish, now caught largely in the open ocean, remain highly prized, even though their numbers have dwindled sharply, and many stocks originating in the upper river basin are now so depleted that they verge on extinction.

The lifecycle of salmon, with migrations as long as 10,000 miles, is a great drama of natural history. The salmon lifecycle is immense in spatial

comments welcome

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scale, diverse in the habitats sampled by the fish, and exacting in what it requires in those habitats. Salmon survive only in high-quality environments. Their decline is, accordingly, a classic example of the canary in the mineshaft. If salmon aren't doing well, then many other life forms may follow.

[slide: McNary dam]

Humans have modified the salmon habitat drastically over the past 120 years. The most visible manifestation is the building of dozens of multiple-purpose dams on the major rivers of the Northwest.

[slide: transmission lines]

These dams generate electric power from falling water — in the Columbia basin alone, roughly enough to supply the needs of New York City.

[slide: aluminum pour]

That electricity, in turn, has made possible energy-intensive industries like aluminum refining.

[slide: irrigation sprinklers]

The dams were built in the 1930s to provide irrigation for a depressed agricultural society in the semi-arid lands of the inland Northwest. Today, potatoes, apples, cherries, and other crops contribute to the prosperity of that land.

[slide: barge]

And the crops are brought to market, in many cases, by low-cost water transportation that relies on navigation locks in the dams.

[slide: Portland]



DRAFT

comments welcome

What most people see of the Northwest are its national parks and cities, like Portland. Here too, low-cost electricity from hydropower has become a vital, if often unnoticed component of a comfortable existence.

[slide: Vernita Bar]

By the 1970s, when the Columbia's network of dams was completed, there was only one stretch of the river's main stem where salmon spawned on their own, here at a lonely spot in eastern Washington called Vernita Bar. The annual salmon runs, more than 10 million in aboriginal times, had dwindled to two to three million, and more than two-thirds of the remaining salmon population began its lives in hatcheries.

The salmon's decline is a monument to mismatch:

- In spatial terms, the migrations of salmon from the Columbia to the Gulf of Alaska have led different groups of fish harvesters to compete with one another for the dwindling catch. Before 1985 there was not even an institutional framework for overall assessment of the stocks during the harvest season. It was impossible to tell who caught which portions of the run until the season had ended. The work you've done in otolith marking and other means of identifying fish in mixed-stock fisheries lays the technical basis for advances in management.
- In functional terms, salmon have been only one claimant among many to the bounty of the river. Their voice has not been influential until very recently, and it's never been commanding. Migrating fish evolved in the presence of large springtime flows, as snow melted from the mountainous interior. Juveniles were carried to sea by the spring freshet, often covering hundreds of miles in several days' time. Now, the water is held back in storage dams, because the value of electricity is highest in the winter, when people need heat, not in the spring, when there's already a lot of water running and not so much demand for power. The spring migrants now spend weeks rather than days getting to salt water. Along the way they are exposed to predators in the slackwater reservoirs and the rigors of passing the dams. Amazingly, a lot make it through each dam; but the cumulative mortality of a series of dams is high enough to depress the abundance of upriver stocks dangerously.

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And in temporal terms, the large-scale modifications of the past century have yet to be taken into account. The rivers have been impounded, the forests cleared, and the landscape transformed yet there has been little understanding that salmon habitat has been drastically altered. Harvesters and fishery managers did not foresee the vulnerability of large populations sustained by hatcheries. And human actions have tended to assume that the abundance of the past would be readily restored, even as the environmental capital needed to regain productivity was being destroyed or altered beyond biological recognition (Larkin 1979).

[slides off]

The story of the Columbia is one with many parallels. The Columbia demonstrates clearly the profound impact of human scales of action that do not match ecological requirements. What's different about the salmon is that people care a lot about its decline, but the way salmon declined is a dynamic repeated often in other places.

Yet it's important to bear in mind a major difference between damage to the salmon ecosystem and the damage done by the *Exxon Valdez* spill. The salmon is the victim of routine, profitable activities — dams, irrigation, cities. These activities yield a steady stream of revenues, part of which has been diverted to salvaging the salmon ecosystem, so far with little to show for it.

The oil spill was not a routine event; it is, in fact, the opposite, producing a one-time disturbance and a one-time settlement agreement. The challenge you face is to fashion a meaningful restoration from that settlement — a task in which nature has been your ally already, in which the people of coastal Alaska can be too, I think. The challenge in the Pacific Northwest salmon ecosystem is to achieve a sustainable fishery in the permanently altered world of the industrialized Columbia; it isn't clear whether nature will permit that, and it is certainly unclear whether the



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human institutions that manage parts of the salmon ecosystem are willing to make, or even find, the necessary accommodations.

Ecosystem management

In response to the dwindling of salmon and other valued species, the idea has gradually grown that species are not the right unit of conservation. For if we want to take advantage of the quality and productivity of valuable species, then we must protect and manage their ecosystems, rather than attempt to supersede or to substitute for those ecosystems by artificial culturing methods like hatcheries. Phil Janik quoted the new chief of the Forest Service, Mike Dombeck, to that effect just yesterday. It is the logic that propelled the Sound Ecosystem Assessment into being, as Ted Cooney said yesterday; it is a hope that hangs in the mist over the Everglades, the Grand Canyon, and even the Columbia.

A Forest Service framework...

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There is no single method of ecosystem management. Let me, for the sake of clarity, pick a thoughtful example put forward by two analysts at the U.S. Forest Service.

[ecosystem management defn]

- Landscape ecology should be the conceptual template...
- Informed by systematic data collection and interpretation,

using ecological mapping units.

- Landscapes are heterogeneous and controlled by disturbance regimes operating through time.
- Ecological integrity is maintained by sustaining or restoring presettlement landscapes.

Ecosystem Management (after Jensen and Bourgeon, USDA 1994)



These principles should be familiar to you.

...operating in a historical context

Consider, then, how they contrast with the historical assumptions that shape land use.

[ecosystem management vs. human priorities]

In place of landscape ecology, humans have emphasized sovereignty and property.

In place of systematic data collection, humans have relied upon the knowledge of owners: an understanding of land and water that is shaped by and often limited to past uses, instead of the ecological character of the land and sea. Owner's knowledge is rooted in place — in place-dependent economic activities like farming, on time scales organized by human tenure, inheritance, and land speculation, and on spatial scales shaped by human mobility (Jackson 1970). Owner's knowledge is different from, sometimes a great deal more humane than the scientist's geographic information system or species lists. These differences underlie a good deal of mutual suspicion (e.g., Berry 1989). Consider how long it's taken the trustee council to give Traditional Ecological Knowledge a place on your agenda, and how even that place is labeled with an acronym that makes this kind of knowledge TEK ...but not high-TEK.



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ECOSYSTEM MANAGEMENT	HUMAN PRIORITIES IN UTILIZATION
Landscape ecology	Sovereignty & property
Systematic data collection & synoptic interpretation	Owner's knowledge
Ecological integrity in mapping units	Boundaries set by human use, institutions, & memories
Heterogeneity governed by disturbance regime	Homogeneity within use class; high productivity
Pre-industrial landscape as standard	Maximization of (long-term) utility
<i>biotic system</i> — independent of institutions	historical — bound by precedent & institutional tradition; individual-rational

Ecosystem Management vs. Human Priorities

The prevalence of owner's knowledge means, in turn, that humans divide and conceive of landscapes in particular ways. Here is a map, taken from a document discussing the Northern spotted owl. It shows the key watersheds to be managed because they lie within the geographic range of the owl.

[overhead: key watersheds]

Compare this map to another one, of the county governments in that same geographic area.

[overhead: counties]

You can see the qualitative difference. The ranges of biota are governed by precipitation and topography. Humans choose readily defensible borders, such as rivers, to mark jurisdiction and property. Or else we draw straight lines on the land.

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Rivers are of course the centers of drainages, not their edges, and the boundaries of plant or animal dispersal rarely fall along straight lines. Drawing straight lines upon the land is arbitrary. Relying on rivers as borders is critically inappropriate, separating human interests along lines where human concerns should be unitary or at least coherent.

[return to ecosys mgt vs. human priorities]

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Instead of heterogeneous landscapes resulting from natural disturbance regimes, human control has traditionally aimed at homogeneity and, in the case of cultivated lands, at installing and maintaining ecosystems at early successional stages where productivity is high. That is, humans take pre-development landscapes as starting point for transformation, not a benchmark for conservation or restoration.

The contrast between ecosystem management and human exploitation as ways of looking at the land is a contrast between sets of assumptions. Ecosytem management takes as its organizing premise the communities of biota. But ecosystem management envisions a landscape shaped primarily by disturbances of non-human origin, over times that are long compared to human temporal horizons. In short, ecosystem management operates on different scales than nearly all types of human utilization. Such a perspective operates independent of institutional considerations, in sharp contrast to human ownership and transformations of land.

The harmonizing of human and natural scales called for in ecosystem management is accordingly difficult.





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Three responses

The rise of ecosystem management in U.S. policy coincided with the dwindling capacity of the federal government to govern. Interior Secretary Bruce Babbitt's frustrating career in that post is a graphic demonstration of both the importance of ecosystem management as an idea and the political difficulty of pursuing its governmental realization.

[three responses]

Instead of national policy, three rather different and somewhat complementary approaches have been tried as ways to harmonize human and natural. I want briefly to review these ideas — co-management, bioregionalism, and adaptive management — and explore how they might become part of a way to think about ecosystems inhabited and used by humans.

Each of these approaches responds to the two principal roots of environmental conflict in American politics. First, the management of public resources is shaped by the fragmentation of formal authority and political power. Authority is divided between federal and state governments and power is dispersed among a wide variety of business, citizen, media, and governmental organizations. Cooperative action requires compromise whenever there is conflict. Second, the economy is technically complex and environmental questions face uncertainties at every turn. Managing ecosystems — which are owned by private and public entities with conflicting agendas affecting one another and other neighboring and distant interests — requires recognizing conflict, stimulating negotiations, and providing technical analyses to illuminate disputes. Co-management, bioregionalism, and adaptive management each seek to do this, and each

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can be carried out with only the acquiescence of the federal government they do not require large-scale funding.

<u>Co-management</u>

Let me begin with co-management. For most of the past century, public lands in the U.S. have been managed on a model of expert neutrality (Hays 1987). Agencies like the U.S. Forest Service have been charged with managing public lands in the public interest. But rising conflict has make it impossible to define the public interest non-controversially.

Bringing in those who are affected became an attractive alternative to increasingly embattled agencies. The result has been co-management: "power-sharing in the exercise of resource management between a⁻ government agency and a community or organization of stakeholders." (Pinkerton 1992, p. 331)

The idea of co-management is simple: get the contending interests together so they can work out something all can live with. Co-management recognizes the central role of equity and fairness in managing ecosystems that are owned by and affect people in diverse circumstances. Human communities can avoid a tragedy of the commons (Ostrom 1990); they do so by fostering monitoring of resource users and effective enforcement of those who violate the rules of equitable use. That is, managing ecosystems is a people issue. Co-management seeks to tackle that people problem head-on.

But this approach is not a cure-all. As the number of competing interests in a resource increases, the costs, procedural complications, and complex tradeoffs increase as well, often in apparent disproportion to the scope of involvement.



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Moreover, most cooperative arrangements have not been designed but are the residue of conflict and negotiation among opposed parties. Such a history often brings with it a range of problems — lowest-common denominator positions, blaming as a substitute for analysis, and emphasizing short-term remedies with anticipated early payoffs, such as salmon hatcheries. On the other hand, over time periods of a decade or more, as Pinkerton (1992) showed for state forest management, both the agenda of disputing and the institutions within which disputes are conducted can evolve toward durable accommodations. In sum, comanagement is a tool; it can't do everything, but it can do some essential things.

<u>Bioregional scope</u>

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Consider next management organized around bioregion. From an ecological perspective the most straightforward strategy of reform is to shift the margins of human control and responsibility to match natural boundaries. Indeed, the notion of ecosystem management is rooted in the claim that ecosystems are the best scale at which to manage. What I've learned here is that you have had the courage to define ecosystems so that they include both terrestrial and marine components; that's important and difficult and novel.

Let me emphasize "difficult." Straight-line boundaries like the eastern border of Alaska are in place. Trade routes have tied together different biogeographic provinces: highways, transmission lines for electricity, water diversions on land, shipping lanes at sea and in the sky. Along these human paths flow commercial transactions in which human values define the relative scarcity of specific resources, including the crops

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harvested from managed vegetation and animal populations. Any attempt to shift human jurisdictions so as to focus attention on the welfare of an ecosystem must begin with these boundaries and networks (Volkman and Lee 1988).

Even a more modest aim, to map reality in ecosystemic terms, runs afoul of human priorities. Much of what is needed to make maps and data bases that make sense ecologically would come from observations made on private lands. Gathering that information relies, in turn, on land-owners' perception that sharing data is in their interest. But the use of biological information for regulation undermines this perception. The result has been the strange struggle over the National Biological Survey, fueled by land-owners' fears of the Endangered Species Act. This battle is one measure of how far we remain from bioregional governance of ecosystems.

Adaptive learning

[back to Three Responses]

Let me turn now to the third of the responses to scale mismatch, adaptive management.

[AM defn]

Because human understanding of nature is imperfect, human interactions with nature should be experimental. *Adaptive* management applies the concept of experimentation to the design and implementation of naturalresource and environmental policies. (Holling 1978, Walters 1986, Lee 1993a, Gunderson, Holling & Light 1995) An adaptive policy is one that is designed from the outset to test clearly formulated hypotheses about the behavior of an ecosystem being changed by human use. If the policy succeeds, the hypothesis is affirmed. But if the policy fails, an adaptive



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design still permits learning, so that future decisions can proceed from a better base of understanding.

[cartoon]

Adaptive management makes sense when there is a lot of uncertainty, but the adaptive approach is not free: two problems are the costs of information gathering and the political risks of having clearly identified failures (Volkman and McConnaha 1993). An adaptive approach has been tried in practice in several arenas over the past 15 years. Recent studies (Halbert and Lee 1990, Walters, Goruk and Radford 1993, Hilborn and Winton 1993, Lee 1993, Volkman and McConnaha 1993) provide appraisals of the successes and limitations of the adaptive process. ⁻

[learning under adaptive mgt]

This body of experience has produced lessons about the practicability of adaptive management and the institutional conditions that affect the conditions under which experiments at the scale of ecosystems can be conducted.

- Learning takes a long time decades to centuries. Patience, particularly in institutional settings such as government that work on much faster cycles, is both necessary and difficult.
- Systematic record-keeping and monitoring is essential if learning is to be possible. But collecting information is expensive and often hard to justify at the outset and during times of budget stringency because the benefits of learning are hard to estimate quantitatively.
- Experimentation within the context of resource use depends critically upon the collaboration of resource users.
- Adaptive management does not eliminate political conflict, but can affect its character in important, if indirect, ways.

[adaptive management cycle]



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Adaptive management looks like a planning cycle, but rarely conforms to that orderly image. Because it is experimental, adaptive management will encounter surprises *if it works* as intended.

[adaptive management cycle, with conflict]

Given the fragmented jurisdictions and conflicting claims that characterize all contested ecosystems, surprise and its companion, disappointment, spawn disputes. Disputes in turn focus around funding and high-visibility decisions, points at which conflict can produce change for those who find the surprises worrying or costly.

These destabilizing elements, which appear to be *inherent* in the social dynamics of adaptive processes, underscore the importance of patience, persistence, and a politically grounded determination to make constructive use of inevitable conflicts. Disputes are sure to arise within the spans of space, time, and functional interaction that characterize the mismatched cycles of human endeavor.

Not solutions but frontiers

As my comments have suggested, co-management, bioregionalism, and adaptive management each bring important ideas to the pursuit of a sustainable and just ecosystem management. But none seems to provide an overall answer. We have ideas, not solutions. These ideas help to clarify the conflicts but they cannot reliably resolve the disputes.

I have tried to summarize my discussion in a chart that I've handed out.

[overhead: chart]

The first two rows reproduce the table I showed you earlier, comparing the ideas of ecosystem management to the patterns of human behavior and

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institutions. The third row arrays the three change strategies I've just described — co-management, bioregional governance, and adaptive management — along the spectrum of ecosystem management principles. Co-management is a direct attempt to engage with the need to manage at the landscape scale; bioregionalism seeks to bring an ecological unity to human information gathering and perception; and adaptive management is a way to bridge the homogeneous uses that humans impose upon heterogeneous ecosystems, so that we may learn from both rehabilitating ecosystems and from domesticating others.

The two pairs of crossed arrows in the lower part of the chart are meant to suggest that the social ideas that make sense in thinking about ecosystem management are likely to have inconsistencies. For example, the sharing of authority that is central to co-management empowers landowners and the fragmented, narrow understandings that I called owner's knowledge earlier. The voices of owners, in turn, are likely to come into conflict with the bioregional insistence upon perceiving the landscape as a connected biotic system. And in turn, the notion that an ecosystem has integrity that deserves protection chips away at the idea of property rights. We know already that the defense of property rights is a vigorous one.

Similarly, the experimental mood of adaptive management promotes not only learning but questioning, including questioning of the intergenerational tradeoffs that are unavoidable if human endeavors are to take into account the time scales of ecosystems (Lee 1993a, chap. 8). Conversely, the environmentalist's instinct for prudence in the face of uncertain change must face the reality that learning by experiment requires manipulation of ecosystems. Although we have an economy increasingly

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devoted to the production and handling of information, we have few widely shared guidelines about the value of information. As a result, it is hard to judge — and even hard to argue over — whether a proposed modification of an ecosystem is likely to produce valuable information.

[overhead off]

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Ecosystem management in coastal Alaska

In short, ecosystem management encounters the fundamental challenge of democratic public policy — the challenge of reconciling rational ideas with historical circumstance. In that context, I'd like to share some thoughts about the relationship between the scientific ideas that you work with and the historical setting of the *Exxon Valdez* oil spill.

In opening this workshop yesterday, Molly McCammon drew attention to the 171 publications — referreed journals and theses — that have emerged so far from your research program. Collectively, these publications are an important milestone, marking the *reliable* knowledge your creativity and energy have produced. We've seen ample evidence in the posters, in the talks, — and perhaps most of all in the idealism of the kids in the Prince William Sound Youth Area Watch — of the determination that goes into making knowledge reliable. It's the refereed journals that certify this determination.

But few people can read 171 publications, certainly not when they range over the technical fields you all work in. And the value of these publications goes beyond the scientific audiences served by the refereed journals. How should the trustee council bridge the gap between reliable knowledge and its meanings to society?



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There is one group that knows those 171 papers and theses: the peer review panel chaired by Bob Spies. That panel should write a synthesis of the work coming out of the trustee council's research program, aiming to publish it in *Science*, *Nature*, or another of the widely read (but still refereed) national magazines. Such a paper should be written every two or three years.

So long as I'm offering unsolicited advice, let me say something about people as well as science. Something an outsider finds surprising about what you do here is the way you focus on the natural world. As three three ecosystem studies implicitly acknowledge, the trustee council's jurisdiction isn't one ecosystem but many. What defines the spatial scope of your work is disturbance — a human disturbance, the oil spill. That disturbance created a large but finite pool of resources, the settlements that the council administers. Although you work in the natural world, the scope, structure, and resource base of your activities is touchingly human. What you do arises from grief and worry, from the pursuit of justice from values that are incomprehensible without humans in the landscape.

Yet the restoration, protection, and research activities you carry out have only accidental ties to the *future* human presence in Prince William Sound. There has been debate recently about what "restoration" should mean. But, more than halfway into the payment period for the trustee funds, that argument strikes me as far less important than the question of what "stewardship" should mean.

As the funds under the council's supervision are spent, the pace of land acquisition, research, and other activities will necessarily subside.



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Isn't that the practical meaning of "restoration": the state of Prince William Sound when the money runs out?

Alaskans are famously skeptical of outsiders from the Lower 48. I won't press my luck here today, beyond saying that the meaning of words like "stewardship" and "restoration" are human words, invested with social meaning. Looking at the abstracts of the impressive range of science done with council sponsorship over the past year, I see the raw materials for meaning. Your most recent annual report is graced by the phrase, "where there is life there is hope." By the turn of the century, a lot more than hope will be needed. What is needed, to my way of thinking, is a way to understand the oil spill and the restoration as a historical period in coastal Alaska's natural and human communities. That understanding must draw upon the scientific knowledge and restoration activities you have carried out. But it must be framed by and rooted in the human communities that will go on beyond the restoration period. I don't know how that should be done; it just seems to me that the conversation isn't very audible yet, at least to an outsider.

Concluding thoughts

[slide: Earth from space]

Ecosystem management is, in concept, a strategy for organizing social responsibility in natural systems. The name of the strategy misleads in three ways: first, as ecological scientists know, ecosystems are human constructs, rather than biological units given by nature (Allen and Hoekstra 1992); second, what is being managed in ecosystem management is people, not just non-human elements of ecosystems; and third, as I have





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emphasized here, the management process is political and cultural rather than managerial in the usual sense of command and control.

That the activity of ecosystem management is so different from the ordinary-language implications of the name "ecosystem management" reflects, I think, the deep ambivalence industrial societies have about the natural world and the place of our species within it. Our growing ability to link together, control, destroy, and remake significant portions of the biosphere raises the question of how to make our presence more deliberate, less careless, and perhaps over time wiser. That is the question of harmonizing this familiar view of the biosphere to a quite different one.

[slide: Earth at night]

The natural planet is powered by the sun — atmosphere, ocean, and biota all derive their motive energy from solar radiation. This image, Earth at Night, assembled by the astronomer Woodruff Sullivan from weathersatellite photographs, shows us the human planet, illuminated by energies of human origin.

Whether they are the fires lit to clear lands for agriculture in the tropics, or the flaring of natural gas in the oil fields of Siberia, or the brilliance of urban landscapes, these are lights that are both recent in the places where they shine and temporary on time scales of ecological relevance. In Earth at Night only the aurora and possibly some woodfueled fires are sustainable. A challenge for ecosystem management is to find a way for civilization to persist in the face of this historical context. I'm glad to be here with you to pursue that search.

Thank you.



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characteristics Ecological **Pre-industrial** Ecosystem Landscape Systematic data Heterogeneity biotic system dollection & ecology governed by landscape as integrity in independent of Management synoptic mapping units disturbance standard institutions principles interpretation regime historical — bound Human Sovereignty & Owner's Boundaries set Homogeneity Maximization o within use class; (long-term) Priorities in knowledge by human use, by precedent & property high utility institutions, & institutional utilization memories productivity tradition; individualrational Bioregional framework: gather Adaptive Social utility: divided authority; Clunge Comanagement and present information using management public trust; strategies decentralized ecosystems as units conserve power; scientific natural capital; complexity and socialize risk uncertainty Barriers Property rights; Fragmented authority, Scarce consensus; Value of Intertemporal institutionally entrenched routines information (vs. tradeoffs (incl commercial chaotic processes links among for data collection, analysis & social prudence) distribution continuity) ecosystems; edge, stem, common-mode effects

Implicit social

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