Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178

AGENDA
EXXON VALDEZ OIL SPILL SETTLEMENT
TRUSTEE COUNCIL
CONTINUATION OF JANUARY 31, 1994 MEETING
TELECONFERENCE

DRAFT

APRIL 11, 1994 @ 1:00 p.m.

Trustee Council Members:

MICHAEL A. BARTON
Regional Forester, Alaska Region
U.S. Department of Agriculture-Forest Service

BRUCE M. BOTELHO/CRAIG TILLERY
Attorney General/Trustee
State of Alaska/Representative

GEORGE T. FRAMPTON, JR.
Assistant Secretary for Fish, Wildlife & Parks
U.S. Department of the Interior

STEVEN PENNOYER
Director, Alaska Region
National Marine Fisheries Service

CARL L. ROSIER
Commissioner
Alaska Department of Fish & Game

JOHN A. SANDOR
Commissioner
Alaska Department of Environmental Conservation

Chair: Jim Wolfe, U.S. Forest Service
U.S. Forest Service Conference Room 445C, Juneau

1. Approval of Agenda
   Order of the Day

2. Reports
   - Executive Director's Report
     - Implementation Strategy
       - Adaptive Management
       - Science Review Board
     - Habitat Acquisition & Protection
       - Appraisal Process
       - Small Parcel Process
       - Follow-up to Motion on Private Landowner Habitat Protection Options
     - Restoration Reserve
     - EIS Report (Rod Kuhn)
     - Update on Recreation & Subsistence Planning
     - Report on Forum and Public Participation Efforts
   - Financial Report

- 1994 Work Plan
  - * A. Review scope and detailed budgets of Project 94320
  - * B. Increment for Project 94191
  - * C. Increment for NEPA for Project 94199
  - D. Report on status of NEPA Compliance for 1994 Projects

4. New Business

- * Proposed Project 94428 - Subsistence Restoration Planning
- * Proposed Project 94427 - Harlequin Duck Boat Surveys & Methodology Testing

Adjourn

* Indicates action items.

EXXON VALDEZ TRUSTEE COUNCIL
FY 94 DETAILED PROJECT DESCRIPTION

Project title:	Experimental Harlequin Duck Breeding Survey
Project ID number:	94427
Project type:	Research/Monitoring
Project leader(s):	Daniel H. Rosenberg, Thomas C. Rothe
Lead agency:	Alaska Department of Fish and Game
Cooperating agencies:	U. S. Fish and Wildlife Service
Cost of project/FY 94:	$21.0K
Cost of project/FY 95:	$145.5K
Cost of Project/FY 96 and beyond:	Unknown
Project Start-up/Completion Dates:	May 1, 1994 to November 1, 1994
Geographic area of project:	Western Prince William Sound
Project leader:	Daniel H. Rosenberg
Lead agency project manager:	Joseph Sullivan

B. INTRODUCTION

Oil spill studies of harlequin ducks in western Prince William Sound (PWS) 1989-93 indicate an initial mortality up to 1,000 birds (spill-wide), consistently low numbers of birds during the breeding season, a lack of breeding activity on suitable streams 1991-92, negligible production of broods through 1993, and an apparent decline in post-breeding molting birds in the region. Two main hypotheses have been followed to explain these findings: (1) ingested oil is continuing to cause either mortality and/or sublethal impairment of reproduction; and/or (2) initial mortality caused significant losses to the local western PWS breeding component and subsequent low production. To date, oil has been found in a few harlequins collected during 1989-90 and 1993, and they continue to feed in oiled areas year around. However, no conclusive evidence has been found of histological or physiological effects from oil.

Regardless of ultimate causes, collective results of EVOS studies indicate serious population-level concerns for harlequin ducks in western PWS. Prompt focus on specific population parameters is necessary to determine the status and recovery potential of harlequin ducks. Sea duck populations, in general, are composed of long-lived birds that have delayed sexual maturity, low annual production rates, and "boom and bust" years. Consequently, sea duck population dynamics are quite sensitive to adult survival rates, size of the breeding component, and variable breeding propensity (% of adults breeding annually). Data on sex and age composition are very useful in examining these aspects of a population. To date, EVOS projects have gathered abundance and distribution data only on total harlequin ducks, with little information on sex and age composition, or proportions of paired birds. The focus of these projects has been extensive survey coverage and a diverse array of other time-consuming objectives. Also, efficient techniques for the kind of intensive survey required have not been developed for sea ducks.

Currently, there are no sufficiently measured parameters of harlequin population dynamics with which to construct a population model for Prince William Sound. Development of a reliable breeding bird survey is a critical prerequisite to evaluating the remaining reproductive potential in the western Sound and acquiring data to fill in several important model elements. The experimental survey described below is intended to provide a new tool for establishing quantified restoration goals and designing an effective monitoring program for harlequin ducks in PWS.

C. PROJECT DESCRIPTION

1. Resources and/or Associated Services:

The subject resource of this project is the harlequin duck in Prince William Sound. Results of this work will have a direct bearing on assessing the status and outlook for this resource for guiding agency management programs and policies related to public uses, especially subsistence and recreational hunting.

2. Relation to Other Damage Assessment/Restoration Work:

More specific information on harlequin duck population structure in PWS is absolutely vital to: (1) estimate post-spill harlequin breeding birds remaining in western PWS, (2) assess potential rates of long-term recovery/increase for the spill region, (3) establish definitive, realistic restoration goals, and (4) monitor a meaningful population parameter for progress toward goals. Pursuit of these data will provide a more reliable basis for restoration planning and be consistent with an adaptive management approach that allows more efficient allocation of efforts and enrichment of knowledge over time (e.g. for a long-term monitoring program).

3. Objectives:

The objectives of this project are to: (1) conduct limited intensive boat surveys of harlequin ducks in selected shoreline segments (previously surveyed) of western PWS during May and June; (2) test several methods of classifying age and sex composition of harlequin ducks in the region; (3) compare reliability of classification methods and select a viable option; and (4) design a sampling regime to reliably estimate number of adults and/or pairs in the survey region and recommend it for EVOS monitoring plans.

4. Methods:

Shoreline survey segments will be selected in western PWS from areas surveyed during 1991-93 and where sufficient numbers of harlequin ducks are likely to occur. Seasonal sex and age classification criteria will be developed from literature accounts, examination of study skins, and experience of previous investigators in Canada and the U.S. Surveys will be conducted over 1-2 weeks during late May and early June by 2-3 observers from a slow-moving boat within 100 m of shore, ideally during periods and tide stages when harlequins will be most visible. Field classification methods will include visual assessments by multiple observers, photography, videography, and other prospective means of capturing sex and age data. No birds will be captured or collected. After field studies are complete, analysis will include quantification of class data from visual observations and other media, comparison and corroboration of data among methods, and statistical description of results.

5. Location:

The project will be conducted in the oil spill area of western Prince William Sound, generally between Perry Island and LaTouche Island, including mainland coast. Potentially affected communities include Chenega and Whittier.

6. Technical Support:

The only potential need for technical support is access to videography editing equipment available in Anchorage through the National Biological Survey.

7. Contracts:

No contracts will be necessary for this project.

D. SCHEDULES

This project is a short-term experimental survey. Preparation and field work will be conducted from May 1-June 15, 1994. Data analysis and report writing will occur through October 1994. A final report will be produced by November 1, 1994.

E. EXISTING AGENCY PROGRAM

There are no other agency or non-agency contributions to this project. Neither ADFG nor USFWS have plans for work on harlequin ducks in this region in 1994.

F. ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

This project will comply with all applicable requirements of the National Environmental Policy Act and all applicable ordinances, regulations, and laws. No environmental analysis is required for this study, which qualifies for categorical exclusion.

G. PERFORMANCE MONITORING

This study will be conducted and managed by the Division of Wildlife Conservation, Waterfowl Program. Project operations will be conducted by permanent staff of the division and supervised according to professional standards. The Waterfowl Coordinator will be responsible for technical and administrative oversight, including project design approval, staff assignments, budget monitoring, and quality control of products. Operations and data management will be controlled through supervision, appropriate staff training, and compliance with applicable SOP's. The products of this study will be peer reviewed internally and through prescribed EVOS processes.

H. COORDINATION OF INTEGRATED RESEARCH EFFORT

There are no other projects directly related to the work planned in this project, although results of USFWS boat surveys for birds and mammals may provide useful information. However, those surveys are conducted outside the harlequin duck breeding season (March and July). Eventually, the techniques developed on this project should provide a partial basis for future sea duck monitoring efforts. Subsequent EVOS program development can incorporate sea duck population dynamics information with intertidal and nearshore ecosystem projects.

I. PUBLIC PROCESS

A comprehensive survey program for harlequin ducks in Prince William Sound was proposed as part of the FY 94 Work Plan and reviewed by the public and EVOS personnel. This project is a small experimental effort related to that proposal.

J. PERSONNEL QUALIFICATIONS

Daniel H. Rosenberg — Project Leader

Dan Rosenberg has worked as a waterfowl biologist for The Alaska Department of Fish and Game (ADFG) since 1985. From 1980—1983 Mr. Rosenberg worked as a waterfowl biologist for the U.S. Fish and Wildlife Service and from 1983—1984 as a Habitat Biologist for ADFG. Mr. Rosenberg served on the adjunct faculty of Anchorage Community College from 1984 - 1987 as an instructor for courses in Ecology and Animal Behavior, and Fish and Wildlife Management.

Mr. Rosenberg has conducted extensive waterfowl population monitoring and habitat assessment surveys on the Copper River delta, Stikine River delta, Kenai wetlands, upper Cook Inlet, Aleutian Islands, and Kodiak Island. As project leader, Mr. Rosenberg has assessed impacts to waterfowl and wildlife populations from hydroelectric development, urban expansion, habitat alterations, chemical pollutants, timber harvest, and surface mining.

Mr. Rosenberg has conducted studies to assess impacts from chemical pollutants on waterfowl populations in Alaska wetlands. Mr. Rosenberg designed, supervised, and conducted the first definitive study to assess the physiological effects from the ingestion of spent lead shot on mallards and pintails in Alaska. As the ADFG representative on the Biological Technical Assistance Group for the Eagle River Flats (ERF), Mr. Rosenberg has been responsible for overseeing the investigation into the identification, and remediation of white phosphorous, and restoration of the ERF, the site of one of the largest waterfowl die-offs in Alaska from chemical pollutants.

Mr. Rosenberg has been responsible for ecological assessment, design, construction, and post—project monitoring of the first large scale experimental waterfowl habitat enhancement projects in Alaska and coordinated ADFG review of fish and wildlife impact analysis and mitigation planning for the Susitna Hydroelectric Project.

Mr. Rosenberg received a Bachelor of Science degree in Wildlife Management from Humboldt State University, Arcata, CA in 1979. Mr. Rosenberg was ADFG Wildlife Biologist of the Year in 1991, and Alaska Outdoor Council Waterfowl Conservationist of the Year in 1993.

Thomas C. Rothe, Project Supervisor

Tom Rothe earned a Bachelor of Science degree in Population Dynamics from the University of Wisconsin (1973), including background in environmental impact analysis, environmental law and public policy, and natural resource economics. He received a Master of Science degree in Animal Ecology from Iowa State University (1977) after research work on wetland ecology and behavioral biology of prairie ducks.

Mr. Rothe conducted wetland and waterbird studies in relation to petroleum development on Alaska's North Slope 1976-83 for the U.S. Fish and Wildlife Service.

During 1980-83 he supervised the Office of Special Studies in a program of baseline, pre-development, and mitigation studies for petroleum, mining, and wetland impact activities in northern, southcentral and southeastern Alaska. This work included studies of sea duck food habits and potential contamination from oil in Port Valdez and from metals near the Quartz Hill molybdenum mine near Ketchikan. In these capacities, Mr. Rothe has had extensive experience with the petroleum industry and their consultants (TAPS, Prudhoe/Kuparuk, NPR-A, ANGTS), interagency coordination, management of major field studies, and public involvement processes on natural resource issues.

Since 1983, he has been Waterfowl Coordinator for the Alaska Department of Fish and Game, responsible for a wide variety of waterfowl and habitat management programs. He currently serves as the Alaska member of the Pacific Flyway Council's Study Committee and the Council's technical representative to the international Arctic Goose Joint Venture. Mr. Rothe has been involved with flywaywide and international population management issues for over 10 years and has accumulated broad knowledge of waterfowl biology and ecology.

K. BUDGET

	ADF&G	TOTAL
Personnel	11.4	11.4
Travel	1.8	1.8
Contractual	1.5	1.5
Commodities	2.8	2.8
Equipment	1.0	1.0
Capital Outlay	0.0	0.0
Subtotal	18.5	18.5
General Administration	1.8	1.8
Project Total	20.3	20.3

EXXON VALD[illegible] TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Experimental Harlequin Duck Breeding Survey - This project is an experimental survey of harlequin ducks in Western PWS during the breeding season. Several methods will be tested during boat surveys to record sex and age classification data. Classification techniques will be compared and a reliable method will be chosen for application to future monitoring of breeding population structure. Products will include a comprehensive breeding season survey design.

Budget Category:	1993 Project No. 93033 Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$11.4	$11.4	$108.5	
Travel	$0.0	$0.0	$1.9	$1.9	$6.5	
Contractual	$0.0	$0.0	$1.5	$1.5	$10.0	
Commodities	$0.0	$0.0	$2.8	$2.8	$17.0	
Equipment	$0.0	$0.0	$1.0	$1.0	$3.5	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$18.6	$18.6	$145.5	
General Administration	$0.0	$0.0	$1.8	$1.8	$17.0	
Project Total	$0.0	$0.0	$20.4	$20.4	$162.5	
Full-time Equivalents (FTE)	1.6	0.0	0.2	0.2	2.0	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Wildlife Biologist III			0.5	$3.0
Wildlife Biologist II			1.5	$8.4
Program Manager				
Personnel Total	0.0	$0.0	2.0	$11.4

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

07/14/93

1994

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Project Number: 94427
Project Title: Experimental Harlequin Duck Breeding Survey
Agency: AK Dept. of Fish & Game

FORM 2A
PROJECT
DETAIL

EXXON VALD[illegible] TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Two round trips Portage/Whittier @ $192/trip		$0.4
Two round trips Portage/Whittier @ $126/trip		$0.3
Four round trips Portage/Whittier @ $16/trip		$0.1
Per diem for Whittier trips 10 days @ $110/day		$1.1
Travel Total	$0.0	$1.9
Contractual:		
Air charter - 5.5 hours in a Beaver @ $275/hour		$1.5
Contractual Total	$0.0	$1.5

Project Number: 94427
Project Title: Experimental Harlequin Duck Breeding Survey
Agency: AK Dept. of Fish & Game

FORM 2B
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Commodities:		
Food and supplies for field camps		$0.6
Fuel for boat (1 boat x 60 gallons/day x $1.50/gallon x 15days)		$1.4
Film/video supplies		$0.5
Parts for boat repairs		$0.3
Commodities Total	$0.0	$2.8
Equipment:		
Photo/video accessories		$1.0
Equipment Total	$0.0	$1.0

Project Number: 94427
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FORM 2B
PROJECT
DETAIL

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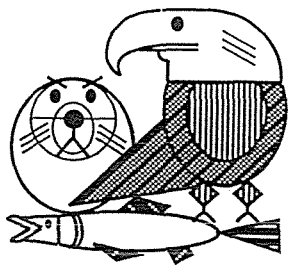


MEMORANDUM

TO: Trustee Council Members

FROM: James R. Ayers
Executive Director

DATE: April 7, 1994

RE: Small parcel protection process

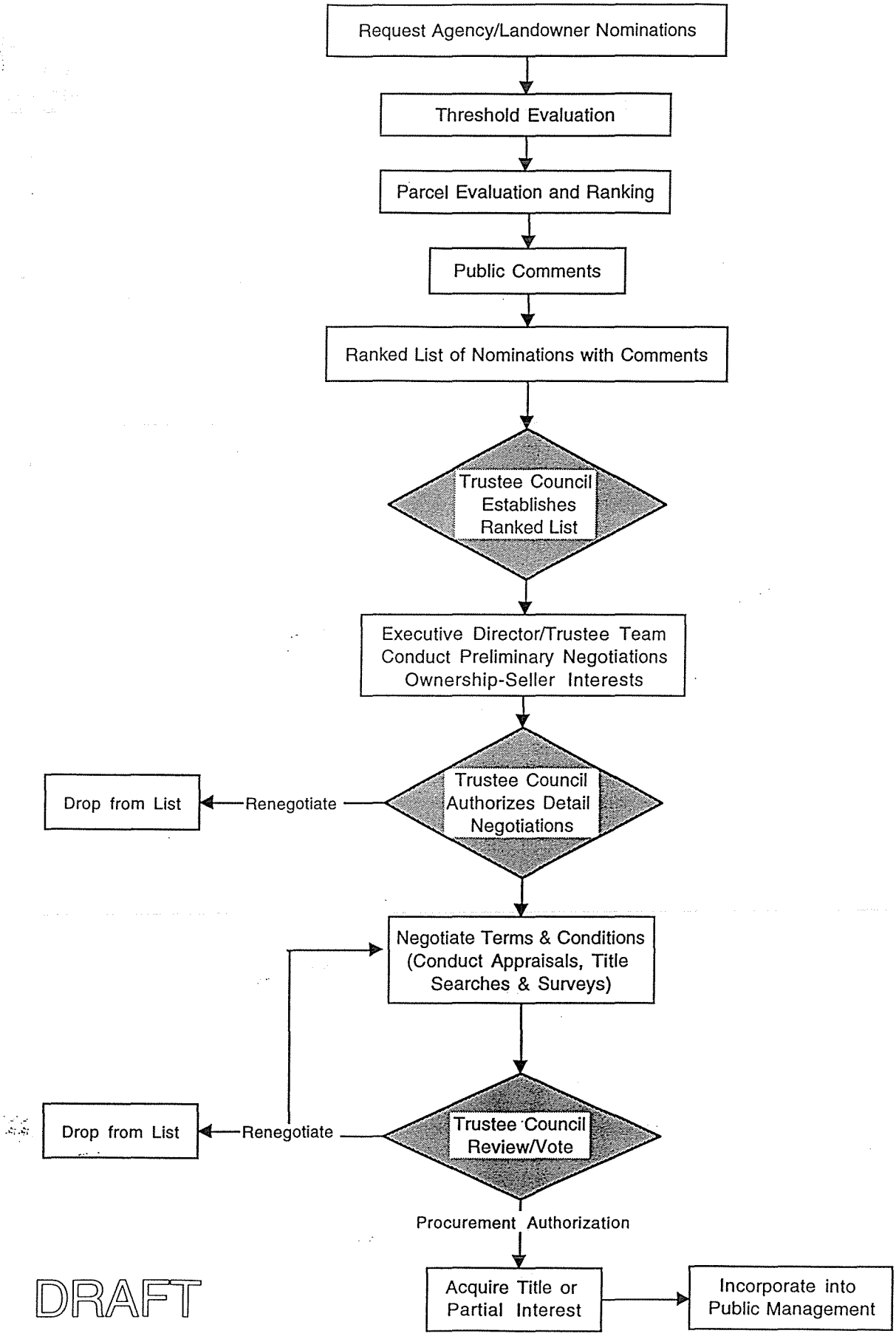
On January 31, 1994 the Trustee Council adopted a resolution in conjunction with Projects 94110 and 94126 for Habitat Protection and Acquisition. Number 7 of that resolution says that

> Small parcel negotiations will proceed once an evaluation and ranking of small parcels has been completed and approved by the Trustee Council.

Staff have been working on development of a small parcel protection process, as well as a timeline for the activities involved in that process. Attached you will find a graphic description of the process that has been recommended by agency staff. The process will begin with a joint, simultaneous agency/landowner request for nominations. This request will include information to assist the public in developing its nominations and will be coordinated with the Trustee Council public solicitation for FY95 Work Plan projects. Once the nomination process is closed, agency and Trustee staff will review, evaluate, and rank parcels according to established criteria. A ranked list of parcels would be distributed for public comment, with a final list to be submitted to the Trustee Council.

The threshold and evaluation criteria are close to completion, although there still remain some minor revisions. The expected budget and timeline for completion of the small parcel process depend in large part upon the number of parcels that are eventually nominated, the scope of the evaluation process, and the number of other work duties assigned to the staff. It is estimated that this process could be completed in early 1995, and possibly before.

MALL PARCEL PROTECTION PROCI



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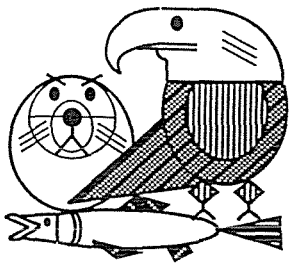

AGENDA
EXXON VALDEZ OIL SPILL SETTLEMENT
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CONTINUATION OF JANUARY 31, 1994 MEETING
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U.S. Forest Service Conference Room ~~445C~~ 541A, Juneau

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4. New Business

- * Proposed Project 94428 - Subsistence Restoration Planning
- * Proposed Project 94427 - Harlequin Duck Boat Surveys & Methodology Testing

Adjourn

* Indicates action items.

Cash Flow Statement Exxon Valdez Oil Spill Settlement Monies from Exxon
As of February 28, 1994

Beginning Balance of Settlement	900,000,000
Receipts:	
Interest Earned on Exxon Escrow Account	831,233
Net Interest Earned on Joint Trust Fund	3,803,120
Interest Earned on United States and State of Alaska Accounts	497,531
Total Interest	5,131,884
Total Receipts	5,131,884
Disbursements:	
Reimbursements to United States and State of Alaska	139,111,287
Exxon clean up cost deduction	39,913,688
Joint Trust Fund deposits	161,806,258
Total Disbursements	340,831,233
Ending Balance	564,300,651

Footnote: April 1994 court request to be submitted in the amount of $13,618,982.

Cash Flow Statement Exxon Valdez Oil Spill Settlement United States and State of Alaska Joint Trust Fund
As of February 28, 1994

Receipts:

Exxon payments		
Deposit December 1991	36,837,111	
Deposit December 1992	56,586,312	
Deposit September 1993	68,382,835	
Total Deposits	161,806,258	161,806,258
Interest Earned	4,063,544	
Total Interest	4,063,544	4,063,544
Total Receipts		165,869,802

Disbursements:

Court requests		
Withdrawal June 1992	12,879,700	
Withdrawal December 1992	6,567,254	
Withdrawal June 1993	21,067,740	
Withdrawal November 1993	29,950,000	
Withdrawal November 1993	4,743,925	
Total Requests	75,208,619	75,208,619
District Court Fees	401,473	401,473
Total Disbursements		75,610,092
Balance in Joint Trust Fund		90,259,710

Footnote: April 1994 court request to be submitted in the amount of $13,618,982.

Draft - 4/07/94

Organization Structure
Monitoring/Research Science Planning and Management
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The Trustee Council has identified the need for an explicit organizational structure for science planning and management. Science needs to address a series of questions for the restoration process: Are the injured resources recovering? (Monitoring). If not, why? (research on toxicological linkages, ecosystem processes, other anthropogenic impacts). How can recovery be achieved or accelerated? (general restoration). This organizational structure must address the public and scientists' concerns that the Council is directing its efforts at the priority restoration issues; that the work is technically appropriate and feasible; and that programs are efficient and effective, with appropriate coordination and integration. The Council has also recognized the need for an adaptive management approach to the process, with on-going review and revision utilizing the results of monitoring and research efforts to guide restoration activities.

The attached draft organization diagram (Figure 1) was developed at the Implementation Management Structure work sessions held by the Executive Director on January 13 & 14 and March 21 & 23 to address these needs and concerns. This management structure works from the base of injured resources to develop an integrated, ecosystem approach to accomplishing the goals of healthy ecosystem components, and thus the Mission "to restore the environment injured by the *Exxon Valdez* oil spill to a healthy, productive, world-renowned ecosystem..." The court settlement requires that restoration funds must be used "... for the purpose of restoring, replacing, enhancing, or acquiring the equivalent of *natural resources* injured as a result of the Oil Spill and the reduced or lost *services* provided by such resources..." Thus, general restoration and monitoring/research activities must be linked to the injured resources. However, we have recognized that a single-species approach to restoration is not adequate. The first policy stated in the Draft Restoration Plan is that the restoration program will take an **ecosystem approach**. Restoration of the injured resources will require attention to ecosystem processes that may be limiting recovery, as well as monitoring/ research and active restoration that addresses the specific needs of particular injured resources.

The structure proposed to address these concerns and provide a process to pose and answer the appropriate questions includes Interdisciplinary Work Groups, a Coordinating Committee for the Work Groups, and a Science Review Board (SRB). The responsibilities and composition of the Interdisciplinary Work Groups Coordinating Committee are outlined below. An Annual Workshop and an annual cycle of review and revision provide the feedback loop for adaptive management. The Annual Workshop provides the opportunity for informing the scientific community, the public, and the Trustee Council about the results from restoration activities. This information can then be used to refine on-going projects and revise strategies and research approaches for future work. A schematic of the annual cycle is attached (Figure 2).

Draft - 4/07/94

I. Interdisciplinary Work Groups: Structured around groups of injured resources, including fish, birds, mammals, nearshore organisms and sediments, and archeology. This is not a restatement of the single-species paradigm, but a basis to build an ecosystem approach from the need to restore injured resources.

1.) Responsibilities

A. Identify strategies, research approaches, and testable hypotheses for monitoring, research, and general restoration.

a. Emphasis on integrated, interdisciplinary approaches. SEA plan as an example.

b. Needed for guidance of FY-95 proposals and beyond.

B. Annual review of resource status and strategies for achieving restoration objectives.

C. Recommend priorities for research and restoration activities needed to achieve restoration objectives.

D. Ensure communication, cooperation, and integration

a. Within Work Group.

b. Determine representative for Coordinating Committee for communication with other Work Groups.

2.) Composition

A. Scientists from resource disciplines, including PI's with projects for monitoring and restoration of the injured resources.

B. Scientists from other disciplines (e.g., oceanography, toxicology, ecosystem modeling).

C. Public participation. Meetings are open to the public and interested public are a part of the planning and review process. Administrative funds will be available to ensure appropriate representation.

II. Coordinating Committee

1.) Responsibilities

A. Communication, coordination, and cooperation among Work Groups to ensure an integrated effort directed at restoration of injured resources and services and a healthy ecosystem.

B. Coordination of information from Work Groups on strategies, testable hypothesis, priorities, and progress towards restoration for review by the SRB and the Executive Director.

C. Coordination of activities with Restoration Work Force to facilitate agency administration and cooperation.

D. Organizes the agenda for the Annual Workshop, in conjunction with the SRB.

2.) Composition

A. Representatives from Work Groups.
   a. One representative from each Work Group.
   b. Executive Director must confirm selection.

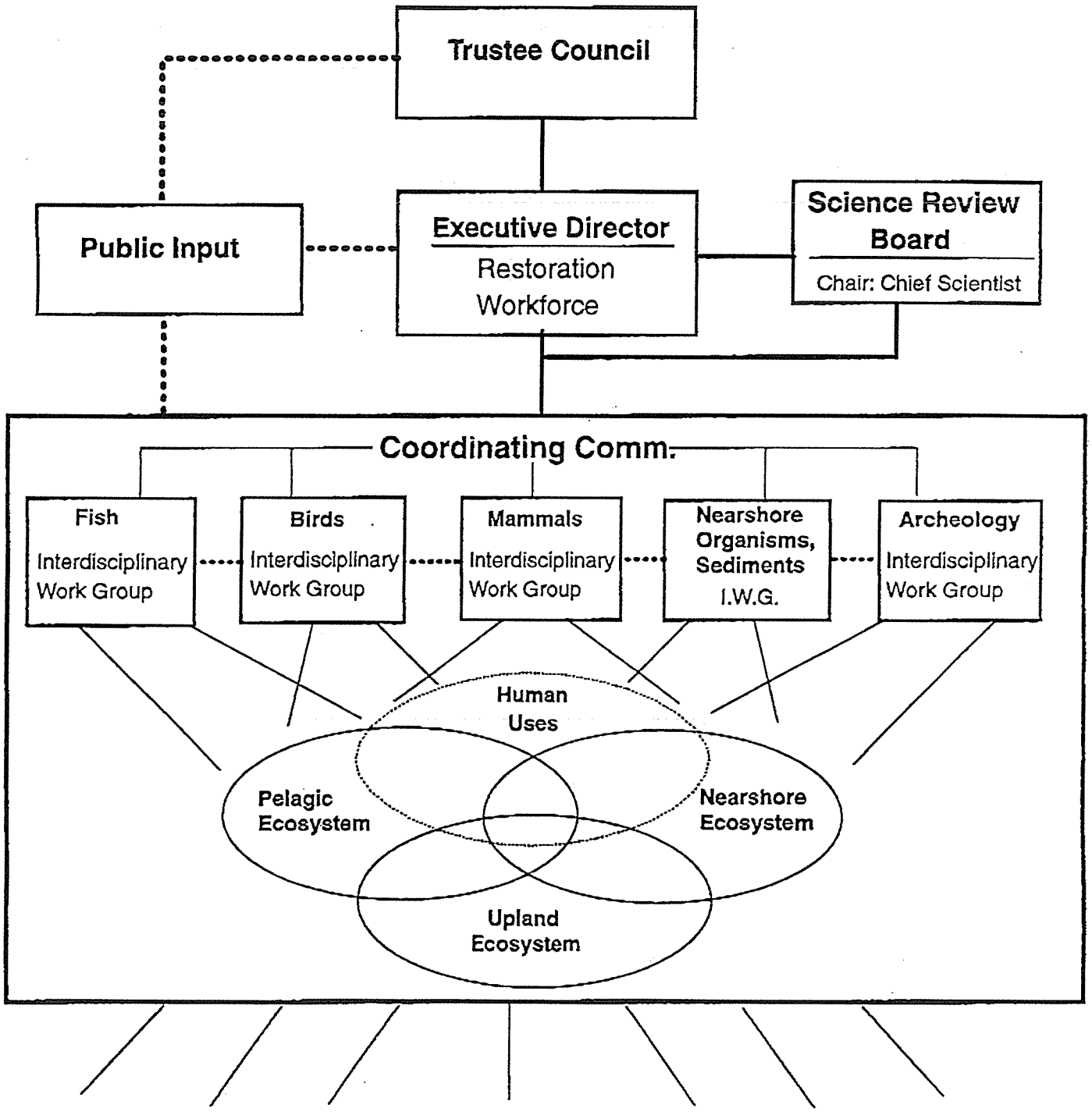
B. Three at-large members
   a. Two selected by the Executive Director from nominees chosen by Work Group representatives.
   b. One public member selected by the Executive Director from nominees chosen by the Public Advisory Group.

C. Trustee Council Chief Scientist.

D. All meetings are open to the public.

Figure 1A
Organizational Diagram Science Planning and Management

(DRAFT 4/07/94)



Monitoring; Ecosystem Research; General Restoration; Habitat Protection

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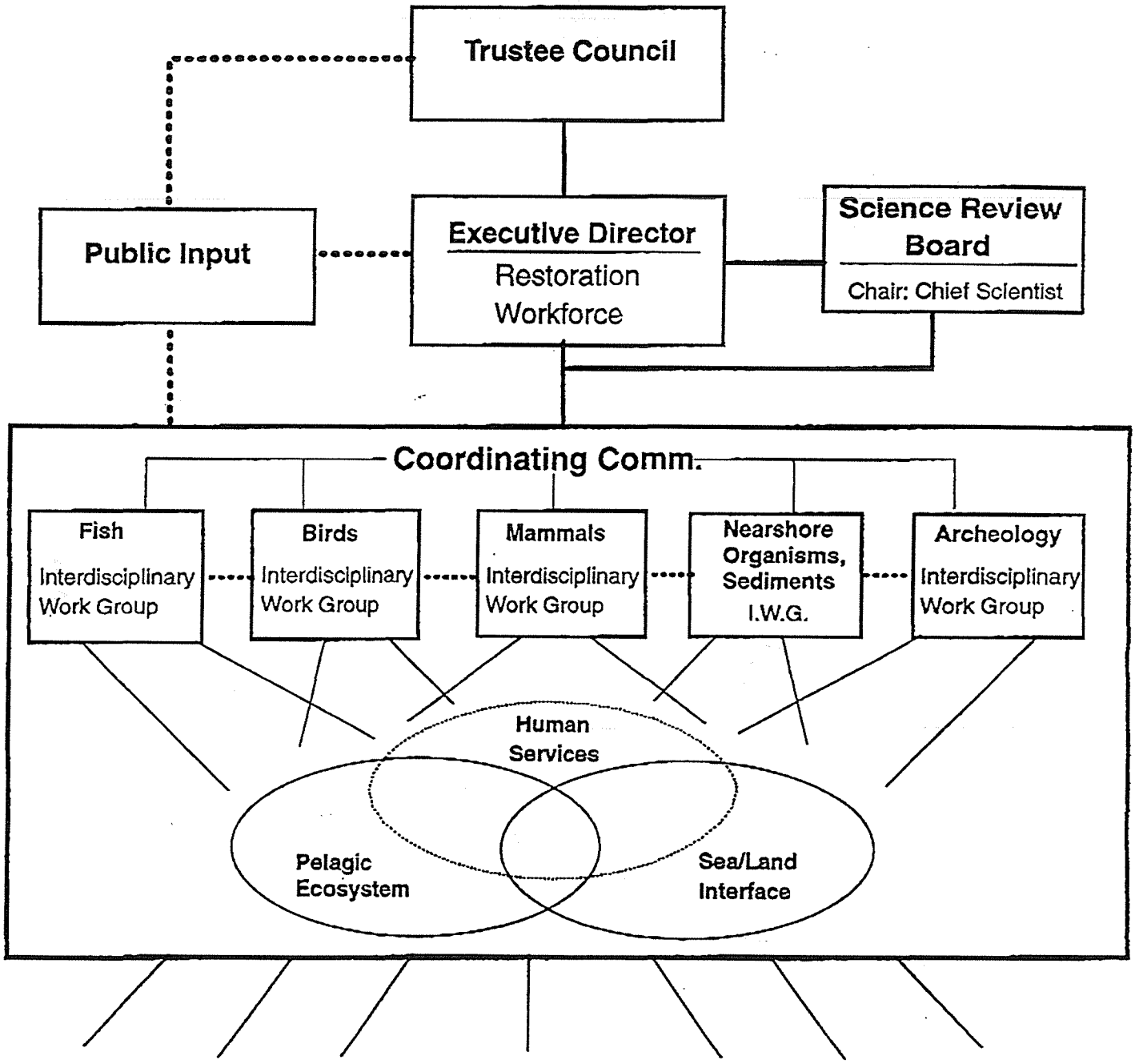
Figure 1B
Organizational Diagram Science Planning and Management
(DRAFT 4/07/94)



Monitoring; Ecosystem Research; General Restoration; Habitat Protection

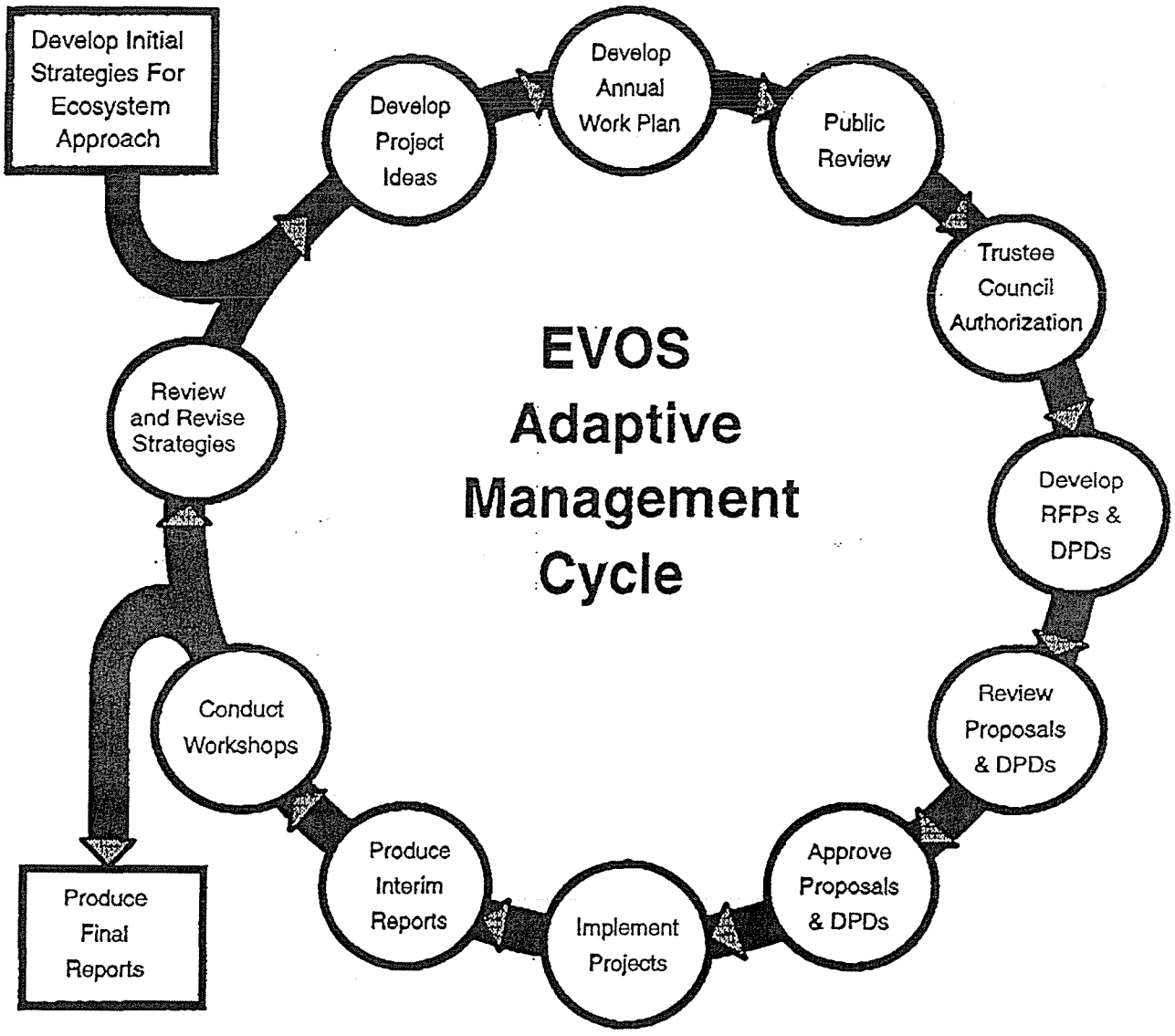


Figure 2. An annual workshop and an annual cycle of review and revision provide the feedback loop for adaptive management. The Annual Workshop provides the opportunity for informing the scientific community, the public, and the Trustee Council about the results from restoration activities. This information can then be used to refine on-going projects and revise strategies and research approaches for future work. Public input is an integral part in the development, review, and revision of the ecosystem approach. The Science Review Board (see Figure 1) provides objective, credible scientific review and guidance.

11.5.3

DRAFT

Environmental Impact Statement for the IMS Improvements

Tasks and Funding Needs for Ms Nancy Swanton:

Tasks

- Works closely with project team to ensure the environmental impact statement meets (EIS) Department of the Interior (DOI) standards and follows DOI procedures.

- Ensures close and frequent coordination with the DOI Solicitor, the Office of Environmental Policy and Compliance, and the Special Assistant to the Secretary, keeping them apprised of EIS planning and schedule, and issues requiring their advice and attention. Prepares briefing materials for these individuals as needed. Coordinates necessary DOI reviews of the draft EIS and final EIS prior to publication ("internal reviews").

- As needed, prepares briefing materials for the Trustee Council to keep them informed of EIS progress and possible problems. Ensures continuing verbal and written status reports for DOI Trustee Council staff.

- Ensures comprehensive coordination with parties interested in the EIS, particularly Federal and State agencies.

- Ensures adequate public involvement in the EIS process. Actively participates in the scoping process for the EIS, and ensures appropriate evaluation of issues and alternatives to be included in the EIS as a result of this process.

- Reviews various written materials relating to the EIS (e.g., scoping materials, newsletters about the EIS process and project, EIS sections).

Funding Needs

Swanton*

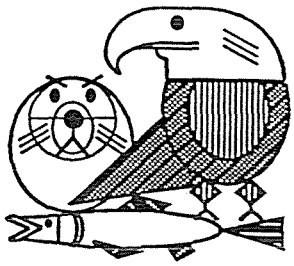
o Salary (including benefits)	$84,000
o Travel Costs (assumes travel to Washington, D.C., Seward, Alaska)	9,000
o Administrative Support (includes secretarial support and administrative overhead)	10,000

DOI

o Travel (for DOI Solicitor and staff from the Office of Environmental Policy and Compliance to review the draft and final EIS prior to publication ("internal review")	$ 6,000
TOTAL	$89,000

11.5.26

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: James R. Ayers, Executive Director

FROM: Eric F. Myers, Restoration Project Coordinator

DATE: April 7, 1994

SUBJ: NEPA Compliance for FY 94 Work Plan Projects

Attached you will find a NEPA compliance status report for projects approved as part of the FY 94 Work Plan.

If you have questions regarding a specific project's NEPA compliance status, please let me know as this status report is constantly in need of revision as NEPA compliance efforts progress.

enclosure

DRAFT

DRAFT - 4/1/94

FY 94 Work Plan Projects

NEPA Compliance Status

NOTE: This "NEPA Compliance Status" tracking form only identifies those FY 94 Work Plan projects that are expected to require, in part or whole, an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). All other FY 94 projects are expected to qualify for a Categorical Exclusion (CE).

Project #/Name	Lead Agency	NEPA Lead	NEPA Status	Additional Notes
#94043 Cutthroat/Dolly Restoration (agency contact: Ray Thompson/USFS)				
— Eshamy River (W. PWS)	USFS	USFS	EA in progress	
— Gumboot Crk (W. PWS)	USFS	USFS	EA in progress	
— Stream No. 508 (W. PWS)	USFS	USFS	EA in progress	
— Stream No. 509 (W. PWS)	USFS	USFS	EA in progress	
— Otter Crk/Lake (Knight I.)	USFS	USFS	EA in progress	EA for Otter Crk Cutthroat/Dolly (043) and Salmon (139) combined
— Sockeye Crk/Lake (Knight I.)	USFS	USFS	EA in progress	
— Miners Crk/Lake (N. PWS)	USFS	USFS	EA in progress	
— Shrode Crk/Lake (W. PWS)	USFS	USFS	EA in progress	
— Rocky Crk/Bay (Montague)	USFS	USFS	EA in progress	
#94139 Salmon Instream Restoration (agency contact: Joe Sullivan/ADF&G, Ray Thompson/USFS)				
— Lowe River (6.5 Mile)	ADF&G	USFS	EA in draft	
— Montague Island chum	USFS	USFS	EA in progress	
— Otter Creek bypass	USFS	USFS	EA in progress	EA for Otter Crk Cutthroat/Dolly (043) and Salmon (139) combined
— Shrode Creek bypass	USFS	USFS	eligible for CE	
— Port Dick spawn channel	ADF&G	USFS	*project withdrawn*	*poor cost-benefit ratio*
— Waterfall Creek bypass	ADF&G	USFS	eligible for CE	(Note: need copy of CE on file.)
#94090 Mussel Bed Restoration/Monitoring (agency contact: Mark Brodersen/ADEC)				
	ADEC	NOAA	EA needed	EA for Project #94090 and Project #94266 have been combined
#94199 Seward IMS Improvements (agency contact: Kim Sundberg/ADF&G, Alex Swiderski/DOLaw)				
	ADF&G	MMS	EIS in progress	
#94266 Shoreline Assessment/Oil Removal (agency contact: Mark Brodersen/ADEC)				
	ADEC	NOAA	EA in progress	EA for Project #94090 and Project #94266 have been combined

DRAFT

Project #/Name	Lead Agency	NEPA Lead	NEPA Status	Additional Notes
#94272 Chenega Chinook Release (agency contact: Joe Sullivan/ADF&G)	ADF&G	NOAA	*EA complete*	*Copy of EA and NOAA FONSI on file.*
#94320-K, L PWS System Investigation - Hatchery Portions (contact: Joe Sullivan,/ADF&G Alex Swiderski/DOLaw)	ADF&G	NOAA	*EA complete*	*Copy of EA and NOAA FONSI on file.*
#92417 Waste Oil Disposal Facilities (contact: Mark Brodersen)	ADEC	USFS	EA in progress	

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: Trustee Council Members

FROM: James R. Ayers
Executive Director

DATE: April 7, 1994

RE: Recommendation on Proposed Increment for Project 94191

Proj #94191/Oil Related Egg & Alevin Mortality (ADF&G) Cost: $97.7

Purpose: Supplemental funding for project 94191 is needed to replicate the results of studies from last year that found heritable damage in pink salmon that differs systematically between oiled and unoiled streams. This was an unanticipated finding. The study needs to be repeated this year in order to further strengthen the results.

Description: In this study pink salmon gametes will be collected from adult pink salmon returning to oil contaminated and unimpacted streams in western Prince William Sound (PWS). Intra-stream crosses will be made and the resulting embryos incubated under identical controlled conditions to evaluate the effect of physical stream characteristics. This project also includes a contract ($15.0) with Washington State University for a pilot study to examine the usefulness of androgenesis for evaluating genetic damage in pink salmon.

NEPA: This project is expected to receive a Categorical Exclusion (CE) under the National Environmental Policy Act.

Legal concerns: None.

Long-term implications: Verifying genetic damage from oil exposure would imply a continuing EVOS impact on the wild pink salmon of Prince William Sound. This has important implications for restoration, as historic escapements may not be sufficient to maintain genetically damaged populations. This project will probably need to be continued at least through FY96.

Chief Scientist recommendation: Strongly recommended.

Executive Director recommendation: I strongly recommend $97.7 in supplemental funding be approved to allow this addition to Project 94191 to go forward.

APPLIED
Marine
SCIENCES

April 1, 1994

TO: James Ayers
Executive Director

FROM: Robert B. Spies
Chief Scientist

CC: Molly McCammon
Byron Morris
Jeep Rice
Jerome Montague
Jim Seeb
Sam Scharr

RE: Review of Project 94191, Oiled Related Egg and Alevin Mortalities

Purpose of Study

Past investigations of damage to pink salmon as a result of the oil spill have indicated that (1) eggs and larvae in oiled streams had lower survival than those from unoiled streams, (2) that this difference has persisted despite a vast reduction in the concentrations of hydrocarbons in the oiled streams, and (3) this difference is apparently the result of an inherited genetic difference between fish returning to oiled and unoiled streams. This study will continue to monitor recovery of pink salmon embryos and fry in the field, verify the inheritable differences documented last year and use cytogenetic techniques to look for the presence of genetic aberrations, and conduct a controlled laboratory experiment to determine if genetic damage can be induced by exposing fertilized pink salmon eggs to crude oil.

Relation to Restoration Management Objectives

This project will document the recovery of pink salmon populations injured by the spill, which is an important trend to be monitoring to assess the progress of restoration. The project will also verify a surprising discovery that the inferior survival of populations in oiled streams is inheritable, and conduct laboratory experiments to determine if this damage is due to oil exposure. Verifying genetic damage from oil exposure would imply a continuing impact on the wild pink salmon of Prince William Sound. This has important implications for restoration, as historic escapements may not be sufficient to maintain genetically damaged populations.

APPLIED
marine
SCIENCES

April 6, 1994

TO: James Ayers
Executive Director

FROM: Robert B. Spies
Chief Scientist

CC: Molly McCammon
Byron Morris
Jeep Rice
Jerome Montague
Jim Seeb
Sam Scharr

RE: Support of a supplemental allocation for Project 94191, Oiled Related Egg and Alevin Mortalities

Purpose of Study

This memo is to confirm my support of supplemental funding of Project 94191 for $97.7K. I supported this project in my longer memo to you. Last year's results indicate that there is a heritable factor for egg morality that differs systematically between oiled and unoiled streams. This was an unanticipated result; I expected to find that the differences in egg mortality were due to environmental factors such as oil, or other factors that differ from stream to stream. Since the finding was so startling and also points to a lasting oil effect we need to repeat this study this year to make it more creditable. The supplemental funding is to repeat this part of the study. I wholeheartedly support this supplemental allocation.

The reviewer has suggested three polymerase chain reaction (PCR) based techniques to measure genetic damage, which should provide orders-of-magnitude more sensitivity than flow cytometry. These techniques, although not commonly used in aquatic toxicology, are well-established in biomedical research, and can be used on archived tissue as well as fresh samples. These techniques include analyses of mitochondrial DNA, use of gene probes, and single stranded conformational polymorphism analysis. Discussion with the principal investigators indicates that they are investigating the use of PCR-based techniques, and recognize the value of these techniques for this study. They will begin to phase these techniques into the project, and have requested a meeting for peer review of the study occur in mid-October.

Finally, there remains a question regarding the whether the differences in survival that have been measured in the field, which are the basis of the injury, existed prior to the oil spill. There may be some geographic bias in the location of oiled and unoiled streams that may introduce differences in these two groups besides oiling in 1989. Or, there is a possibility of straying of hatchery fish unequally into the oiled and unoiled wild populations. These questions introduce potential confounding factors into the interpretation of research results.

Recommendation

I recommend that Project 94191 be approved with the following changes:

1. MFO analyses should be eliminated, as they do not contribute information that will be valuable for restoration. Histopathology measurements should also be eliminated unless the principal investigators can justify their inclusion.

2. The one person-year of effort for flow cytometry should be scaled back to 2-3 person-months, with the remaining resources being put into PCR-based analyses of genetic damage. The PCR-based analyses of mitochondrial DNA, a technique already on-line in fisheries genotoxicology, should be considered as the first priority for PCR analyses.

3. A program review involving the principal investigators, key peer reviewers, and myself should occur in early October. The results of the review should be considered in decisions regarding relevant portions of the 1995 workplan.

I would request a written response from the principal investigators regarding their implementation of the above recommendations. In addition, the principal investigators should consider the existence of factors that confound the interpretation of the observed changes oil-related, and suggest experiments that might eliminate these questions. I am happy to assist them in obtaining additional advice from key peer reviewers as appropriate.

Analysis

Component A of the project, field monitoring of egg and fry survival, is the continuation of past recovery monitoring. This component received strong support from reviewers, and is important for maintaining our up-to-date knowledge of the recovery of damaged salmon populations.

In component B of the study pink salmon gametes will be collected from fish in oiled and unoiled streams. Fertilization and rearing will take place in a controlled laboratory environment to verify last year's startling finding that decreased egg survival in oiled streams exists even when the eggs are not exposed to the contaminated stream environment. This finding underlies the claims of inheritable genetic damage to the pink salmon populations in oiled streams, and it is important that this study be conducted.

Component C is the continuing laboratory study to verify injury to pink salmon eggs and pre-emergent fry exposed to crude oil during incubation. This component includes several experimental endpoints, and review of the proposal raised important questions about some of these measurements. The rationale for this study component is sound, as verifying that exposure to crude oil can produce the effects documented last year (and, it is assumed, in component B) will provide robust proof of the genetic difference between the fish from oiled and unoiled streams. Randomly obtained fertilized eggs will be exposed to different doses of crude oil, and samples taken during development for genetic, mixed-function oxidase (MFO), histopathological, and hydrocarbon analyses. Fry from these incubations will be reared to maturity, and their gametes incubated without exposure to oil. Consequently, decreased survival will be due to inherited characteristics from oil exposure only, not a function of environmental factors

There are questions about the measurements that are proposed to quantify injury in this experiment. First, the measurement of MFO does not seem warranted. This will only document exposure to crude oil, which seems unnecessary in a dosing study, especially given the fact that hydrocarbon concentration in the various stages of development will also be measured. The principal investigators should also provide justification for the histopathological measurements.

Second, the measurement of genetic damage, flow cytometry, does not seem appropriate for the experiment. Flow cytometry measures large changes in DNA, and is not well-suited to determining the subtle changes expected from exposure to crude oil. Our expert reviewer suggests that if genetic damage of the level that can be measured by flow cytometry occurred in 1989 in fish in oiled streams, it is unlikely that these fish would survive to reproductive age in order to pass this damage on to the next generation.

EXXON VALDEZ TRUSTEE COUNCIL
FY 94 DETAILED PROJECT DESCRIPTION

Project title:	Oil Related Egg and Alevin Mortalities
Project ID number:	94191 - Supplemental
Project type:	Monitoring and Research
Name of project leaders:	Samuel Sharr, Alaska Dept. Fish and Game Jim Seeb, Alaska Dept. Fish and Game
Lead agency:	Alaska Department of Fish and Game
Cooperating agencies: **Other Cooperating Parties:**	National Marine Fisheries Service Washington State University
Cost of project/FY 94: **Cost of project/FY 95:** **Cost of Project/FY 96 and beyond:**	$ 97.7 $128.4 $130.4
Project Start-up/Completion Dates:	October 1, 1994 to September 30, 1996
Geographic area of project:	Prince William Sound

Project leaders:

Sam Sharr (ADF&G) By Brian Bue — 3/18/94 Date

Jim Seeb (ADF&G) By Brian Bue — 3/18/94 Date

Agency project managers:

Joe Sullivan (ADF&G) — 3/18/94 Date

Finally, I would like to note that this is one of the better scientific studies supported by the Trustees. The investigators are quite competent, have found something of potentially great importance and are doing a very good job of following up on their findings.

B. INTRODUCTION

This project was included in the 1993 Work Plan under project 93003. At the time proposals were submitted for the 1994 work plan, we elected to discontinue the work proposed here. This decision was based on our perception that oil damages had diminished to an undetectable level; consequently, we believed this work had very little probability of providing additional information on damages. When preliminary results of the 1993 field season were obtained in December of 1993, we found that this project provided strong evidence for the existence of genetic damage. This project will incorporate this work back into the 1994 work plan.

Summary

Elevated embryo mortalities were detected in populations of pink salmon *Oncorhyncus gorbuscha* inhabiting oiled streams following the March 1989 *Exxon Valdez* oil spill (EVOS). These increased rates of mortality have persisted annually through the 1993 field season, three generations after the oil spill, suggesting that genetic damage may have occurred as a result of exposure to oil during early developmental life-stages (Sharr et al. 1994a, 1994b, and in prep; and Bue et al. in press). The consequences of this putative genetic damage include physiological dysfunction and functional sterilization of affected individuals, reducing the reproductive capacity of wild pink salmon populations.

These effects would likely persist in populations of pink salmon for a longer duration than would be observed in other vertebrates because of the tetraploid nature of the salmonid genome. Salmonids evolved through a gene duplication event 25 million years ago (Allendorf and Thorgaard 1984). Pink salmon basically possess a duplicate set of chromosomes (tetraploid instead of diploid); although, some of the duplicates have been lost through subsequent evolutionary processes. However, the extra genes found for many loci would mask deleterious recessive alleles. The effects of these deleterious mutations would be uncovered in the homozygotes formed through the mating of heterozygotes in subsequent generations.

This study will continue to monitor the recovery of pink salmon embryos and provide an assessment of the role that physical stream characteristics played in the damages observed by Sharr et al. (1994a and 1994b) and Bue et al. (in press) in the field. This will be accomplished by collecting pink salmon gametes from oil contaminated and uncontaminated streams in southwestern Prince William Sound (PWS) and incubating them under identical controlled conditions.

History

Pink salmon eggs and fry incubating in the oiled intertidal spawning areas in PrinceWilliam Sound in 1989, 1990, 1991, and 1992 appear to have been adversely affected by EVOS. Oil was deposited in layers of varying thickness in the intertidal portions of streams utilized by spawning pink salmon during the spring of 1989. Pink salmon eggs deposited in 1988 (1988 brood year) emerged as fry through the oiled spawning gravels during the spring of 1989

and began feeding on oiled plankton. These fish showed decreased growth due to oiling (Willette and Carpenter 1993). Although gross oil levels decreased during the summer of 1989, contamination in the intertidal zone was still evident. The pink salmon eggs deposited during the late summer of 1989 (the 1989 brood year) were exposed to intra-gravel contamination from late August 1989 through mid-May 1990. Sharr et al. (1994a) and Bue et al. (in press) detected elevated pink salmon egg mortalities in the intertidal zones of oiled streams while no difference between oiled and non-oiled streams was detected above mean high tide. Elevated egg mortalities in oiled streams were again detected in the 1990 brood year, but only in the highest intertidal spawning zone (Sharr et al. 1994a, and Bue et al. in press). Visual observations indicated that the majority of the remaining oil was deposited in this zone. Spawning areas lower in the intertidal zone seemed to be recovering as egg mortalities in these areas were not statistically different from non-oil impacted streams.

Surprisingly, Sharr et al. (1994a) and Bue et al. (in press), found increased egg mortalities in oiled streams during the fall of 1991 survey. Furthermore, significant differences in egg mortality occurred at all tidal zones, including the area above mean high tide. Clearly, the elevated egg mortalities in the oiled streams were not the direct effect from recent oiling. The 1991 adult returns were the progeny of the 1989 brood year, the group with the highest exposure to intra-gravel oil (the 1989-90 incubation period). We hypothesize that the elevated egg mortalities in 1991 may be the result of genetic damage acquired during development after fertilization in 1989. Elevated egg mortalities at all tidal zones in oiled streams were again detected during the fall of 1992 survey (Sharr et al. 1994b and Bue et al in press). Hatchery incubation experiments using gametes from fish returning to oiled and control streams in 1993 indicate that mortality differences observed during past studies cannot be attributed to sampling design (Sharr et al. in prep).

The hypothesis of genetic damage is consistent with previous laboratory experiments on the effects of crude oil on early life stages of fish and with other NRDA field observations. Long term intra-gravel oil exposures (7-8 months) to freshly fertilized eggs provide embryos sufficient time to accumulate polynuclear aromatic hydrocarbons (PAH's) from very low aqueous concentrations of crude oil. PAH's are abundant in crude oil and are potent clastogens (i.e. capable of breaking chromosomes). Mironov (1969) observed reduced survival of fish eggs and larvae exposed to very low aqueous doses (1 ul oil/l seawater) of oil. Moles et al. (1987) confirmed that pink salmon eggs take up PAH's and demonstrated that the uptake was much greater in an intertidal environment than in strictly freshwater conditions. Biggs et al. (1991) found greater numbers of chromosome aberrations in larval herring which incubated in oiled areas than in non-oiled areas. It is logical that the same type of damage may have occurred in pink salmon, and this damage could have affected the reproductive fitness of a significant proportion of exposed individuals.

Information gained from this study will provide resource managers insight to the magnitude and persistence of damages sustained by wild pink salmon due to EVOS. Efforts to restore damaged pink salmon populations depend upon the fishery manager's abilities to identify sources of reduced survival and to monitor their persistence. Information on the potential of long term oil exposures to cause genetic damage is needed so spawning escapement goals can be reevaluated and adjusted if necessary. In addition, verification of the genetic

hypothesis would provide the first evidence that reproductive capacity of fish exposed to chronic or acute sources of oil pollution would be compromised.

C. PROJECT DESCRIPTION

This project is an addition to project 94191 - *Oil Related Egg and Alevin Mortalities*. In this study we will collect pink salmon gametes from adult pink salmon returning to oil contaminated and unimpacted streams in western Prince William Sound (PWS). Intra-stream crosses will be made and the resulting embryos incubated under identical controlled conditions to evaluate the effect of physical stream characteristics.

This project will also administer a contract (15k) for a pilot study to examine the usefulness of androgenesis for evaluating genetic damage in pink salmon. Androgenetic individuals are obtained by enucleating eggs with gamma radiation before fertilization. These eggs are then fertilized with normal sperm. If no other treatments are applied, the resulting progeny will be haploid, containing only a single set of chromosomes from the male parent and none from the female. Mortality rates for these haploids are directly related to the presence and number of deleterious mutations (Armstrong and Fletcher, 1983). Advantages of this technique over most classical techniques include rapid early detection, ability to detect the effects of point mutations, and the ability to detect the presence of deleterious recessive alleles. The androgenesis technique is not widely used because of the requirement of a gamma radiation treatment. Ultimately, haploid androgens will be used to test for the presence of deleterious mutations in the chromosomes of oil impacted and control populations in Prince William Sound as well as oil treated and control populations from the Little Port Walter experiment (component B of Project 94191).

1. Resources and/or Associated Services:

This study will investigate pink salmon in Prince William Sound, Alaska. Pink salmon are a major predator and prey species in the PWS ecosystem and provide transport of nutrients from the marine to terrestrial ecosystem. Pink salmon also support large commercial, sport, and subsistence fisheries which are vital to the economy of the area.

2. Relation to Other Damage Assessment/Restoration Work:

The foundations for this project date back to the original NRDA F/S Study 2 (Injury to Salmon Eggs and Preemergent Fry). NRDA F/S Study 2 was equivalent to the field monitoring portion of Project 94191 (Component A of 94191) and was conducted in 1989, 1990, and 1991. The same project was continued as Restoration Study R60C in 1992. Two additional elements, a controlled oiling experiment (Component B of 94191) and the study addressed in this proposal were added to Restoration Study R60C during the summer of 1992. These additions were designed to assess the genetic damage hypotheses raised through NRDA F/S Study 2. All three components were present in the 1993 project, Restoration Study 93003.

At the time proposals were submitted for the 1994 work plan, we elected to discontinue the work being proposed here. This decision was based on our perception that oil damages had diminished to an undetectable level; consequently, we believed this work had very little probability of providing additional information on damages. When preliminary results of the 1993 field season were obtained in December of 1993, we found that this project provided strong evidence for the existence of genetic damage. It was at that time that we began to work towards putting this study back into the 1994 work plan.

Several past NRDA and present Restoration projects have been and continue to be intimately related to this project. The 1989 and 1990 NRDA F/S Study 4 demonstrated reduced growth and survival for salmon which reared in oiled areas. NRDA F/S Study 1 in 1989, 1990, and 1991 and subsequent Restoration Study R60B in 1992, investigated oil damage to adult p[illegible] salmon spawning populations and provided valuable improvements in escapement estima[illegible] procedures used by fisheries managers to monitor and protect injured wild pink salmon populations. NRDA F/S Study 3 in 1989, 1990, and 1991 and subsequent Restoration studies R60A in 1992 and 93185 in 1993 provided hatchery and wild catch contribution estimates. This information was used by fisheries managers to reduce fisheries exploitation rates on injured wild pink salmon and also provided survival estimates for groups of fish examined by NRDA Study 4. The 1989, 1990, and 1991 NRDA F/S Study 28 and a subsequent Restoration study in 1992, incorporated data from all the previous studies into life history and run reconstruction models. These models were used to extrapolate losses in adult pink salmon production from injuries observed in earlier life history stages.

3. Objectives:

1. Determine whether the increased pink salmon egg mortalities observed in oiled streams can be attributed to the physical characteristics of the study streams.

4. Methods:

1. Experimental Design

The experiment will assess the effects of the physical characteristics of the study streams upon the observed results. This will be accomplished by collecting pink salmon gametes from oiled and non-oiled streams and rearing the resulting embryos in a controlled laboratory environment.

This experiment will provide information to help determine whether the results observed in NRDA Study FS2 can be attributed solely to the physical characteristics of the study streams. In this experiment we will collect gametes from 8 oiled and 8 non-oiled streams from southwestern PWS, make intra-stream crosses, and incubate the resulting embryos in a controlled laboratory environment. Egg mortality will be compared between the oiled and uncontaminated streams. If no difference is observed in this experiment and a significant difference in egg mortality is detected between oiled and non-oiled streams during the recovery monitoring portion of this study during the fall of 1993 egg sampling, it can be stated that the physical characteristics of the study streams played a role in the results of the previous egg mortality studies.

Gamete collection and fertilization procedures will occur over a four day period to obtain data from 8 oiled and 8 non-oiled streams. Gametes from 30 male and 30 female pink salmon will be collected from 2 oiled and 2 control streams during each sampling day. The gametes will be flown to the Armin F. Koernig (AFK) hatchery where a random gamete pool will be assembled for each stream in a timely manner.

The random gamete pool will be constructed by placing approximately 30 eggs from each female (one teaspoon) into each of 30 cups. Each cup will then be fertilized by a different male. The 30 cups will be recombined into a large pail where the fertilized eggs will be mixed as they are rinsed. This method of creating a randomized gamete pool should insure that all possible crosses (30 x 30 = 900) will be present.

A minimum of nine randomly selected aliquots of approximately 500 embryos each will be collected from each intra-stream pool, placed into separate incubating vessels, and randomly placed into a common incubator (Heath Incubator).

Incubating embryos will be periodically screened for dead eggs and hatching success. Samples of sperm from each male used to build the embryo pools will be cryopreserved for future analysis if required. The experiment will be terminated prior to swimup at which time all larvae will be killed.

2. Data Analysis

The data will be analyzed as a fixed-effects generalized randomized block design:

$$Y_{ijk} = \mu + B_i + O_j + \epsilon_{ijk} \qquad (1)$$

where Y_{ijk} is egg mortality for sample day i, oil contamination level j, and stream k; μ is the model mean; B_i is sampling day a blocking variable; O_j is the level of oil contamination (oiled or not oiled); and ϵ_{ijk} is random error. The relative power of the test was estimated. The sample size was considered sufficient to detect a difference of less than 1.5 standard deviations at $\alpha = 0.05$ and 95% power (Neter et al. 1990). A test with high power is needed to protect against arriving at the conclusion that all observed damages could be attributed to the physical characteristics of the streams when in actuality significant damages due to oil were present.

The assumption of constant error terms will be tested using the F_{max}-test (Sokal and Rohlf 1969) while normality will be visually assessed using scatter plots, box plots, and normal probability plots (Chambers et al. 1983). Appropriate transformations will be used to alleviate variance and normality concerns if they are detected. All suitable comparisons will be made using Bonferroni family confidence intervals. The SAS (SAS Institute Inc. 1988) General Linear Models Procedure will be used to analyze the data.

5. **Location:**

This study will collect gametes from streams in southwestern Prince William Sound and incubate the resulting embryos at the Armin F. Koernig hatchery (Figure 1).

6. **Technical Support:**

A biometrician will ensure the study design will provide a reasonable chance of reaching a defendable conclusion.

7. **Contracts:**

We propose to have a $15,000 project *Detection of Deleterious Mutations in Pink Salmon Through Haploid Androgenesis* conducted by Dr. Gary Throgaard, Washington State University (WSU), as a sole-source contractor. WSU is uniquely suited to conduct such a project. The WSU Nuclear Radiation Center has Cobalt-60 gamma radiation source that Dr. Thorgaard is currently using to conduct deleterious-mutation studies on rainbow trout. Dr. Thorgaard's laboratory is widely recognized as one of the leading laboratories in the world in the field of androgenesis in salmonids; to our knowledge it is the only laboratory in North America capable of such study. Dr. Throgaard's proposal is attached.

D. SCHEDULES

Dates	Activity
30 Oct 1993 - 30 Jan 1994	Analysis of 1993 data and completion of first draft of 93003 report for laboratory evaluation
April 1994	Initiate Androgensis Contract
1 Aug - 15 Aug 1994	Preparation for 1994 AFK Incubation Experiment
15 Aug - 30 Aug 1994	Collect Gametes and make crosses from 16 PWS streams; begin incubation of gametes at AFK.
30 Aug - 15 Nov 1994	Monitor incubators and collect data
15 December 1994	Androgensis Contract Report Due to ADF&G
15 Nov 1994 - 30 Jan 1995	Analyze data and prepare first draft of 94191 report

E. EXISTING AGENCY PROGRAM

This project will benefit from both ADF&G's commercial fisheries management and genetics programs. Both groups provide supporting information for the successful completion of the project.

F. ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

Transport of wild gametes to the Prince William Sound Aquaculture Corporation (PWSAC) hatchery on Evans Island, PWS will require an Alaska Department of Fish and Game (ADF&G) Fish Transport Permit for each stock and a permit Alteration may be required to rear and incubate the wild eggs at the hatchery. This project is a continuation of Project 93003 which received a Categorical Exclusion (memorandum from Byron Morris, NOAA, to Ken Rice, US Forest Service, dated December 8, 1992).

G. PERFORMANCE MONITORING

Principal investigator Sharr (Fisheries Biologist III) will help design the experiment, supervise incubator setup, and coordinate and supervise field logistics. Principal investigator Seeb (Principal Geneticist) will help design and provide genetics oversight as well as administer the proposed androgensis contract. Seeb's assistant, Gary Miller (Fisheries Biologist II) will provide fish culture oversite and will supervise the technicians responsible for collecting the data. Consulting biometrician Bue (Biometrician II) will conduct the experimental design and provide statistical oversight for the project. Sharr, Seeb, and Bue will cooperate in the data analysis and writing of the project report.

The methodologies for this project have been approved by the Chief Scientist and his staff in past proposals. Past work has shown the methods to be appropriate and efficient. The principal geneticist and his staff have extensive laboratory fish culture experience and will be present at all times during the rearing experiment at AFK Hatchery.

H. COORDINATION OF INTEGRATED RESEARCH EFFORT

Data collection for this project occurs over a very compressed period of time and is very stream specific; hence, this study does not blend well logistically with most of the other pink salmon projects. However, all of the streams used for brood stock in this study are also of interest to the Pink Salmon Genetics Project (94189) and carcasses from the egg takes can be used for genetic samples from these streams. The study is housed at the Prince William Sound Aquaculture Corporation (PWSAC) Armin F. Koerning (AFK) hatchery and will take advantage of the same incubation facilities as the PWSAC experimental release project included in the SEA project.

I. PUBLIC PROCESS

Many of the field procedures used in the field monitoring portion (Component A of 94191) of this project have been employed as part of the data collection activities for preemergent fry indices used in PWS pink salmon forecasts for more than 30 years. The procedures have been presented and reviewed at a multitude of workshops and scientific meetings, are widely understood by the fishing industry, and have undergone peer review through the NRDA process. Field monitoring methodologies were presented at the 1991 Pink and Chum Workshop in Parksville, British Columbia, Canada. Field monitoring results from 1989, 1990, 1991, and 1992 were presented at the 1993 meeting of the Alaska Chapter of The American Fisheries Society in Valdez, Alaska, the 1993 Oil Spill Symposium in Anchorage, Alaska, and the 1993 Pink and Chum Workshop in Juneau, Alaska. Abbreviated operational plans for 1989 through 1994 egg and alevin mortality studies have been published annually in EVOS Trustee Council work plans which incorporate public comment.

J. PERSONNEL QUALIFICATIONS

Fisheries Biologist III - Samuel Sharr

Mr. Sharr received a Bachelor of Science degree in biology from the University of Washington in 1968. He has been a research biologist for ADF&G since 1979 and has worked on PWS salmon and herring since 1981. He assumed his present position as the ADF&G, Division of Commercial Fisheries, Biologist III, PWS Area Finfish Research Project Leader in 1986. In this capacity, Mr. Sharr oversees all the salmon and herring research conducted by the Division of Commercial Fisheries in PWS. His involvement with the PWS salmon escapement aerial survey program dates from the early 1980's. Mr.Sharr has supervised a total re-edit of the historic aerial and ground survey data and designed a new RBASE data base for inseason escapement analyses. Mr. Sharr wrote the original operational plans for NRDA F/S Studies 1,2 and, 3 and has been the Principal Investigator for those projects since their inception.

Principal Geneticist - James E. Seeb

Jim Seeb earned a B.S. in Biology (1974) from the University of Puget Sound, an M.S. in Fisheries (1982) and a Ph.D. in Fisheries (1987) from the University of Washington. Jim has worked as a Fish Biologist for the Washington Department of Fisheries (1978-1980) and Pacific Fisheries Research (1980-1982), as a Graduate Research Assistant at the University of Washington (1982-1986), a Research Assistant Professor at the University of Idaho (1987-1988), and as an Assistant Professor at Southern Illinois University (1988-1990). Presently, Jim is the Principal Geneticist for FRED Division of the Alaska Department of Fish and Game and has overall responsibility for fisheries genetic issues throughout Alaska. Dr. Seeb has published extensively in the Fisheries and Genetics Literature. He has worked with many fish species on numerous genetic topics including but not limited to genetic marking and its use to assess stock dynamics and management programs, genetic variation and postglacial dispersal of populations, the use of genetic structure in the enforcement of fishing regulations, and the measurement of DNA content using flow cytometry.

Biometrician II - Brian G. Bue

Brian Bue has a Bachelor of Science in Biology and a Bachelor of Science in Fisheries from the University of Alaska, Fairbanks. He also possesses a Masters degree in Fisheries with an emphasis on quantitative studies from the University of Alaska, Fairbanks. Brian has worked with the ADF&G from 1974 through present in many capacities. He has worked as a consulting biometrician on oil spill damage assessment projects since the first days of the *Exxon Valdez* spill.

Fisheries Biologist II - Gary Miller

Gary Miller is the flow cytometry specialist for the Alaska Department of Fish and Game Genetics Laboratory in Anchorage. Gary has a Bachelor of Science in Fisheries Biology from the University of Washington, a M.S. in Zoology from Southern Illinois University - Carbondale, and is currently pursuing his Ph.D. from the University of Washington. He has worked periodically for the Alaska Department of Fish and Game since 1981. He has a strong background in genetics and developmental biology and has conducted research and co-authored projects in hybridization, polyploid induction, allozyme expression, and growth performance of triploid salmonids and other fishes. He has extensive laboratory experience with techniques including flow cytometry, protein starch gel electrophoresis, protein and molecular marker analysis, and fluorescent antibody testing of pathogens.

K. BUDGET

(see attached)

L. LITERATURE CITED

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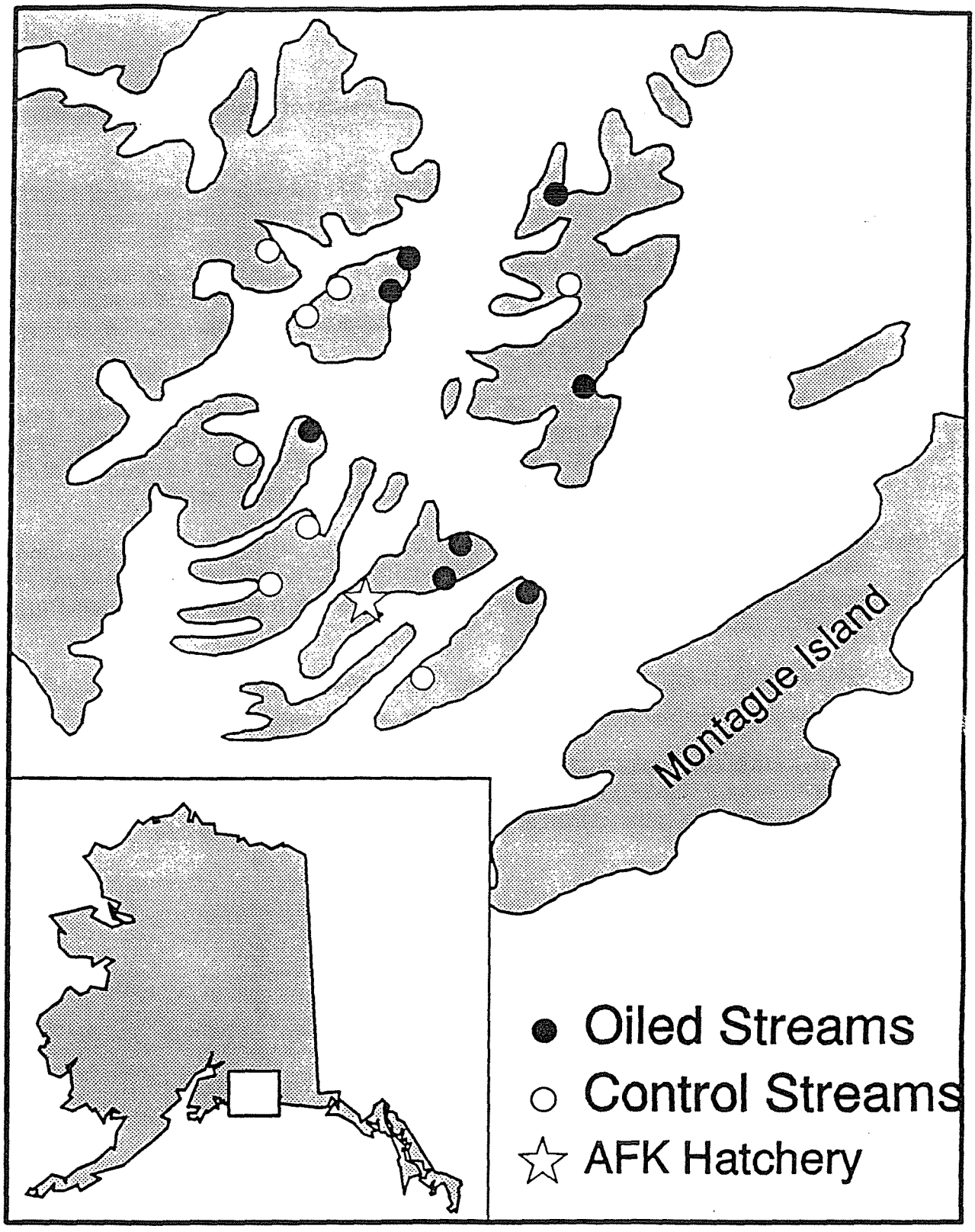

Figure 1. Stream and Hatchery locations for controled incubation experiment.

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Oil Related Egg & Alevin Mortalities (Supplemental) - This project will evaluate whether the differences in pink salmon embryo mortality observed in the field under Component A of Project 94191 can be attributed to differences in physical stream makeup or to genetic differences. This experiment will examine the possibility of genetic injury as an explanation for chronic injury and assess the likely time frame for natural recovery.

Budget Category:	1993 Project No. 93003 Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel		$0.0	$44.7	$44.7	$65.0	
Travel		$0.0	$2.0	$2.0	$3.5	
Contractual		$0.0	$37.7	$37.7	$42.7	
Commodities		$0.0	$4.0	$4.0	$4.5	
Equipment		$0.0	$0.0	$0.0	$0.0	
Capital Outlay		$0.0	$0.0	$0.0	$0.0	
Subtotal		$0.0	$88.4	$88.4	$115.7	
General Administration		$0.0	$9.3	$9.3	$12.7	
Project Total		$0.0	$97.7	$97.7	$128.4	
Full-time Equivalents (FTE)		0.0	0.7	0.7	1.1	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Fisheries Biologist III			1.5	$9.9
Fisheries Biologist II			2.7	$14.6
Fish and Wildlife Technician III			2.0	$6.7
Fish and Wildlife Technician II			0.6	$4.3
Biometrician II			1.5	$9.2
Personnel Total	0.0	$0.0	8.3	$44.7

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

07/14/93

1994

Project Number: 94191 - Supplemental
Project Title: Oil Related Egg & Alevin Mortalities
Sub-Project:
Agency: AK Dept. of Fish & Game

FORM 3A SUB-PROJECT DETAIL

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
4Trips Cordova/Anchorage @ $500/trip Per diem included		$2.0
Travel Total	$0.0	$2.0
Contractual:		
Facility Lease		$1.2
Air Charter		$21.5
Genetic Analysis Contract		$15.0
Contractual Total	$0.0	$37.7

07/14/93

1994

Project Number: 94191 - Supplemental
Project Title: Oil Related Egg & Alevin Mortalities
Sub-Project:
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Fish Culture Supplies		$4.0
Commodities Total	$0.0	$4.0
Equipment:		
Equipment Total	$0.0	$0.0

07/14/93

1994

Project Number: 94191 - Supplemental
Project Title: Oil Related Egg & Alevin Mortalities
Sub-Project:
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

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11.5.3 E

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: Trustee Council Members

FROM: James R. Ayers
Executive Director

DATE: April 7, 1994

RE: Recommendation on Proposed Increment for Project 94199

Proj #94199/IMS Improvements at Seward (ADF&G) Cost: $83.0

Purpose: On January 31, 1994 the Trustee Council passed a resolution giving conceptual approval of improvements to the research facilities of the University of Alaska, Institute of Marine Science at Seward. The resolution directed the Executive Director to take necessary steps to secure NEPA compliance, to review the economic and other assumptions of the project, to develop an integrated funding approach, and to prepare a recommendation of the appropriate level of Trustee fundiing that would be legally permissible. The Trustees have already authorized $50.0 to begin work on these tasks. Since that time, it has been determined that a complete Environmental Impact Statement is required for this project, in addition to completion of the other tasks.

Description: Of the original $50.0 authorization, $25.0 was given to ADF&G as the lead agency, and $25.0 to the Department of Interior (Minerals Management Service) as the lead agency for NEPA. An additional $97.0 is required to complete these tasks ($64.0 for DOI and $33.0 for ADF&G).

NEPA: An Environmental Impact Statement is currently under preparation for this project. The Record of Decision is scheduled to be published by the end of October 1994.

Legal concerns: The level of Trustee funding legally permissible is being reviewed by both state of Alaska and federal attorneys.

Long-term implications: This additional funding would ensure that the tasks required by the Trustee Council's resolution of support for Project 94199 would be accomplished this year.

Chief Scientist recommendation: No recommendation.

Executive Director recommendation: I recommend $97.0 in supplemental funding be approved to allow this addition to Project 94191 to go forward. Of the $33.0 required by ADF&G, I recommend that $14.0 be transferred from Project 94110. The total of new funding required would be $83.0.

DRAFT

Supplemental Budget Request for Seward IMS Project (#94199)

Draft

Background

On January 31, 1994 the Trustee Council passed a resolution approving financial support for expansion of the University of Alaska, Institute of Marine Science (IMS) at Seward. The resolution directed the Executive Director to:

1. Take necessary steps to secure NEPA compliance;

2. Consult appropriate entities, including the University of Alaska, the City of Seward, the Seward Association for the Advancement of Marine Science, and appropriate Trustee agencies to review the assumptions relating to the proposed improvements and capital and operating budgets;

3. Develop an integrated funding approach which assures that the use of trust funds are appropriate and legally permissible under the terms of the Memorandum of Agreement and Consent Decree; and

4. Prepare a recommendation of the appropriate level of funding for consideration by the Trustee Council that would be legally permissible under terms of the Memorandum of Agreement and Consent Decree.

At the January 31 meeting the Trustee Council authorized $50,000 to begin work on the above tasks.

Project Status

Since January 31, substantial progress has been made on addressing the first three tasks. With respect to the first task, a 33-week Environmental Impact Statement process was initiated on March 9. Public Scoping Meetings have been completed in Seward and Anchorage and a pre-application meeting has been held with state and federal regulatory agencies to determine permitting requirements. A Scoping Report is currently being prepared. The Draft EIS is scheduled to be published in late June followed by a 45-60 day public review period. The Record of Decision is scheduled to be published by the end of October 1994.

With respect to the second task, consultation has been initiated with all of the appropriate entities. A Scientific Work Group (SWG) has been formed with representatives of the Institute of Marine Science, National Marine Fisheries Service, National Biological Survey, Alaska Department of Fish and Game and others to advise the project architects and planners on the conceptual and schematic design of the proposed improvements. An Education Work Group (EWG) has been formed to provide

DRAFT Draft

equivalent information for the public education component of the project. Work by the SWG and the EWG will be used by the design team, the EIS team, and other project consultants to validate the assumptions relative to the scope of the improvements and associated capital and operating budgets.

With respect to the third task, a four-part integrated funding plan is being formulated with state and federal restitution funds, joint funds, and private funds. A professionally-run private fund raising program is scheduled to be initiated by SAAMS in May.

Results from the above three tasks will be used to develop the Executive Director's recommendation concerning the appropriate level of funding for consideration by the Trustee Council. Staff will continue to work with state and federal legal council to identify the project components that would be legally permissible for joint funds under the terms of the Memorandum of Agreement and Consent Decree.

Budget Request

An additional FY94 authorization of $97,000 for the Department of Interior and the Department of Fish and Game is requested to complete the above tasks. This authorization would be allocated as follows:

DOI (EIS Coordination)

• Salary & Benefits	$ 64,000
• Travel	9,000
• Administrative Support	10,000
• DOI Solicitor and OEPC Review	6,000
	$ 89,000
• Less $25,000 from January 31 authorization	**$ 64,000**

ADF&G (Project Coordination)

• Salary & Benefits	$ 48,300
• Travel	5,000
• Contractual	4,000
• Supplies	700
	$ 58,000
• Less $25,000 from January 31 authorization	**$ 33,000**

MEMORANDUM

State of Alaska

DEPARTMENT OF FISH AND GAME

TO: Jerome Montague
Chief, Restoration Unit
Habitat and Restoration Division
Juneau

DATE: March 29, 1994
FILE:

PHONE: 267-2334
FAX: 349-1723
SYSM: FH2CKAS

FROM: Kimbal A. Sundberg
Habitat Biologist
Habitat and Restoration Division
Anchorage

SUBJECT: Seward Institute of Marine Science Budget

Per your request, the following is my recommended budget for accomplishing remaining tasks associated with the Seward Institute of Marine Science (Project #94199) in FY94. This budget anticipates my full time involvement in refining the project description to address the four items in the Trustee Council's January 31 resolution including the EIS, review of assumptions relating to the proposed improvements and capital and operating budgets, and the integrated funding approach. I will continue to document my actual hours spent on this project on bi-monthly time sheets.

Line 100	7.0 months HB IV (3/1/94 - 9/30/94)	$ 48.3
Line 200	Juneau, Fairbanks, Seward	5.0
Line 300	Phone, fax, xerox, email	4.0
Line 400	Software, supplies	0.7
Line 500		0.0
TOTAL		$ 58.0

cc: Carol Roten
Lance Trasky
Joe Sullivan

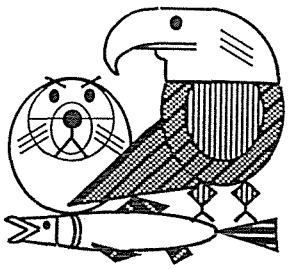
Draft

SAAMS has budgeted approximately $ 1.2 million to support the design team, EIS and other technical consultants, project management, and project administration for the Alaska Sea Life Center / Institute of Marine Science project through the remainder of FY 94. This project support is being funded through a $ 4 million grant from the State of Alaska to the City of Seward from the $ 12.5 million authorized for the Alaska Sea Life Center from state restitution funds.

DRAFT

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 402, Anchorage, Alaska 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: *Exxon Valdez* Oil Spill Trustee Council

FROM: James R. Ayers, Executive Director

DATE: April 7, 1994

SUBJ: Project #94320/PWS System Investigation — Recommendation

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The purpose of this memorandum is to provide the Trustee Council with my recommendation regarding the funding and implementation of Project #94320/Prince William Sound System Investigation.

In summary, it is my recommendation that Project #94320 (which is, in fact, a collection of sixteen interrelated sub-projects) be approved by the Trustee Council to proceed consistent with the recommendations and conditions described below. Included with this memorandum are copies of the Detailed Project Descriptions (DPDs) for each of the sixteen projects as listed in Table 1. Budget information for each "sub-project" is summarized in Table 2. (Copies of the detailed budgets have been provided to each of the Trustee Council agency liasons.)

Prior Trustee Council Action on Project #94320

On January 31, 1994, the Trustee Council conditionally approved Project #94320/PWS System Investigation with a total budget of $6.25 million subject to integration and coordination of the various project parts and a favorable scientific peer review of the various Detailed Project Descriptions (DPDs) under the direction of the Chief Scientist. The Trustee Council specifically reserved to itself the final decision on the overall approval of the project, while simultaneously directing the Executive Director to identify time-sensitive elements of the proposed work effort that required immediate funding in order to allow the project to proceed in a timely manner.

In response to the Trustee Council direction to identify time-sensitive elements of the project, the Executive Director, in consultation with the Chief Scientist and agency staff, developed a recommendation that was transmitted to the Trustee Council on March 4. This recommendation, as accepted by the Trustee Council, authorized a total of $1,529.0 in time-sensitive expenditures (largely equipment purchases, vessel charter costs and some limited project administration funding for the Prince William Sound Science Center to offset the cost of developing DPDs) together with $1.75 million for the PWSAC hatchery release and manipulation portions of the project pending NEPA compliance which has since been secured (Attachment A).

In addition to the identification of these time-sensitive elements of the project, the Chief Scientist has overseen a comprehensive scientific peer review of the overall project and its various constituent parts and prepared a formal recommendation. In some cases, this review process included direct consultation and discussion between the peer review scientists and the principal investigators and resulted in revisions to the proposed work and scope of services. The Chief Scientist's recommendation is attached to this memorandum (Attachment B). Additionally, a Project #94320 Summary has been prepared by Dr. Ted Cooney in his capacity as the lead scientist for the project.

Executive Director's Recommendation

As a collaborative, interdisciplinary effort developed to address critical questions about the ecological health and recovery of spill damaged resources in PWS, the interrelated sub-projects being pursued through Project #94320 constitute an extraordinarily ambitious attempt to address a number of important research questions that the Trustee Council can use to: 1) guide further restoration activities; 2) improve management of common property fishery resources as a means of effecting restoration; and 3) identify important marine resources and processes for long-term recovery monitoring.

I concur with the findings and recommendations of the Chief Scientist that the project represents a "valid, defensible, sophisticated ecosystem approach" to understanding the factors controlling pink salmon production in Prince William Sound as well as the biological oceanography of PWS and, in this way, can make an important contribution to the overall restoration mission of the Trustee Council. While the primary focus of the project revolves around pink salmon, the project also includes important components that start to address herring, marine mammals, and certain sea birds. As indicated by the Chief Scientist, "understanding the ecological factors [that are limiting the recovery of these resources] is an integral part of the ecosystem approach" to restoration that the Trustee Council has endorsed.

It is imperative to underscore the ambitious nature of this collective research effort and to stress that a critical evaluation of the success of the first year of work will be essential to determining the appropriate scope and level of future efforts. A number of the project components that are central to the success of Project #94320 (e.g., the hydroacoustics work) involve highly innovative research methodologies that remain to be proven and workable in the field. Not only are there technical issues (e.g., the ability to successfully interpret hydroacoustics data to identify salmon predators), there are formidable logistical challenges to implement the program "on the water" in a manner that will yield useful results. Additionally, the ability to productively accumulate, analyze and interpret what will be enormous quantities of raw data remains to be determined.

Consistent with the peer review findings and recommendations of the Chief Scientist, my own recommendations concerning implementation of Project #94320 are as follows:

1. Project Leadership

   During development and review of the DPDs for the project, it became critically apparent that successful project implementation will require strong project leadership and management. As noted by the Chief Scientist, the consensus-based process that led to the formulation of the PWS research proposals reflected in Project #94320, must now give way to a strong leader-based process needed for the day-to-day execution of the work effort. In recognition of this need, Dr. Ted Cooney of the University of Alaska has assumed the role of "lead scientist" for implementation of Project #94320 for this year.

   To ensure needed overall project accountability, it is both appropriate and important that the Trustee Council formally recognize Dr. Cooney's initial leadership role for Project #94320 and clearly communicate that the Trustee Council will expect Dr. Cooney to exercise both the leadership and authority necessary to successfully implement the various interrelated sub-projects as they get under way in this first critical year. Leadership responsibility and accountability should be emphasized as essential to continued Trustee Council support for the project. The future leadership and direction of Project #94320 warrants further evaluation by the Chief Scientist, the Executive Director and the Trustee Council.

2. Adaptive Management and Project Implementation

   Closely related to recommendation #1 above, is the need to ensure that the various sub-projects are implemented in a manner that is responsive to the exceptional logistical and deployment challenges being confronted this first year. A large portion of the overall project effort depends upon

the timely acquisition and use of hydroaucoustic equipment to track cohorts of hatchery released salmon and to study blooms of zooplankton. The peer review process has resulted in substantial questions about whether the project, as originally envisioned, can be fully implemented this first year given delays in procurement, the need to calibrate equipment, field test logistics, etc. The ability to respond to real-time circumstances in the field is critical. The Chief Scientist is planning to spend time in PWS this summer in order to obtain a first-hand understanding of project implementation and will provide periodic briefings to the Executive Director and the Trustee Council regarding project implementation progress.

The Trustee Council should communicate the clear expectation that, as noted by the Chief Scientist, research "objectives and plans have to be tailored to the biological realities... ." If logistical or biological circumstances preclude the ability to implement a certain portion of the work effort this year, the researchers must anticipate the need to curtail their activity and expenditures accordingly. Implementation of this first field season will necessitate flexibility and a willingness on the part of the investigators to scale the work effort to the biological opportunities that are available. In some cases, this may mean deferring significant portions of the proposed work effort to a future field season (e.g., if the plankton bloom occurs earlier than needed research equipment can be deployed).

3. Data Management and Modeling

The PWS System Investigation research effort will generate enormous quantities of raw data. The ability to successfully manage, synthesize and interpret this raw data will be a major factor in determining the overall success of the project (see project #94320-J/Information Systems-Modeling). While the data management and analysis effort is clearly needed as an integral part of the overall Project #94320 work effort, the Chief Scientist's peer review process identified substantial questions about the utility of a deterministic modeling effort to address fisheries management issues.

I strongly concur with the questions and concerns regarding the highly technical nature of deterministic modeling. I recommend that this aspect of the work effort be closely scrutinized by the Chief Scientist and peer reviewers as part of the FY 95 work plan development effort.

4. Project #94320 — Program Review and Evaluation

A frank and critical review of the Project #94320's successes (and, inevitably, some failures) is essential. To that end, the Chief Scientist has been working with the various project Principle Investigators to identify,

on a project-by-project basis, specific deliverables, work products and "milestones" that can be used to assess the success of the project's first year of implementation. These "mid-September 1994 milestones" are needed in order to formulate a recommendation to the Trustee Council regarding a continued work effort in FY 95.

I strongly commend the Chief Scientist's proposal for a critical review of the overall project in mid-September and urge that the Trustee Council communicate an expectation that future funding and support for the PWS System Investigation effort will be substantially determined by the success in meeting these "milestones." In addition, the results of the 1994 field season should be given a more in-depth review in mid-January 1995 (at the same time that initial results of other FY 94 projects are available). This will provide an additional opportunity for modification or revision of the scope of work planned for FY 95.

5. NEPA Compliance

ADF&G successfully addressed NEPA compliance requirements pertaining to the hatchery release (94320-K) and manipulation (94320-L) components of the project through the preparation of an Environmental Assessment (EA). This EA was approved by NOAA with a Finding of No Significant Environmental Impact (FONSI) on March 28, 1994.

A copy of the FONSI for the hatchery related portions of the project is on file. It is my understanding that all other parts of Project #94320 are eligible for a Categorical Exclusion under NEPA. In any case, no project element will be allowed to proceed prior to a determination of full NEPA compliance.

6. Budget Issues

At the January 31, 1994 Trustee Council meeting, Project #94320 was conceptually approved, subject to integration and coordination of the various project parts and a favorable scientific peer review, with a budget not to exceed $6.25 million. As a result of a budget review involving the various affected agencies, the University of Alaska, PWSAC, the PWS Science Center, and the Trustee Council staff, budget allocations for each of the proposed projects have been developed as reflected in Table 2.

Review of the detailed project budgets has been exceptionally difficult and accomplished within a very short timeframe — detailed budget information pertaining to the PWS Science Center projects was only received on April 4. For the most part, the budgets proposed for the various components appear appropriate for the work proposed. However, as noted previously and also reflected in the comments of the Chief

Scientist, the PWS System Investigation represents an extremely ambitious work effort and it is possible, if not likely, that certain portions of the work effort will not be ready to proceed at full capacity this field season. In the event this occurs, the Trustee Council should make clear that it fully expects that expenditures from the budgets of affected sub-projects will be correspondingly reduced.

Some points of note include a highly competitive vessel charter market, that has resulted in some cost savings to this part of the budget. Additionally, in order to ensure flexibility regarding the possibility of needing to terminate charters due to changing biological or logistical circumstances, ADF&G included a provision in its vessel charter contracts allowing for termination of charters on short notice. The budget review also resulted in a reduction of some personnel costs in order to not exceed the 5.5 months remaining in the fiscal year.

Three particularly significant issues emerged during the budget review:

• University of Alaska/PWSSC Indirect Rate — For FY 93, the Trustee Council and the University of Alaska agreed to an indirect rate of 20% of project costs. This is a significant reduction from the University's standard 41% indirect rate, but significantly more than the rates typically approved for Trustee Council projects (15% for personnel and 2 - 7% for contractual). There appears to be a fundamental disagreement regarding what constitutes the definition of total direct costs. The University's definition is 20% of total project costs — that is, both direct and indirect costs — which is, in effect, a 25% rate on direct project costs. As a University of Alaska sub-contractor, the PWS Science Center adopted the same methodology for calculating indirect rates. (The extra cost for the University of Alaska is mitigated somewhat by the fact that they did not charge the full 20% rate on the "pass through" funding for the PWS Science Center contract. In fact, the University charged only approximately $11.2 to administer the PWS Science Center contract. Unfortunately, this is an issue that only surfaced six days prior to the Trustee Council's scheduled meeting.)

In view of the need to move forward quickly and get work in the field, I recommend that the University of Alaska and PWS Science Center budgets be accepted as proposed with the express understanding that the indirect rate used is an exception and will apply to this start up year only. Further, it should be made clear that, to the extent that any work is to be undertaken by the University of Alaska or the PWS Science Center on behalf of the Trustee Council in FY 95 or beyond, indirect rates will be calculated as 20% of direct project costs as is the case with other Trustee Council funded projects. It is worth noting that this issue could be avoided in the future by putting projects such as these through a formal,

competitive Request for Proposal (RFP) process and that this option for project implementation is currently under review.

• Equipment Ownership — Questions regarding equipment ownership emerged during the budget review. (The PWS Science Center had offered to waive its indirect charges on equipment purchased for sub-projects they are implementing if they were granted ownership of the equipment.) Trustee Council staff have clarified to both the University of Alaska and the PWS Science Center that one of the Trustee Council agencies, acting on behalf of the Trustees must retain ownership of the equipment. At this point, the University of Alaska and PWS Science Center budgets reflect funding for the purchasing, insurance, storage, maintenance and repair of equipment purchased with Trustee Council funds.

I recommend that the RSA between ADF&G and the University of Alaska (which includes the PWS Science Center) be amended to reflect that these services (purchasing, insurance, storage, maintenance and repair) are being paid for in this budget year and that these services will not be charged for in the future to the extent that these projects continue. In the future, it may be possible to avoid this problem by having one of the Trustee Council agencies purchase, store and maintain equipment.

• Otolith Thermal Mass Marking — As a result of further review and evaluation of project #94320-C/Otolith Mass Marking it became apparent that the original budget was substantially below what it would take to implement the project because 1) it was mistakenly assumed that boilers and other equipment would be installed inside existing buildings which is not possible due to fire code and lack of space; and 2) larger boilers would be needed to ensure that sufficient water can be heated to produce the number of banding "rings" for the thermal banding codes.

At this point, ADF&G has withdrawn the thermal mass marking portion of the project in order to fully reevaluate project costs and will review the proposal as part of the FY 95 work plan process. (A small portion of the project involving chemical marking of otoliths using oxytetracycline is still proposed for funding. It is the expectation of ADF&G that this portion of the project will qualify for a Categorical Exclusion under NEPA.)

7. Long-Term Implications

Finally, it is important to put Project #94320 into the larger context of the overall Trustee Council restoration effort. In essence, the sixteen FY 94 sub-projects that collectively comprise the Project #94320/PWS System Investigation constitute an elaborate and ambitious pilot project to implement an ecosystem approach to restoration. The project investigators are to be commended for their exceptional effort and commitment in designing an important and pioneering restoration

research and monitoring program. At the same time, the PWS System Investigation effort should be clearly viewed as part of the overall ecosystem approach to restoration being pursued by the Trustee Council. This overall approach must also provide for the restoration of a wide range of resources and services beyond those addressed by Project #94320.

To the extent that portions of the PWS System Investigation effort are found to be workable and successful in the field and are determined to make a worthwhile contribution to the overall restoration mission of the Trustee Council within the terms of the civil Settlement, long-term funding (perhaps 5 to 10 years for certain project components) will be needed and should be provided. Again, the appropriate level of funding is yet to be determined and will be substantially influenced by the success of the various sub-projects in meeting their first year "milestones."

* * * * *

Table 1	Project #94320 — PWS System Investigation (index)
Table 2	Project #94320 — Budget Summary
Attachment A	Project #94320 — Time-Sensitive Elements
Attachment B	R. Spies, Chief Scientist to J. Ayers, Executive Director Scientific Review and Recommendations for Project 94320 Memorandum dated April 4, 1994

Table 1

Project #94320 — PWS System Investigation

94320-A/Salmon Growth and Mortality	ADF&G/Willette	Tab A
94320-B/CWT Recovery-PWS Pinks (94184)	ADF&G/Sharr	Tab B
94320-C/Otolith Mass Marking (94187)	ADF&G/Sharr	Tab C
94320-D/Pink Salmon Genetics (94189)	ADF&G/Seeb	Tab D
94320-E/Salmon Predation	ADF&G/Willette	Tab E
94320-F/Harbor Seals-Trophic Interactions	ADF&G/Frost	Tab F
94320-G/Phytoplankton and Nutrients	UAF/McRoy	Tab G
94320-H/Zooplankton in Ecosystem	UAF/Cooney	Tab H
94320-I/Trophic-Stable Isotopes	UAF/Schell	Tab I
94320-J/Information Systems-Modeling	PWSSC/Patrick	Tab J
94320-K/PWSAC-Experimental Release	PWSSC/Olsen	Tab K
94320-L/PWSAC-Experimental Manipulation	PWSSC/Olsen	Tab L
94320-M/Physical Oceanography	PWSSC/Salmon	Tab M
94320-N/Nearshore Fish	PWSSC/Thomas	Tab N
94320-P/Program Management	PWSSC/Scheel	Tab P
94320-Q/Avian Predation on Herring Spawn	USFS/Bishop	Tab Q

4/7/94

Table 2

Project #94320/PWS System Investigation

Budget Summary

BUDGETS FOR 94320 SUBPROJECTS

SUBPROJECT NUMBER	INTERIM BUDGET	REMAINING BUDGET	TOTAL BUDGET
94320A	$0.0	$263.4	$263.4
94320B	47.8	196.6	244.4
94320C	0.0	53.9	53.9
94320D	0.0	171.2	171.2
94320E	0.0	907.1	907.1
94320F	0.0	26.0	26.0
94320G	0.0	141.5	141.5
94320H	0.0	300.1	300.1
94320I	0.0	60.5	60.5
94320J	0.0	756.5	756.5
94320K	0.0	46.6	46.6
94320L	0.0	1,750.0	1,750.0
94320M	0.0	773.1	773.1
94320N	0.0	666.9	666.9
94320P	100.0	51.8	151.8
94320Q	0.0	84.8	84.8
TOTAL	$147.8	$6,250.0	$6,397.8

Attachment A

Project #94320/PWS System Investigation
Time-Sensitive Project Elements

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

MEMORANDUM

TO: Jerome Montague, ADF&G
Dave Gibbons, USFS

FROM: James R. Ayers
Executive Director

DATE: March 11, 1994

RE: Project 94320

The six Trustees have reviewed and accepted my March 4, 1994 recommendation concerning the time-sensitive elements of Project 94320. You are authorized to proceed only with the expenditures as outlined in the memo to myself and the Trustees from Dr. Spies dated March 2, 1994. These are:

Hydroacoustic equipment	$270.0
Physical oceanography, zooplankton and phytoplankton equipment	310.0
Fish food and coded wire tags for PWSAC	45.0
Juvenile salmon predation/growth/survival	
Vessel charters	793.5
Equipment (seines)	44.0
PWSSC project administration	25.0
Avian predation study startup costs	41.5
TOTAL	$1,529.0

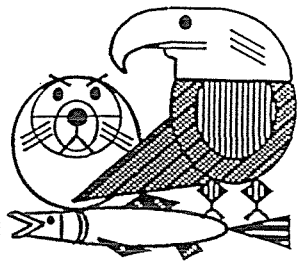
Expenditures for the hatchery research and manipulation portion of the project are not authorized at this time. Those hatchery research related funds will be authorized only when NEPA compliance has been clarified and successfully completed and when the Detailed Project Description is revised.

JRA/mir

cc: Restoration Work Force
Trustee Council Members
Molly McCammon, Director of Operations

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 402, Anchorage, Alaska 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

To: Mike Barton
U.S. Forest Service

From: Jim Ayers
Executive Director

Date: March 4 , 1994

Subj: Authorization for Project # 94320

As directed by the Trustee Council at your January 31, 1994 meeting, I have been in consultation with Dr. Spies and the Prince William Sound System Investigation study group concerning the time-sensitive elements of Project # 94320. I concur with the recommendations of Dr. Spies as reflected in the attached documents.

I. Equipment and Vessel Charters

Attached you will find several supporting documents including: 1) a memo from Dr. Spies describing his recommendation for the time-sensitive elements of Project # 94320; 2) a more detailed memo from Dr. Spies and an agency work group describing further why some equipment is recommended for purchase at this time and why certain other equipment purchases can be deferred; 3) a letter from Dr. Ted Cooney describing how elements of the overall project would be delayed and/or compromised depending on the timing of equipment purchases and final approval of the Detailed Project Descriptions (DPDs).

I recommend that I move forward with Dr. Spies' recommendations for equipment purchase, vessel charters, and start-up personnel costs. As described by Dr. Spies, this funding is an appropriate initial investment in the research capability the Trustee Council will need for continuing investigations of the PWS ecosystem. The recommended expenditures will provide the essential research infrastructure, enable the research to proceed immediately on a pilot phase and permit an expanded effort as methodologies and techniques are determined to be successful. Ownership of the equipment will remain with the Trustee Council for future Trustee projects.

II. Detailed Project Descriptions

Because Detailed Project Descriptions are still being completed and reviewed, I am unable to give you a final recommendation on the full scope of work that should be authorized for Project # 94320. I anticipate that the DPD review will be completed by mid to late March.

I recommend that the full scope of Project # 94320 be reviewed by the Trustee Council at a teleconferenced meeting in late March.

III. Funding for Prince William Sound Aquaculture Corporation (PWSAC)

Included in Project # 94320 is $1.75 million to compensate PWSAC for the costs of manipulating fry releases as an integral part of the research effort. It is my understanding that an additional $250 thousand, above the original estimate of $1.5 million, is needed for this component of the project.

There has been some question about whether the hatchery funding should be subject to an Environmental Assessment. However, because this project consists fundamentally of mariculture activities that have been on-going in PWS since the mid-70s and have gone through a comprehensive permitting and public participation process, I believe there is a strong argument for considering this project a "no action alternative" under NEPA and accordingly subject to a categorical exclusion under NOAA's NEPA guidelines. Additionally, this project should fall under NOAA's general permit for mariculture facilities, which include hatcheries. Finally, it should be noted that the project will have no impact on endangered or threatened species.

Although a final determination has yet to be made on the NEPA question, there is a serious time element involved with this project. I strongly recommend each Trustee work with staff so we can resolve this question as quickly as possible.

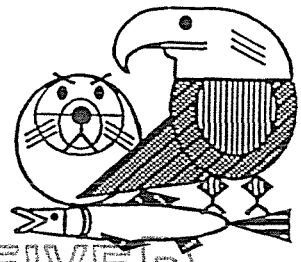
<u>Time Sensitive elements of Project #94320</u>

In accordance with your instructions I am providing you with the time sensitive elements of Project #94320. I am prepared to implement those elements immediately, subject to NEPA compliance. Please advise me in writing by Monday, March 7, 5 p.m., whether or not you require a teleconference to further consider these time sensitive elements prior to their implementation. Other components of Project # 94320 will be peer reviewed and brought back to you for consideration before any further expenditure of funds.

Please contact Molly McCammon at 278-8012 immediately if you would like a detailed briefing on the above recommendation by Dr. Spies and Dr. Cooney.

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

To: Trustee Council

From: Dr. Robert Spies
Assisted by Byron Morris & Alex Wertheimer (NMFS), Jerome Montague (ADF&G), George Rose, Bill Pearcy and Andy Gunther

Thru: James R. Ayers
Executive Director

Date: March 2, 1994

Subj: Recommendation for Time-critical Expenditures for Project # 94320

On January 31, 1994, the Trustee Council conditionally approved $6.25 million for Project 94320 (Prince William Sound System Investigation) subject to the successful integration of this project with project #s 94163, 94184, 94185, 94187, 94189, 94192, 94259 and those portions of projects # 94421 that involve research. The Trustees directed the Executive Director to determine which elements of this project were time-critical and to report back to the Council for further action.

Subsequently, we have been directed by the Executive Director to meet with the principals of the Sound Ecosystem Assessment (SEA) group and to develop a recommended course of action concerning this project with respect to time-critical expenditures. The following is that recommendation.

RECOMMENDED ACTIONS

A. Time-critical equipment and personnel expenditures.

We recommend that the Trustee Council immediately approve the following equipment and personnel expenditures for Project # 94320:

1.	Hydroacoustic equipment	$ 270.0
2.	Physical oceanography, zooplankton and phytoplankton equipment	310.0
3.	Fish food and coded wire tags for PWSAC	45.0

4.	Juvenile salmon predation/growth/survival	
	Vessel charters	793.5
	Equipment (seines)	44.0
5.	PWSSC project administration	25.0
6.	Avian predation study startup costs	41.5
	SUBTOTAL	$1,529.0
7.	PWSAC Experimental Manipulation	1,750.0*
	TOTAL	$3,279.0

* Authorized subject to NEPA compliance. It is anticipated that an additional $250.0 will be needed by PWSAC to complete this portion of the project.

B. Procurement conditions

We recommend that the Trustee Council approve the following procedures for moving forward with the time-critical elements of this project:

1. Procurement of all equipment identified for UAF and the Prince William Sound Science Center (PWSSC) via a Reimbursable Services Agreement (RSA) between ADF&G and UAF.

2. Vessel charters competitively procured by ADF&G for the full charter period, but based on a daily charter rate, with provision for ending the contract at any time without penalty.

3. Procurement of $1.795 million to PWSAC pending NEPA compliance, approval of sole source justification by the Alaska Department of Administration and approval of the Detailed Project Description for that portion of Project # 94320.

DISCUSSION

The scientific questions being asked by the Prince William Sound System Investigation are laudable and appropriate in order to answer basic questions about the health of the Prince William Sound fisheries. The investigators are scientifically qualified, clear about their goals, and enthusiastic. Significant portions of the investigations proposed

Subtotal and Total figures were corrected for accuracy on 3/11/94.

as parts of project # 94320 are very ambitious, in particular, those pertaining to juvenile salmon predation. These include the purchase, delivery and implementation of highly sophisticated equipment, the coordination of several vessels and crew, as well as extremely complex field logistics in order to obtain sampling data.

Although the peer review of Detailed Project Descriptions (DPDs) for all of the component parts of project # 94320 has not yet been completed, we nevertheless feel that the recommended expenditures are justified at this time and represent a sound investment in the research capability that will be needed over the next several years.

At the same time, we emphasize that expenditure commitments (especially the salmon predation studies that require extensive vessel support) should be structured and conditioned to accommodate an initial pilot phase that demonstrates the feasibility of the proposed methods. The pilot study should be designed so that it is possible to roll in the rest of the program to full field operation upon a determination that the pilot phase is successful.

Finally, it should be emphasized that the long lead time associated with procurement and deployment of the equipment necessitates an immediate decision if large portions of the study effort are to be undertaken in the coming field season in concert with the spring plankton bloom.

Final Council action is needed as quickly as possible. Any delays will result in a reduced program.

(Note: The recommended purchases and authorizations addressed above is not a complete list of equipment needs for project # 94320 and reflects only equipment and other procurement needs with long lead times that are critical to have "in the water" by April 15.)

* * * * *

A more detailed memorandum, including a discussion of equipment requests that are not recommended for funding at this time, is provided as an attachment.

Attachment B

Robert Spies, Chief Scientist
to James Ayers, Executive Director

Scientific Review and Recommendations for Project 94320

Memorandum dated April 4, 1994

April 4, 1994

TO: James Ayers, Executive Director

FROM: Robert Spies, Chief Scientist

RE: Scientific Review and Recommendations for Project 94320

At the last Trustee Council meeting on January 31, 1994, the Council approved Project 94320 as part of the 1994 Workplan.This action was contingent on favorable peer review of the Detailed Project Descriptions (DPDs) written by the principal investigators for the various components of this project. A comprehensive review includes both technical and fiscal aspects of this project. Over the last two months, I have received the DPDs for Project 94320 and obtained expert review of their technical merit. Although a few of these reviews are still outstanding, I now have enough information to provide you with my analysis and recommendation for Project 94320 based on its technical merit. I have also provided an attachment that provides some background information on the development of this project.

I am also recommending that a detailed review of the budget, which I have not done, be carried out before you formulate your final recommendations to the Trustee Council. In addition you may wish to give further consideration to the specific manner in which the four general recommendations listed below can be implemented.

Recommended Actions

I recommend that the Trustee Council approve Project 94320 with the following provisions:

1. The SEA program needs to rethink how the leadership of the project can be strengthened. The current consensus-based process, which has been appropriate for formulating goals, should give way to a leader-based process needed for the day-to-day execution of the mandate set out by the Trustee Council, in partnership with the public, and for flexible management of the scientific process.

2. The principles of adaptive management need to be applied so that maximum flexibility in the scientific program is maintained while at the same time scientific objectives are pursued in a cost effective manner. For instance, if the major releases of juvenile salmon occur before all of the acoustic equipment is operable on the charter vessels, then objectives and plans have to be tailored to the biological realities, the most useful biological data should be gathered, and the vessel charters terminated after that data is gathered.

3. There should be a scientific review in mid-September of 1994 that evaluates the success of the program and what aspects of the program should be modified in the coming year. This review would involve the principal investigators, program manager, the chief scientist, selected peer reviewers and others designated by the executive director. The Chief Scientist would prepare a memo to the executive director that evaluates the

progress of the program and makes recommendations regarding relevant portions of the 1995 workplan.

4. I support the information and modeling efforts this year as they are mainly supportive of data interaction and visualization that is so important to the integration of this project. There are, however, serious questions about how effective a deterministic model of the system could be for fisheries management and we will subjecting this aspect of the project to further review with the idea of developing a substantial recommendation for whether this should be funded in 1995.

Background

A lack of understanding of the processes controlling the population fluctuations of injured populations limits the Trustees' ability to restore damaged resources in oil spill area. In order to (1) effectively guide the restoration of Prince William Sound after the *Exxon Valdez* Oil Spill, (2) improve the management of common property fishery resources damaged by the spill in order to effect restoration, and (3) identify key marine resources and processes for long-term monitoring, the Council has committed to improving our understanding of the functioning of the Prince William Sound ecosystem. This commitment was expressed by the Trustees at their September meeting through support of an ecosystem approach to studying the Sound and the greater oil spill area.

To begin the process of developing this ecosystem approach, the Trustee Council sponsored a workshop in Cordova during December of 1993. A Steering Committee was established to organize and conduct the workshop, and report its findings to the Council. The major objectives of this workshop were to obtain the advice of national experts and experienced local scientists in designing a multi-disciplinary study of the Prince William Sound marine ecosystem, and to review and critique an ecological study plan (the SEA plan) prepared by the Prince William Sound Fisheries Ecosystem Planning Research Group.

The Steering Committee reported their findings and recommendations in a January 14, 1994, memorandum to the Executive Director. The Committee's two key findings, strongly supported by the peer reviewers at the workshop, were that (1) the SEA plan contains an innovative, reasonable, and scientifically-testable hypothesis to explain how certain ecological processes may control fluctuations of key fisheries resources in PWS, and (2) the ecological approach described in the SEA could form the basis of a program that would make an important scientific contribution to the Trustee's mission of restoring a healthy, productive, and biologically diverse ecosystem within spill area.

The relevance of the SEA Plan to the Trustee's mission led to the development by SEA scientists of project proposals for 1994 workplan. After review by the Executive Director, myself, and others, these proposals were modified and incorporated in Project 94320. After the Council's action of contingent approval on January 31, the principal investigators prepared DPDs for review by the Chief Scientist and peer reviewers.

Peer Review Process for Project 94320

The peer review of Project 94320 has been conducted in three phases. First, a preliminary review by myself and several key peer reviewers who attended the Cordova Workshop determined that the overall scientific questions being asked by Project 94320 are laudable and appropriate to answer basic questions about the health of Prince William Sound fisheries. The principal investigators are scientifically qualified, clear about their goals, and enthusiastic. Consequently, we recommended to the Executive Director that certain portions of Project 94320 be given a "fast-track" approval. If 94320 was to go forward in the field in April of 1994, those portions of the

project recommended for "fast track" approval needed immediate funding rather than waiting until review of the DPDs was complete. The vast majority of the fast track approval was required for ordering scientific equipment and arranging vessel charters.

The second phase of the peer review process involved the specific review of individual DPDs by scientific experts. The Council currently has over 60 North American scientists, with expertise ranging from cytogenetics to oceanography, who have provided expert review during the NRDA and restoration process. Given the very short time-frame available for review of the DPDs for 94320, I was very pleased with our success at obtaining reviews from top scientists around the country. The purpose of these reviews has been to obtain independent scientific assessments of (1) the validity of the scientific methods proposed in each project, and (2) whether the project as proposed will meet its stated objectives. In addition, two scientists besides myself reviewed all of the DPDs that were available by March 15 to obtain an "overall" assessment of the integration of various project elements.

The third phase of the peer review was to obtain an assessment of the overall integration of the seventeen components of project 94320. Two senior peer reviewers agreed to perform this task, although not all the DPDs were available in time to be included in this review. The table below indicates that of the 12 DPDs being reviewed, nine were available for this overall review (please note that some of the delays were administrative and not the responsibility of the principal investigators). In addition, I have reviewed all of the DPDs, as has my associate Dr. Andrew Gunther.

The following table lists the status of the review of 94320 DPDs.

Included in "Overall" Review	Project Title	DPD Received by Chief Scientist	Review Status
√	Avian Predation on Herring Spawn	March 2	specific reviews complete
√	Salmon Growth & Mortality	March 2	specific reviews complete
√	Salmon Predation	March 2	specific review complete
√	Observational Physical Oceanography in PWS. & the Gulf of Alaska	March 3	specific review complete
	Experimental Fry Release	March 7	no review proposed
√	Sound Ecosystem Assessment (SEA) & Related Studies: Summary	March 7	included in overall review
√	The Role of Zooplankton in the PWS Ecosystem	March 7	specific review complete
	Trophic interactions of Harbor Seals	March 7	no review proposed
	Experimental Manipulation	March 7	no review proposed
√	An Ecosystem Research plan for Nearshore Fish	March 7	specific reviews complete
√	Confirming Food Web Dependencies in the PWS Ecosystem using Stable Isotope Tracers	March 14	included in overall review, specific review not complete
√	Information Systems and Model Development	March 15	included in overall review, specific review not complete
	Coded Wire Tag Recoveries from Pink Salmon in Prince William Sound	March 18	no review proposed
	Otolith Marking-In season Stock Separation	March 18	specific review complete
	Genetic Structure of Pink Salmon Stocks	March 18	specific review not complete
	Program Management		no review proposed
	Plankton Dynamics: Phytoplankton and Nutrients	March 22	specific review not complete

In keeping with past practices, projects of a routine nature, or those with methods that have been reviewed in previous years, have not received a review ("no review proposed").

Overall Analysis

This project represents a valid, defensible, sophisticated ecosystem approach to understanding the factors controlling pink salmon production in Prince William Sound to help guide the Trustee Council's restoration activities. It can also provide valuable information about the biological oceanography of the northern Gulf of Alaska, and in this way will contribute to resource management throughout the oil spill area. Although the project in the first year does not begin to comprehensively address herring, a small project on bird predation on herring spawn is included. In a more comprehensive sense herring has been part of the planning process, and the project can include a more inclusive approach to herring production in the future. Also, of great concern in Prince William Sound and the northern Gulf of Alaska are the mammals (e.g., harbor seals and Stellar sea lions) and sea birds (e.g., marbled murrelets and pigeon guillemots). These species were injured by the spill and are in general decline in the area. Understanding the ecological factors limiting their recovery is a integral part of the ecosystem approach that the Trustees will wish to develop. These species can be included by way of coordination of other programs with the existing efforts within project 94320. The integrative links have already begun to be forged between this study and the forage fish study (94163), among others.

I would like to re-emphasize that for this program to be truly effective it may be necessary to provide from five to ten years of funding, although the level of funding is yet to be determined. This was a strong message from the peer reviewers attending the Cordova workshop. The reason for this recommendation is that the climatic conditions that are such an important source of variation need to be studied over a period of years to understand the relationships between climate, oceanography, and fisheries returns. Each year is in a sense a new natural experiment; the experiment must be repeated under different conditions to draw the appropriate conclusions. Hopefully, we will have a series of years in the near future that will provide the properly variable conditions.

It is critical to note that a comprehensive assessment of the first year's accomplishments towards understanding the complex factors controlling pink salmon production will not be available until early 1995. Since this will be after the Trustee Council approves the 1995 workplan, two years of funding will be committed before the Council has a good sense of what the program is producing. Given this situation, I believe it is imperative to measure the extent to which project 94320 is achieving its first-year objectives. I have therefore requested project-specific milestones from each of the principal investigators for September 1994, and for March 1995. Examples for the milestones for September 1994 include:

1. Preliminary assessment of oceanic transport in and out of PWS during spring and summer of 1994. This will verify our ability to determine if the Sound is acting like a "lake" or a "river".

2. Geotime coded acoustical measurements of juvenile salmon target strength and the fish assemblage associated with the juvenile salmon. This will provide the first measurement of the distribution of juvenile salmon and their predators during a single season.

3. Make a preliminary assessment of the major zooplankton taxa associated with swarms and layers of acoustically and optically censused macrozooplankton. This will verify our ability to measure relative zooplankton distributions using hydroacoustic technology.

4. Demonstration of a functional data management interface for accessing and visualizing empirical data sets and model output. This interface will be critical for providing interactive data management and analysis tools to principal investigators.

Assessment of progress against these milestones should occur in a meeting in Cordova to acquaint selected reviewers and myself of the state of the program after its first field season. I would be prepared to provide the Trustee Council with a formal assessment and recommendation prior to your vote on the 1995 workplan.

I would like to emphasize that the short time for review has made things difficult for all involved. The scientists proposing these studies are very committed, and have moved ahead with planning and preparation at their own risk to make the 1994 field season a meaningful first year. I strongly support the Executive Director's efforts to accelerate the 1995 planning process to move DPD production and review to the late fall. This change would also be welcomed virtually unanimously by the peer reviewers, based upon the comments I received during the review process.

As of today I have been told that the principal investigators still do not have access to the funding for this project that was "fast-tracked" earlier this year. While there are probably good reasons for these administrative delays, I am extremely concerned about the ability to mobilize the equipment and personnel required to be present in the field in mid-April. When last I inquired, the hatcheries were expecting to release the salmon around April 20, which corresponds to the expected peak of the zooplankton populations in Prince William Sound. **The objectives Project 94320 will be able to achieve for the 1994 season will be significantly reduced if the principal investigators are not in the field by mid-April. If start up is delayed until early to mid-May only the final stages of the macrozooplankton populations can be censused, and only the later (and smaller) releases of juvenile salmon will be available for predation studies.** I will monitor the progress of the mobilization of equipment and personnel if the Council approves Project 94320, and will advise the Executive Director as the situation develops.

Specific Analyses of Each Component

94320-A: Salmon Growth & Mortality

The purpose of this project is to: (1) estimate the growth of juvenile pink salmon in 1994 and compare the rates to past years, (2) describe their migration through PWS, (3) estimate their diet and compare it to past years, (4) determine the role of food abundance in limiting growth, (5) evaluate past relationships between juvenile growth rates and fry-to-adult survival, and (6) develop techniques to estimate mortality of juveniles in PWS and the Gulf of Alaska. There may be a predictable relationship between food availability to juvenile, juvenile growth rates and survival from juvenile to adult. This project will continue to explore these relationships and in the context of the other studies, particularly those on salmon predation and zooplankton abundance, help improve our understanding of the main factors that determine adult returns.

The reviewers thought that the investigators proposed for this part of the program had proven that they can do this kind of work successfully. The principal investigators also must devise a strategy to determine if faster growing juvenile salmon move to deeper water sooner, as this would make the school that is followed a more and more biased sample over time.

94320-B: Coded Wire Tag Recoveries from Pink Salmon in Prince William Sound

The purpose of this study is to recover coded wire tags (CWTs) from pink salmon caught by commercial fishermen, researchers, and others. The recovery of the tags and subsequent analyses will provide, among other objectives, data regarding (1) the contribution of tagged hatchery stocks to the commercial harvest, and (2) the growth and marine survival rates of tagged hatchery stocks. These data are quite valuable to fisheries managers, and used for both planning and in-season regulation. The data on salmon growth and survival will also be used in conjunction with data from salmon predation, oceanographic, and zooplankton studies to test the basic hypothesis regarding factors controlling pink salmon production in Prince William Sound.

This study utilizes methods that have been reviewed in past years. It does not contain experimental or non routine elements, and so was not sent out for peer review. A pilot study has been proposed this year to test thermal and chemical marking of otoliths as an alternative to CWTs. Until the results of this study are available CWTs will remain the only feasible method for developing the data described above regarding growth and survival of hatchery salmon.

94320-C: Otolith Marking: In–Season Stock Separation

This is a proven technology in other species of fish for putting marks or checks on the otoliths (ear bones) of juveniles. This has not been tried on a wide scale with juvenile pink salmon previously and this project proposes to try to mark large numbers of hatchery fish by this method in 1994. This methodology, if successful, will replace the more costly coded wire tag method currently used on a portion of hatchery-released fish. This new tag can nearly universally mark hatchery fish and perhaps settle some long-standing potential objections to CWTs (e.g., potential alteration of the olfactory sense). This project alone has a great chance to greatly improve salmon management practice.

94320-D: Genetic Structure of Pink Salmon Stock

The objective of this project is to define the genetic structure of pink salmon stocks in PWS. Potential sources of variation include stream-to-stream differences, even and odd-year stocks, upstream and intertidal spawners, early and late-season spawners. The program proposes to evaluate a series of analyses of allozyme frequencies in fish from a wide geographic range and from two hatcheries and apply a series of statistical measures to determine if different allele frequencies exist, the extent of the difference, and, if there are systematic differences, to construct measures of genetic distances between substocks. In addition a pilot study using DNA techniques will be carried out using mitochondrial DNA.

94320-E: Salmon Predation

The purpose of this project is to: (1) determine the role that variable predation plays in overall survival of pink salmon, and (2) identify and describe the predators and mechanisms of predation under various conditions. This is an ambitious program that will track cohorts of juvenile pink salmon after they are released into PWS, attempt to identify their predators, and examine the mode of interaction of predators with the juvenile fish. This involves a highly coordinated group of vessels using state-of-the-art hydroacoustic equipment to track the juvenile fish and their predators as the fish progress from the Esther Island hatchery towards the southeast passages from PWS to the Gulf of Alaska. At the same time there will be real-time sampling of oceanographic conditions, plankton abundance, predators and the juveniles themselves.

This sort of effort has never been attempted before, and this has caused some nervousness among the reviewers particularly with regard to coordination of vessels, calibration of the acoustic equipment and a myriad of details that have to "go right" for this effort to be successful. However, it appears to be possible and is definitely worth the effort, as much can be learned. As mentioned previously, if there are irresolvable technical problems that arise early in the program, the major costs associated with this project, the vessel charters, can be terminated without penalty.

94320-F: Trophic Interactions of Harbor Seals

This is a small but potentially important part of the overall project. The objective of this portion of the project is to determine if links between various food sources and the harbor seal population in PWS can be established either by use of lipid-specific analysis or analysis of stable isotope ratios. The technique being proposed is a relatively new application. The key scientist in the country to act as a peer reviewer has already reviewed the proposal, so I did not think that it needed to go out for review. I do plan to recommend that a general review be performed on the use of lipid markers to indicate food sources in marine food webs.

94320-G: Plankton Dynamics: Phytoplankton and Nutrients

The objective of this part of the program will be to: (1) describe the spatial and temporal extent of the spring-summer phytoplankton bloom in PWS, (2) measure phytoplankton primary productivity, (3) identify the major species comprising the bloom, and (4) describe the distribution and abundance of the dissolved inorganic nutrients important to phytoplankton growth. Besides the obvious importance of this program for describing the primary production that eventually supports larval fish growth and production, this program will be making a major contribution in itself to our basic understanding of the PWS system. There has simply been very little work done in this area and this study will be a pioneering one in phytoplankton dynamics of PWS.

This DPD was delayed by the University of Alaska due to questions about potential conflict of interest because the principal investigator attended the Cordova workshop. The Department of Law determined that this was not a problem, and the DPD was then released by the University, although too late to obtain a review prior to preparation of this memo.

94320-H: The Role of Zooplankton in the Prince William Sound Ecosystem

The purpose of this project is to: (1) determine the timing, duration and magnitude of the bloom of mixed layer zooplankton stocks in western and northern PWS in the spring and summer, (2) determine how changes in vertical distribution of zooplankton affect their predators, (3) provide estimates of zooplankton abundance to calibrate the acoustic instrumentation used to locate and track swarms and patches of zooplankton in PWS, (4) determine the coupling of the phytoplankton and zooplankton blooms, and (5) provide taxonomic assistance with identification of zooplankton. The main goal of the project is to test the "River-lake" hypothesis that postulates that in years when PWS is swept continuously by buoyancy driven coastal currents during the spring plankton bloom food for juvenile fish is poor, and in years when PWS is not so swept, a "lake" year, there are better feeding conditions for juvenile pink salmon. A second and related hypothesis, "prey switching", is that certain fish that feed on zooplankton in "lake" years, when they are abundant, become predators of juvenile pink salmon instead in "river" years when zooplankton are less abundant.

94320-I: Confirming Food Web Dependencies in the Prince William Sound Ecosystem using Stable Isotope Tracers

The objective of this project is to use the predictable shifts in stable isotope ratios of carbon and nitrogen that occur with increasing trophic level to determine if the river-lake and prey switching hypothesis described above can be confirmed. As both of these elements are cycled further up the food chain the heavier natural isotopes (^{13}C and ^{15}N) become relatively less abundant. Such shifts are easily measured and shifts of these isotopes in predatory fish during various types of years "river' or "lake" provide a novel way to test these hypotheses. This represents a novel application of stable isotope ratios in that such measurements, seasonal changes in food stable isotope ratios, reflected in a small measurable change of total isotope ratios against the background of carbon accumulated under different conditions.

94320-J: Information Systems and Model Development

This study component is the data and information management element for all the major portions of 94320. The major objectives of this component are (1) to process the data developed by all parts of the project (including available satellite imagery), (2) integrate these data using geographic coordinates and date of collection, (3) adapt an existing computer interface for use by principal investigators for data analysis and interpretation, and (4) plan for the development of a numerical model of the Prince William Sound ecosystem in future years. This program component also includes purchase and modification of the aquashuttle sampling device for biological oceanography, and establishment of a high-speed Internet connection to Cordova for data transmission and analysis.

I have seen an example of the oceanographic computer interface to be adapted for this program (ECMOP), which will provide all investigators with the capacity to examine their data visually in time and space in a form analogous to a Geographic Information System (GIS). Data sets can be overlaid, allowing analysis of the basic hypotheses regarding the relation between oceanographic conditions and zooplankton distributions. Data sets from sequential sampling days can be "animated", developing a visual representation of changing conditions with time in the study area. The Internet connection will allow data to be quickly transferred between Fairbanks (where satellite images are downloaded), the University of Maryland, and Cordova, and will allow principal investigators in different locations to work with data stored in Cordova. I believe the data collection equipment and data analysis tools to be developed under this component will allow the principal investigators to test and refine their basic ecological hypotheses regarding factors controlling the production of Prince William Sound fisheries. I will be receiving a specific review of this component soon, and I will also been keenly focused upon the interim products to be produced under this study component. These products will be vital for developing useful information from the entire 94320 project.

While I and all of the peer reviewers at the Cordova workshop supported the testing of these "conceptual" or "descriptive" models, there are some very critical questions that must be examined before a major commitment is made to developing a complex numerical model. Such a model, if valid, would be an extremely valuable predictive tool for fisheries management. These models have been developed at many institutions around the country for oceanographic features, and a few of these models include plankton elements. However, developing a model that can use oceanographic and plankton data to predict salmon and herring returns is fraught with such unknowns and complications that there is much skepticism regarding the eventual success of such an effort. For example, these models rely upon assumptions regarding "boundary" conditions that may create enough uncertainty to limit the predictive use of the model on time scales of interest. In the current year, these efforts are limited, and the Trustees should not make a significant

commitment in this regard without careful consideration of the likelihood of developing a useful product.

94320-K: Experimental Fry Release
94320-L: Experimental manipulation

These are fairly routine aspects of the project in that the standard approaches to aquaculture used previously will again be employed to raise fry from eggs. The juveniles will be released from the hatchery after attaining specified sizes, at certain times in relation to plankton abundance and at certain places. By releasing tagged lots and having a juvenile sampling and tag recovery component in other parts of this program it will be possible to do "natural experiments" whose outcome will point to conditions that are optimal for survival of juveniles. Since this projects was somewhat routine in nature it was not peer reviewed and no opinion is offered in relation to its value for restoration.

94320-M: Observational Physical Oceanography in PWS & the Gulf of Alaska

The purpose of this project is to: (1) determine the structure and variability of the climatic patterns and oceanographic features in PWS and the Gulf of Alaska, (2) determine the relationship between the atmospheric forcing and the wind and buoyancy driven ocean currents, (3) determine how currents act to disperse or retain food resources, (4) and determine the relationship between climatic and oceanographic cycles, physical features and changes in abundance of important species. The basic oceanographic process that will influence the abundance of fish food resources will be studied through charting currents and physical structure of the water in relation to biological phenomenon. In essence this provides the physical evidence for testing the "River-Lake" hypothesis. The basic measurements will be conducted with conductivity/temperature/depth measurements (CTDs), acoustic doppler current profilers (ADCPs) and chemical analyses of water samples. In addition towed vehicles with attached instruments will provide the "sections" needed to further characterize water structure. In the future the use of permanent buoys will be considered to supplement these other data gathering modes. The investigator has requested and received assurances that continuing advice from other oceanographers regarding fruitful approaches to measuring physical processes on a scale appropriate to biological resources will be made available.

94320-N: An Ecosystem Research plan for PWS Nearshore Fish

The purpose of this project is to: (1) evaluate the distribution of macrozooplankton in PWS in real time in order to describe the prey field for juvenile pink salmon, and (2) describe the distribution of predators of juvenile fish in real time. This will be an integral part of the complex field studies centered around fry releases in northwestern PWS and provides an important part of the biological picture for the purposes of coordinating net sampling of predators and zooplankton. The investigator faces the challenge of ground truthing the measurements of zooplankton by hydroacoustical methods against the more conventional methods. There is considerable controversy on the ability of single-frequency hydroacoustic equipment to quantitatively measure zooplankton and this is, therefore, a challenging area on the cutting edge of biological oceanography for the investigators. Data interpretation will need to rely whenever possible on the simultaneous net and hydroacoustic data for zooplankton abundance to be convincing.

94320-P: Program Management

Although the SEA program originally requested sizable resources for program management it appeared to some of us that what was being requested was a whole different management structure outside the Trustee Council management process. This was viewed as duplicative. There is however, as there are with other Trustee Council sponsored projects, a need for program direction and leadership.

I believe that the management of the overall program requires strengthening by changing the way that program direction is formulated. The program was developed by consensus among a diverse group of scientists and the public, but it cannot be managed by committee. Some hard real-time decisions will undoubtedly be made during the next field season. These decisions cannot be made by consensus--that will undoubtedly paralyze the program. The open public process that lead up to the workshop is a good one and needs to continue to provide general guidance to the process, but the day to day execution of the mandate requires a single strong leader. The leadership should absolutely committed to the success of the program and we need a leader that will work untiringly towards this end.

94320-Q: Avian Predation on Herring Spawn

The purpose of this study is to assess the impact of avian predation on herring spawn, with the goal of integrating this information into a model to predicts herring embryo survival. Better information regarding factors influencing the mortality of herring eggs should improve our ability to predict the spawning biomass of herring in Prince William Sound. The investigators will use avian census techniques to compare bird densities at sites of low and high density of egg deposition in different habitat types. Predator exclusion techniques will attempt to quantify predation from different sources. In this first year, the project will be limited to herring spawning sites along the northeastern shore of Montague Island.

Review of this DPD has greatly strengthened the experimental design. Proposals to collect lipid samples in an effort to determine the energetic importance of herring spawn has been eliminated, and the principal investigator is pursuing suggestions to provide samples to the stable isotope component (see below) if feasible. The proposal to collect seabirds for dietary analysis has been removed in favor of netting the birds and using regurgitation techniques to examine diet. In practice, it may be difficult to quantify bird predation as separate from predation by small fishes or invertebrates using exclosures. If the Trustee Council does not expand Project 94320 in future years to include pacific herring, the full value of the avian predation study will not be realized. This project is well integrated with the Herring Spawn Deposition and Egg Loss Survey (Project 94166).

EXXON VALDEZ TRUSTEE COUNCIL
FY 94 DETAILED PROJECT DESCRIPTION

A. COVER PAGE

Project title: Feasibility of Otolith Marking Wild Pink Salmon in Prince William Sound

Project ID number: 94320C

Project type: Research/Monitoring

Name of project leader(s): Sam Sharr

Lead agency: Alaska Department of Fish and Game

Cooperating agencies:

Cost of project/FY 94: $53.9K

Cost of project/FY 95:

Cost of Project/FY 96 and beyond:

Project Start-up/Completion Dates: April 1, 1994 - September 30, 1994

Geographic area of project: Prince William Sound

Project leader(s):

Sam Sharr by [illegible] — 4/7/94
Sam Sharr — Date

Regional Research Supervisor:

Steve Fried — 4/7/94
Steve Fried — Date

Agency Project Manager:

[illegible] — 4/7/94
Joe Sullivan — Date

B. INTRODUCTION

Each year approximately one half billion wild pink salmon fry emerge from the streams of Prince William Sound (PWS) and migrate seaward. Adult returns of wild pink salmon to PWS averaged approximately 10 million fish annually over the last two decades. The huge fry outmigrations and subsequent adult returns of pink salmon play major roles in the Prince William Sound (PWS) ecosystem. Both juveniles and adults are important sources of food for many fish, birds, and mammals. Adults returning from the high seas also convey needed nutrients and minerals from the marine ecosystem to estuaries, freshwater streams, and terrestrial ecosystems. Wild pink salmon also play a major role in the economy of PWS because of their contribution to commercial, sport, and subsistence fisheries in the area.

Up to 75% of pink salmon spawning in PWS occurs in intertidal areas. In the spring of 1989 oil from the *T/V Exxon Valdez* oil spill (EVOS) was deposited in layers of varying thickness in intertidal portions of many western PWS streams utilized by spawning salmon. Pink salmon eggs and fry rearing in these intertidal areas appear to have been adversely affected by the oil. Sharr *et al.* (1993a and 1993b) observed salmon embryo mortalities which were 67%, 51%, 96%, and 80% higher in oiled streams than in comparable and nearby unoiled streams in 1989, 1990, 1991, and 1992. Weibmer (1992) also observed a high incidence of deformities and elevated levels of cytochrome P-450 among fry in oiled streams in 1989. Willette and Carpenter (1993) reported reduced growth and survival of pink salmon fry and juveniles which reared in oiled marine waters of PWS in 1989. Mortality differences between oiled and unoiled streams in 1989 and 1990 were confined to intertidal spawning areas and may be attributed to direct lethal effects of oil. Large differences observed across all tide zones in 1991 and 1992 may be the consequence of damage to germ cells of the adults which originated from the 1989 and 1990 brood years when egg and larval exposures to intertidal oil were greatest. A consequence of this genetic damage may be persistent functional sterility and reduced returns per spawner for populations from oiled streams.

PWS pink salmon returns originating from brood years subsequent to the March 24, 1989, *Exxon Valdez Oil Spill* (EVOS) have been aberrant or weak. Returns of wild and hatchery pink salmon in 1991 were only slightly below the mid-point of the pre-season forecast but arrived late and had very compressed run timing. The fish were also small and in advanced stages of sexual maturity long before reaching their natal streams. As a result of this small size and advanced maturity, the fish were of little commercial value. Returns of pink salmon in 1992 and 1993 were far fewer than expected. The 1992 return of wild pink salmon was the fourth smallest even year return in the last 30 years and the hatchery return was less than one third of expected. The 1993 return of wild pink salmon was the third smallest in the last 30 years and the hatchery return was less than one fifth of expected.

Although hatchery pink salmon production in PWS began in the 1970's, returns from maximum permitted levels of fry production did not occur until the late 1980's and early 1990's and coincided with the EVOS era. Wild salmon populations injured by the EVOS are heavily exploited in mixed stock commercial, sport, and subsistence fisheries which are dominated by the huge returns from more productive hatchery populations. Wild pink salmon populations originate from hundreds of streams in PWS. Migratory timing and

abundance of wild returns in marine fishing areas varies among populations. To sustain production from wild populations managers must insure that adequate numbers of wild fish from all portions of the wild return escape fisheries and enter streams to spawn. To achieve this goal mixed stock fisheries must be managed to achieve exploitation rates appropriate for less productive wild populations. To this end, managers must be able to distinguish wild from hatchery fish and estimate their relative spatial and temporal abundance in fishing areas.

In addition to their dominance in the catch, hatchery stocks may also complicate management of PWS fisheries by straying into streams and spawning with wild fish. Hatchery fish may be poorly adapted to spawning and rearing in wild conditions. If they enter wild streams, they may fail to spawn. If they do spawn with other stray hatchery fish or with wild fish their progeny may be less fit than fish originating from 100 percent wild parentage. Sharp *et al. (in prep.)* found evidence that significant numbers of fish originating from hatcheries strayed into PWS streams and spawned in 1991 and 1992. Extensive straying by tagged wild stocks was also documented both years. The magnitude and range of straying by both hatchery and wild pink salmon stocks in PWS may significantly influence the success or failure of restoration efforts directed at wild stocks. The definition of what constitutes a wild population and the scale of restoration efforts may change if significant straying also occurs among wild populations. If straying of hatchery fish is significant and does lower the fitness of wild populations, restoration efforts which concentrate on insuring that spawning escapement goals are met may fail if no attention is given to the origins of the escapement.

Coded wire tags have been the tool of choice for applying unique marks to populations of pink salmon in PWS. The methodology has been used extensively to estimate hatchery and wild stock contributions to commercial harvests and has also been used in preliminary straying research. Despite its usefulness, there are drawbacks to coded wire tag technology. In PWS marked populations are huge consequently the number of tags applied must also be huge if accurate and precise catch contribution estimates are to be made for returning adults. Tagging and recovery are both very labor intensive and the number of tags applied and recovered are sometimes inadequate for the levels of accuracy and precision desires. Coded wire tags are also intrusive, tags can be shed, and tagging may affect the subsequent survival. Tag loss through shedding and differential mortality of tagged individuals affects subsequent estimates of adult returns based on tag recoveries and must be accounted for. There is also recent evidence that the propensity for straying among tagged fish may be related to tag placement.

Because of the cost and problems associated with coded wire technology, other alternatives of marking larger portions of populations with relatively inexpensive non-intrusive methods must be investigated. By marking most or all of the fish in a population sample sizes at the time of tag recovery can be much smaller without affecting the accuracy and precision of contribution estimates. Non-intrusive marks which cannot be shed and which do not affect survival or behavior will eliminate important sources of error in adult population estimates based on tag recoveries.

C. PROJECT DESCRIPTION

This study is designed to test the feasibility of chemically marking fish otoliths or skeletal parts by short term immersion in a dilute solution of tetracycline during the embryo or emergent fry life stages. Tetracycline has been used very successfully to apply chemical marks in many other fish species. Tetracycline is now regularly permitted by the United States Food and Drug Administration (FDA) for use as an antibiotic and otolith marking agent on fish destined for human consumption. Marks from tetracycline are permanent, relatively easy to apply, easily recognizable, and at low dosages do not appear to be alter fish survival. While the most widely reported means of applying tetracycline is by feeding, several investigators have reported successful marking of fish species by immersion in dilute solutions of the chemical. Spot and pinfish, coregonids, and striped bass, have all been successfully marked using immersion methods (Hettler 1984, Dabrowski and Tsukamoto 1986, and Secor *et al.* 1991) successfully marked. There are less documented instances of pink and chum salmon having been successfully marked by immersion as well (R.C. Johnson, National marine Fisheries Service, retired, personal communication and J. Short, National Marine Fisheries Service, Auke Bay Laboratory, Juneau, Alaska, personal communication). While probably not cost effective for large hatchery releases reared in massive flow through incubator systems, tetracycline immersion is an attractive alternative for marking much smaller wild populations of pink salmon as the migrate out of their natal streams as fry. Marking the total fry population in a stream provides an accurate and precise tool for estimating total adult returns and survival. As a non-intrusive method which does not appear to alter fish behavior, chemical otolith marking also provides a powerful tool for investigating straying among wild populations.

1. Resources and/or Associated Services:

This is project is designed to test the feasibility of a potentially powerful research and monitoring tool for wild populations of salmon in PWS. Wild populations of salmon in PWS are vital to the health of the marine, freshwater, and terrestrial portions of the PWS ecosystem and to the PWS fishing industry which is the cornerstone of the area economy.

2. Relation to Other Damage Assessment/Restoration Work:

The foundations for this study were firmly established by previous NRDA studies (F/S #1,#3) which demonstrated the technical feasibility of capturing and enumerating the entire fry outmigration from wild streams, applying coded-wire tags to wild pink salmon fry, and recovering tagged individuals in subsequent adult returns. Recoveries of tagged fish from the commercial catch and from numerous streams have demonstrated that estimates of stock abundance, timing, survival, and straying can be obtained using mark recapture techniques. This study seeks to test the feasibility of a more cost effective and reliable marking tool as a means of improving existing methodology.

3. Objectives:

a. Test and refine remote field camp methods and equipment to be used for immersing wild pink salmon fry in tetracycline solutions for up to 18 hours at varying temperatures,
b. determine the minimum immersion time and temperature of pink salmon fry in tetracycline solution to insure that otoliths from 100% of the individuals immersed have a unique fluorescent tetracycline mark which is distinguishable from otoliths selected randomly from a pool of individuals which are not immersed,
c. determine the maximum number of fry which can feasibly be marked daily at a remote field camp, and
d. compare short term growth and survival among pink fry which are treated with tetracycline following capture versus those which are not.

4. Methods:

Marking feasibility studies will be conducted adjacent to the Prince William Sound Aquaculture Corporation Cannery Creek Hatchery in Unakwik Inlet, PWS using equipment identical to that proposed for future field camp use. Fry for the study will be donated by the hatchery.

Testing Marking Procedures

A buffered solution of tetracycline hydrochloride (Tetra-bac) diluted to 400 parts per million in fresh water will be used to mark all treatment groups in this experiment. Although lessor dosages have been successfully used for some warm water species, Short (National Marine Fisheries Service, Auke Bay Laboratory personal communication) used this dose with success in chum salmon. Emergent hatchery pink salmon fry immersed in this dose for 24 hours during a small test conducted by the Cordova ADF&G staff in the March of 1994 had no short term mortalities and exhibited no signs during exposure. Short (personal communication) also reported that results improved to a point with increasing temperature and length of immersion. This study will test 12 unique combinations (t_{ij}) of immersion time (*i*) and temperature (*j*). Immersion times of three, six, 12 and 18 hours (*i = 1,2, 3,* and 4) will be tested at 2°, 5°, and 8° C (*j = 1,2,* and 3*)*. There will be five replicates (*r = 1,2,3,4, and 5*) for each t_{ij}.

Sharr *et al.* observed as many as 50,000 fry migrating daily from moderate sized pink salmon streams during tagging and enumeration studies conducted in PWS in 1990 and 1991 as part of NRDA F/S Study #3 . Larger streams having peak daily fry outmigrations of 100,000 fish per day may be considered for enumeration and tagging studies if otolith marking proves to be feasible. Projections of costs and logistics constraints indicate that heating water and loading densities for immersion baths will be the factors which define the upper limit of chemical otolith marking at a remote field camp. Present projections for fry handling and personnel time as well as fuel and camp supply needs indicate that a typical two person crew at a remote fry enumeration camp can heat approximately 540 liters of tetracycline solution

daily for marking fry. Under these constraints, loading densities of approximately 2,500 fry per treatment bag (approximately 180 fry per liter) must be possible if 100,000 fry are to be marked daily. Local aquaculture associations use loading densities as high as 320 fry per liter of aerated water for fry transport operations. It is likely that loading densities that high will result in significant mortalities among fry in a heated tetracycline immersion bath but it is assumed that the required densities of 180 fry per liter can be maintained. This experiment will also test that assumption.

Three 750 liter water baths, one for each temperature treatment, will be prepared in large insulated fish totes. Water will be heated and maintained at temperature by thermostatically controlled electric immersion heaters supplied by a gasoline powered generator. Fry emerging from hatchery incubators will initially be divided into 60 groups (12 treatments x 5 replicates) of 600 individuals each. Each 600 fish group will be placed in a clear polyethylene bag containing four liters of hatchery (stream) water at ambient stream temperature. Compressed air will supplied to each bag via air stones to insure that fry receive adequate oxygen. A pre-mixed 135 ml. buffered tetracycline solution prepared by dissolving 2.25g of Tetra-bac and 2.0g dibasic sodium phosphate in 135ml of warm (~30°C) fresh water will be cooled to stream temperature and added to the each of 60 treatment bags. Fifteen additional bags will be left untreated and used for controls (c_{ij}) to test the effects of tetracycline on survival at different temperatures and exposure times. Treatment bags and control bags will then be transferred in equal numbers to each of the three heated water baths. The water temperature in treatments bags will be monitored and when all bags in a tote have reached the desired immersion temperature timing for duration of immersion will begin. At the endpoints of each time treatment (j = 1, 2, 3, and 4), five treatment bags will be removed from each of the three totes, transferred to a saltwater enclosure in front of the hatchery and allowed to cool to ambient seawater temperature. Fry from each bag will then be transferred to separate saltwater rearing cylinders constructed of fine meshed plastic screen (vexar). In addition at the start of the treatment day fifteen groups of 600 fry each will be transferred directly from the hatchery into saltwater rearing cylinders. These fry will act as controls (c_0) for testing the marking effectiveness of each of the 12 treatments. All treatment and control groups will be held and fed in saltwater rearing pens for four weeks to insure that the treatment band is deposited on the otolith and that otolith growth occurs beyond the marking band. At the end of four weeks fry from each rearing cylinder which represent one replicate of a treatment group will be transferred to a light proof black plastic bottle containing 90 % ethyl alcohol and shipped to the Alaska Department of Fish and Game Otolith Processing Laboratory in Juneau (Otolith Lab) for otolith removal and processing.

Determining the Minimum Required Treatment

If otolith marked wild populations are to be considered as being representative of other unmarked wild populations then one important criteria for marking success should be that application of the mark does not significantly affect survival. The number of mortalities in each 600 fish treatment and control group will be enumerated for the treatment and rearing periods and totaled. A one way analysis of variance will be used to test for total mortality differences between each treatment group and their corresponding control. Any treatment which has total mortalities significantly greater than those observed in the corresponding control group will be eliminated from further consideration as a potential marking treatment.

All otolith extractions and processing will be completed by the Otolith Lab. Initially a random sample of 30 otoliths from the first replicate of the maximum treatment group t_{341} will be mounted and processed to determine if the maximum treatment resulted in a tetracycline mark. If some or all of the 30 otoliths examined bear no mark it will be assumed that lesser treatments are equally or more ineffective, that tetracycline marking procedures tested are not effective, and that the experiment should be terminated with no further expenditure of funds for otolith processing. If all 30 otoliths from t_{341} bear marks then a systematic search will be initiated to find the minimum treatment required to insure that a recognizable mark is produced in 100 percent of the individuals treated.

The systematic search for the minimum required treatment from among those having no effect on survival will proceed according to the following steps:

(1) 30 otoliths from each replicate of t_{11} will be processed and examined by a trained observer.

(2) If all 30 are in each replicate are marked, 30 more otoliths from the first replicate t_{111} will be extracted, mounted on slides then randomly mixed with 30 similarly prepared otoliths from the control group of fish c_0. The trained observer will examine this pool of 60 otoliths and attempt to correctly identify the treated individuals.

(3) If the observer correctly identifies all of the treated individuals from a pool of t_{111} and c_0, the procedure in step (2) will be repeated three more times for similar t_{111}, t_{112}, t_{113}, t_{114}, t_{115} and control pools.

(4) If at any point in these tests the observer fails to detect a mark on an otolith which has been treated, the procedure will terminate for $i=1$ and begin anew at step (1) for $i=2$ through 4.

(5) If the observer fails to classify any time treatments of temperature $j=1$ with 100 percent accuracy the steps (1) through (4) will be repeated for treatments t_{12} through t_{34}.

(6) At the first instance of the observer correctly identifying all marked individuals in all replicates for a treatment t_{ij} it will be determined that this is the minimum treatment suitable for marking.

Subsequent to identifying the minimum suitable treatment, 30 otoliths from each of the first

replicates of each remaining untested treatment group which had no significant mortalities may be examined to determine if more readily identifiable marks available and if accidentally elevated temperature in the field may adversely affect marking. If a more readily identifiable mark is identified, steps one through three list above will be repeated for that treatment. If 100 percent classification accuracy is achieved by the observer for all replicates of the treatment, this new treatment will be designated as the minimum treatment of choice and the former selected treatment will become the alternate treatment of choice. The decision as to which to use in future field studies will based upon which had the lowest mortality rate during treatment and subsequent rearing.

Testing Effects of Tetracycline

If results of this study indicate that tetracycline is a suitable marking agent for use on wild pink salmon an FDA permit for use in future years when marked fish are to be released. As part of the permit the FDA stipulates that investigators must contribute to furthering the knowledge about the biological effect of tetracycline. Typically they require that a set of controls be maintained for each treatment application of the chemical and that results of treatments and controls be compared. Because fry are not being released, these comparisons are not required for this feasibility study. However, they can be done at no additional cost and by doing them, we may facilitate obtaining future permits when fish are to be released.

Mortalities from each of the treatment controls (c_{ij}) which were held in fresh water but subject to time and temperature treatments will be enumerated and totaled for the treatment and rearing phases of the experiment. A one way analysis of variance will be used to test for significant differences between mortalities observed among controls and those observed in the corresponding treatment groups immersed in tetracycline (t_{ijr}).

5. Location:

All feasibility tests will be conducted in PWS at the PWSAC Cannery Creek Hatchery. Otoliths will be extracted and processed at the Otolith Lab in Juneau. Data analyses and reporting will be completed by ADF&G staff in Cordova and Anchorage.

6. Technical Support:

The ADF&G Commercial Fisheries Management and development Division will provide biometrics support for review of project methods and data analyses. The ADF&G Otolith Lab will supply processing expertise.

7. Contracts:

No contracts are needed. ADF&G will administer and supervise the project.

D. SCHEDULES

Dates	Activity
April 5 - May 5, 1994	Apparatus set up at Cannery Creek Hatchery, marking immersion treatments, and rearing of treatments and controls.
May 5 - May 15	Dismantle and remove equipment at Cannery Creek and ship otolith samples to Otolith Lab
May 15 - Sept 15	Process otoliths at Otolith Lab
Nov. 15, 1994	Draft Summary Report
Dec. 15, 1994	Final Report

E. EXISTING AGENCY PROGRAM

The ADF&G permanent staff of biologists and biometricians write operational plans and provide overall supervision for this project. PWSAC will supply up to 50,000 fry for and space to the experiment as well as room and board for project personnel at Cannery Creek Hatchery. the ADF&G Otolith Lab will process all otoliths from the experiment.

F. ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

None of the fish reared in this experiment will be released. The Alaska Department of Environmental Conservation has determined that amounts of tetracycline being deposited in PWS from the experiment are well below allowable standards and require no permits. Net pens and fish rearing activities at Cannery Creek Hatchery fall within existing ADF&G and PWSAC permits.

G. PERFORMANCE MONITORING

The Assistant Project Leader is a seasonal permanent Fisheries Biologist I with the ADF&G. The Project Leader is a full time Fisheries Biologist III PWS Salmon Research Project Leader for the ADF&G, Region II, Division of Commercial Fisheries Management and Development (CFMD). The Project Leader is supervised by the ADF&G, CFMD Region II Regional Research Supervisor.

An ADF&G Biometrician II from the CFMD office in Anchorage will review the experimental design for the project. The Assistant Project Leader will purchase all equipment needed and set up the marking and rearing apparatus. The Assistant Project Leader will conduct all treatments with the assistance of the Project Leader and a Fish and Wildlife Technician II and oversee a Fish and Wildlife Technician II will monitor the rearing of the fish. The ADF&G Otolith Lab will process all otolith samples. The assistant project leader will write draft and final reports for the project.

H. COORDINATION OF INTEGRATED RESEARCH EFFORT

The Project Leader, Assistant Project Leader, and the Biometrician positions are shared with EVOS pink salmon research projects 94191 and 94184. Fry donated by PWSAC are part of those included in the experimental release portion of the SEA project (94320). Cannery Creek Hatchery is on the regular sampling route for the field monitoring portion of project 94191 and the research vessel conducting that sampling will transport all marking and rearing apparatus for this project to the hatchery site during a scheduled sampling trip.

Without the availability of a non-intrusive mass marking methodology it is unlikely that reliable estimates of total return, survival, and straying rates for wild populations will be possible. Therefore, the monitoring, research and restoration objectives of this project are related to several other projects including the suite of SEA projects (94320), the Pink Salmon Genetics project (94189), and the Pink Salmon Egg and Alevin Mortality (94191) projects. Total return, survival and straying data which may become possible to obtain as a result of methods developed by this project will be critical to several components of SEA and related pink salmon projects by including those investigating:

1) wild salmon survival in relation sea surface temperature and other oceanographic features of PWS during the fry and juvenile life stages.

2) salmon survival in relation to abundance, size, growth rate, and distribution of pink salmon fry and juveniles and, zooplankton population distribution, abundance, and species composition,

3) salmon survival in relation to abundance, size, growth rate, and distribution of salmon fry and juveniles and the abundance distribution, size, and species composition of predator populations and,

4) pink salmon population structure in PWS.

I. PUBLIC PROCESS

The general public has been involved in the development and evolution of mass marking programs such as the Prince William Sound coded wire tagging programs since their inception in the early 1980's as a cooperative effort between ADF&G and the PWS area private non-profit (PNP) aquaculture associations. These PNP's, operated by a broad constituency of commercial, sport, personal use, and subsistence fishers and community representatives, review coded wire tag project plans and results annually before approving subsequent funding. Operational plans and results of mass marking projects are also reviewed periodically by the PWS Regional planning team as well as interested fishing industry groups. As part of the Trustee Council NRDA and Restoration process the code-wire tag mass marking and recovery project has also been subject to extensive peer review and annual public review and comment. Results of coded-wire tag projects have been

presented at the March 1993 Oil Spill Symposium sponsored by the Trustee Council, the 1993 Pink and Chum Workshop, the annual Spring meeting of the PWSAC board of directors in 1993 and, the Alaska Board of Fisheries in 1994. The PWSAC board and the PWS Regional Planning Team have endorsed the concept of otolith marking of hatchery and wild fish and thermal otolith marking of hatchery fish is considered to be the methodology of choice for the future.

J. PERSONNEL QUALIFICATIONS

Fisheries Biologist III Project Leader - Samuel Sharr

Mr. Sharr received a Bachelor of Science degree in biology from the University of Washington in 1968. He has been a research biologist for ADF&G since 1979 and has worked on PWS salmon and herring since 1981. He assumed his present position as the ADF&G, Division of Commercial Fisheries, Biologist III, PWS Area Fin Fish Research Project Leader in 1986. In this capacity, Mr. Sharr oversees all the salmon and herring research conducted by the Division of Commercial Fisheries in PWS. His involvement with the PWS salmon escapement aerial survey program dates from the early 1980's. Mr.Sharr has supervised a total re-edit of the historic aerial and ground survey data and designed a new RBASE data base for inseason escapement analyses. Mr. Sharr wrote the original operational plans for NRDA F/S Studies 1,2 and, 3, in 1989 and 1990, and 1991, restoration studies 60A, 60B, and 60C in 1992, and 93137, 93184, and 93191 in 1993 and has been the Principal Investigator for all of those projects. Mr. Sharr is also a member of the scientific committee of the Prince William Sound Fisheries Ecosystem Planning Group and a co-author of the Sound Ecosystem Assessment research plan and science proposal.

K. BUDGET

(see attached)

LITERATURE CITED

Sharr, S., B. Bue, S.D. Moffitt, and A. Craig (1993a). Injury to salmon eggs and pre-emergent fry in Prince William Sound. Federal/State Natural Resources Damage Assessment Fish/Shellfish Study Number 2 Final Report, Alaska Department of Fish and Game, Cordova.

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Wiebmer, M. 1992. Cytochrome P-450 induction of pink salmon (*Oncorhyncus gorbuscha*) eggs and larvae in Prince William Sound, Alaska: Effects of the *Exxon Valdez* oil spill, Alaska Department of Fish and Game, Habitat Division, Technical Report No. 92-3, Juneau, Alaska.

Willette, T.M. and G. Carpenter. 1993. Early marine salmon injury assessment in Prince William Sound. Federal/State Natural Resources Damage Assessment Fish/Shellfish Study Number 4 Final Report, Alaska Department of Fish and Game, Cordova, Ak.

Hettler, W.F. 1984. marking otoliths by immersion of marine fish larvae in tetracycline. Transactions of the American Fisheries Society 113:370-373.

Secor, D.H., M.G. White, and J.M. Dean. 1991. Immersion marking of larval and juvenile hatchery-produced striped bass with oxytetracycline. Transactions of the American Fisheries Society 120:261-266.

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description:

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$37.9	$594.0	$631.9	$1,392.4	
Travel	$0.0	$0.8	$18.6	$19.4	$105.2	
Contractual	$0.0	$103.2	$5,205.6	$5,308.8	$1,039.6	
Commodities	$0.0	$0.0	$76.9	$76.9	$118.2	
Equipment	$0.0	$0.0	$128.9	$128.9	$383.3	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$141.9	$6,024.0	$6,165.9	$3,038.7	
General Administration	$0.0	$5.9	$226.1	$232.0	$374.6	
Project Total	$0.0	$147.8	$6,250.0	$6,397.8	$3,413.3	
Full-time Equivalents (FTE)	0.0	0.7	10.7	11.4	13.3	
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
See Individual 3A Forms for Personnel Details				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

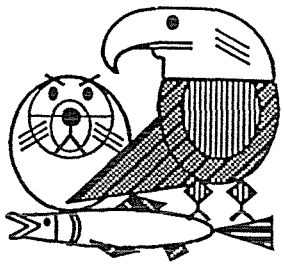
Project Number: 94320
Project Title: Prince William Sound System Investigation
Agency: AK Dept. of Fish & Game

FORM 2A
PROJECT
DETAIL

11.5.5C

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, AK 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: Trustee Council Members

FROM: James R. Ayers
Executive Director

DATE: April 7, 1994

RE: Recommendation on Proposed New Project 94427

Proj #94427/Harlequin Duck Boat Surveys & Methodology Testing (ADF&G)
Cost: $20.3

Purpose: Although final reports for the FY92 and FY93 studies are still not complete, and the Trustees earlier decided not to undertake a harlequin duck monitoring project for FY94, a comprehensive project is being developed for FY95. ADF&G researchers are seeking $20.3 for FY94 in order to develop the best methodology for next year's study.

Description: Limited intensive boat surveys of harlequins will be conducted in selected shoreline segments of western Prince William Sound. Several methods of classifying age and sex composition in the region will be tested and compared in order to design a sampling regime for future work.

NEPA: This project is expected to be eligible for a Categorical Exclusion.

Legal concerns: None.

Long-term implications: A long-term program for harlequin duck restoration and recovery monitoring is being considered and will be presented to the Trustee Council as part of the FY95 Work Plan.

Chief Scientist recommendation: Supports this limited project. Recommends that further studies await the results of the FY92 and 93 field reports which still have not been finalized. The FY92 report has been submitted and reviewed. The FY93 report has still to be submitted.

Executive Director recommendation: I recommend $20.3 be approved to allow Project 94427 to go forward.

EXXON VALDEZ TRUSTEE COUNCIL
FY 94 DETAILED PROJECT DESCRIPTION

Project title:	Experimental Harlequin Duck Breeding Survey
Project ID number:	94427
Project type:	Research/Monitoring
Project leader(s):	Daniel H. Rosenberg, Thomas C. Rothe
Lead agency:	Alaska Department of Fish and Game
Cooperating agencies:	U. S. Fish and Wildlife Service
Cost of project/FY 94:	$21.0K
Cost of project/FY 95:	$145.5K
Cost of Project/FY 96 and beyond:	Unknown
Project Start-up/Completion Dates:	May 1, 1994 to November 1, 1994
Geographic area of project:	Western Prince William Sound
Project leader:	Daniel H. Rosenberg
Lead agency project manager:	Joseph Sullivan

B. INTRODUCTION

Oil spill studies of harlequin ducks in western Prince William Sound (PWS) 1989-93 indicate an initial mortality up to 1,000 birds (spill-wide), consistently low numbers of birds during the breeding season, a lack of breeding activity on suitable streams 1991-92, negligible production of broods through 1993, and an apparent decline in post-breeding molting birds in the region. Two main hypotheses have been followed to explain these findings: (1) ingested oil is continuing to cause either mortality and/or sublethal impairment of reproduction; and/or (2) initial mortality caused significant losses to the local western PWS breeding component and subsequent low production. To date, oil has been found in a few harlequins collected during 1989-90 and 1993, and they continue to feed in oiled areas year around. However, no conclusive evidence has been found of histological or physiological effects from oil.

Regardless of ultimate causes, collective results of EVOS studies indicate serious population-level concerns for harlequin ducks in western PWS. Prompt focus on specific population parameters is necessary to determine the status and recovery potential of harlequin ducks. Sea duck populations, in general, are composed of long-lived birds that have delayed sexual maturity, low annual production rates, and "boom and bust" years. Consequently, sea duck population dynamics are quite sensitive to adult survival rates, size of the breeding component, and variable breeding propensity (% of adults breeding annually). Data on sex and age composition are very useful in examining these aspects of a population. To date, EVOS projects have gathered abundance and distribution data only on total harlequin ducks, with little information on sex and age composition, or proportions of paired birds. The focus of these projects has been extensive survey coverage and a diverse array of other time-consuming objectives. Also, efficient techniques for the kind of intensive survey required have not been developed for sea ducks.

Currently, there are no sufficiently measured parameters of harlequin population dynamics with which to construct a population model for Prince William Sound. Development of a reliable breeding bird survey is a critical prerequisite to evaluating the remaining reproductive potential in the western Sound and acquiring data to fill in several important model elements. The experimental survey described below is intended to provide a new tool for establishing quantified restoration goals and designing an effective monitoring program for harlequin ducks in PWS.

C. PROJECT DESCRIPTION

1. Resources and/or Associated Services:

The subject resource of this project is the harlequin duck in Prince William Sound. Results of this work will have a direct bearing on assessing the status and outlook for this resource for guiding agency management programs and policies related to public uses, especially subsistence and recreational hunting.

2. Relation to Other Damage Assessment/Restoration Work:

More specific information on harlequin duck population structure in PWS is absolutely vital to: (1) estimate post-spill harlequin breeding birds remaining in western PWS, (2) assess potential rates of long-term recovery/increase for the spill region, (3) establish definitive, realistic restoration goals, and (4) monitor a meaningful population parameter for progress toward goals. Pursuit of these data will provide a more reliable basis for restoration planning and be consistent with an adaptive management approach that allows more efficient allocation of efforts and enrichment of knowledge over time (e.g. for a long-term monitoring program).

3. Objectives:

The objectives of this project are to: (1) conduct limited intensive boat surveys of harlequin ducks in selected shoreline segments (previously surveyed) of western PWS during May and June; (2) test several methods of classifying age and sex composition of harlequin ducks in the region; (3) compare reliability of classification methods and select a viable option; and (4) design a sampling regime to reliably estimate number of adults and/or pairs in the survey region and recommend it for EVOS monitoring plans.

4. Methods:

Shoreline survey segments will be selected in western PWS from areas surveyed during 1991-93 and where sufficient numbers of harlequin ducks are likely to occur. Seasonal sex and age classification criteria will be developed from literature accounts, examination of study skins, and experience of previous investigators in Canada and the U.S. Surveys will be conducted over 1-2 weeks during late May and early June by 2-3 observers from a slow-moving boat within 100 m of shore, ideally during periods and tide stages when harlequins will be most visible. Field classification methods will include visual assessments by multiple observers, photography, videography, and other prospective means of capturing sex and age data. No birds will be captured or collected. After field studies are complete, analysis will include quantification of class data from visual observations and other media, comparison and corroboration of data among methods, and statistical description of results.

5. Location:

The project will be conducted in the oil spill area of western Prince William Sound, generally between Perry Island and LaTouche Island, including mainland coast. Potentially affected communities include Chenega and Whittier.

6. Technical Support:

The only potential need for technical support is access to videography editing equipment available in Anchorage through the National Biological Survey.

7. Contracts:

No contracts will be necessary for this project.

D. SCHEDULES

This project is a short-term experimental survey. Preparation and field work will be conducted from May 1-June 15, 1994. Data analysis and report writing will occur through October 1994. A final report will be produced by November 1, 1994.

E. EXISTING AGENCY PROGRAM

There are no other agency or non-agency contributions to this project. Neither ADFG nor USFWS have plans for work on harlequin ducks in this region in 1994.

F. ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

This project will comply with all applicable requirements of the National Environmental Policy Act and all applicable ordinances, regulations, and laws. No environmental analysis is required for this study, which qualifies for categorical exclusion.

G. PERFORMANCE MONITORING

This study will be conducted and managed by the Division of Wildlife Conservation, Waterfowl Program. Project operations will be conducted by permanent staff of the division and supervised according to professional standards. The Waterfowl Coordinator will be responsible for technical and administrative oversight, including project design approval, staff assignments, budget monitoring, and quality control of products. Operations and data management will be controlled through supervision, appropriate staff training, and compliance with applicable SOP's. The products of this study will be peer reviewed internally and through prescribed EVOS processes.

H. COORDINATION OF INTEGRATED RESEARCH EFFORT

There are no other projects directly related to the work planned in this project, although results of USFWS boat surveys for birds and mammals may provide useful information. However, those surveys are conducted outside the harlequin duck breeding season (March and July). Eventually, the techniques developed on this project should provide a partial basis for future sea duck monitoring efforts. Subsequent EVOS program development can incorporate sea duck population dynamics information with intertidal and nearshore ecosystem projects.

I. PUBLIC PROCESS

A comprehensive survey program for harlequin ducks in Prince William Sound was proposed as part of the FY 94 Work Plan and reviewed by the public and EVOS personnel. This project is a small experimental effort related to that proposal.

J. PERSONNEL QUALIFICATIONS

Daniel H. Rosenberg — Project Leader

Dan Rosenberg has worked as a waterfowl biologist for The Alaska Department of Fish and Game (ADFG) since 1985. From 1980—1983 Mr. Rosenberg worked as a waterfowl biologist for the U.S. Fish and Wildlife Service and from 1983—1984 as a Habitat Biologist for ADFG. Mr. Rosenberg served on the adjunct faculty of Anchorage Community College from 1984 - 1987 as an instructor for courses in Ecology and Animal Behavior, and Fish and Wildlife Management.

Mr. Rosenberg has conducted extensive waterfowl population monitoring and habitat assessment surveys on the Copper River delta, Stikine River delta, Kenai wetlands, upper Cook Inlet, Aleutian Islands, and Kodiak Island. As project leader, Mr. Rosenberg has assessed impacts to waterfowl and wildlife populations from hydroelectric development, urban expansion, habitat alterations, chemical pollutants, timber harvest, and surface mining.

Mr. Rosenberg has conducted studies to assess impacts from chemical pollutants on waterfowl populations in Alaska wetlands. Mr. Rosenberg designed, supervised, and conducted the first definitive study to assess the physiological effects from the ingestion of spent lead shot on mallards and pintails in Alaska. As the ADFG representative on the Biological Technical Assistance Group for the Eagle River Flats (ERF), Mr. Rosenberg has been responsible for overseeing the investigation into the identification, and remediation of white phosphorous, and restoration of the ERF, the site of one of the largest waterfowl die-offs in Alaska from chemical pollutants.

Mr. Rosenberg has been responsible for ecological assessment, design, construction, and post—project monitoring of the first large scale experimental waterfowl habitat enhancement projects in Alaska and coordinated ADFG review of fish and wildlife impact analysis and mitigation planning for the Susitna Hydroelectric Project.

Mr. Rosenberg received a Bachelor of Science degree in Wildlife Management from Humboldt State University, Arcata, CA in 1979. Mr. Rosenberg was ADFG Wildlife Biologist of the Year in 1991, and Alaska Outdoor Council Waterfowl Conservationist of the Year in 1993.

Thomas C. Rothe, Project Supervisor

Tom Rothe earned a Bachelor of Science degree in Population Dynamics from the University of Wisconsin (1973), including background in environmental impact analysis, environmental law and public policy, and natural resource economics. He received a Master of Science degree in Animal Ecology from Iowa State University (1977) after research work on wetland ecology and behavioral biology of prairie ducks.

Mr. Rothe conducted wetland and waterbird studies in relation to petroleum development on Alaska's North Slope 1976-83 for the U.S. Fish and Wildlife Service.

During 1980-83 he supervised the Office of Special Studies in a program of baseline, pre-development, and mitigation studies for petroleum, mining, and wetland impact activities in northern, southcentral and southeastern Alaska. This work included studies of sea duck food habits and potential contamination from oil in Port Valdez and from metals near the Quartz Hill molybdenum mine near Ketchikan. In these capacities, Mr. Rothe has had extensive experience with the petroleum industry and their consultants (TAPS, Prudhoe/Kuparuk, NPR-A, ANGTS), interagency coordination, management of major field studies, and public involvement processes on natural resource issues.

Since 1983, he has been Waterfowl Coordinator for the Alaska Department of Fish and Game, responsible for a wide variety of waterfowl and habitat management programs. He currently serves as the Alaska member of the Pacific Flyway Council's Study Committee and the Council's technical representative to the international Arctic Goose Joint Venture. Mr. Rothe has been involved with flywaywide and international population management issues for over 10 years and has accumulated broad knowledge of waterfowl biology and ecology.

K. BUDGET

	ADF&G	TOTAL
Personnel	11.4	11.4
Travel	1.8	1.8
Contractual	1.5	1.5
Commodities	2.8	2.8
Equipment	1.0	1.0
Capital Outlay	0.0	0.0
Subtotal	18.5	18.5
General Administration	1.8	1.8
Project Total	20.3	20.3

EXXON VALD. TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Experimental Harlequin Duck Breeding Survey - This project is an experimental survey of harlequin ducks in Western PWS during the breeding season. Several methods will be tested during boat surveys to record sex and age classification data. Classification techniques will be compared and a reliable method will be chosen for application to future monitoring of breeding population structure. Products will include a comprehensive breeding season survey design.

Budget Category:	1993 Project No. 93033 Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$11.4	$11.4	$108.5	
Travel	$0.0	$0.0	$1.9	$1.9	$6.5	
Contractual	$0.0	$0.0	$1.5	$1.5	$10.0	
Commodities	$0.0	$0.0	$2.8	$2.8	$17.0	
Equipment	$0.0	$0.0	$1.0	$1.0	$3.5	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$18.6	$18.6	$145.5	
General Administration	$0.0	$0.0	$1.8	$1.8	$17.0	
Project Total	$0.0	$0.0	$20.4	$20.4	$162.5	
Full-time Equivalents (FTE)	1.6	0.0	0.2	0.2	2.0	
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Wildlife Biologist III			0.5	$3.0
Wildlife Biologist II			1.5	$8.4
Program Manager				
Personnel Total	0.0	$0.0	2.0	$11.4

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94427
Project Title: Experimental Harlequin Duck Breeding Survey
Agency: AK Dept. of Fish & Game

FORM 2A
PROJECT
DETAIL

EXXON VALD. TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Two round trips Portage/Whittier @ $192/trip		$0.4
Two round trips Portage/Whittier @ $126/trip		$0.3
Four round trips Portage/Whittier @ $16/trip		$0.1
Per diem for Whittier trips 10 days @ $110/day		$1.1
Travel Total	$0.0	$1.9
Contractual:		
Air charter - 5.5 hours in a Beaver @ $275/hour		$1.5
Contractual Total	$0.0	$1.5

Project Number: 94427
Project Title: Experimental Harlequin Duck Breeding Survey
Agency: AK Dept. of Fish & Game

FORM 2B
PROJECT
DETAIL

EXXON VALD TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Food and supplies for field camps		$0.6
Fuel for boat (1 boat x 60 gallons/day x $1.50/gallon x 15days)		$1.4
Film/video supplies		$0.5
Parts for boat repairs		$0.3
Commodities Total	$0.0	$2.8
Equipment:		
Photo/video accessories		$1.0
Equipment Total	$0.0	$1.0

07/14/93

1994

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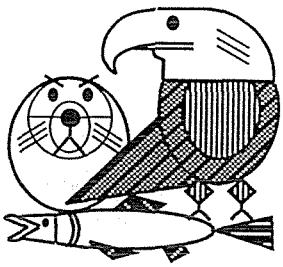
Project Number: 94427
Project Title: Experimental Harlequin Duck Breeding Survey
Agency: AK Dept. of Fish & Game

FORM 2B
PROJECT
DETAIL

11.5.3B

Exxon Valdez Oil Spill Trustee Council

Restoration Office
645 G Street, Suite 401, Anchorage, Alaska 99501-3451
Phone: (907) 278-8012 Fax: (907) 276-7178



MEMORANDUM

TO: Trustee Council Members

FROM: James R. Ayers
Executive Director

DATE: April 7, 1994

RE: Recommendation on Proposed New Project 94428

Proj #94428/Subsistence Restoration Planning and Implementation (ADF&G, DOI,USFS) Cost: $99.1

Purpose: This is a new project to design and implement a one-time planning process, coordinated among state and federal agencies and affected subsistence communities, to identify subsistence restoration project proposals for the FY95 Work Plan and to ensure the participation of subsistence users in other FY95 planning efforts. Project ideas that do not become part of the FY95 Work Plan may be eligible for funding through grants from a $5 million appropriation of Exxon Valdez criminal settlement funds by the Alaska Legislature.

Description: Working closely with state and federal attorneys and Trustee Council staff, guidelines for potential subsistence restoration projects would be developed, project ideas solicited and prioritized through an intensive community-based public process, and potential projects submitted to the Trustee Council for consideration for FY95.

NEPA: This project is expected to be eligible for a Categorical Exclusion.

Legal concerns: The primary purpose of this project is to develop subsistence restoration projects for civil funding. A side benefit would be the potential identification of projects that might be eligible for funding by the state of Alaska under the criminal settlement.

Long-term implications: Subsistence uses of fish and wildlife in the spill region are still feeling the effects of the spill. This project would result in an intensive outreach effort with subsistence users and affected communities in order to develop additional means to aiding recovery of subsistence resources and their uses.

Chief Scientist recommendation: No recommendation.

Executive Director recommendation: I recommend $99.1 be approved to allow Project 94428 to go forward. A review of an earlier version of this project has resulted in its being expanded to a joint state-federal effort which I believe greatly strengthens the project.

EXXON VALDEZ TRUSTEE COUNCIL
FY 94 PROJECT DESCRIPTION

A. COVER PAGE

Title: Subsistence Restoration Planning and Implementation
Project Identification Number: 94428
Lead Agencies: Alaska Department of Fish and Game, United States Department of the Interior, U.S. Forest Service
Cooperating Agencies: Alaska Department of Community and Regional Affairs; Alaska Department of Law
Cost of Project: $99,084
Project Startup Date: April 15, 1994
Duration: April 15, 1994 - April 1995
Geographic Area: Prince William Sound, lower Kenai Peninsula, Kodiak Island, and Alaska Peninsula

Project leader: James A. Fall

Program Manager: Joseph R. Sullivan

B. INTRODUCTION

Subsistence uses of fish and wildlife are a vital natural resource service that was injured by the Exxon Valdez oil spill. After the spill, harvest levels declined, sharing of resources was reduced, and the transmission of skills and knowledge about natural resources was disrupted. While harvest levels and participation in subsistence activities have rebounded somewhat since the first two post-spill years, effects of the spill remain. These include concerns about the long term health effects of using resources from the spill area, a loss of confidence in people's own abilities to judge if resources are safe to eat, scarcity of certain injured subsistence resources (such as harbor seals, marine invertebrates, and waterfowl) in traditional harvest areas, increased costs associated with subsistence harvests, and reduced opportunities for young people to learn the subsistence way of life.

The purpose of this project is to design and implement a coordinated planning process to develop subsistence restoration project proposals for the Trustee Council Restoration Plan for FY 95 and to insure the participation of subsistence users in other FY 95 planning efforts. Such projects could propose to directly restore resources used for subsistence, provide alternative natural resources, or restore access or people's use of the resource. Guidelines for project content will be developed, project ideas will be solicited and prioritized through a public process, project proposals will be evaluated, and a set of project proposals will be presented to the Trustee Council for consideration for funding.

Project ideas developed through this planning process which do not become part of the FY 95 Restoration Plan may be eligible for funding through grants from a $5 million appropriation of Exxon Valdez criminal settlement funds by the Alaska Legislature. The legislature authorized the Department of Community and Regional Affairs to award grants to unincorporated rural communities in the oil spill area in order to restore, replace, or enhance subsistence resources or services damaged or lost as a result of the spill (Section 11, Chapter 79, SLA 1993). The legislation requires that selection of grant recipients shall be made after consultation with the state members of the Trustee Council.

In addressing an injured service which represents an aspect of the human component of the injured natural environment in a comprehensive manner, the development of this planning program is consistent with an ecosystem approach towards restoration endorsed by the Trustee Council.

C. PROJECT DESCRIPTION

1. Resources and/or Associated Services. The purpose of the project is to collaboratively develop and evaluate proposals to restore or enhance injured subsistence resources and lost or diminished subsistence services.

2. Relation to Other Damage Assessment/Restoration work. The FY 94 Restoration Plan includes two subsistence restoration projects: 94244 (Harbor Seal and Sea Otter Co-op Subsistence Harvest Assistance) and 94279 (Subsistence Food Safety Testing). Aspects of these projects may be continued as part of projects developed during the cooperative planning effort. Projects more appropriately supported through grants from the $5 million appropriation from the criminal settlement money may also be identified.

3. Objectives. The project has three primary objectives. The first objective is to develop a set of guidelines for soliciting and evaluating proposals to restore reduced or lost subsistence uses. The second objective is to conduct a public outreach program to assist in identifying community needs and priorities related to injured subsistence uses which can be developed as subsistence restoration project proposals, either for the Trustee Council FY 95 work plan, or for possible funding through grants from the criminal settlement appropriation. The third objective is to identify subsistence resources that could be used as substitutes for those subsistence resources injured by the spill.

4. Methods. Guidelines for appropriate topics for projects will be developed by the Alaska Department of Fish and Game (Division of Subsistence), the Alaska Department of Community and Regional Affairs (DCRA) (Division of Municipal and Regional Assistance), the U.S. Department of the Interior, and the U.S. Forest Service (the latter two agencies representing the federal Trustee Council members), with assistance from the Alaska Department of Law, Trustee Council staff, and representatives of spill-area communities. A community outreach program will occur to solicit ideas about priorities for subsistence restoration projects. A local community facilitator will be hired as a

nonpermanent employee within the Division of Subsistence to assist with the planning and implementation of the community meetings. Following the meetings, interested parties may then develop their projects as proposals for funding; project staff will provide assistance. After evaluation of the proposals, recommendations will be passed on to the Trustee Council for review.

5. Location. Prince William Sound, Cook Inlet, Kodiak Island Borough, and the Alaska Peninsula within the spill area

6. Technical Support. This project will not need technical support as described in the proposal guidelines.

7. Contracts. Development of the program itself will not require contracts.

D. SCHEDULES

April 15 - 30, 1994: Develop draft guidelines
May and June 1994: Community meetings to develop project priorities and proposals.
July - early August 1994: Proposal evaluation
August 15: Publication of project proposals in Draft FY 95 Work plan
October 1994: Trustee Council Meeting.
November 1994 - March 1995: Monitor and evaluate proposals; continue development of proposals for future work plans.

E. EXISTING AGENCY PROGRAM

The ADF&G Division of Subsistence maintains an ongoing program of data collection and report preparation about the role of subsistence activities in Alaska, including the spill area communities. The division is currently involved in a joint project with the U.S. Minerals Management Service, which, among other things, is investigating social effects of the spill. The division is also actively engaged in research on subsistence harbor seal and sea lion harvests in coastal communities of southcentral and southwest Alaska, supported by the National Marine Fisheries Service. In addition, the division is the lead agency on two FY 94 oil spill restoration projects: Project 94279, Subsistence Foods Safety Testing; and Project 94244, Harbor Seal and Sea Otter Co-op Subsistence Harvest Assistance. The Division of Community and Regional Assistance (DCRA) provides technical assistance services, including grants administration, to communities and has administered an emergency oil spill impact program in the spill area.

F. ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS.

This project is categorically excluded under NEPA guidelines.

G. PERFORMANCE MONITORING

Performance monitoring will be conducted jointly by staff of the Division of Subsistence and Division of Municipal and Regional Assistance (MARAD). Generally, staff of the Division of Subsistence will monitor the technical adequacy of projects while MARAD staff will monitor the administrative and management adequacy of projects. The two divisions will develop a general agreement based on the preceding and, for particularly complex projects, may develop specific agreements relating to the performance monitoring of that particular project.

H. COORDINATION OF INTEGRATED RESEARCH EFFORT

As a planning project, a goal of this project will be to coordinate the subsistence restoration program with other research efforts.

I. PUBLIC PROCESS

Community meetings will be held to solicit project ideas and priorities. Information about the projects will be communicated in the Subsistence Restoration Newsletter produced by the Division of Subsistence.

J. PERSONNEL QUALIFICATIONS

James Fall. Dr. Fall is the regional program manager for the Division of Subsistence, ADF&G, for southcentral and southwest Alaska. Since 1989, he has supervised the division's oil spill response and research program.

Rita Miraglia. Ms Miraglia has served as the oil spill coordinator for the Division of Subsistence since 1990. As such, she has organized and participated in the subsistence resource collection and testing program of 1990, 1991, and 1993. She has also been the lead communicator of study findings to communities through organizing community meetings and writing newsletters.

Jody Seitz. Ms Seitz has worked as a subsistence resource specialist with the Division of Subsistence since 1989, with responsibility for Prince William Sound communities since 1991.

Craig Mishler. Since 1989, Dr. Mishler has been the subsistence resource specialist with the Division of Subsistence with responsibility for the Kodiak Island Borough and the division's multi-regional harbor seal and sea lion project.

Lisa Scarbrough. Ms Scarbrough is the subsistence resource specialist with the Division of Subsistence with responsibility for the Alaska Peninsula communities (among others), a position she has held since 1989.

Pat Poland. Mr. Poland is Deputy Director, Division of Community and Regional Assistance, DCRA. He has been responsible for day-to-day management of the division's Technical Assistance and Program Delivery services for a number of years. This experience includes oversight of an emergency oil spill impact grant program following the Exxon Valdez spill.

John Gilva. Mr. Gilva is a Planner IV with the MARAD division and has worked extensively at providing technical assistance services to Prince William Sound communities. Additionally, he developed regulations for administration of the Emergency Oil Spill Impact Program and generally administered the application and award process.

K. BUDGET

Personnel:	$63,925

Subsistence Resource Specialist II. Project Coordinator. 5.5 months ($25,025)
Subsistence Resource Specialist II. Prince William Sound, 1.5 months ($7,050)
Subsistence Resource Specialist II. Alaska Peninsula/Kodiak, 1.5 months ($7,050)
Regional Program Manager, 1 month ($7,200)
Fish and Wildlife Technician III, 2 months (local community facilitator) ($5,000)
U.S. Department of the Interior Representative, 1 month ($6,300)
U.S. Forest Service Representative, 1 month ($6,300)

Travel		$24,000
Community Meetings	$18,000	
Coordinator Travel	$ 6,000	
Printing, etc.		$ 1,000
Supplies		$ 500
SUB TOTAL		$89,425
General Administration		$ 9,659
GRAND TOTAL		$99,084

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Subsistence Restoration and Planning and Implementation - This project will design and implement a coordinated planning process to develop subsistence restoration project proposals for the FY95 work plan. This will insure the participation of subsistence users in other FY95 planning efforts. Such projects could propose to directly restore resources used for subsistence, provide alternative natural resources, or restore access or people's use of the resource.

Budget Category:	1993 Project No. 93017 Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$64.0	$64.0	$0.0	
Travel	$0.0	$0.0	$24.0	$24.0	$0.0	
Contractual	$0.0	$0.0	$1.0	$1.0	$0.0	
Commodities	$0.0	$0.0	$0.5	$0.5	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$89.5	$89.5	$0.0	
General Administration		$0.0	$9.7	$9.7		
Project Total	$0.0	$0.0	$99.2	$99.2	$0.0	
Full-time Equivalents (FTE)		0.0	1.0	1.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
See Individual 3A Forms for Personnel Details				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

07/14/93

1994

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Project Number: 94428
Project Title: Subsistence Restoration Planning and Implementation
Lead Agency: AK Dept. of Fish & Game

FORM 2A
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Subsistence Restoration and Planning and Implementation - This project will design and implement a coordinated planning process to develop subsistence restoration project proposals for the FY95 work plan. This will insure the participation of subsistence users in other FY95 planning efforts. Such projects could propose to directly restore resources used for subsistence, provide alternative natural resources, or restore access or people's use of the resource.

Budget Category:	1993 Project No. 93017 Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$51.4	$51.4	$0.0	
Travel	$0.0	$0.0	$18.0	$18.0	$0.0	
Contractual	$0.0	$0.0	$1.0	$1.0	$0.0	
Commodities	$0.0	$0.0	$0.5	$0.5	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$70.9	$70.9	$0.0	
General Administration	$0.0	$0.0	$7.8	$7.8	$0.0	
Project Total	$0.0	$0.0	$78.7	$78.7	$0.0	
Full-time Equivalents (FTE)	1.1	0.0	1.0	1.0	0.0	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1 Subsistence Resource Specialist II			5.5	$25.0
1 Subsistence Resource Specialist II			1.5	$7.1
1 Subsistence Resource Specialist II			1.5	$7.1
1 Regional Program Manager			1.0	$7.2
1 Fish and Wildlife Technician III			2.0	$5.0
Personnel Total	0.0	$0.0	11.5	$51.4

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

07/14/93

Project Number: 94428
Project Title: Subsistence Restoration Planning and Implementation
Lead Agency: AK Dept. of Fish & Game

FORM 3A SUB-PROJECT DETAIL

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Travel:				Reprt/Intrm	Remaining
4 RT Anchorage-Kodiak = $760	0.8	6 RT Kodiak-Karluk = $660	0.7		$1.5
4 RT Kodiak-Larsen Bay = $320	0.3	6 RT Kodiak-Larsen Bay = $480	0.5		$0.8
4 RT Kodiak-Old Harbor = $400	0.4	6 RT Kodiak-Old Harbor = $600	0.6		$1.0
4 RT Kodiak-Ouzinkie = $240	0.2	4 RT Kodiak-Ouzinkie = $360	0.4		$0.6
4 RT Kodiak-Port Lions = $400	0.4	4 RT Kodiak-Port Lions = $600	0.6		$1.0
2 RT Anchorage-Homer = $200	0.2	3 RT Anchorage-Homer = $300	0.3		$0.5
2 RT Homer-Port Graham & Nanwalek = $200	0.2	3 RT Anchorage-Tatitlek = $1,650	1.7		$1.9
2 RT Anchorage-Chenega Bay = $1,800	1.8	3 RT Anchorage-Valdez = $480	0.5		$2.3
2 RT Anchorage-Tatitlek = $1,100	1.1	3 RT Anchorage-Cordova = $612	0.6		$1.7
2 RT Anchorage-Valdez = $320	0.3	Per diem = $3,200	3.2		$3.5
2 RT Anchorage-Cordova = $408	0.4				$0.4
Per diem = $2,835	2.8				$2.8
			Travel Total	$0.0	$18.0

Contractual:			
Printing			$1.0
		Contractual Total	$0.0	$1.0

07/14/93

1994

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Project Number: 94428
Project Title: Subsistence Restoration Planning and Implementation
Lead Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Office supplies (paper, pens, etc.)		$0.5
Commodities Total	$0.0	$0.5
Equipment:		
Equipment Total	$0.0	$0.0

07/14/93

1994

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Project Number: 94428
Project Title: Subsistence Restoration Planning and Implementation
Lead Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Subsistence Restoration and Planning and Implementation - This project will design and implement a coordinated planning process to develop subsistence restoration project proposals for the FY95 work plan. This will insure the participation of subsistence users in other FY95 planning efforts. Such projects could propose to directly restore resources used for subsistence, provide alternative natural resources, or restore access or people's use of the resource.

Budget Category:	1993 Project No. 93017 Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel		$0.0	$6.3	$6.3		
Travel		$0.0	$3.0	$3.0		
Contractual		$0.0	$0.0	$0.0		
Commodities		$0.0	$0.0	$0.0		
Equipment		$0.0	$0.0	$0.0		
Capital Outlay		$0.0	$0.0	$0.0		
Subtotal		$0.0	$9.3	$9.3		
General Administration		$0.0	$0.9	$0.9		
Project Total		$0.0	$10.2	$10.2		
Full-time Equivalents (FTE)		0.0	0.1	0.1		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1 DOI Representative			1.0	$6.3
Personnel Total	0.0	$0.0	1.0	$6.3

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

07/14/93

1994

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Project Number: 94428
Project Title: Subsistence Restoration Planning and Implementation
Lead Agency: Deptartment of Interior

FORM 3A SUB-PROJECT DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
3 RT Homer-Port Graham & Nanwalek = $300		$0.3
3 RT Anchorage-Chenega Bay = $2,700		$2.7
Travel Total	$0.0	$3.0
Contractual:		
Contractual Total	$0.0	$0.0

07/14/93

1994

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Project Number: 94428
Project Title: Subsistence Restoration Planning and Implementation
Lead Agency: Deptartment of Interior

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

07/14/93

1994

Printed: 4/7/94 6:07 PM

Project Number: 94428
Project Title: Subsistence Restoration Planning and Implementation
Lead Agency: Deptartment of Interior

FORM 3B
SUB-
PROJECT
DETAIL

Charles McKee

- Age: 40
- Occupation: None
- Party affiliation: Undecided
- What kind of car do you drive: None
- Last book read: King James version of Bible
- Favorite movie: None
- Hobbies: Seeking justice
- 1993 Annual Income: None

Mayoral campaign as soapbox works just fine for candidate Charles McKee.

"The current treasury seal is a fraud," McKee said summarizing the key issue of his campaign. "That means we're not using legal tender."

McKee, 40, usually accompanied by a long, knotted walking stick, has become a familiar figure at school board and assembly hearings. His speeches on the illegality of the modern monetary system and its relationship to various world conspiracies has left members of both bodies speechless at nearly every public hearing held in the last few years.

Under Mayor McKee, Anchorage would pioneer the unheard-of concept of city-printed tender after rejecting the money issued by the federal government. The city would crack down hard on insurance agents who McKee believes "run everything and take all our money."

He offered no specifics on how he would carry out such projects.

McKee said he was a commercial fisherman before a 1987 work-related accident. He said his current profession is "trying to collect on the entire insurance industry."

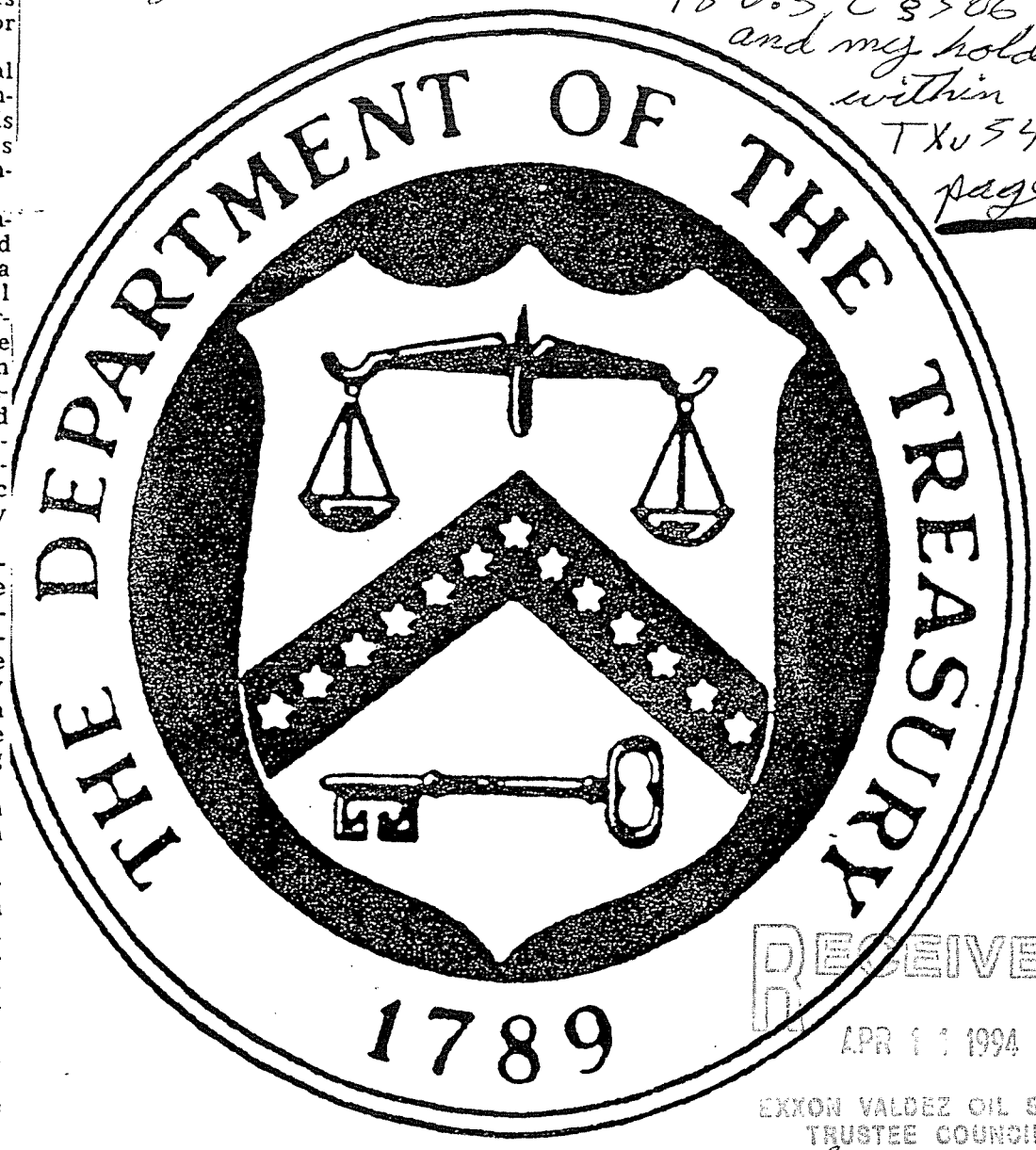
McKee is using his own money during the campaign, even though the notes are issued by the U.S. Treasury.

"I'm using it strictly under duress," he said.

To: Exxon Valdez Oil Spill Trustee Council

I Charles E. McKee having proposed more funding ie "dollars U.S. notes" for restoration, [redacted] and you continue by addressing proposals that are useing counterfeiting funds ie" money of dollars. P.S. Please see 18 U.S.C § 506 and my holding within TXu 545 416

page 1 of 4



In use on all notes and departments plus treasury Bills

No 3

not the Original Seal

Charles E. McKee

4, 11, 94

Charles E. McKee
1506 W 43rd #7
Anch, Ak 99503

To: Alaska Mental Health Board

I Charles E. McKee having proposed a settlement within my copy right work #TXu 545 416 and you continue to fraction the whole number of people by addressing contentious settlement proposals that are counterfeiting crimes at best!

please see 18 U.S.C §506 and my holding within TXu 545 416.

Sincerely
Charles E. McKee

jement (insurance), 2) Interest rate of paper "banking" (hollo), 3) War "civil?" (
streets) and 4) Assassination(s) (of Presidents) to name but a few. Then tr
gold reserve of "interchangeability" to the World Bank (carteling) by way o
S. participation in the international "paper gold" plan, signed by President Jo

The Original Seal of the Treasury of North America

by all that is written, my proof of indictment, the foreordained seal, separation of powers, checks and balances and by adding the whole number of free persons (like me) to be fully educated in such matters by the free and convenient accessibility to legal history, hence, public library.

Sincerely,

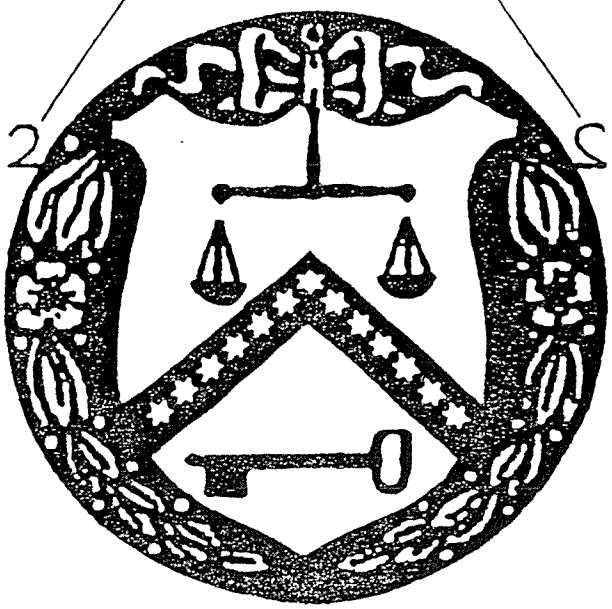
Charles E. McKee

Charles E. McKee

Charles E. McKee 6-10-1992

"amplified" (please see page #4)

E=MC 2 S OM=E



I=TL 2 S JT=I

I= Inspired

T= Thought

L= Light

10

11

Title of Origin

Charles E. McKee 6-8-1992

Notes of Decisions

Evidence 2
Intent 1

1. Intent

Crime of forging signature of United States officer for purpose of authenticating any document includes element of fraudulent intent. Levinson v. U. S., C.C.A.Mich.1931, 47 F.2d 470.

2. Evidence

Where, upon a petition for a writ of habeas corpus, the transcript of the record of conviction which accompanied the petition showed that the petitioner was indicted for forging the signature of C. Douglass Gray, register in bankruptcy, to the following receipt: "Harrisonburg, July 30, 1872. Received of J. D. Martin, by R. S. Parks, his attorney, the application, with necessary papers, for adjudication in bankruptcy of said Martin; also, $50, amount of required deposit. C. Douglass Gray, Register" but the petitioner contended that the forging of this receipt was not a crime by any Act of Congress, as the paper whose forgery was charged was not a document which could be used in evidence in any proceeding by reason of its being authenticated by the official signature of the register, in dismissing the writ for the reason that the question could not be raised by means of the writ, but should have been taken by writ of error to some superior court, the court incidentally said that the receipt could be used in evidence, if genuine, for the purpose of showing the fact stated therein as against the signer in his official as well as private capacity. Ex parte Parks, Va.1876, 93 U.S. 18, 23 L.Ed. 787. See, also, In re Parks, D.C. Mich.1874, 18 Fed.Cas.No.10,765.

§ 506. Seals of departments or agencies

Whoever falsely makes, forges, counterfeits, mutilates, or alters the seal of any department or agency of the United States; or

Whoever knowingly uses, affixes, or impresses any such fraudulently made, forged, counterfeited, mutilated, or altered seal to or upon any certificate, instrument, commission, document, or paper, of any description; or

Whoever, with fraudulent intent, possesses any such seal, knowing the same to have been so falsely made, forged, counterfeited, mutilated, or altered—

Shall be fined not more than $5,000 or imprisoned not more than five years, or both.

June 25, 1948, c. 645, 62 Stat. 714.

Historical and Revision Notes

Reviser's Note. Based on Title 18, U.S.C., 1940 ed., § 131 (June 15, 1917, c. 30, Title X, § 2, 40 Stat. 228).

Reference to persons causing, procuring, aiding or assisting was omitted as unnecessary as such persons are made principals by section 2 of this title.

In view of definitions of department and agency in section 6 of this title, words "department or agency" in first paragraph were substituted for "executive department, or any bureau, commission, or office".

Provision for 10 years' imprisonment was reduced to 5 years to conform to punishment provision in section 505 of this title, covering an offense of like gravity.

Minor changes in phraseology were also made.

Canal Zone. Applicability of section to Canal Zone, see section 14 of this title.

3/29/94 Vickie Contreras

Cross References

Government seals wrongfully used and instruments wrongfully sealed, see section 1017 of this title.
Jurisdiction of offenses, see section 3241 of this title.
Letters, writings, etc., in violation of this section as nonmailable, see section 1717 of this title.

Library References

Costs ⟹2 et seq. C.J.S. Costs § 1.
Forgery ⟹7(1) et seq. C.J.S. Forgery § 17 et seq.

§ 507. Ship's papers

Whoever falsely makes, forges, counterfeits, or alters any instrument in imitation of or purporting to be, an abstract or official copy or certificate of the recording, registry, or enrollment of any vessel, in the office of any collector of the customs, or a license to any vessel for carrying on the coasting trade or fisheries of the United States, or a certificate of ownership, pass, or clearance, granted for any vessel, under the authority of the United States, or a permit, debenture, or other official document granted by any collector or other officer of the customs by virtue of his office; or

Whoever utters, publishes, or passes, or attempts to utter, publish, or pass, as true, any such false, forged, counterfeited, or falsely altered instrument, abstract, official copy, certificate, license, pass, clearance, permit, debenture, or other official document herein specified, knowing the same to be false, forged, counterfeited, or falsely altered, with an intent to defraud—

Shall be fined not more than $1,000 or imprisoned not more than three years, or both.

June 25, 1948, c. 645, 62 Stat. 714.

Historical and Revision Notes

Reviser's Note. Based on Title 18, U.S.C., 1940 ed., § 129 (Mar. 4, 1909, c. 321, § 72, 35 Stat. 1101).

The words "passport" and "sea letter" were omitted as obsolete, in view of the Presidential proclamation of April 10, 1815, discontinuing the use of such passports and sea letters.

Mandatory punishment provisions were rephrased in the alternative.

Minor changes of phraseology were made.

Canal Zone. Applicability of section to Canal Zone, see section 14 of this title.

Cross References

Certificate, license or document issued to vessels, officers or seamen, counterfeiting or forging, see section 2197 of this title.
Provisions relating to recording, registry or enrollment of vessels, see Title 46, Shipping.

Library References

Costs ⟹2 et seq. C.J.S. Costs § 1.
Forgery ⟹7(1) et seq. C.J.S. Forgery § 17 et seq.

4 of 4

PROJECT 94320

An Integrated EVOS-Sponsored Ecosystem Approach to Marine Fish, Bird and Mammal Issues in Prince William Sound: Sound Ecosystem Assessment (SEA) and Related Studies

(Project 94320 Summary)

Introduction

Failing runs of pink salmon in 1992 and 1993, unexpectedly poor herring spawning in 1993 and long-term declining bird and mammal populations raise serious questions about the continuing production status of species which have been identified as officially damaged by the EVOS of 1989. The possibility that these production trends may in some way be associated with a lingering oil-spill effect was addressed by a formal planning process (Fall, 1993) in which a hypothesis-driven, ecosystem-level approach was developed and critically reviewed by peers in a public workshop (Cordova; December). Sound Ecosystem Assessment (SEA) proposed an interdisciplinary, multi-component system investigation as the primary means for partitioning natural and anthropogenic sources of mortality for these species. SEA was crafted initially to investigate causes for herring and pink salmon production failures. Other questions about marine mammals and birds have broadened the study. This summary document and the individual project descriptions that are attached, represent the implementation of year 1 (FY94) of a multi-year SEA and related-studies program for Prince William Sound.

Research Goals

In applying an ecosystem approach, the integrated program identifies the following goals as the means to measure progress, to focus continuing planning efforts, and to guide the proposed field, laboratory and modeling science. Achieving these goals will address public and scientific concerns about the health of this valuable Alaska coastal environment:

1. Acquire an ecosystem-level understanding of marine and freshwater processes that interact to constrain levels of fish, and marine bird and mammal production in Prince William Sound;

2. Use this new information to more accurately forecast apex consumer production and predict fish, bird and mammal responses to different levels of ecosystem disturbance, both natural and anthropogenic;

3. Establish a comprehensive data base describing the status of the Prince William Sound ecosystem, the fisheries and marine bird and mammal populations as a principal means

for improving the effectiveness of management, enhancement and mandated restoration activities.

Expectations for SEA and Related Studies in FY94

Because of uncertainties about when funding will be released in FY94 for Prince William Sound ecosystem studies, the first field season of this multi-year investigation must be classified as a pilot study. This does not mean that data collected will be of lesser value, but rather that certain kinds of information must be obtained before appropriate sampling designs can be implemented for hypothesis testing later in the program.

Much is already understood about the phasing of oceanic and neritic plankton populations in the surface waters and their contribution as a juvenile fish forage resource, and enough is known about the coupled physical and meteorological factors forcing ocean transport to execute a reasonable monitoring and investigative studies now. Regrettably, almost nothing is known about the predator fields (particularly fishes) suspected of consuming up to 80 percent of the juvenile salmon rearing in Prince William Sound. Until this information (kinds, abundance, seasonal patterns) is determined, it will be impossible to craft a statistically defensible study to estimate loss rates of juveniles to these predators. The following represent project expectations for what will likely be an abbreviated field effort in FY94:

1. Initiate physical studies to confirm relationships between broad scale meteorological forcing and resulting patterns in horizontal and vertical transports influencing plankton, fish, bird and mammal distributions in the region;

2. Continue the long-term time series of upper level macrozooplankton (hatchery plankton watch and new net and acoustic studies) and juvenile salmon growth rates and food dependencies (extension of a valuable data base);

3. Initiate acoustic studies of fish predators to locate concentrations along the migratory pathways for juvenile salmon and to assist the seining and trawling efforts.

4. Evaluate acoustically-aided trawling and seining as a means to routinely sample large fishes preying on juvenile salmon near hatchery release sites and along the migratory pathway. Determine optimal fishing times (day/night) and gear.

Achieving these expectations will provide information for post-cruise evaluations that are expected to result in a much more focused and statistically powerful study in FY95.

Coordinating SEA and Related Studies

Sound Ecosystem Assessment (SEA) was conceived and developed around several formal ideas about how Prince William Sound functions in a coupled physical and biological sense. Prior studies of the oceanography, lower trophic levels, the commercial resources and birds and mammals suggested several mechanisms controlling apex consumer population status. The resulting conceptual overview (the SEA plan) was then used to structure an implementation program to begin in FY94. The core SEA study will interact with other EVOS-sponsored projects dealing with pink salmon, herring, and marine birds and mammals. Integration will be realized through: 1) the formal planning process; 2) field logistics; and 3) a regional data base (Figure 1).

Defining Target Species and Critical Life Stages

The Core SEA Study

The implementation phase of Sound Ecosystem Assessment (SEA) is designed to describe functional mechanisms that establish levels of adult production for pink salmon and herring in Prince William Sound. The recruitment literature for these species suggests that losses during the early life stages (embryos, larvae and early post-larvae) account for most of the mortality leading to adult production. For pink salmon (*Oncorhynchus gorbushca*), levels of egg and alevin mortality in spawning reds, and mortality of fry during the first 40-60 days of early marine residence are thought to account for most of the brood year losses. In the case of longer-lived herring (*Clupea pallasi*), losses of embryos and larval and early post-larval forms, in addition to surviving the first two winters, establishes levels of adult recruitment in the region. Since these portions of the life histories for both species occur in Prince William Sound, SEA can focus its collective efforts on defining and evaluating the physical and biological mechanisms that constrain survival during these critical stages in this region.

Mortality in the natal habitats of both species is driven primarily by physical agents (stream scouring, desiccation, freezing, wave action) and modified by losses to predation (birds, fishes, marine invertebrates). Free living forms (larvae and post-larvae) are eaten by a host of predators including macrozooplankton, other fishes, birds and mammals. Growth rates during the early life stages are thought to modulate these losses; the fastest growing individuals reduce the period of greatest risk by outgrowing their predators. Death by starvation is probably not a factor for pink salmon fry, but may occur for larval herring at the time of hatching if appropriate food is not available.

SEA presumes that until the mechanisms establishing levels of natural variability in Prince William Sound pink salmon and herring production are understood and successfully modeled, ascribing losses to anthropogenic factors (like a lingering oil spill effect) will remain problematic. This is an important departure from previous fisheries oceanography studies that have relied on correlative relationships alone to suggest cause and effect. In Prince William

Sound the interactive mechanisms are sought as the keys to realistic simulations of the system.

Related EVOS Studies

Restoration studies of Marbled Murrelets, Pigeon Guillemots, and Harbor Seals are justified on the basis of EVOS-sponsored Damage Assessment studies. Continuing investigations of these apex consumers are expected to benefit from the logistics, and scientific collaboration with the core SEA programs. The Forage Fish Study represents a critical link between lower-trophic level production (SEA) and the production status of bird and mammal populations. Working together, SEA will gather information about foraging conditions (plankton and larval fishes) for sea birds early in the season, while the Forage Fish Study will focus its efforts during the important chick provisioning time in late July and August. Descriptions of fish abundance obtained both by SEA and the Forage Fish Study will describe forage fields for harbor seals from March through August of each year and at a reduced frequency in the Fall/Winter months as well.

The pink salmon genetics study, coded-wire tag recoveries of adult pink salmon, and otolith marking studies represent methodologies and sophisticated techniques for exploring other issues raised by SEA. Questions about the carrying capacity of Prince William Sound for enhanced populations of juvenile salmon and possible adverse interactions between wild and hatchery stocks were not expected to enter the SEA arena until FY95 and beyond. Initiating these cooperating studies in FY94 is expected to provide important information about the role that hatcheries may be playing in the continuing ecology of Prince William Sound. This inquiry will be facilitated by increased funding for hatchery manipulations (timing of releases, regulating the size of fry at release).

SEA Hypotheses for Pink Salmon and Herring

Previous studies of Prince William Sound allow a first-order analysis of the physical oceanography and pelagic food-web dynamics. Results from historical monitoring of the natal habitats for pink salmon and herring are also available to formulate conjectures about factors influencing survival during embryonic development. This information has been used by SEA to craft the following hypotheses which focus the field, laboratory and modeling activities described in much greater detail in the individual DPDs:

1. Density-independent physical factors establish levels of survival in natal habitats. These levels are further modified by density-dependent losses to predation, disease, and genetic aberration.

2. Levels of macrozooplankton forage for planktivores in Prince William Sound (fishes, birds and mammals) are established by balances between physical transport processes

that "seed" the region from the bordering Gulf of Alaska and flush populations from the Sound during the spring. Production of macrozooplankton is further modified by local levels of primary productivity.

3. Losses of 0-class fishes (including pink salmon and herring) to predators are modulated by amounts of macrozooplankton present each year. When macrozooplankton is abundant, consumption is skewed toward planktivory and losses of small fishes to predators are minimized. In contrast, when macrozooplankton populations are weak, consumers shift to piscivory and predation is focused strongly on the smallest fishes. Ocean temperature influences the growth and feeding rates of both predators and prey.

4. Juvenile herring that survive predation during their earliest life stages must successfully negotiate at least two winters in the Sound before they are fully recruited. Their physiological condition entering the winter season, and biological and physical factors (food, temperature and predators) determine subsequent levels of survival.

These hypotheses are referred to as: 1) Natal Habitats; 2) Lake/River Processes; 3) Predator/Prey Relationships; and 4) Herring Overwintering.

Hypotheses for Related Studies

The SEA plan articulated testable hypotheses addressing wild and hatchery stock interactions, and straying. The issue of carrying capacity involves special cases of the Lake/River and Prey/Predator studies detailed above. Because of its initial focus on pink salmon and herring, SEA did not state conjectures about specific mechanisms controlling marine bird and mammal populations in Prince William Sound. Adopting this direction for the science will be encouraged in the FY95 planning process. Sea hypotheses concerning carrying capacity and wild and hatchery interactions are:

1. Hatchery produced and wild pink salmon fry compete for food. Local and regional predator abundances increase in response to large point releases of hatchery pink salmon. Other species of salmon produced at hatcheries prey on pink salmon fry and compete with them.

2. Prince William Sound pink salmon populations have evolved genetically-discrete, ecologically specialized populations which respond differently to physical and biological conditions. The degree of local adaptation is determined by gene flow (straying) among wild populations, and affected by straying from hatchery stocks back into wild populations.

Questions about ecotoxicology and disease as factors influencing apex consumer populations have also been explored by SEA and there is intent to bring these investigations into the FY95 Prince William Sound science plan.

Integrating SEA and Related Interdisciplinary Studies

The important early portions of pink salmon and herring life histories define "ecological pathways" for each species. These pathways begin with fixed-space freshwater, intertidal and shallow sub-littoral spawning habitats and proceed through larval (and post-larval) drifts for herring, and nearshore and coastal free-swimming growth environments. The physical locations of the early life stages of each species and their respective predator and prey fields (the pathways) establish the crucial times and places for intensive study. Processes governing survival along these pathways - natal, lake/river, predator/prey and overwintering (for herring), carrying capacity and genetic adaptation further dictate the methodologies and disciplines needed to understand and model the survival schedules of each species. Similar pathways exist for marine birds and mammals. Their definition will be sought in the FY95 planning period so that inquires about these species can be optimized within the overall ecosystem approach in Prince William Sound.

Individual projects comprising the interdisciplinary, multi-component approach are integrated: 1) in a programmatic way around each of the hypotheses (Table 1); 2) by the logistics supporting the field science; 3) and by the data analysis and modeling portions of the overall study. These cooperative activities assure that SEA and related studies will proceed as a collective effort rather than a series of unrelated studies. Further, SEA proposes an internal organization comprised of a Principal Scientist and executive committee representing the various study programs comprising SEA in any year (Figure 2). This organizational structure will provide timely internal peer review of project results, and assist with reallocating SEA budgets as portions of the study are resolved and new components added through time.

Major Programs as Study Integrators

The Natal Habitat Program (NHP) focuses studies on factors setting levels of survival in spawning redds and herring intertidal and shallow sub-tidal spawning areas. The purpose of the NHP to eventually predict the number of fry and larval herring emerging from natal regions as a function of natural and anthropogenic factors influencing survival during the embryo (and alevin) fixed-space incubation periods. Projects include studies of the physical oceanography and meteorology of the region, larval herring spawning, emergence and drift, salmon fry out-migration timing, and avian predation on herring eggs. For 1994, herring spawning, avian predation and physical oceanography will be initiated; herring larval drift and predicting salmon outmigration will be phased into SEA in 1995.

The Lake/River Program (LRP) focuses on physical and biological factors constraining the production of zooplankton forage for fishes, birds and mammals in Prince William Sound. Field work will evaluate the summer/fall "seeding" mechanism, overwintering stock composition and abundance, and flushing rates relative to springtime upper-layer populations. Studies in 1994 include physical oceanography and meteorology, phytoplankton productivity and nutrients, and macrozooplankton. Herring larval drift will be added in 1995. In the case

of larval herring, advective losses under more "river-like" active flushing remove potential recruits from the region that may survive "downstream" but are not expected to return to the Sound as adults.

The Prey/Predator Program (PPP) represents the core of SEA. Here, the field emphasis will be on identifying the major fish, bird and mammal predators that consume larval and post-larval herring and pink salmon fry and juveniles. This goal of this program is to estimate the feeding intensity of predators on juvenile salmon as a function of predator abundance, numbers of fry consumed and metabolically-determined gastric evacuation rates. The overall effort will involve direct (seines and trawls) and acoustic sampling of predator populations associated with the drifting and free-swimming early life stages of pink salmon and herring along their respective ecological/migratory pathways. Predator and prey (macrozooplankton) fields will be described for the nearshore nursery habitats and the deeper-water regions. Project integration will include physical oceanography and meteorology, macrozooplankton, juvenile pink salmon growth and survival, nearshore fish distributions, juvenile pink salmon predators, experimental hatchery releases and production manipulation, forage fishes, stable isotope tracers, and harbor seal trophic interactions.

The Herring Overwintering Program (HOP) involves measurements of the winter growth environment (food and temperature), juvenile herring condition (lipid reserves) and predator fields at locations where juveniles congregate during the winter months. Project integration will involve physical oceanography and meteorology, macrozooplankton, and nearshore fish distributions (acoustic and seine sampling). This program will be phased into SEA during FY 95.

The Wild and Hatchery Stock Interaction Program (WHSIP) involves a quantitative understanding of the carrying capacity of the region, the ability to identify wild and hatchery juveniles and adults, and the means to account for their respective growths and survivals. It will also be necessary to measure the genetic diversity of wild and hatchery stocks in the region. Studies cooperating within the WHSIP include physical oceanography and meteorology, macrozooplankton, prey/predator, otolith marking, pink salmon growth and survival, nearshore fishes, coded-wire tag recoveries, and pink salmon genetics.

Field Logistics as a SEA and Related Studies Integrator

The workshop that reviewed the SEA conceptual plan recommended that whenever possible, the field study should accommodate the interdisciplinary aspects of the anticipated sampling program by sharing vessels and other logistics. This recommendation is being adopted (Figure 3). A trawler, 3 seiners (one principally for oceanography), 2 acoustic skiffs, a fry recovery skiff and support vessel, an oceanographic (physical and biological) vessel (R/V *Alpha Helix*) and PWSAC hatcheries at Esther Island, Cannery Creek and Evans Island will support the pelagic and nearshore field studies each year. Work in the natal habitats will be supported by the ADF&G vessel M/V *Montague*, a seasonal charter and a variety of small

skiffs. A seiner and one or both acoustic skiffs will be used to address the problem of herring overwintering. Forage fish studies will rely on one additional charter vessel during the late summer.

In most cases, scientific crews aboard these boats will share scientific responsibilities in the field (the trawler and seiners will come with experienced fishermen crews). Physical measurements, plankton observations, hydroacoustics and fisheries work (salmon and herring predators and prey) will be undertaken by each vessel. The resulting information will be shared daily in the field, and changes made to sampling protocols when needed to maintain efficiency and cooperation, and to optimize the power of the investigative activities.

Vessel operations are expected to begin each year in late March (pre-phytoplankton bloom) and continue through mid to late August. A cruise to census overwintering deep-water macrozooplankton will be scheduled in early winter (R/V *Alpha Helix)*, and observations of herring overwintering obtained on numerous short cruises from fall through early spring. For multi-vessel operations, a designated Chief Scientist will be present in the field at all times to facilitate decision making and to coordinate changes in sampling effort driven by trends emerging from the results of the day-to-day operations. Port calls are scheduled for replenishing freshwater and supplies, and for crew rotations (when needed).

Modeling and the Data Base as Project Integrators

Ecosystem modeling and a shared data base represent important overall program integration tools. Information from all studies will be archived in Cordova and distributed to investigators, to the agencies and to the Trustee Council. Instead of requesting funding for separate data compilation activities in each of the individual study projects, SEA and related studies are adopting a "centralized" data bank, common to all projects and addressable for data synthesis and integration activities. All individual projects will contribute to the data base, and all projects will benefit from data services provided by this project.

The Modeling Program (MP) will draw upon shared data base and the expertise of project investigators to simulate important aspects of herring, pink salmon and marine bird and mammal ecological pathways in Prince William Sound. Modeling will include assessments of ocean state, plankton dynamics, predators, competitors and prey for all target species, and mortalities associated with toxicological and other anthropogenic features that are variable in time and space. These models will be capable of nowcasting and forecasting, and sensitivity and risk analyses. Modeling will also be one of the principal tools for testing the SEA hypotheses. Although few in the overall study will have the numerical skills to write the simulations models, all will be encouraged to interact with the specialists undertaking these tasks.

Continuing Program Development in Prince William Sound

SEA has deferred several studies for starts in FY95. These projects include Salmon Fry Outmigration, Herring Larval Drift, Zooplankton Sample Processing, Wild Salmon Straying, and Hatchery Salmon Straying. The latter two projects will depend on the implementation of means other than wire-tags (otoliths) to track wild and hatchery populations.

In as much as SEA and related studies must be viewed as a dynamic planning tool, the overall results of each year's field work will be critiqued in an annual planning workshop, and decisions made about the allocation of funds for priority projects. Funding for Program Management and Planing will be used for this important activity. As EVOS facilities and programs become established at Seward, the broadened SEA program will contribute to the data base and modeling activities scheduled there.

Table 1. FY94 SEA and Related Project Integration

	Program Elements*					
Detailed Projects	NHP	LRP	PPP	HOP	WHSI	MP
PHYSICAL PROCESSES						
Meteorology, Oceanography	X	X	X	X	X	X
Ocean State		X	X	X	X	X
PLANKTON DYNAMICS						
Phytoplankton, Nutrients		X			X	X
Zooplankton		X	X	X	X	X
FISH						
Juvenile Salmon Growth		X	X		X	X
Juvenile Salmon Predators			X		X	X
Nearshore Fish Distributions				X		X
Hatchery Experimental			X		X	X
Hatchery Manipulation		X	X		X	X
94184 CWT Recovery					X	X
94187 Otolith Marking			X		X	X
94189 Pink Salmon Genetics					X	X
94166 Herring Spawning	X					X
94163 Forage Fish Injury			X			X
MARINE BIRDS, MAMMALS						
94102 Murrelet Prey, Foraging						X
94173 Pigeon Guillimot Monitoring						X
Harbor Seal Condition			X			X
Avian Predation	X					X
ECOSYSTEM INTEGRATION						
Stable Isotopes			X			X
Data Base, Models	X	X	X	X	X	X

* NHP Natal Habitat Program
LRP Lake River Program
PPP Prey Predator Program
HOP Herring Overwintering Program
WHSIP Wild/Hatchery Stock Interaction Program
MP Modeling Program

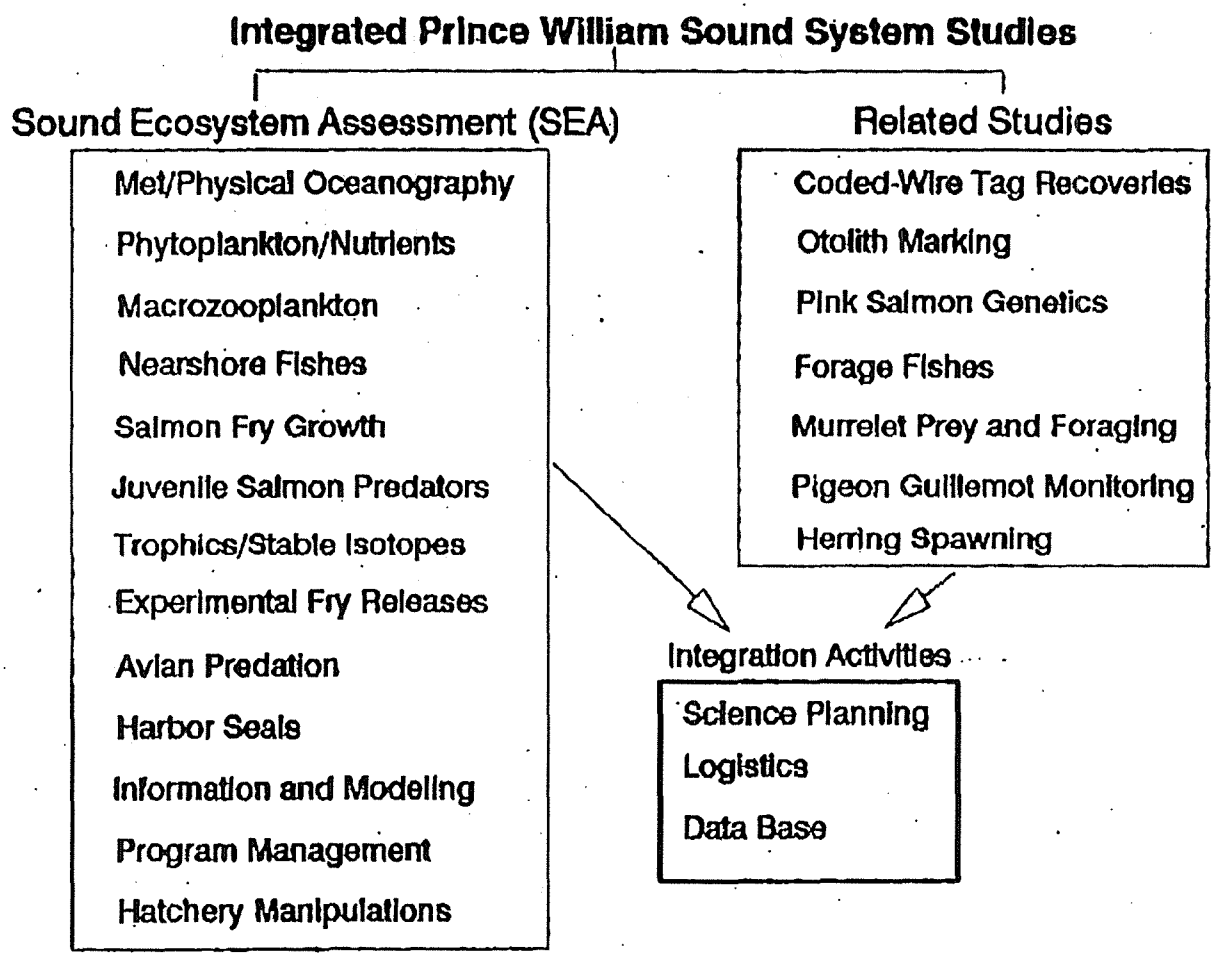

Integrated Prince William Sound System Studies
Sound Ecosystem Assessment (SEA)
Met/Physical Oceanography
Phytoplankton/Nutrients
Macrozooplankton
Nearshore Fishes
Salmon Fry Growth
Juvenile Salmon Predators
Trophics/Stable Isotopes
Experimental Fry Releases
Avian Predation
Harbor Seals
Information and Modeling
Program Management
Hatchery Manipulations
Related Studies
Coded-Wire Tag Recoveries
Otolith Marking
Pink Salmon Genetics
Forage Fishes
Murrelet Prey and Foraging
Pigeon Guillemot Monitoring
Herring Spawning
Integration Activities
Science Planning
Logistics
Data Base

Figure 1.

SEA and Related Studies Organizational Structure

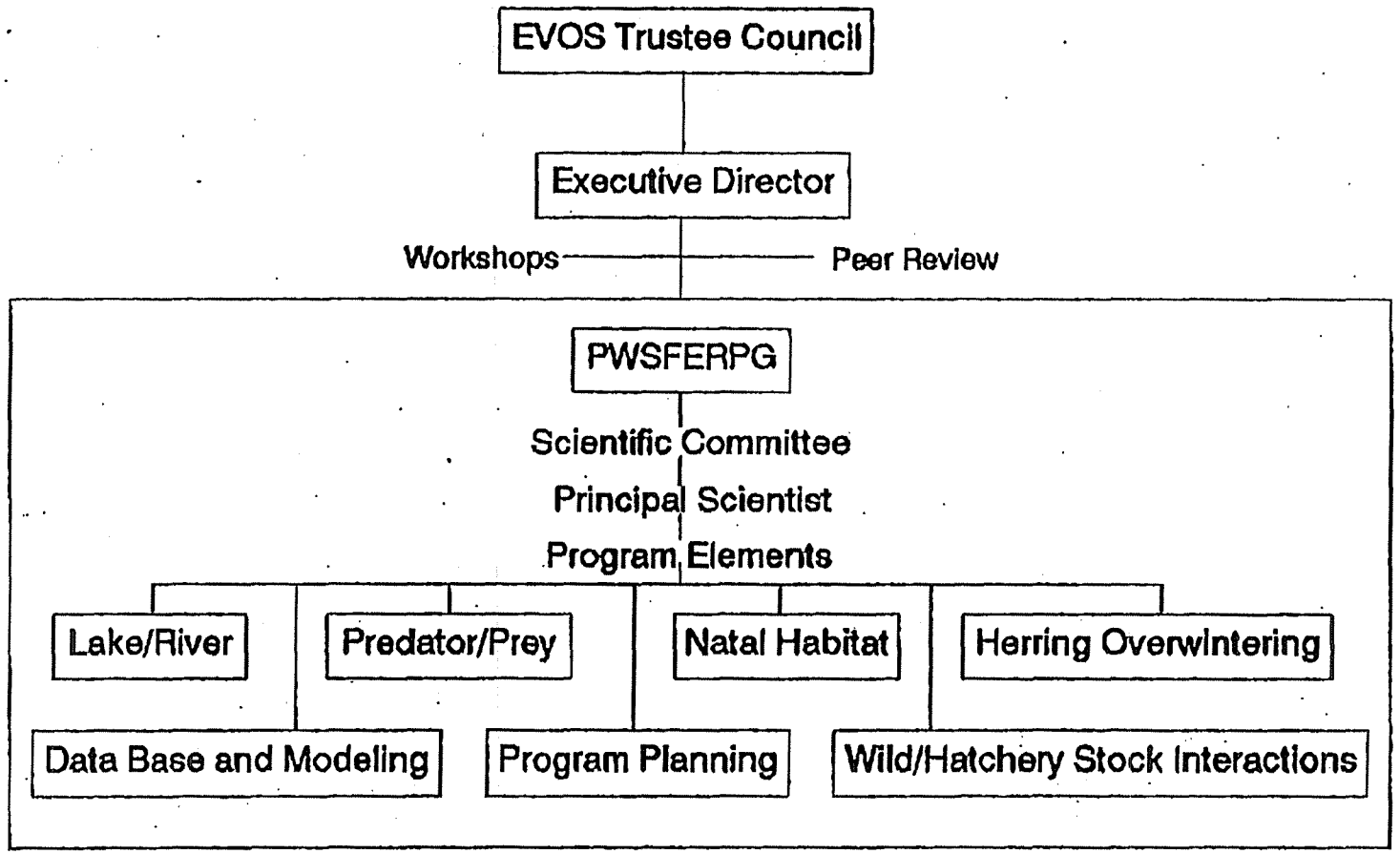


Figure 2.

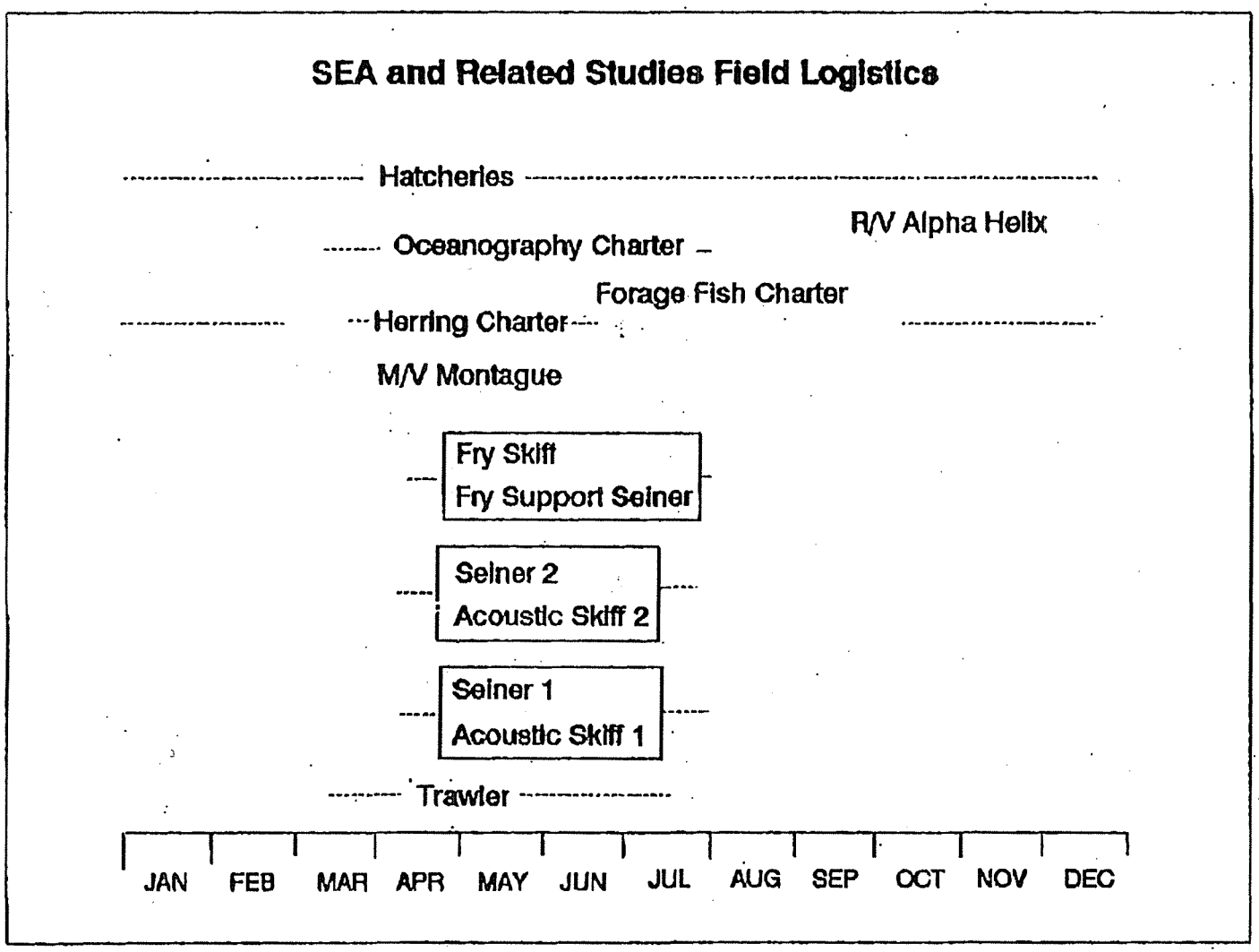

SEA and Related Studies Field Logistics
Hatcheries
R/V Alpha Helix
Oceanography Charter
Forage Fish Charter
Herring Charter
M/V Montague
Fry Skiff
Fry Support Seiner
Seiner 2
Acoustic Skiff 2
Seiner 1
Acoustic Skiff 1
Trawler
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

Figure 3.

Budget Modifications Made to 94320 UAF and PWSSC Budgets

1. University Overhead was calculated at **25%** of direct project costs for purposes of discussion at the 4/11/94 Trustee Council meeting, but not on monies passed through to the Prince William Sound Science Center.

2. PWSSC overhead was calculated at **24%** of direct project costs for purposes of discussion at the 4/11/94 Trustee Council meeting. Gary Thomas had offered to reduce costs if title to equipment was given to PWSSC. A counter offer for the state to pick up insurance, maintenance, etc. would have saved only a little over $200 by Thomas's calculations.

3. University of Alaska charged **$11.2K** to pass monies through to PWSSC for all projects but this appears as part of the budget for 94320-P, Program Management.

4. Budgets for the fall workshop and work leading to that appear in the interim portion of 94320-P

5. The PWSSC and UAF portion of the "Remaining FFY94" budget for 94320-P, Program Management, is capped at **$50K** including overhead (PWSSC) and pass through (UAF) charges.

6. The Trustee Council allocated **$25K** at the end of January to the PWSSC in order to prepare detailed project descriptions for all 94320 projects involving the Science Center and this money appears in 94320-P, Program Management.

7. **Interim personnel costs identified by PWSSC for subprojects J (Information and Modelling) and N (Nearshore Fishes) were not allowed because they exceeded the 5.5 month limit.** It appears these were detailed project description preparatory costs which should have appeared in 94320-P, Program Management, but this budget already was at its cap of $50K.

8. A few similar PWSSC positions were compressed into a category of positions to fit within the EXCEL sheet space for the same number of FTE's and personnel costs. This is unimportant but only clarifies differences PWSSC might notice between what they submitted and what appears in the sheets.

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To Eric Morgan	From Joe Sullivan
Co.	Co.
Dept.	Phone #
Fax #	Fax #

EXXON VALL TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description:

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$37.9	$594.0	$631.9	$1,392.4	
Travel	$0.0	$0.8	$18.6	$19.4	$105.2	
Contractual	$0.0	$103.2	$5,205.6	$5,308.8	$1,039.6	
Commodities	$0.0	$0.0	$76.9	$76.9	$118.2	
Equipment	$0.0	$0.0	$128.9	$128.9	$383.3	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$141.9	$6,024.0	$6,165.9	$3,038.7	
General Administration	$0.0	$5.9	$226.1	$232.0	$374.6	
Project Total	$0.0	$147.8	$6,250.0	$6,397.8	$3,413.3	
Full-time Equivalents (FTE)	0.0	0.7	10.7	11.4	13.3	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
See Individual 3A Forms for Personnel Details				
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

07/14/93

1994

Printed: 4/7/94 6:55 PM

Project Number: 94320
Project Title: Prince William Sound System Investigation
Agency: AK Dept. of Fish & Game

FORM 2A
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Assessment of Juvenile Salmon Growth and Mortality in PWS- This projects objectives are to: 1) estimate the growth rate of juvenile salmon in PWS, 2) describe the migration of juvenile salmon though PWS, 3) estimate the diet composition of juvenile salmon in PWS, 4) determine the growth rate of juvenile salmon was limited by low food abundance in 1994, 5) test for differences in the relationship between juvenile salmon growth and fry-to-adult survival , and 6) develop techniques to estimate the mortality of juvenile salmon in PWS and the GOA.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$124.1	$124.1	$161.8	
Travel	$0.0	$0.0	$0.5	$0.5	$0.9	
Contractual	$0.0	$0.0	$95.0	$95.0	$114.3	
Commodities	$0.0	$0.0	$13.2	$13.2	$13.2	
Equipment	$0.0	$0.0	$4.0	$4.0	$4.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$236.8	$236.8	$294.2	
General Administration	$0.0	$0.0	$26.6	$26.6	$32.3	
Project Total	$0.0	$0.0	$263.4	$263.4	$326.5	
Full-time Equivalents (FTE)	0.0	0.0	1.9	1.9	0.8	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1 Program Manager			0.8	$5.4
1 Fishery Biologist III			3.0	$16.9
1 Fishery Biologist I			5.5	$35.2
4 Fish and Wildlife Technician II			8.5	$49.1
3 Fish and Wildlife Technician III			5.0	$17.5
Personnel Total	0.0	$0.0	22.8	$124.1

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - A
Project Title: Prince William Sound System Investigation
Sub-Project: Salmon Growth
Agency: AK Dept. of Fish & Game

FORM 3A
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
One round trip between Juneau and Cordova to have biometrician review data collection procedures in the field.		$0.4
Per diem for biometrician		$0.1
Travel Total	$0.0	$0.5
Contractual:		
Air charter flights to transport staff from Cordova to the vessel		$2.0
Charter for approximately 60' vessel to provide logistical support to track juvenile salmon migration		$93.0
Contractual Total	$0.0	$95.0

Project Number: 94320 - A
Project Title: Prince William Sound System Investigation
Sub-Project: Salmon Growth
Agency: AK Dept. of Fish & Game

FORM 3B
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DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Office supplies		$1.8
Laboratory supplies		$4.9
Field sampling supplies (food, fuel, etc.)		$4.7
Utilities		$1.8
Commodities Total	$0.0	$13.2
Equipment:		
One small mesh purse seine to capture juvenile salmon in the nearshore areas.		$4.0
Equipment Total	$0.0	$4.0

Project Number: 94320 - A
Project Title: Prince William Sound System Investigation
Sub-Project: Salmon Growth
Agency: AK Dept. of Fish & Game

FORM 3B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Coded Wire Tag Recoveries from Pinks in PWS - This project involves the recovery of coded wire tags that were placed in pink salmon in previous study years. Data from tag recoveries are used for in-season fisheries management decisions which allow optimal escapement of impacted wild stocks and harvest of excess hatchery and wild fish in high market quality condition.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$37.9	$125.2	$163.1	$172.5	
Travel	$0.0	$0.8	$11.8	$12.6	$12.6	
Contractual	$0.0	$3.2	$23.4	$26.6	$21.6	
Commodities	$0.0	$0.0	$14.7	$14.7	$10.3	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$41.9	$175.1	$217.0	$217.0	
General Administration	$0.0	$5.9	$21.5	$27.4	$27.4	
Project Total	$0.0	$47.8	$196.6	$244.4	$244.4	
Full-time Equivalents (FTE)	0.0	0.7	3.0	3.7	3.1	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
14 Fish & Wildlife Technician II/III	0.0	$0.0	19.8	$58.3
2 Fishery Biologist II/I	3.5	$17.1	3.0	$11.3
2 Analyst Programmers	0.4	$1.9	0.0	$0.0
1 Publication Specialist	0.2	$0.9	0.0	$0.0
1 Biometrician I	1.0	$5.0	4.0	$20.3
1 Analyst Programmer (tag lab)	0.0	$0.0	3.0	$14.3
3 Fisheries Technicians II/III (tag lab)	3.0	$9.6	5.0	$14.3
1 Program Manager	0.5	$3.4	1.0	$6.7
Personnel Total	8.6	$37.9	35.8	$125.2

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - B
Project Title: Prince William Sound System Investigation
Sub-Project: Coded Wire Tag Recoveries From Pinks in PWS
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

		Reprt/Intrm	Remaining
Travel:			
Rept	2 RT between Anchorage & Cordova @ $400	$0.8	$0.0
	Per diem included		
	Supervisory trips to Whittier (7 trips @ $500/trip), Kodiak (7 trips @ $600/trip), Anchorage (7 trips @ $350/trip) plus 11 days per diem @ $150/day	$0.0	$11.8
	Travel Total	$0.8	$11.8
Contractual:			
Rept	Transportation - Air charter to hatcheries for recovery of coded wire tags and transportation of salmon heads to lab	$2.0	$0.0
	Two DOT Fleet Vehicles (2 months each)	$1.2	$0.0
	Air charter to hatcheries, Valdez (18 trips @ $600/trip + 9 days per diem @ $150/day)	$0.0	$12.2
	Temporary office rental at Valdez and Whittier for project only	$0.0	$3.0
	DOT fleet vehicles (2 vehicles @ $400 each/month x 4 months)	$0.0	$3.2
	Supply, head and data shipments to and from the Tag Lab		$4.0
	Computer maintenance		$1.0
	Contractual Total	$3.2	$23.4

Project Number: 94320 - B
Project Title: Prince William Sound System Investigation
Sub-Project: Coded Wire Tag Recoveries From Pinks in PWS
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Field supplies (rain gear, gloves, knives, sampling kits, jars, ice chests, containers for thousands of pink salmon heads)	$0.0	$10.3
Tag Lab supplies		$4.4
Commodities Total	$0.0	$14.7
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - B
Project Title: Prince William Sound System Investigation
Sub-Project: Coded Wire Tag Recoveries From Pinks in PWS
Agency: AK Dept. of Fish & Game

FORM 3B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Otolith Tetracycline Mass Marking of Pink Salmon in PWS- This project tests the feasibility of chemically marking the otoliths of pink salmon by immersing newly emerged fry in a highly dilute solution of tetracycline. If feasible, this technology will be used to apply a unique mass mark to wild populations of pink salmon for estimates of survival and straying rates which are integral to the SEA research effort.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$23.1	$23.1	$19.7	
Travel	$0.0	$0.0	$0.6	$0.6	$0.6	
Contractual	$0.0	$0.0	$3.5	$3.5	$3.5	
Commodities	$0.0	$0.0	$10.4	$10.4	$10.4	
Equipment	$0.0	$0.0	$12.6	$12.6	$12.6	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$50.2	$50.2	$46.8	
General Administration	$0.0	$0.0	$3.7	$3.7	$3.2	
Project Total	$0.0	$0.0	$53.9	$53.9	$50.0	
Full-time Equivalents (FTE)	0.0	0.0	0.5	0.5	1.3	

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Fishery Biologist I	0.0	$0.0	1.0	$4.5
Fish and Wildlife Technician II	0.0	$0.0	0.2	$1.2
Fish and Wildlife Technician II (Tag lab)	0.0	$0.0	4.5	$14.0
Program Manager	0.0	$0.0	0.5	$3.4
Personnel Total	0.0	$0.0	6.2	$23.1

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - C
Project Title: Prince William Sound System Investigation
Sub-Project: Otolith Marking - Inseason Stock Separation
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
One round trip Cordova/Juneau @ $400/trip		$0.4
Per diem 2 days @ $100/day		$0.2
Travel Total	$0.0	$0.6
Contractual:		
Air charter to hatcheries (5 trips @ $400/trip)		$2.0
Vessel Charter		$1.5
Contractual Total	$0.0	$3.5

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Project Number: 94320 - C
Project Title: Prince William Sound System Investigation
Sub-Project: Otolith Marking - Inseason Stock Separation
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Hatchery supplies - Totes, hoses, bags, buckets, pipe fittings, chemicals	$0.0	$5.0
Lab supplies	$0.0	$5.0
fuel	$0.0	$0.4
Commodities Total	$0.0	$10.4
Equipment:		
Microscope attachments and alterations		$12.6
Equipment Total	$0.0	$12.6

Project Number: 94320 - C
Project Title: Prince William Sound System Investigation
Sub-Project: Otolith Marking - Inseason Stock Separation
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Pink Salmon Stock Genetics in Prince William Sound - This project will use proven genetic techniques to determine separate genetic stocks of pink salmon in Prince William Sound. This information will be used to manage commercial harvest to protect wild pink salmon populations while maintaining a viable commercial fishery for hatchery released pink salmon.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$36.2	$36.2	$55.0	
Travel	$0.0	$0.0	$3.0	$3.0	$5.5	
Contractual	$0.0	$0.0	$112.2	$112.2	$118.2	
Commodities	$0.0	$0.0	$6.5	$6.5	$8.5	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$157.9	$157.9	$187.2	
General Administration	$0.0	$0.0	$13.3	$13.3	$16.5	
Project Total	$0.0	$0.0	$171.2	$171.2	$203.7	
Full-time Equivalents (FTE)	0.0	0.0	0.7	0.7	0.6	
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Fishery Biologist II	0.0	$0.0	2.0	$8.6
Biometrician I	0.0	$0.0	3.0	$14.7
Fish& Wildlife Technician II	0.0	$0.0	2.0	$6.2
Program Manager	0.0	$0.0	1.0	$6.7
Personnel Total	0.0	$0.0	8.0	$36.2

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - D
Project Title: Prince William Sound System Investigation
Sub-Project: Pink Salmon Stock Genetics in PWS
Agency: AK Dept. of Fish & Game

FORM 3A SUB-PROJECT DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
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	Reprt/Intrm	Remaining
Travel:		
Two RT Anchorage/Cordova (air fare $350 + 3 days per diem @ $100/day)		$1.0
Four RT Anchorage/Cordova for staff/biometricians meetings (air fare $350 + 6 days per diem @ $100/day)		$2.0
Travel Total	$0.0	$3.0
Contractual:		
Air freight, postage		$1.0
Long distance telephone charges		$1.2
Contract via RFP for genetics work to separate discrete genetic stocks of pink salmon in Prince William Sound		$110.0
Contractual Total	$0.0	$112.2

Project Number: 94320 - D
Project Title: Prince William Sound System Investigation
Sub-Project: Pink Salmon Stock Genetics in PWS
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Computer software upgrades		$1.5
Field supplies (cryotubes, knives, tweezers, jars, label tape, markers, preservatives, gasoline, etc.)		$5.0
Commodities Total	$0.0	$6.5
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - D
Project Title: Prince William Sound System Investigation
Sub-Project: Pink Salmon Stock Genetics in PWS
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Assessment of Juvenile Salmon Predation in Prince William Sound - This project tests 2 hypotheses mechanisms that regulate predation on juvenile salmon and other age-0 fish in PWS. The objectives are : 1) identify principal predators on juvenile salmon, 2) determine distribution, abundance, species and size composition of fish predators along the juvenile salmon migratory pathways, and 3) recommend methods for improving field sampling techniques, sampling designs, and hypothesis testing capabilities.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$228.9	$228.9	$339.3	
Travel	$0.0	$0.0	$1.7	$1.7	$3.3	
Contractual	$0.0	$0.0	$510.1	$510.1	$619.5	
Commodities	$0.0	$0.0	$10.2	$10.2	$20.2	
Equipment	$0.0	$0.0	$95.6	$95.6	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$846.5	$846.5	$982.3	
General Administration	$0.0	$0.0	$60.6	$60.6	$75.8	
Project Total	$0.0	$0.0	$907.1	$907.1	$1,058.1	
Full-time Equivalents (FTE)	0.0	0.0	3.5	3.5	5.8	

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description		Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1	Fishery Biologist IV			1.0	$6.5
1	Fishery Biologist III			2.5	$14.3
1	Fishery Biologist II			5.5	$25.9
1	Fishery Biologist I			3.5	$33.0
5	Fish & Wildlife Technician III			10.5	$36.8
5	Fish & Wildlife Technician II			16.0	$98.1
1	Biometrician II			2.5	$14.3
	Personnel Total	0.0	$0.0	41.5	$228.9

The budget for the FB I and F&WT include sea duty and overtime hours aboard a ship

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - E
Project Title: Prince William Sound System Investigation
Sub-Project: Salmon Predators
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
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Travel:	Reprt/Intrm	Remaining
Two round trips between Soldotna and Cordova to have biometrician review data collection procedures in the field.		$0.7
Per diem for biometrician		$1.0
Travel Total	$0.0	$1.7
Contractual:		
Air charter flights to transport staff from Cordova to the vessels		$4.0
Charter for a 70' trawl vessel to conduct mid-water trawl sampling of juvenile salmon predators.		$300.7
Charter of a 42' + purse seine vessel to conduct nearshore sampling of juvenile salmon predators		$96.6
Charter of a 42' + purse seine vessel to conduct nearshore sampling of juvenile salmon predators		$108.8
Contractual Total	$0.0	$510.1

Project Number: 94320 - E
Project Title: Prince William Sound System Investigation
Sub-Project: Salmon Predators
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
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Commodities:	Reprt/Intrm	Remaining
Office supplies		$1.6
Laboratory supplies		$4.0
Field sampling supplies (food, fuel, etc.)		$3.0
Utilities		$1.6
Commodities Total	$0.0	$10.2
Equipment:		
One 486 IBM compatible computer (w/ 80Mb hard disk and 8Mb Ram) for data entry and analysis		$6.0
Two dissecting microscopes for stomach contents analysis		$5.6
Two small mesh purse seines		$54.0
One mid-water trawl net		$30.0
Equipment Total	$0.0	$95.6

Project Number: 94320 - E
Project Title: Prince William Sound System Investigation
Sub-Project: Salmon Predators
Agency: AK Dept. of Fish & Game

FORM 3B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Trophic Interactions of Harbor Seals - This project will investigate trophic ecology of harbor seals in PWS and assess the role of prey availability in the ongoing declines. The objectives of this project are to: 1) integrate information from ongoing tagging studies with information about distribution of key species of forage fishes, 2) determine fatty acid composition of blubber and blood samples taken from seals during tagging, 3) assess diet and harbor seal position in the food chain using lipid and stable isotope analysis.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$6.5	$6.5		Anticipated budget for FY95 is unknown at this time
Travel	$0.0	$0.0	$1.0	$1.0		
Contractual	$0.0	$0.0	$15.0	$15.0		
Commodities	$0.0	$0.0	$1.5	$1.5		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$24.0	$24.0	$0.0	
General Administration	$0.0	$0.0	$2.0	$2.0	$0.0	
Project Total	$0.0	$0.0	$26.0	$26.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.1	0.1		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Wildlife Biologist III			1.0	$6.5
Personnel Total	0.0	$0.0	1.0	$6.5

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - F
Project Title: Prince William Sound System Investigation
Sub-Project: Harbor Seals
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
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	Reprt/Intrm	Remaining
Travel:		
Two RT Fairbanks/Whittier to assist with field work @$350/trip		$0.7
Per diem and lodging at combination of commercial, state, and field facilities.		$0.3
Travel Total	$0.0	$1.0
Contractual:		
RSA with the University of Alaska - Fairbanks for lipid analysis of seal blood and blubber and also prey species		$15.0
Contractual Total	$0.0	$15.0

Project Number: 94320 - F
Project Title: Prince William Sound System Investigation
Sub-Project: Harbor Seals
Agency: AK Dept. of Fish & Game

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Commodities:	Reprt/Intrm	Remaining
Laboratory and sampling supplies to biopsy seals and collect blood and other tissues for stable isotope analysis		$1.1
Office supplies (paper, pens, etc.)		$0.4
Commodities Total	$0.0	$1.5
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - F
Project Title: Prince William Sound System Investigation
Sub-Project: Harbor Seals
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: A central tenet of the SEA hypothesis is that there is variable advection of Gulf of Alaska waters into Prince William Sound. This advection affects not only zooplankton populations, but also the Prince William sound phytoplankton populations. Strong advection may confound the effects of in situ Prince William Sound primary production with Gulf of Alaska production. We propose to use satellite-derived sea-surface temperatures to monitor the movement of GOA surface waters into PWS and, after September 1994, to use satellite-measured surface chlorophyll concentrations to determine the effect of advection on the observed chlorophyll field.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$113.5	
Travel	$0.0	$0.0	$0.0	$0.0	$4.5	
Contractual	$0.0	$0.0	$136.3	$136.3	$3.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$9.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$15.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$136.3	$136.3	$145.0	
General Administration	$0.0	$0.0	$5.2	$5.2	$36.2	
Project Total	$0.0	$0.0	$141.5	$141.5	$181.2	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - G
Project Title: Prince William Sound System Investigation
Sub-Project: Phytoplankton/Nutrients
Agency: AK Dept. of Fish & Game

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SUB-PROJECT DETAIL

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1994 Federal Fiscal Year Project Budget
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Travel:	Reprt/Intrm	Remaining
Travel Total	$0.0	$0.0

Contractual:		
RSA with UAF to conduct a phytoplankton project		$136.3
Contractual Total	$0.0	$136.3

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Project Number: 94320 - G
Project Title: Prince William Sound System Investigation
Sub-Project: Phytoplankton/Nutrients
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - G
Project Title: Prince William Sound System Investigation
Sub-Project: Phytoplankton/Nutrients
Agency: AK Dept. of Fish & Game

FORM 3B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: A central tenet of the SEA hypothesis is that there is variable advection of Gulf of Alaska waters into Prince William Sound. This advection affects not only zooplankton populations, but also the Prince William sound phytoplankton populations. Strong advection may confound the effects of in situ Prince William Sound primary production with Gulf of Alaska production. We propose to use satellite-derived sea-surface temperatures to monitor the movement of GOA surface waters into PWS and, after September 1994, to use satellite-measured surface chlorophyll concentrations to determine the effect of advection on the observed chlorophyll field.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$90.5	$90.5	$113.5	
Travel	$0.0	$0.0	$4.5	$4.5	$4.5	
Contractual	$0.0	$0.0	$5.0	$5.0	$3.0	
Commodities	$0.0	$0.0	$9.0	$9.0	$9.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$15.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$109.0	$109.0	$145.0	
General Administration	$0.0	$0.0	$27.3	$27.3	$36.2	
Project Total	$0.0	$0.0	$136.3	$136.3	$181.2	
Full-time Equivalents (FTE)	0.0	0.0	1.8	1.8		

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
P. McRoy			2.0	$24.8
D. Eslinger			3.0	$22.6
B. Bergeron			5.0	$23.5
PhD. Student			5.5	$10.5
M.S. Student			5.5	$9.1
Personnel Total	0.0	$0.0	21.0	$90.5

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
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Project Number: 94320 - G
Project Title: Prince William Sound System Investigation
Sub-Project: Phytoplankton/Nutrients
Agency: University of Alaska - Fairbanks

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Eight RT Fairbanks/PWS @$365/trip		$2.9
Per diem (8 people X 5 days X $40/person/day)		$1.6
Travel Total	$0.0	$4.5
Contractual:		
Equipment fabrication (2 photosynthetron @ $2.0 K)		$4.0
Publications/Page charges		$1.0
Contractual Total	$0.0	$5.0

Project Number: 94320 - G
Project Title: Prince William Sound System Investigation
Sub-Project: Phytoplankton/Nutrients
Agency: University of Alaska - Fairbanks

FORM 4B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Isotopes		$1.0
Chemicals		$1.0
Auto-analyzer supplies		$2.0
Glassware		$1.5
Sample Containers		$2.0
Field supplies		$1.0
Office supplies		$0.5
Commodities Total	$0.0	$9.0
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - G
Project Title: Prince William Sound System Investigation
Sub-Project: Phytoplankton/Nutrients
Agency: University of Alaska - Fairbanks

FORM 4B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: This project is one part of the multi-component SEA and related studies program in Prince William Sound designed as an ecosystem approach to understanding pink salmon, herring, and marine bird and mammal population trends. Within SEA, the zooplankton project will work closely with the Physical Oceanography/Meteorology, Nearshore Fishes, Salmon Growth and Survival, Salmon Predators, Hatchery Experimental and Manipulation, and Ecosystem Data Base and Modeling projects. The zooplankton work proposed here will provide data for eventual tests of the Lake/River and Prey/Predator hypotheses.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$209.7	
Travel	$0.0	$0.0	$0.0	$0.0	$16.5	
Contractual	$0.0	$0.0	$289.1	$289.1	$68.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$12.3	
Equipment	$0.0	$0.0	$0.0	$0.0	$3.5	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$289.1	$289.1	$310.0	
General Administration	$0.0	$0.0	$11.0	$11.0	$77.5	
Project Total	$0.0	$0.0	$300.1	$300.1	$387.5	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

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Project Number: 94320 - H
Project Title: Prince William Sound System Investigation
Sub-Project: Zooplankton in Ecosystem
Agency: AK Dept. of Fish & Game

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1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
RSA with UAF to conduct the zooplankton study		$289.1
Contractual Total	$0.0	$289.1

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Project Number: 94320 - H
Project Title: Prince William Sound System Investigation
Sub-Project: Zooplankton in Ecosystem
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - H
Project Title: Prince William Sound System Investigation
Sub-Project: Zooplankton in Ecosystem
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: This project is one part of the multi-component SEA and related studies program in Prince William Sound designed as an ecosystem approach to understanding pink salmon, herring, and marine bird and mammal population trends. Within SEA, the zooplankton project will work closely with the Physical Oceanography/Meteorology, Nearshore Fishes, Salmon Growth and Survival, Salmon Predators, Hatchery Experimental and Manipulation, and Ecosystem Data Base and Modeling projects. The zooplankton work proposed here will provide data for eventual tests of the Lake/River and Prey/Predator hypotheses.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$159.4	$159.4	$209.7	
Travel	$0.0	$0.0	$15.0	$15.0	$16.5	
Contractual	$0.0	$0.0	$18.0	$18.0	$68.0	
Commodities	$0.0	$0.0	$14.3	$14.3	$12.3	
Equipment	$0.0	$0.0	$24.6	$24.6	$3.5	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$231.3	$231.3	$310.0	
General Administration	$0.0	$0.0	$57.8	$57.8	$77.5	
Project Total	$0.0	$0.0	$289.1	$289.1	$387.5	
Full-time Equivalents (FTE)	0.0	0.0	3.1	3.1		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
R.T. Cooney			5.0	$51.5
K. Coyle			5.0	$27.3
C. Stark			5.5	$23.4
E. Stockmar			5.5	$18.8
1 Field Aid			5.5	$18.8
2 M.S. Students			11.0	$19.6
Personnel Total	0.0	$0.0	37.5	$159.4

NEPA Cost: $0.0

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Project Number: 94320 - H
Project Title: Prince William Sound System Investigation
Sub-Project: Zooplankton in Ecosystem
Agency: University of Alaska - Fairbanks

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Travel:	Reprt/Intrm	Remaining
15 RT Fairbanks-PWS @ $500/trip		$7.5
10 RT Anchorage-Cordova @ $350/trip		$3.5
Per diem (15 trips X 7 days @$40/day)		$3.9
Car rental (5 trips @ $25/day)		$0.1
Travel Total	$0.0	$15.0
Contractual:		
Shipping		
Zooplankton samples - surface Cordova-Fairbanks		$0.5
Equipment/supplies - air freight Seward/Fairbanks-Cordova		$2.0
Supplies and equipment from vendors		$0.5
Communications		
Photocopy		$0.5
Phone/Fax		$1.5
Typing/Clerical (Recharge center @ $35/hour)		$6.0
MOCNESS Maintenance Fee - pre-cruise calibration and staging		$6.0
CTC/Seabird pre-cruise calibration of system on hand		$1.0
Contractual Total	$0.0	$18.0

Project Number: 94320 - H
Project Title: Prince William Sound System Investigation
Sub-Project: Zooplankton in Ecosystem
Agency: University of Alaska - Fairbanks

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Bottles (1000 - 8 oz. plastic @ $1/bottle, 270 - 16 oz. glass @ $3.67/bottle, 215 - 32 oz glass @ $4.67/bottle)		$3.0
Preservative (Formaldehyde, 24 liters @ $12.50 /liter)		$0.3
Foul weather gear (7 full deck weatherproof suits @ $250/suit, assorted gloves and boots ($250))		$2.0
Other field/lab supplies		
Dissecting kits (10 @ $20/kit)		$0.2
Glassware		$0.5
Plankton splitter		$0.3
Software - new and upgrades		$1.0
Telephone answering machine		$0.1
Calvnets/frames (2 @ $200/net)		$0.4
Flowmeters (15 @ $250/flowmeter)		$3.8
1/2 - meter ring nets (6 @ $200/net)		$1.2
Miscellaneous replacement nets/cups		$1.5
Commodities Total	$0.0	$14.3
Equipment:		
MOCNESS nets/cups (2 sets @ $6750/set)		$13.1
1/2 - meter Closing net (2 @ $500/net)		$1.0
6 - centimeter bongo systems (2 @ $1000/system)		$2.0
1 - meter opening/closing net (2 @ $1000/net)		$2.0
Field 486 Notebook computer/printer		$2.5
Office laser printer		$1.0
Temperature logger		$3.0
Equipment Total	$0.0	$24.6

Project Number: 94320 - H
Project Title: Prince William Sound System Investigation
Sub-Project: Zooplankton in Ecosystem
Agency: University of Alaska - Fairbanks

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: This project is an interdisciplinary effort focused on the food web dynamics supporting top trophic levels in Prince William Sound. The study would provide an integrating function to projects focusing on several levels in the food chains and will employ the stable isotope ratios of carbon and nitrogen to trace trophic transfers of carbon and nitrogen between levels. One focus will concern building the database regarding harbor seals whereas the remaining work will seek to build a comprehensive base of isotopic data for the Prince William Sound area. In cases where regional gradients in isotope ratios exist, it may be possible to identify critical habitats used by marine biota.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$50.5	
Travel	$0.0	$0.0	$0.0	$0.0	$3.0	
Contractual	$0.0	$0.0	$58.4	$58.4	$20.4	
Commodities	$0.0	$0.0	$0.0	$0.0	$6.1	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$58.4	$58.4	$80.0	
General Administration	$0.0	$0.0	$2.1	$2.1	$20.0	
Project Total	$0.0	$0.0	$60.5	$60.5	$100.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
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Project Number: 94320 - I
Project Title: Prince William Sound System Investigation
Sub-Project: Trophic/Stable Isotopes
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
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	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contract with UAF to conduct food web dependency study		$58.4
Contractual Total	$0.0	$58.4

Project Number: 94320 - I
Project Title: Prince William Sound System Investigation
Sub-Project: Trophic/Stable Isotopes
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - I
Project Title: Prince William Sound System Investigation
Sub-Project: Trophic/Stable Isotopes
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: This project is an interdisciplinary effort focused on the food web dynamics supporting top trophic levels in Prince William Sound. The study would provide an integrating function to project focusing on several levels in the food chains and will employ the stable isotope ratios of carbon and nitrogen to trace trophic transfers of carbon and nitrogen between levels. One focus will concern building the database regarding harbor seals whereas the remaining work will seek to build a comprehensive base of isotopic data for the Prince William Sound area. In cases where regional gradients in isotope ratios exist, it may be possible to identify critical habitats used by marine biota.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$27.6	$27.6	$50.5	
Travel	$0.0	$0.0	$0.6	$0.6	$3.0	
Contractual	$0.0	$0.0	$12.6	$12.6	$20.4	
Commodities	$0.0	$0.0	$4.9	$4.9	$6.1	
Equipment	$0.0	$0.0	$1.0	$1.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$46.7	$46.7	$80.0	
General Administration	$0.0	$0.0	$11.7	$11.7	$20.0	
Project Total	$0.0	$0.0	$58.4	$58.4	$100.0	
Full-time Equivalents (FTE)	0.0	0.0	0.5	0.5		

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
T. Kline			3.0	$12.6
D. Schell			0.6	$7.0
N. Haubenstock			1.4	$6.0
M. Hoberg			0.5	$2.0
Personnel Total	0.0	$0.0	5.5	$27.6

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
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Project Number: 94320 - I
Project Title: Prince William Sound System Investigation
Sub-Project: Trophic/Stable Isotopes
Agency: University of Alaska - Fairbanks

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EXXON VALDEZ TRUSTEE COUNCIL
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Travel:	Reprt/Intrm	Remaining
One RT Fairbanks-Seward, Valdez or Whittier		$0.4
Per diem (5 days@ $40/day)		$0.2
Travel Total	$0.0	$0.6
Contractual:		
Mass spectrometry @ $15/sample		$8.5
Shipping, communication, etc.		$1.6
Air charters		$1.0
Report preparation, photocopy, etc.		$1.0
Computer/Equipment Maintenance		$0.5
Contractual Total	$0.0	$12.6

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Project Number: 94320 - I
Project Title: Prince William Sound System Investigation
Sub-Project: Trophic/Stable Isotopes
Agency: University of Alaska - Fairbanks

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Commodities:	Reprt/Intrm	Remaining
Scintillation vials		$0.6
Whirlpacks, plastic bags, scalpels		$0.3
Lab/office		$0.5
Computer peripherals		$1.1
Software upgrades		$0.4
Glassware and chemicals		$0.8
Liquid nitrogen, standards, gases		$1.2
Commodities Total	$0.0	$4.9
Equipment:		
Freezer		$1.0
Equipment Total	$0.0	$1.0

Project Number: 94320 - I
Project Title: Prince William Sound System Investigation
Sub-Project: Trophic/Stable Isotopes
Agency: University of Alaska - Fairbanks

FORM 4B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - An Ecosystem Study for Prince William Sound - Information Systems and Model Development - (SEA-DATA) - for FY94, there are five SEA-DATA projects: 1) Field data communications, 2) Data management, 3) descriptive model, 4) numerical models, and 5) sampling technologies.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$18.8	$18.8	$0.0	
Travel	$0.0	$0.0	$0.0	$0.0	$0.0	
Contractual	$0.0	$0.0	$701.5	$701.5	$0.0	
Commodities	$0.0	$0.0	$10.0	$10.0	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$730.3	$730.3	$0.0	
General Administration	$0.0	$0.0	$26.2	$26.2	$0.0	
Project Total	$0.0	$0.0	$756.5	$756.5	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0	0.0	

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
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Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
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	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contractual Total	$0.0	$0.0

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Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
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Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - An Ecosystem Study for Prince William Sound - Information Systems and Model Development - (SEA-DATA) - for FY94, there are five SEA-DATA projects: 1) Field data communications, 2) Data management, 3) descriptive model, 4) numerical models, and 5) sampling technologies.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$64.0	$64.0		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$0.0	$10.8	$10.8		
Commodities	$0.0	$0.0	$6.8	$6.8		
Equipment	$0.0	$0.0	$13.4	$13.4		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$95.0	$95.0	$0.0	
General Administration	$0.0	$0.0	$23.8	$23.8		
Project Total	$0.0	$0.0	$118.8	$118.8	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	1.3	1.3		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
M. Johnson			1.0	$7.8
D. Eslinger			2.0	$14.7
Technician			4.5	$19.5
Technician			3.0	$12.8
M.S. Student			5.5	$9.2
Personnel Total	0.0	$0.0	16.0	$64.0

NEPA Cost: $0.0

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Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: University of Alaska - Fairbanks

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
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Travel:	Reprt/Intrm	Remaining
Travel Total	$0.0	$0.0

Contractual:		
Clerical/Secretarial support (Academic Services @ $35/hr)		$4.0
Shipping (UPS)		$0.8
Terrascan licencse		$6.0
Contractual Total	$0.0	$10.8

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Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: University of Alaska - Fairbanks

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EXXON VALDEZ TRUSTEE COUNCIL
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Commodities:	Reprt/Intrm	Remaining
Data charges		$5.8
Tapes		$1.0
Commodities Total	$0.0	$6.8
Equipment:		
Unix Workstation		$6.0
Printer		$2.4
Hard disks (5 GB)		$5.0
Equipment Total	$0.0	$13.4

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: University of Alaska - Fairbanks

FORM 4B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - An Ecosystem Study for Prince William Sound - Information Systems and Model Development - (SEA-DATA) - for FY94, there are five SEA-DATA projects: 1) Field data communications, 2) Data management, 3) descriptive model, 4) numerical models, and 5) sampling technologies.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$173.3	$173.3		
Travel	$0.0	$0.0	$27.9	$27.9		
Contractual	$0.0	$0.0	$6.3	$6.3		
Commodities	$0.0	$0.0	$2.1	$2.1		
Equipment	$0.0	$0.0	$256.6	$256.6		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$466.2	$466.2	$0.0	
General Administration	$0.0	$0.0	$116.6	$116.6		
Project Total	$0.0	$0.0	$582.8	$582.8	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	2.7	2.7		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1 Project Manager			5.5	$37.2
1 Technical administrative assistant			4.0	$16.0
3 Communication/Sci. Data System Engineer			4.3	$27.1
2 Marine/Data Systems Specialist			7.0	$30.6
1 Systems Administrator			5.5	$23.8
1 Numerical analyst			1.0	$7.6
2 OPC/ Tomography Specialist			2.4	$15.2
3 Fish Ecologist I/Ecologist/Fish Oceanographer			2.9	$15.8
Personnel Total	0.0	$0.0	32.6	$173.3

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994

**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: Prince William Sound Science Center

FORM 4A
SUB-PROJECT
CONTRACTUAL
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Travel:	Reprt/Intrm	Remaining
2 round trip Cordova/Fairbanks @ $456/trip + 6 days per diem @ $140/day, 6 days car rental @ $30/day		$1.9
3 round trip Cordova/Anchorage @ $224/trip + 5 days per diem @ $170/day, 5 days car rental @ $30/day		$1.7
2 round trip Cordova/Washington D.C. @ $1100/trip		$2.2
1 round trip Cordova/Anchorage @ $1200/trip + 8 days per diem @ $97/day, 8 days car rental @ $30/day		$2.1
1 round trip Cordova/Norfolk VA @ $600/trip + 2 days per diem @ $102/day, 2 days car rental @ $30/day		$0.9
1 round trip Cordova/Stennis MS @ $1100/trip + 3 days per diem @ $82/day, 3 days car rental @ $30/day		$1.4
1 round trip Logan UT/Cordova @ $900/trip + 42 days per diem @ $103/day		$5.2
3 round trip Chicago/Cordova @ $900/trip		$0.9
2 round trip Cordova/Fairbanks @ $456/trip + 4 days per diem @ $140/day, 4 days car rental @ $30/day		$1.6
1 round trip Boulder/Cordova @ $900/trip		$0.9
1 round trip Washington D.C./Cordova @ $1100/trip + 6 days per diem @ $103/day		$1.7
1 round trip Madison WI/Cordova @ $700/trip + 18 days per diem @ $103/day		$2.6
1 round trip Miami/Cordova @ $1200/trip + 5 days per diem @ $103/day		$1.7
2 round trip Toronto/Cordova @ $1200/trip + 7 days per diem @ $103/day		$3.1
Travel Total	$0.0	$27.9

Contractual:		
Long distance telephone charges, E-mail, and facsimile		$4.7
Mail, freight, and shipping		$1.0
Office equipment maintenance and repair		$0.6
Contractual Total	$0.0	$6.3

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: Prince William Sound Science Center

FORM 4B
SUB-PROJECT
CONTRACTUAL
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:				Reprt/Intrm	Remaining
Paper and office supplies					$2.1
			Commodities Total	$0.0	$2.1
Equipment:					
Hardware & electronics for demonstration system		Community LAN hardware:			
for near-real time buoy & ship data telemetry	30.0	5 - X11 for PC's ($2.0), hub ($2.0), cable ($0.	4.5		$34.5
Data storage, management, & retrieval hardware		UPS ($0.3), ethernet cards ($0.7), link ($5.0)	6.0		$6.0
Workstation- ($20.0K), x-terminal ($5.0K)	25.0	x-terminal ($4.0), pc router ($1.1)	5.1		$30.1
Optical drive ($3.8), Hard drive ($5.0)	8.8				$8.8
Fast CDROM ($2.0), DAT tape drive ($2.0)	4.0	Descriptive model & visualization development:			$4.0
Media ($3.0), software ($10.0), UPS ($0.5)	13.5	Workstation ($20.0), terminal ($5.0)	25.0		$38.5
annual maintenance($2.0)	2.0	hard drive ($5.0), media ($2.0), AVS software ($1	19.0		$21.0
		IDL software ($5.0), productivity items ($5.0)	10.0		$10.0
Leased data line @ 256 kbs, w/hardware, network fee		project mgmnt ($5.0), network conference ($3.0)	8.0		$8.0
Install ($1.7), hardware ($10.0), maintenance	13.5	laser printer ($2.0), UPS ($0.5)	2.5		$16.0
IXC ($20.2), LAN-Cordova ($3.4)	23.6				$23.6
LAN-Anchorage ($6.5), NWNET mbrship ($3.0	9.5	Towed vehicle providing depth shuttling			$9.5
		aquashuttle	46.6		$46.6
			Equipment Total	$0.0	$256.6

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: Prince William Sound Science Center

FORM 4B
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CONTRACTUAL
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - An Ecosystem Study for Prince William Sound - Information Systems and Model Development - (SEA-DATA) - for FY94, there are five SEA-DATA projects: 1) Field data communications, 2) Data management, 3) descriptive model, 4) numerical models, and 5) sampling technologies.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$0.0	$701.5	$701.5		
Commodities	$0.0	$0.0	$0.0	$0.0		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$701.5	$701.5	$0.0	
General Administration	$0.0	$0.0	$23.4	$23.4		
Project Total	$0.0	$0.0	$724.9	$724.9	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: AK Dept. of Fish & Game

FORM 3A-1
SUB-PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contract with the UAF		$118.8
Contract Prince William Sound Science Center		$582.8
Contractual Total	$0.0	$701.5

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Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: AK Dept. of Fish & Game

FORM 3B-1
SUB-PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: AK Dept. of Fish & Game

FORM 3B-1
SUB-PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description:

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$18.8	$18.8		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$0.0	$0.0	$0.0		
Commodities	$0.0	$0.0	$10.0	$10.0		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$28.8	$28.8	$0.0	
General Administration	$0.0	$0.0	$2.8	$2.8	$0.0	
Project Total	$0.0	$0.0	$31.6	$31.6	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.2	0.2		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
2 Scientists			2.5	$18.8
Personnel Total	0.0	$0.0	2.5	$18.8

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: Dept. of Interior, National Biological Survey

FORM 3A-2
SUB-PROJECT DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contractual Total	$0.0	$0.0

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: Dept. of Interior, National Biological Survey

FORM 3B-2
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Software		$10.0
Commodities Total	$0.0	$10.0
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - J
Project Title: Prince William Sound System Investigation
Sub-Project: Information and Modeling
Agency: Dept. of Interior, National Biological Survey

FORM 3B-2
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: PWS System Investigation- Experimental Release - This project is part of the SEA ecosystem study. Approximately 16,000,000 pink salmon fry will be reared at two hatcheries to 1.5 grams for a late spring release in 1994. This project will measure the influence of size at ocean-entry and time of ocean entry on growth and mortality.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$3.4	
Travel	$0.0	$0.0	$0.0	$0.0	$0.0	
Contractual	$0.0	$0.0	$45.0	$45.0	$30.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$45.0	$45.0	$33.4	
General Administration	$0.0	$0.0	$1.6	$1.6	$2.6	
Project Total	$0.0	$0.0	$46.6	$46.6	$36.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994

**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - K
Project Title: Prince William Sound System Investigation
Sub-Project: Experimental Fry Release
Agency: AK Dept. of Fish & Game

FORM 3A
SUB-PROJECT DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contract with PWSAC to raise and release 16,000,000 1.5 gram pink salmon fry into PWS @ $2,813/million.		$45.0
Contractual Total	$0.0	$45.0

Project Number: 94320 - K
Project Title: Prince William Sound System Investigation
Sub-Project: Experimental Fry Release
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - K
Project Title: Prince William Sound System Investigation
Sub-Project: Experimental Fry Release
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: PWS System Investigation- Experimental Manipulation - This project aids in the restoration of PWS pink salmon through collaboration with the SEA ecosystem study. 390,000,000 pink salmon fry will be released from three hatcheries at various times and at various sizes to assess the influence of these variables on growth, mortality and migration patterns. This subproject budget identifies the line item allocations for the contract with PWSAC.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$0.0	$1,750.0	$1,750.0		
Commodities	$0.0	$0.0	$0.0	$0.0		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$1,750.0	$1,750.0	$0.0	
General Administration	$0.0	$0.0		$0.0		
Project Total	$0.0	$0.0	$1,750.0	$1,750.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - L
Project Title: Prince William Sound System Investigation
Sub-Project: Experimental Manipulation
Agency: AK Dept. of Fish & Game

FORM 3A SUB-PROJECT DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contract with PWSAC to raise and release 355,000,000 juvenile pink salmon @ $4930/million fish released.		$1,750.0
Contractual Total	$0.0	$1,750.0

Project Number: 94320 - L
Project Title: Prince William Sound System Investigation
Sub-Project: Experimental Manipulation
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - L
Project Title: Prince William Sound System Investigation
Sub-Project: Experimental Manipulation
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment- An Ecosystem Study of Prince William Sound Physical Oceanography (SEA-OCEAN) - a descriptive physical oceanography of Prince William Sound and the Northern Gulf of Alaska.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$0.0	$749.9	$749.9		
Commodities	$0.0	$0.0	$0.0	$0.0		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$749.9	$749.9	$0.0	
General Administration	$0.0	$0.0	$23.2	$23.2		
Project Total	$0.0	$0.0	$773.1	$773.1	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost:	$0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

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Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: AK Dept. of Fish & Game

FORM 3A
SUB-
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Travel:	Reprt/Intrm	Remaining
Travel Total	$0.0	$0.0
Contractual:		
RSA with UAF and PWSSC to conduct a physical oceanography study in PWS		$749.9
Contractual Total	$0.0	$749.9

Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: AK Dept. of Fish & Game

FORM 3B
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DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: AK Dept. of Fish & Game

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment- An Ecosystem Study of Prince William Sound Physical Oceanography (SEA-OCEAN) - a descriptive physical oceanography of Prince William Sound and the Northern Gulf of Alaska.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$25.5	$25.5	$0.0	
Travel	$0.0	$0.0	$3.6	$3.6	$0.0	
Contractual	$0.0	$0.0	$70.4	$70.4	$0.0	
Commodities	$0.0	$0.0	$0.7	$0.7	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$100.2	$100.2	$0.0	
General Administration	$0.0	$0.0	$25.1	$25.1	$0.0	
Project Total	$0.0	$0.0	$125.3	$125.3	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.7	0.7		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Johnson, M.			1.0	$7.8
Technician			2.0	$8.5
M.S. Student			5.5	$9.2
Personnel Total	0.0	$0.0	8.5	$25.5

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: University of Alaska - Fairbanks

FORM 4A
SUB-PROJECT
CONTRACTUAL
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
2 round trips Cordova/Western Prince William Sound @ $500/trip		$1.0
Per diem - 6 days @ $125/day		$0.8
4 round trips Fairbanks/Cordova @ $465/trip		$1.8
Travel Total	$0.0	$3.6
Contractual:		
Vessel Charter (25days @ $1,400/day)		$35.0
Lease - ADCP and cable (2.9 months @ $8,600/month)		$24.9
Installation of thermosalinograph		$10.0
Long distance telephone charges		$0.5
Contractual Total	$0.0	$70.4

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1994

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Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: University of Alaska - Fairbanks

FORM 4B
SUB-PROJECT
CONTRACTUAL
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Paper and office supplies		$0.7
Commodities Total	$0.0	$0.7
Equipment:		
Equipment Total	$0.0	$0.0

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1994

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Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: University of Alaska - Fairbanks

FORM 4B
SUB-PROJECT
CONTRACTUAL
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment- An Ecosystem Study of Prince William Sound Physical Oceanography (SEA-OCEAN) - a descriptive physical oceanography of Prince William Sound and the Northern Gulf of Alaska.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$112.3	$112.3	$198.3	
Travel	$0.0	$0.0	$3.8	$3.8	$12.0	
Contractual	$0.0	$0.0	$12.9	$12.9	$125.0	
Commodities	$0.0	$0.0	$11.0	$11.0	$15.0	
Equipment	$0.0	$0.0	$359.7	$359.7	$80.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$499.7	$499.7	$430.3	
General Administration	$0.0	$0.0	$124.9	$124.9	$84.1	
Project Total	$0.0	$0.0	$624.6	$624.6	$514.4	
Full-time Equivalents (FTE)	0.0	0.0	1.7	1.7		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1 Physical Oceanographer			5.5	$32.8
1 Marine Engineer			3.6	$35.5
1 Technician			5.5	$22.0
1 Technician			5.5	$22.0
Personnel Total	0.0	$0.0	20.1	$112.3

NEPA Cost: $0.0

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Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: Prince William Sound Science Center

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Travel:	Reprt/Intrm	Remaining
1 round trip Cordova/Fairbanks @ $456/trip		$0.5
2 days per diem @ $140/day		$0.3
6 air charter trips Cordova/Western Prince William Sound @ $500/trip		$3.0
Travel Total	$0.0	$3.8
Contractual:		
Communications for real time data transmission and for communication between field personnel and Cordova		$5.0
Shipping (1%) and insurance (1%) for equipment		$6.4
Long distance telephone charges and facsimile		$1.0
Copying		$0.5
Contractual Total	$0.0	$12.9

Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: Prince William Sound Science Center

FORM 4B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
4 Mustang suits @ $250/each		$1.0
Floppy disks and accessories		$1.0
Statistics software		$3.0
Analytical Software		$2.5
Communications Software		$1.0
Marine hardware accessories		$1.0
Wet lab supplies		$1.0
Paper & Office supplies		$0.5
Commodities Total	$0.0	$11.0

Equipment:					
150 kHz direct reading broad band Acoustic Doppler Current Profiler	64.2	1 Chelea Instr. CTD-F, CTD & Flourimeter	20.0		$20.0
1 ENDECO towing body	19.0	1 Sea Bird underwater unit for 911 plus CTD	24.0		$88.2
1 Towing cable	8.0	1 SBE 11 plus deck unit	5.0		$24.0
1 ENDECO paravane system	7.0	1 Modem and PCB interface	1.5		$9.5
1 EL - 1000 transducer adapter	4.0	1 SBE 32 Carousel	14.5		$21.5
1 gyro interface	4.5	1 Adapter for 5 liter Niskin bottle	0.4		$4.4
1 Continental shelf broad band ADCP 150 kHz	53.0	12 PVC Niskin Bottles - 1.7 liter @ $600/bottle	7.2		$11.7
1 Direct reading capability	9.0	2 Sea Cat CTD's & enhancements @ $9.4/each	18.8		$71.8
1 Self contained end cap	1.0	2 Deep Sea winches @ $18K/each	36.0		$45.0
1 Additional 30 MB recording capacity	3.0	3- 486 Computers for shipboard data acquisition	8.0		$9.0
1 additional battery pack	7.5	1 Flourometer	15.0		$18.0
1 system Commissioning and ADCP training	4.0	1 Aandera current meter	10.0		$17.5
1 Acoustic release & buoy floats, lines for ADCP	15.1				$4.0
					$15.1
			Equipment Total	$0.0	$359.7

Project Number: 94320 - M
Project Title: Prince William Sound System Investigation
Sub-Project: Met/Phys. Oceanography
Agency: Prince William Sound Science Center

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - Nearshore Fish (SEA-FISH) - will use underwater acoustics and optics, and aerial optics to map distributions and assess biomass of the fish and plankton assemblage in Prince William Sound. SEA-FISH will provide large and fine scale trophic structure information to the SEA model where it will be integrated with ocean stated and pink salmon or Pacific herring information.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$189.7	
Travel	$0.0	$0.0	$0.0	$0.0	$56.7	
Contractual	$0.0	$0.0	$645.8	$645.8	$13.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$14.7	
Equipment	$0.0	$0.0	$0.0	$0.0	$313.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$645.8	$645.8	$587.1	
General Administration	$0.0	$0.0	$21.1	$21.1	$65.8	
Project Total	$0.0	$0.0	$666.9	$666.9	$652.9	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

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Project Number: 94320 - N
Project Title: Prince William Sound System Investigation
Sub-Project: Nearshore Fish
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
RSA with UAF to conduct the nearshore fish study		$645.8
Contractual Total	$0.0	$645.8

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Project Number: 94320 - N
Project Title: Prince William Sound System Investigation
Sub-Project: Nearshore Fish
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - N
Project Title: Prince William Sound System Investigation
Sub-Project: Nearshore Fish
Agency: AK Dept. of Fish & Game

FORM 3B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment- Nearshore Fish (SEA-FISH) - will use underwater acoustics and optics, and aerial optics to map distributions and assess biomass of the fish and plankton assemblage in Prince William Sound. SEA-FISH will provide large and fine scale trophic structure information to the SEA model where it will be integrated with ocean stated and pink salmon or Pacific herring information.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$167.8	$167.8	$189.7	
Travel	$0.0	$0.0	$51.5	$51.5	$56.7	
Contractual	$0.0	$0.0	$11.7	$11.7	$13.0	
Commodities	$0.0	$0.0	$14.7	$14.7	$14.7	
Equipment	$0.0	$0.0	$270.9	$270.9	$313.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$0.0	$516.6	$516.6	$587.1	
General Administration	$0.0	$0.0	$129.2	$129.2	$65.8	
Project Total	$0.0	$0.0	$645.8	$645.8	$652.9	
Full-time Equivalents (FTE)	0.0	0.0	2.8	2.8		

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Principal Investigator			5.0	$42.4
Project Leader			5.5	$25.2
Electrical Engineer			5.5	$23.8
Ecologist/Modeler			5.5	$25.2
Senior Acoustician			3.7	$18.9
Ecologist			3.2	$13.5
Technician			5.5	$18.8
Personnel Total	0.0	$0.0	33.9	$167.8

NEPA Cost: $0.0

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Project Number: 94320 - N
Project Title: Prince William Sound System Investigation
Sub-Project: Nearshore Fish
Agency: Prince William Sound Science Center

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Travel:	Reprt/Intrm	Remaining
3 round trips Cordova/Juneau @ $352/trip + 19 days per diem @ $128/day		$3.5
6 round trips Cordova/Anchorage @ $224/trip + 42 days per diem @ $170/day		$8.4
2 round trips Cordova/Fairbanks @ $456/trip + 11 days per diem @ $140/day		$2.5
PWS air charters (85 hours @ 230/hour)		$19.5
1 round trip Cordova/San Francisco @ $1,132/trip +10 days per diem @ $134/day		$2.4
3 round trips Cordova/Seattle @ $778/trip		$2.3
3 round trips Seattle/Halifax @ $1,683/trip + 27days per diem @ $153/day		$9.1
Misc. travel expenses		$1.2
Eighty-eight days of car rental @ $30/day		$2.6
Travel Total	$0.0	$51.5

Contractual:		
Long distance telephone charges		$1.2
Facsimile		$1.3
Copying		$2.4
Office Equipment maintenance and repair		$2.6
Electronic Mail and communication costs		$1.3
		$2.9
Contractual Total	$0.0	$11.7

Project Number: 94320 - N
Project Title: Prince William Sound System Investigation
Sub-Project: Nearshore Fish
Agency: Prince William Sound Science Center

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Analytical software		$1.0
Statistical software		$1.2
Communications software		$0.9
4 UPS (power supplies) @ $250/each		$1.0
4 Mustang suits @ $250/suit		$1.0
4 survival suits @ $750/suit		$3.0
4 sets raingear @ $150/each		$0.6
Electronics/Mechanical tools		$1.0
Marine hardware		$1.1
Office supplies		$0.9
Video tapes, disks, film		$1.0
Calibration and maintenance		$2.0
Commodities Total	$0.0	$14.7

Equipment:					
4 Biosonics DT 38,120/420, 200/420, 720/1000 kHz portable, digital, dual and split beam, scientific sounder systems @ $25,915/sounder	103.7	Tektronix color printer	13.9		$13.9
4 Pentiem color ntbk computer w/2PCMCIA slots @ $4,799	19.2	Seagate barracuda disk drive (2 gigab	2.2		$2.2
4 HP560 Color inkjet printers @ $902/each	3.6	Sun 1.7 gigabyte CDROM, 8mm,& .25" tape drive, w/ optical disk drive storage systems	4.8		$103.7
4 Optical data storage systems @4,989/sys	20.0	Infocus screen projection system	4.8		$19.2
2 - 8' Biofin towed body @ $4970/ea	9.9	Nikon 35mm camera w/wide angle and telescopic lens	2.3		$8.4
2 - 4' Biofin towed Body @ $2735/ea.	5.5	Sony, 8mm, 3 chip video camera	6.9		$24.8
6 Standard targets (38-1000kHz) @ $600/ea.	3.6	Frame grabber	3.4		$9.9
4 - 50' tow cables @ $3,300/ea	13.2				$7.8
Acoustic survey boat, 27'-32', dry hull, large cabin, twin OB's	37.5				$10.5
Polaroid color pallet	6.5				$16.6
Sun Sparc 2 work stations	9.9				$37.5
					$6.5
					$9.9
				Equipment Total	$0.0	$270.9

Project Number: 94320 - N
Project Title: Prince William Sound System Investigation
Sub-Project: Nearshore Fish
Agency: Prince William Sound Science Center

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - Information and Management (SEA-Plan)- This project is to provide continued integration of the SEAPLAN with new projects (birds, mammals and fish), educational outreach between SEA projects and the communities in the spill affected area, and coordination between existing SEA projects.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0	$0.0	
Travel	$0.0	$0.0	$0.0	$0.0	$0.0	
Contractual	$0.0	$100.0	$50.0	$150.0	$0.0	
Commodities	$0.0	$0.0	$0.0	$0.0	$0.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$100.0	$50.0	$150.0	$0.0	
General Administration	$0.0	$0.0	$1.8	$1.8	$0.0	
Project Total	$0.0	$100.0	$51.8	$151.8	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0	0.0	
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contractual Total	$0.0	$0.0

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0

Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: **Sound Ecosystem Assessment - Information and Management (SEA-Plan)-** This project is to provide continued integration of the SEAPLAN with new projects (birds, mammals and fish), educational outreach between SEA projects and the communities in the spill affected area, and coordination between existing SEA projects.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$75.0	$50.0	$125.0		
Commodities	$0.0	$0.0	$0.0	$0.0		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$75.0	$50.0	$125.0	$0.0	
General Administration	$0.0	$0.0	$1.8	$1.8		
Project Total	$0.0	$75.0	$51.8	$126.8	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
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	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Contract to PWSSC to help with the development of the ecosystem study plan	$50.0	$38.8
Contract to The Nature Conservancy to help with the development of the ecosystem study plan	$25.0	$0.0
RSA with UAF for administation of non-ADF&G portion of 94320-P. UAF will subcontract with PWSSC for completion of the project and charge $11.2 pass through charges.		$11.2
Contractual Total	$75.0	$50.0

Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Fish & Game

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: **Sound Ecosystem Assessment - Information and Management (SEA-Plan)**- This project is to provide continued integration of the SEAPLAN with new projects (birds, mammals and fish), educational outreach between SEA projects and the communities in the spill affected area, and coordination between existing SEA projects.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$38.6	$16.5	$55.1	$40.0	
Travel	$0.0	$10.5	$10.3	$20.8	$20.0	
Contractual	$0.0	$0.5	$2.4	$2.9	$0.0	
Commodities	$0.0	$0.4	$1.8	$2.2	$20.0	
Equipment	$0.0	$0.0	$0.0	$0.0	$0.0	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$50.0	$31.0	$81.0	$80.0	FFY 95 general administration budget
General Administration	$0.0	$0.0	$7.8	$7.8	$19.2	reflects the Science Center portion
Project Total	$0.0	$50.0	$38.8	$88.8	$99.2	excluding the projected general administration for the UAF
Full-time Equivalents (FTE)	0.0	0.6	0.3	0.9		

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1 Planner			2.0	$9.2
1 Administrative Coordinator			2.0	$7.3
Intrm 3 Oceanographer/Modeler/Ecologist	7.0	$30.6		
Intrm ? Peer reviewers		$8.0		
Personnel Total	7.0	$38.6	4.0	$16.5

NEPA Cost: $0.0

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: PWS Science Center

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Two round trips Cordova/Juneau @ $350/trip + 12 days per diem @ $128/day		$2.2
Three round trips Cordova/Anchorage @ $672/trip + 28 days per diem @ $170/day		$5.4
Two round trips Cordova/PWS @ $456/trip + 7 days per diem @ $140/day		$1.9
Twenty-six days of car rental for the various trips @$30/day		$0.8
Intrm G. Thomas (Anchorage, Juneau, Fairbanks)	$2.0	
Intrm T. Cooney (Fairbanks, Cordova, Anchorage, Juneau)	$3.0	
Intrm V. Patrick (Maryland/Cordova RT)	$2.0	
Intrm D. Eslinger (Fairbanks/Cordova)	$1.0	
Intrm Peer reviewer travel	$2.5	
Travel Total	$10.5	$10.3
Contractual:		
Long distance telephone charges	$0.5	$0.5
Facsimile		$0.5
Copying		$0.5
Mail		$0.5
Maintenance		$0.4
Contractual Total	$0.5	$2.4

Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: PWS Science Center

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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Office supplies (Paper, pens, tape, etc.)	$0.4	$1.8
Commodities Total	$0.4	$1.8
Equipment:		
Equipment Total	$0.0	$0.0

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: PWS Science Center

FORM 4B
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EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - Information and Management (SEA-Plan)- This project is to provide continued integration of the SEAPLAN with new projects (birds, mammals and fish), educational outreach between SEA projects and the communities in the spill affected area, and coordination between existing SEA projects.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$18.0	$0.0	$18.0		
Commodities	$0.0	$0.0	$0.0	$0.0		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$18.0	$0.0	$18.0	$0.0	
General Administration	$0.0	$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$18.0	$0.0	$18.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
	Dollar amounts are shown in thousands of dollars.					

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Natural Resources

FORM 3A-2
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Peer Reviewers for workshop to help develop the study plan for this project.	$18.0	$0.0
Contractual Total	$18.0	$0.0

Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Natural Resources

FORM 3B-2
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0
Equipment:		
Equipment Total	$0.0	$0.0

07/14/93

1994

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: AK Dept. of Natural Resources

FORM 3B-2
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Sound Ecosystem Assessment - Information and Management (SEA-Plan)- This project is to provide continued integration of the SEAPLAN with new projects (birds, mammals and fish), educational outreach between SEA projects and the communities in the spill affected area, and coordination between existing SEA projects.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$0.0	$0.0		
Travel	$0.0	$0.0	$0.0	$0.0		
Contractual	$0.0	$7.0	$0.0	$7.0		
Commodities	$0.0	$0.0	$0.0	$0.0		
Equipment	$0.0	$0.0	$0.0	$0.0		
Capital Outlay	$0.0	$0.0	$0.0	$0.0		
Subtotal	$0.0	$7.0	$0.0	$7.0	$0.0	
General Administration	$0.0	$0.0	$0.0	$0.0	$0.0	
Project Total	$0.0	$7.0	$0.0	$7.0	$0.0	
Full-time Equivalents (FTE)	0.0	0.0	0.0	0.0		
Dollar amounts are shown in thousands of dollars.						

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
Personnel Total	0.0	$0.0	0.0	$0.0

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: National Oceanic & Atmospheric Admin.

FORM 3A-3
SUB-PROJECT DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

	Reprt/Intrm	Remaining
Travel:		
Travel Total	$0.0	$0.0
Contractual:		
Workshop to help develop the study plan for this project.	$7.0	$0.0
Contractual Total	$7.0	$0.0

07/14/93

1994

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Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: National Oceanic & Atmospheric Admin.

FORM 3B-3
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Commodities Total	$0.0	$0.0

Equipment:		
Equipment Total	$0.0	$0.0

07/14/93

1994

Printed: 4/7/94 6:57 PM

Project Number: 94320 - P
Project Title: Prince William Sound System Investigation
Sub-Project: Program Management
Agency: National Oceanic & Atmospheric Admin.

FORM 3B-3
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Project Description: Avian Predation on Herring Spawn - This project will assess the effects of avian predation on Pacific herring reproduction in Prince William Sound. The data will be integrated in a model of Pacific herring survival and recruitment. Additionally, this project will assess the importance of herring roe to avian species breeding in the Prince William Sound area and using the herring spawn locations as migratory stopover areas.

Budget Category:	1993 Project No. . . . . Authorized FFY 93	'93 Report/ '94 Interim* FFY 94	Remaining Cost** FFY 94	Total FFY 94	FFY 95	Comment
Personnel	$0.0	$0.0	$31.2	$31.2	$77.3	
Travel	$0.0	$0.0	$0.0	$0.0	$1.6	
Contractual	$0.0	$0.0	$20.5	$20.5	$28.1	
Commodities	$0.0	$0.0	$10.4	$10.4	$13.5	
Equipment	$0.0	$0.0	$16.7	$16.7	$35.2	
Capital Outlay	$0.0	$0.0	$0.0	$0.0	$0.0	
Subtotal	$0.0	$0.0	$78.8	$78.8	$155.7	
General Administration	$0.0	$0.0	$6.1	$6.1	$17.3	
Project Total	$0.0	$0.0	$84.9	$84.9	$173.0	
Full-time Equivalents (FTE)	0.0	0.0	0.9	0.9	1.7	

Dollar amounts are shown in thousands of dollars.

Budget Year Proposed Personnel: Position Description	Reprt/Intrm Months	Reprt/Intrm Cost	Remaining Months	Remaining Cost
1 Research Wildlife Biologist			1.4	$6.9
1 Wildlife Technician			3.0	$8.1
1 Wildlife Technician			2.0	$5.4
1 Wildlife Technician			2.0	$5.4
1 Wildlife Technician			2.0	$5.4
Personnel Total	0.0	$0.0	10.4	$31.2

NEPA Cost: $0.0

*Oct 1, 1993 - Jan 31, 1994
**Feb 1, 1994 - Sep 30, 1994

Project Number: 94320 - Q
Project Title: Prince William Sound System Investigation
Sub-Project: Avian Predation
Agency: Dept. of Agriculture, Forest Service

FORM 3A
SUB-PROJECT DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Travel:	Reprt/Intrm	Remaining
Travel Total	$0.0	$0.0
Contractual:		
Air charter for aerial surveys (approx. 25 - 2.5 hour flights @ $.23/hr)		$14.4
Analysis of stomach contents (240 stomachs @ $.015/stomach)		$3.6
Analysis of lipid content (30 samples @ $.08/sample)		$2.5
Contractual Total	$0.0	$20.5

Project Number: 94320 - Q
Project Title: Prince William Sound System Investigation
Sub-Project: Avian Predation
Agency: Dept. of Agriculture, Forest Service

FORM 3B
SUB-
PROJECT
DETAIL

EXXON VALDEZ TRUSTEE COUNCIL
1994 Federal Fiscal Year Project Budget
October 1, 1993 - September 30, 1994

Commodities:	Reprt/Intrm	Remaining
Camp supplies (40days of food for 4 ($2.4), first aid kits ($.33), bear box ($.4), 4 propane bottles and propane ($.14), lumber ($.2), 2 dry bags ($.09), miscellaneous ($.19))		$3.8
Scientific supplies (Pelican cases($.22), specimen jars ($.4), chemicals ($.2), personal protection equipment ($.07), dissection kit ($.12), pencils and paper ($.02))		$1.0
Field sampling supplies (270 gallons of gas ($.675), oil ($.04), six gas barrels ($.234), mustang and immersion suits ($2.61))		$3.7
Boat supplies (safety supplies ($.075), survival kit ($.25), tools ($.22), two dry bags ($.07), stainless steel prop ($.3), general boat maintenance and parts ($1.0)		$1.9
Commodities Total	$0.0	$10.4
Equipment:		
Optics (four Leica binoculars @ $.878 ($3.512), Kowa spotting scope and eye pieces ($1.09), two tripods ($.3), three microcassette recorders ($.23))		$5.3
Communications (two 6-watt handheld VHF radios ($.78)		$0.8
Boat (refiberglass hull on a 17' Boston whaler ($1.5), install semi-enclosed cockpit on17' Boston whaler ($1.7)		$3.3
Computer and software (486/66 Mhz desktop computer ($4.5), event recording program compiling software and data logger interface ($2.25), and tide prediction software ($.11))		$7.3
Equipment Total	$0.0	$16.7

Project Number: 94320 - Q
Project Title: Prince William Sound System Investigation
Sub-Project: Avian Predation
Agency: Dept. of Agriculture, Forest Service

FORM 3B
SUB-
PROJECT
DETAIL