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96191B

# INJURY TO SALMON EGGS AND PRE-EMERGENT FRY INCUBATED IN OILED GRAVEL (LABORATORY STUDY)

Project Number:	96191B
Restoration Category:	Research
Proposer:	Ron Heintz and Stanley Rice NMFS, Auke Bay Laboratory
Lead Trustee Agency:	NOAA
Duration	3 years
Cost FY 96:	\$169,300
Cost FY 97:	\$75,000
Cost FY 98:	\$88,000
Geographic Area:	Southeastern Alaska
Injured Resource/Service:	Pink Salmon

# ABSTRACT

We propose to test the hypothesis that incubating in oiled gravel results in genetic damage that results in reduced reproductive capacity. Evidence collected from Prince William Sound after the *Exxon Valdez* oil spill demonstrates differences in embryo survival rates between oiled and unoiled streams. In addition, laboratory incubation of eggs from adults collected from oiled and unoiled streams demonstrate that differences in embryo survival are heritable. It is not clear if the differences in embryo survival are the result of oiling or some other selective process. This project will determine if oil can cause heritable damage to pink salmon reproductive capacity. This requires culturing three generations of pink salmon which provides opportunities to examine other immediate and long-term effects of incubating in oiled gravel. The project is underway; oil exposures were completed in 1994, and this FY96 proposal focuses on incubating eggs from maturing adults in 1995, and coded-wire tagging the second generation for release in Spring 1996.

## **INTRODUCTION**

This project tests the hypothesis that incubating in oiled gravel causes genetic damage to adult pink salmon which leads to reduced reproductive ability. After the *Exxon Valdez* oil spill (EVOS), pink

salmon embryos developing in oiled streams had higher rates of mortality than embryos in unoiled streams, and this increased mortality rate appears to have been inherited (Sharr et al. 1994). Unfortunately, estimates of pink salmon embryo survival for oiled and unoiled streams are not available for the period prior to the spill, so the differences cannot be definitely attributed to oil contamination. The intent of this experiment is to determine if incubating in oiled gravel results in reduced reproductive capacity and if the reduction can be inherited. To demonstrate the effect of oil on embryo survival we need to expose a group of pink salmon to oiled gravel while they incubate. We can determine if there is a genetic basis to the reduced reproductive capacity by continuing to culture the offspring of the exposed fish. If the exposure history of the offspring's parents can explain differences in the offspring does not mean that the parents were genetically damaged, it only means that the parents could not produce healthy eggs or sperm. To demonstrate that reduced embryo survival has a genetic basis, we need to observe the embryo survival in their offspring's offspring. If the same pattern of embryo survival is observed in all three generations then we can safely conclude that there is a genetic basis to the pattern, because the only direct link between the first and third generations is genetic.

We began testing our hypothesis by exposing the first generation of pink salmon to oil in 1993. These fish will mature in September 1995, when we propose to begin culturing the second generation. The exposures experienced by pink salmon in Prince William Sound (PWS) were easily mimicked in a hatchery by filling 12 cm (30 inches) pipes with oiled gravel, standing them on end, and laying pink salmon eggs on top. We simulated the intertidal environment by alternating fresh and salt water to the incubators. Eggs were exposed to 7 different doses of oil, and over 71 incubators were used. During this period we evaluated the immediate effects of incubating in oiled gravel. In September 1995, we will begin a detailed analysis of the long-term effects by evaluating the marine survival, fecundity and fertilization rate of returning adults from the earlier exposures. Long-term effects to be evaluated in the second generation during FY96 include survival to major developmental stages.

# NEED FOR THE PROJECT

# A. Statement of Problem

We propose to test the feasibility of the conclusion that oil caused increased embryo mortality in the oiled streams of Prince William Sound. Despite convincing evidence from the field, we cannot be sure that the elevated embryo mortality in oiled streams is the result of oil. Field evidence collected by Sharr et al (1994) clearly showed that pink salmon embryo mortality was higher in oiled streams in 1989 through 1992. In addition, Sharr et al. (1994) demonstrated that embryos from oiled streams had higher mortality regardless of the environment, by spawning and incubating eggs from oiled and unoiled streams in a hatchery. Unfortunately, we do not know if the embryo survival rates differed between oiled and unoiled streams, and this property is observable even when the embryos are incubated in a hatchery, we will never prove that the differences were caused by oil, because they may have been different before the spill. The best we can do is to see if oil could have caused a decrease in embryo survival, and if that effect has a genetic basis.

# B. Rationale

The two reasons for pursuing this research are that it has important implications for the pink salmon Restoration effort, and its potential for demonstrating a dramatic effect of oil that has not been previously described. If pink salmon in oiled streams are carrying a genetic mutation that interferes with their ability to reproduce, then efforts to restore them may be greatly impeded. Efforts to restore damaged pink salmon populations depend on fishery manager's abilities to identify sources of mortality and their persistence. Alternative strategies for restoration will be required if affected populations are shown to carry sublethal mutations. This would be an unanticipated result of the oilspill, because the genotoxic properties of low concentrations of crude oil have not been demonstrated. Mirinov (1969) concluded that developing fish eggs and larvae exposed to low concentrations of oil suffered from reduced survival and he expected survivors to continue experiencing effects. Al-Sabti (1985) demonstrated that exposing rainbow trout to relatively high doses of crude oil for short time periods led to increased chromosomal abnormalities, but he was unable to conclude that the observed abnormalities would affect the exposed fish. Herring larvae collected from oiled spawning grounds in PWS had more chromosomal abnormalities than larvae from unoiled spawning sites (Biggs et al. 1991). While there may be some evidence of the genotoxic effects of oil, no one has shown how oil might affect populations. The proposed study tackles this problem directly. If developing fish embryos and larvae are shown to experience genetic damage when they are exposed to low concentrations of oil, then the health of fish populations in the vicinity of tanker lanes or other chronic sources of oil should be seriously questioned.

## C. Summary of Major Hypotheses and Objectives

Even though the primary hypothesis cannot be tested until we are done incubating the third generation, we can identify a number of other effects along the way. The primary hypothesis for this project is that incubating in oiled gravel results in genetic damage to survivors, which requires culturing 3 generations of pink salmon in a hatchery environment. The other effects we observe in each of the generations can be classified as either immediate or long-term. Immediate effects are those effects that are observed while embryos and larvae are being exposed to oiled gravel while long-term effects are identified after oil exposures have ceased. Genetic damage is the most extreme long-term effect. Since the project is underway, we have completed our analysis of the immediate effects of incubating in oiled gravel. These effects include, but are not limited to reduced survival to emergence, altered emergence timing, delayed development, and increased number of deformities at emergence. We have begun to determine some of the long-term effects and will have more information after September, 1995. However, we have already demonstrated an oil effect on growth 4 to 6 months after the exposures have ceased. Future analysis will include the effects of oiling on marine survival, growth to maturity, fecundity, fertilization rate, and offspring survival.

#### **D.** Completion Date

This project will be complete in FY 98, after the third generation of pink salmon has completed their incubation.

#### **COMMUNITY INVOLVEMENT**

No community involvement is needed for this project.

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# FY 96 BUDGET

Personnel	112.6
Travel	14.1
Contractual	7.5
Commodities	16.2
Equipment	1.5
Subtotal	151.9
Gen. Administration.	17.4
Total	169.3

## **PROJECT DESIGN**

## A. Objectives

1. Determine the immediate effects that result from incubating in oiled gravel.

This objective is mostly complete, it includes measurements of embryo survival to eyeing and emergence, hydrocarbon uptake, mixed function oxidase activity, histopathological damage, emergence timing, and size at emergence.

2. Determine long term effects that result from incubating in oiled gravel.

This objective will be completed in early FY96; it will include measuring growth from the juvenile stage to maturity, marine survival, and fecundity.

3. Evaluate the feasibility of the hypothesis proposed by Sharr et al. (1994).

Although this objective will not be complete until FY98, work begins in FY96. It requires determining if reduced embryo survival is heritable and if there is a genetic basis to the reduction.

In FY96, Objectives 2 and 3 require the following tasks:

1) Analyze and report on the effects of incubating in oiled gravel on marine survival, growth, fecundity and fertilization rate from adults returning to the hatchery in September, 1995; 2) incubate the second generation, evaluate survival to eyeing, hatching and emergence, and determine if there is a relationship between parental exposure and offspring survival; and 3) release coded-wire tagged fry from the second generation.

## B. Methods

Demonstrating the genetic effects of incubating in oiled gravel (objective 3) requires culturing 3 generations of pink salmon. The first two objectives are reached en route to objective 3. The first generation (P1) is exposed to oiled gravel during incubation, reared to maturity and spawned providing data to assess objectives 1, 2. Embryos from the second and third generations are incubated in

uncontaminated environments. A demonstration of dose related differences in embryo survival in the second generation (F1) indicates the P1 suffered damage to their ability to produce viable gametes that were either genetically or developmentally based. Identifying effects of the P1 on embryo survival in the second generation (F2) provides the basis for identifying genetic damage.

<u>Objectives 1 and 2</u>: The data collected by the end of FY95 will satisfy objectives 1 and 2. The P1 generation was spawned in 1993, incubation, embryo sampling and dosing chemistries were completed in Spring 1994. Fish tagged with coded-wire tags were released in May 1994, and will return as mature adults in September 1995 when marine survival, growth, fecundity and fertilization rate will be measured. Analysis of this data will be completed in early FY96 In 1992 a similar study was executed, but exposed fish did not survive to maturity. Details of the incubation, embryo sampling and chemical analysis of doses can be found in Heintz et al. (1994). Coded-wire tagged fish represent a control and 3 doses of oil. The highest dose represented by the tagged fish has been shown to affect embryo survival, emergence timing and growth 4 to 6 months after exposures have terminated.

<u>Objective 3:</u> In FY 96 we will begin working on objective 3. We propose to determine if there are differences in the F1 embryo survival, and to tag and release surviving fry. Fertilized gametes will be incubated in Heath trays and exposed only to clean fresh water. Each cross will represent a unique pairing, with both parents having the same exposure history. Crosses will be kept separate during incubation and randomly pooled for subsequent culture. During the incubation period, standard hatchery practices will be equally applied to all crosses. At eyeing all eggs will be shocked and counted, dead eggs will be also be counted and removed. At hatching, all dead eggs and alevins will be counted and removed and the number of survivors will be estimated by subtraction. Yolk absorption rates will be determined periodically (every 10 temperature units) after the cumulative number of degree days since fertilization reaches 850. Heath trays will be emptied into saltwater netpens when the fry average less than 2% yolk Emergent fry will be reared in saltwater netpens until they have been tagged with coded-wire tags Tagged fry will be counted and released five days after tagging.

The proportion of fish surviving to each major developmental stage will be related to the parental dose using the following fixed effects model:

$$Y_{ijk} = \mu + t_i + C_j + t_i C_j + \epsilon_{ijk}$$

where  $Y_{ijk}$  is the survival of the k<sup>th</sup> cross from parents exposed to oiling concentration j, and spawned on day I;  $\mu$  is the model mean;  $t_i$  is the effect of the i<sup>th</sup> spawning date,  $C_j$  is the effect of the j<sup>th</sup> oil concentration;  $t_iC_j$  is the interaction between spawning date and dose, and  $\epsilon_{ijk}$  is random error

The expected number of coded-wire tag recoveries in September 1995 should provide adequate power to evaluate this model. Each cross represents a replicate observation. Approximately 3,500 coded-wire tagged fish were released from each of three doses and the control. Assuming 2% survival and a 50° of fishery interception rate 35 fish should return from each dose. If the sex ratio is 50% female then a minimum of 10 crosses can be expected. The proposed model will detect a 10% reduction in survival to emergence with 95% certainty 80% of the time if there are 4 replicate observations per dose. The variance for the power analysis was taken from an experiment where pink salmon eggs were incubated in water contaminated by percolating through oiled gravel. The procedures for this experiment were

described in Restoration Study 94191. All assumptions of normality and homogenous variances will be evaluated for each model tested.

The assumptions required for planning the tagging of the P1 and F1 generations are based on experience. The assumption of 2% survival is the average weir recovery rate for the odd year line escaping to the Sashin Creek weir. Fisheries existed at the time the Sashin Creek escapements were counted, but they did not include fisheries associated with the Armstrong Keta hatchery. The Alaska Department of Fish and Game (B. VanAlen personal communication) provided the estimated fishery interception rate for stocks in District 109. This estimate should be conservative because it includes interceptions by the fisheries associated with the Armstrong Keta hatchery, and interceptions already accounted for by the weir recovery rates. Other factors that may further influence survival include, the reduction in survival due the presence of a coded-wire tag, poor mark recognition and straying. While reliable estimates of these differentials do not exist for Sashin Creek, the model clearly has sufficient power to detect differences in survival with even 40% of the estimated recovery.

After emergence, fry from the F1 generation will coded-wire tagged and released. Approximately 18,000 coded-wire tagged fish representing each dose will be tagged. Tag lots will consist of 6,000 half length tags, with the lots applied in random order. Fish will be held for five days before counting and releasing them, and aliquots of 500 fish from each lot will be retained for 30 days to determine the tag retention rate. The same set of assumptions used for the power analysis suggests that survival in the F1 generation in 1997 should be sufficient to provide for spawning the F2 generation.

The heritability of survival in the F2 generation will be calculated two ways (Falconer 1980). One estimate of heritability will be obtained by regressing the survival of the F2 generation on the survival of their parents. Estimates of parental survival will be used because parental identities will be lost when F1 crosses are pooled into tag lots. However, the average survival for each tag lot will be recorded and used as the proxy for the parental value. A second estimate will be obtained by using a mating design which will allow for identifying sire and dam effects.

# C. Contracts and Other Agency Assistance

No contracts or other agency assistance will be required for the remainder of this project.

# D. Location

This project is under way at the Little Port Walter hatchery on Baranof Island in southeastern Alaska Performing the experiment in southeastern Alaska isolates the effects of oil on pink salmon without confounding them with environmental effects.

# SCHEDULE

# A. Measurable Project Tasks for FY 96

October 1 - May 10: Evaluate growth and fecundity data collected from P1 generation, incubate F1 generation, collect survival information at eyeing, hatching and emergence

May 13 - May 24: Tag F1 generation fry with coded-wire tags, and release.

June 1 - August 1: Report on growth and fecundity in P1 and embryo survival in F1 generation.

# B. Project Milestones and Endpoints

1992 Brood Year

Period	Complete	Tasks
Jul 15 - Sep 15 1992	X	Oil gravel, set up incubators
Sep 15 1992 - Sep 15 1993	х	Spawn pink salmon, collect incubation data, pond fry, culture fry, PIT tag and move to netpens.
Sep 15, 1993 - Sep 15 1994	Х	Culture tagged fish in netpens, observe growth rates, size at maturity and fecundity. Obtain gametes, spawn second generation.

1993 Brood Year

Period	Complete	Tasks
Jul 15 - Sep 15 1993	X	Oil gravel, set up incubators
Sep 15 1992 - Sep 15 1994	Х	Spawn P1, collect incubation data, pond fry, coded-wire tag and release some fry, culture remaining fry, PIT tag and move to netpens.
Sep 15, 1994 - Sep 15 1995	Х	Culture tagged fish in netpens, recover tagged fish at weir, observe growth rates, size at maturity and fecundity. Obtain gametes, spawn F1 generation.
Sep 15 1995 - May 15 1996		Incubate F1 generation, observe survival to each major developmental stage, coded wire tag and release.
May 15 1996 - Sep 15 1997		Collect gametes from returning F1, cross and begin incubation of F2.

Sep 15 1997 - May 15 1998	Evaluate embryo survival in F2 at all major developmental
	stages.

# C. Project Reports

1992 Brood Year

Period	Complete	Tasks
Sep 15, 1993	X	Write first interim report: summarize effects of oil on development of pink salmon embryos including survival to eyeing and emergence, size and timing of emergence, and frequency of gross lesions.
Sep 15 1994	Х	Write second interim report: summarize the effects of oil on pink salmon survival and growth in the marine phase.
May 15 1995	in progress	Write a final report on histopathological effects of incubating in oiled gravel including MFO analysis and dosing chemistries.

1993 Brood Year

Period	Complete	Tasks
Sep 15, 1994	Х	Write second interim report include: effects of oil on development of pink salmon embryos including survival to eyeing and emergence, size and timing of emergence, and frequency of gross lesions.
Aug 15, 1995	in progress	Write Final report on effects of oiled gravel on P1 embryo development and growth during early marine growth.

Oct 15 1995	Write the third interim report: describe effects of oiled gravel on P1 marine survival and fecundity.
Oct. 15 1996	Write fourth interim report describing the effects the P1 oil exposures had on the incubation of the F1. Also, describe tagging of F1.
Oct. 15 1997	Write fifth interim report describing the effects the P1 oil exposures had on the marine survival and fecundity of the F1. Also, describe spawning of the F2.
Oct. 15 1998	Write Final report describing the genetic effects the P1 oil exposures had on the development of the F2 embryos.

# COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project combined with Restoration Study 96191-A is aimed at verifying the functional sterility hypothesis proposed by Sharr et al. (1994). Restoration Study 96191-A will determine if fish returning to oiled streams have persistently lower gamete viability than fish returning to unoiled streams. Unfortunately, study 96191-A cannot demonstrate that reduced embryo survival in the oiled streams is caused by the oil. Study 96191-B tests the feasibility of this conclusion by determining the effect of incubating in oiled substrates on embryo survival and subsequent gamete viability.

The methods and objectives of Restoration Study 96191-B parallel Restoration Study 96076. Both studies seek to identify long-term effects associated with incubating in oiled gravel, use the hatchery at Little Port Walter, the same exposure protocol, and the same stock of pink salmon. Recovery programs associated with each project are completely complementary, as are the tagging programs. While this study aims at identifying the heritable effects of incubating in oiled gravel, study 96076 examines the effects of incubating in oiled gravel on pink salmon homing ability and survival.

Data provided by the project proposed under the title "Pink Salmon Spawning Habitat Recovery" can be combined with dose response curves generated by this study to estimate the potential for damage in Prince William Sound (PWS). Samples, collected from some of the streams surveyed by Sharr were collected in 1989 under Response projects, were never analyzed by GC/MS. The project proposed under "Pink Salmon Spawning Habitat Recovery" aims to identify and analyze samples collected from important pink salmon spawning streams, and will identify the exposure levels pink salmon experienced in PWS streams in 1989.

Together these four projects (96191A, 96191B, 96076 and the study proposed under "Pink Salmon Spawning Habitat Recovery") will provide a detailed picture of the nature and scope of damage experienced by pink salmon in PWS. Projects 96191B and 96076 provide dose response curves for genetic and behavioral damage, while the unnumbered project permits linking the laboratory studies to field observations in PWS. Projected responses may be confirmed by 96191A.

# ENVIRONMENTAL COMPLIANCE

Broodstock for the 1992 and 1993 broods required an ADF&G Fish Transport Permit.

# LITERATURE CITED

Falconer, D. S. 1981. Introduction to Quantitative Genetics. Longman Inc. New York. 340 p.

- Heintz, R., S. D. Rice, and J. Short. 1994. Injury to Pink Salmon Eggs and Pre-emergent Fry Incubated in Oiled Gravel (Laboratory Study). Interim Report for Restoration Science Study Number 93003. National Marine Fisheries Service Auke Laboratory, 11305 Glacier Hwy., Juneau, AK 99801.
- Sharr, S., J. E. Seeb, B. Bue, A. Craig and G. D. Miller. 1994. Injury to Pink Salmon Eggs and Preemergent Fry in Prince William Sound - Restoration Study 93003. Alaska Department of Fish and Gam Regional Information Report No. 2A94-48. Alaska Department of Fish and Game. Division of Commercial Fisheries Management and Development, 333 Raspberry Rd. Anchorage. Alaska. 99518-1599. 45 p.

# PERSONNEL

Ron A. Heintz GS-11 Fisheries Biologist (Research) Project Leader

Ron Heintz has a Bachelor of Science in Ecology from the University of Illinois, and a Master's degree in Fisheries from the University of Alaska. He has worked for the National Marine Fisheries Service since 1985 concentrating his efforts on salmon enhancement research and salmon genetics. He is the principal investigator and co-investigator on several salmon genetics projects.

Stanley D. Rice GS-13 Physiologist ABL Habitat Investigations Program Manager Dr. Rice received his BA (1966) and MA (1968) in Biology from Chico State University, and Ph.D. (1971) in Comparative Physiology from Kent State University. He has been employed at Auke Bay Fisheries Laboratory since 1971 as a research physiologist, task leader and the Habitat Program Manager since 1986. Rice has researched oil effects problems since 1971, and has published more than 70 papers, including more than 50 on oil effects. Studies have ranged from field to lab tests, behavioral to physiological to biochemical studies, from salmonids to invertebrates to larvae to meiofauna. Rice has conducted and managed soft-funded projects since 1974, including the Auke Bay Laboratory *Exxon Valdez* damage assessment studies since 1989. Activities since the oil spill have included leadership and management of up to 10 damage assessment projects, field work in PWS, direct research effort in some studies, establishment of state of the art chemistry labs and analyses in response to the spill, quality assurance procedures in biological-chemical-statistical analyses, establishment of hydrocarbon database management, servicing principal investigators and program managers in NOAA and other agencies with reviews and interpretations, provided direct input into agency decisions, interacted with other agencies in various ways (logistics coordination, critique experimental designs, interpret observations, etc.).

Ron A. Heintz

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Bruce Wright NMFS Office of Oil Spill Damage Assessment and Restoration 11305 Glacier Highway Juneau, AK 99801-8626 Ph (907) 789-6601 FAX (907) 789-6608 email bwright@abl.afsc.noaa.gov

<u>30 April 1994</u> Date prepared

# 1996 EXXON VALDEZ TRUSTLL JUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

[	Authorized	Proposed						
Budget Category:	FEY 1995	FFY 1996						
Personnel	\$213.7	\$112.6						
Travel	\$32.5	\$14.1						
Contractual	\$0.0	\$7.5						
Commodities	\$45.7	\$16.2						
Equipment	\$7.0	\$1.5		LONG R/	ANGE FUNDIN	IG REQUIREN	MENTS	
Subtotal	\$298.9	\$151.9	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration	\$32.1	\$17.4	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$331.0	\$169.3	\$75.0	\$88.0	· · ····			
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Full-time Equivalents (FTE)	4.4	1.9						
		• • • • •	Dollar amount	s are shown ir	n thousands of	dollars.		
Other Resources	\$45.5	\$57.8	\$48.0	\$30.0				1
The activities under this project are closely coordinated with Project 96076 Other Resources: NOAA contribution includes overall consultation and management by Habitat Investigations Program Manager , J Rice 2 mo = \$21.8K Salmon Investigations Program Manager, B Heard, 1 mo = \$10.9K Little Port Walter Station Manager, R Martin, 2 mo = \$15.1K NOAA contribution of routine operating costs for LPW estimated at \$10.0K								
<b>1996</b>	Project Nur Project Title Agency: Na	nber: 9616 e: Injury to E ational Ocea	1B Eggs & Fry Ir anic & Atmo	ncubated in spheric Adm	Oiled Grave	)		FORM 3A AGENCY PROJECT

DETAIL

# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Personnel Costs:		GS/Range/	Months	Monthly		Proposed	
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	R Heintz	Project Leader	11/4	12.0	5,500		66.0
	R Bradshaw	Fish Biologist	9/4	6.0	4,500		27.0
	J Maselko	Fish Biologist	7/4	4.0	3,600		14.4
*	B Wright	NOAA Program Manager	12/5	0.8	6,500		5.2
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T no	se costs associated with pro	gram management should be indicated by	Ticket	Dound	Tetel	Sonner Total	Broppood
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+ IVI	Anchorage Japuany Works	hon & other planning mas 3	444	11103	15	225	47
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	Little Port Walter Field Stati	on. 4 staff multiple trips			77	2	0.2
	Air Charter, B	leaver	1000	6			6.0
	Air Charter, C	Cess 180	600	4			2.4
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Tho	Those costs associated with program management should be indicated by placement of an *.						\$14.1
		F					
ļ						F	FORM 3B
1	1000	Project Number: 96161B				F	Personnel
1996 Project Title: Injury to Eggs & Fry Incubated in Oiled Gravel							9 Troug

Project Title: Injury to Eggs & Fry Incubated in Oiled Gravel Agency: National Oceanic & Atmospheric Administration

& Travel DETAIL

## 1996 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Contractual Costs:			Proposed
Description			FFY 1996
Tagging Crew (Under N 4 crew @	NOAA Fishmarker Contracts) 012.50/h for 50h/wk for 3 wks		7.5
NOAA considers fixed v	wing aircraft charters as Travel		
When a non-trustee organiz	ation is used, the form 4A is required.	Contractual Total	\$7.5
Commodities Costs:			Proposed
Description		· · · · · · · · · · · · · · · · · · ·	FFY 1996
Field protective gear Tagging Supplies (wire, Computer maintenance Computer software and Field Station Supplies (f	, cutters, scissors) e and repair d upgrades fuel, groceries, other consummables)		0.5 7.2 1.5 0.5 6.5
		Commodities Total	\$16.2
1996	Project Number: 96161B Project Title: Injury to Eggs & Fry Incubated in Oiled Gravel Agency: National Oceanic & Atmospheric Administration	F( Cor Cor [	ORM 3B htractual & mmodities DETAIL

#### 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Nev	v Equipment Purchases:		Number	Unit	Proposed	
Des	cription		of Units	Price	FFY 1996	
					0.0	
R	Microbalance		1	1,500	1.5	
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	Power Supply			1	NOAA	
	Outboard Motor			2	NOAA	
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		Project Number: 06161P		F	ORM 3B	
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	1990	Project Little: Injury to Eggs & Fry Incubated in Oiled Grave				
		Agency: National Oceanic & Atmospheric Administration				
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8/25/95 Versiu Dritevin Budsets for 96076 961918 96163A-L

August 2, 1995

#### MEMORANDUM TO:

Traci Cramer Director of Administration

FROM:

Bruce Wright Program Manager

Re:

Interim Budgets (Oct. 1, 1995 to Jan. 31, 1996)

#### Restoration Study 96076: Effects of Oil on Straying and Survival

Project 96076 is a continuing research program with on-going field and laboratory activities during the period October 1, 1995 through January 31, 1996. These activities focus on the maintenance, monitoring, and evaluation of the pink salmon embryos exposed to oiled gravel; the collection of water, gravel, and embryos for hydrocarbon analysis; and the development of methods for enumerating escapements from carcass mark/recapture techniques. The continuation of the project also requires planning and logistic arrangements for the large-scale tagging operations in the spring of 1996, data analysis and preparation of the annual report, and presentations at the January workshop. The interim costs include salary and contracts for personnel costs, travel to support field operations and to Anchorage for Trustee Council workshops and reviews, and essential supplies. A list of tasks to be accomplished over the interim period follows.

1) <u>Maintenance and monitoring of incubation system</u>. Daily monitoring of flow rates to 100 incubators, cleaning of incubators as necessary, and monitoring and maintenance of seawater and freshwater supply systems.

2) <u>Evaluation of treatment effects.</u> Assessment of survival of embryos to eyed-stage (late October-early November) and to hatching (January).

3) <u>Hydrocarbon analysis</u>. Collection of gravel, water, and embryo samples at eyed stage and hatch stage, and analysis of samples collected at earlier spawning in FY 95.

4) <u>Sashin Creek weir operation</u>. Continued operation of Sashin Creek weir until late October to enumerate total escapement of pink salmon to Sashin Creek. This requires daily fish counts and weir cleaning.

5). Stream Surveys. Weekly carcass surveys of Sashin and Lovers Cove Creeks in October

for estimation (mark/recapture) of pink salmon escapement. These surveys are needed to develop techniques and statistical models for enumeration of escapement in streams sampled for returning strays and must be done in conjunction with the weir escapement enumeration for the 1995 return.

6.) Planning, logistic support, data analyses, report preparation. Ongoing, October-January.

#### COSTS BY LINE ITEM, 96076

Line Item	Costs (\$K)
Personnel	\$ 6.8
Travel	10. <b>9</b>
Contracts	3.6
Commodities	13.8
Equipment	0.0
SUBTOTAL	97.1
General Admin	10.6
TOTAL	\$107.7

## <u>Restoration Study 96191B: Damage to Pink Salmon Fry and Pre-emergent Fry Incubated</u> in Oiled Gravel (Laboratory Study).

Below are the interim budget requirements for this study. The primary objective of this project is to determine if pink salmon that incubate in oiled gravel ultimately experience impaired reproductive ability. Exposures for the 1993 brood were complete in the spring of 1994, and the adult fish will be mature at the end of FY95.

During the interim portion of FY96 we will begin evaluating the reproductive success of the 1993 brood. In addition, we will be writing our annual report, and perparing for the annual meeting in Anchorage. Labor costs include a half-time technician to culture the developing eggs, and PI to prepare the annual report. The travel budget reflects the need for two trips to Little Port Walter, to observe the survival to "eyeing" among the progeny of the 1993 brood, and later, to assist the hatchery technician when larvae begin hatching. In addition, we have included the cost of the trip to the annual meeting in Anchorage and the cost of another trip to Anchorage to meet with investigators from Restoration Study 96191A.

## COSTS BY LINE ITEM, 96191B

Line Item	<u>Costs (\$K)</u>
Personnel	42.0
Travel	19.2
Contracts	0.0
Commodities	5.3
Equipment	0.0
SUBTOTAL	66.5
General Admin	6.3
TOTAL	\$72.8

#### Restoration Study 96163 A-L: Apex Predator Ecosystem Experiment (APEX)

Interim funding will be necessary for data analysis, report and workshop preparation, and development of the FY96 proposal based on the November 30-December 1, 1995 workshop review.

The attached APEX interim budget will allow for personnel and travel costs to accommodate data analysis, reporting, and travel (see tables below). The two contracts, 96163A and 96163G extend beyond January 31, 1996 already, so no interim funding will be requested. Program management costs will, however, be necessary. Project 96163H was not funded in FY95 so no interim funding will be requested.

\*

COSTS BY AGENCY and BY LINE ITEM, 96163 A-L							
Line Item	<u>DOI (\$K)</u>	<u>NOAA (\$K)</u>	<u>ADF&amp;G (\$K)</u>	TOTAL (\$K)			
Personnel	181.1	29.3	26.3	. 236.7			
Travel	7.0	7.0	0.0	14.0			
Contracts	0.0	Ó.0	0.0	0.0			
Commodities	0.0	0.0	0.0	0.0			
Equipment	0.0	0.0	0.0	0.0			
SUBTOTAL	188.1	36.3	26.3	250.7			
General Admin	27.2	4.4	3.9	35.5			
TOTAL	\$ 215.3	\$ 40.7	\$ 30.2	\$ 286.2			

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cc: Dave Duffy Ron Heintz Dave Irons Byron Morris Jeep Rice Sandra Schubert Stan Senner Joe Sullivan Alex Wertheimer

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PROJECT	TITLE	Personnel Costs (title/months)	Travel Costs	Total
95163 A	Fish Survey & Biology	\$ 5.8K (PM NOAA/1 months)	\$ 1.0K	\$ 6.8K
95163 B	Bird/Fish Interactions	19.2 (PI/4 months) 5.5 (PM DOI/1 month)	0.5 0.0	25.2
95163 C	Fish Diet Overlap	9.9 (PI/3 months) 20.3 (techs./3 months) 5.8 (PM NOAA/1 month) 1.2 (PM ADFG/.2 month)	4.5 0.0 0.0 0.0	41.7
95163 D	Puffins as Samplers	5.0 (PI/1 month) 6.0 (Assis. PI/3 months)	1.0 0.0	12.0
95163 E	Black-legged Kittiwakes	19.2 (PI/4 months) 4.9 (2 techs./2 months) 5.5 (PM DOI/1 month)	1.0 0.0 0.0	30.6
95163 F	Pigeon Guillemots	19.2 (PI/4 months) 4.9 (2 techs./2 months) 5.5 (PM DOI/1 month)	1.0 0.0 0.0	30.6
95163 G	Energetics	2.8 (PM NOAA/0.5 month)	1.0	3.8
95163 H	Proximate Composition	0.0	0.0	0.0
95163 I	Project Leader	35.0 (PI/2 months) 2.5 (PM DOI/0.5 month) 2.9 (PM NOAA/0.5 month) 15.0 (Fish Symposium)	1.0 0.0 0.5 0.0	56.9
95163 J	Barren I. Murres & BLKs	12.6 (PI/3 months) 6.9 (bio. tech./2 months)	1.0 0.0 ~	20.5
95163 K	Fish as Samplers	4.2 (PI/1 month)	0.5	4.7
95163 L	Barrens & Historical	10.0 (PI/2 months) 2.1 (biologist NOAA/1 mo) 4.8 (biologists F&G/2 mo)	1.0 0.0 0.0	17.9
General Admin. TOTAL		236.7*	14.00	250.7*

# 96163 A-L Interim Budget for Oct. 1, 1995 to Jan. 31, 1996

PI = principal investigator PM = program manager \* General administration will be added to these costs. See summary tables below.

96193-BAA

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## PROPOSAL

96193-

#### TO: EXXON VALDEZ Oil Spill Trustee Council

- THROUGH: NOAA, WASC, Procurement Division, WC33 7600 Sand Point Way NE, Bin C15700 Seattle, WA 98115
- FROM: School of Fisheries and Ocean Sciences P.O. Box 757220 University of Alaska Fairbanks Fairbanks, AK 99775-7220
- TITLE: Flux and Nutritional Quality of Particulate Organic Carbon: Relationship to Survival of Juvenile Pelagic Fish of Prince William Sound

PRINCIPAL INVESTIGATOR:

A. Sathy Naidu Professor SS# 574-26-7802 Bruce P. Finney Assistant Professor SS# 473-72-3045

DURATION:

3 Years

PROPOSED START DATE:

1 October 1995

AMOUNT REQUESTED:

\$418.663

/Date

/Date

Neudu 4/26/95

A. Sathy Naidu Principal Investigator (907) 474-7032

21. 41

Joan Osterkamp /Date Executive Officer School of Fisheries & Ocean Sciences

Donald M. Schell Director Institute of Marine Science

/Date

Bruce P. Finney Co-Principal Investigator (907) 474-7724

/Date

A. V. Tyler // Associate Dean School of Fisheries & Ocean Sciences

27/95

Ted DeLaca Director, Office of Arctic Research University of Alaska Fairbanks

April 1995

# Flux and Nutritional Quality of Particulate Organic Carbon: Relationship to Survival of Juvenile Pelagic Fish of Prince William Sound

96193
Research
University of Alaska Fairbanks
3 Years
\$156,607
\$129,845
\$132,209
Prince William Sound
Pink Salmon and Pacific Herring

## ABSTRACT

Particulate organic carbon (POC) is the ultimate source of food and energy for marine organisms. Therefore, knowledge of the production, nutritional quality and partitioning of POC between various trophic components is vital to any ecosystem understanding. We propose to test the EVOS-SEA Project's river-lake hypothesis for Prince William Sound by correlating the seasonal fluxes and nutritional quality of POC to the time-series variations (that are being measured by others) in primary production and hydrodynamic conditions, with implication on the growth and survival of juvenile pink salmon and Pacific herring. This testing will help to clarify whether or not the yearly fluctuation in the two fish stocks are related to natural causes, and provide a basis in decision making for either restoration, as related to the Exxon Valdez oil spill, or for optimizing the two fish stocks in the sound.

## INTRODUCTION

Particulate organic carbon (POC) derived from phytoplankton is the primary source of food and energy for most marine organisms (Valiela, 1984). Consequently, the dynamics of primary production and the subsequent fate (e.g. horizontal advection, consumption, flux, accumulation, mineralization) of the generated POC are one of major importance to a holistic study of any marine ecosystem investigations. This is particularly relevant to the SEA (Sound Ecosystem Assessment) hypothesis that has been developed for Prince William Sound. The hypothesis essentially states that the ecological state of Prince William Sound is closely linked to the oceanographic forcing of circulation in the sound which alternates between years of strong through-flow river-like conditions, and relatively stagnant, lake-like conditions. The changes are controlled by the extent of ingress of Gulf of Alaska waters into the sound. One of the suggested premises of the hypothesis is that in Prince William Sound in any year the rate of primary production controls the standing crop of primary consumers (e.g. herbivore zooplankton) and, by implication, through the food chain also those of the secondary consumers (carnivore macrozooplankton), juvenile fish and associated higher trophic organisms (e.g. adult salmon, herring, bottom fish species). For the benthos, the flux of phytodetritus from the water column to the bottom is the linking factor to primary production. For high standing crops of herbivore zooplankton it is critical that a ration of sustained supply of phytoplankton of high nutritional quality is available. In contrast, high flux of POC to the bottom would be vital to support a high abundance of benthic animals. It is conceivable, however, that in areas of high primary production, the concentrations of zooplankton may not correspondingly be always high because of loss of the phytodetritus and phytoplankton from the generating euphotic zone via rapid horizontal advection and/or sinking. Another important determining factor for the survival and growth potential of primary consumers and up the food chain leading to juvenile pink salmon and Pacific herring is the nutritional quality of settling POC, because this quality controls the assimilation efficiency of food by organisms and thus their overall health (Valiela, 1984). The strong relationship between primary production and particle flux out of the euphotic zone has been amply demonstrated in numerous studies (see Knauer et al., 1984; Valiela, 1984). The extent of correlation between the two would, of course, depend upon the grazing rates and hydrodynamics of water flow. Thus, it is imperative that investigations relating to the seasonal flux and nutritional quality and partitioning of particulate organic carbon (POC) between the pelagic and benthic system within the sound be an integral part of the SEA study.

In Prince William Sound there is no regional data base available on the seasonal flux of POC either to the bottom or within the euphotic zone. However, extensive data are available, spanning over several years (1979-1991, including pre- and post Exxon Valdez spill years), on the concentrations and accumulation rates of organic carbon, nitrogen, C/N ratios and stable isotopes of organic carbon in sediments from widely-located stations in Prince William Sound (Klein, 1983; Naidu and Klein, 1988; Naidu et al, 1993). The only data published on the POC flux are those locally for Port Valdez (Naidu and Klein, 1988). In Port Valdez there is apparently a close link between the yearly concentrations of benthos and zooplankton with implied coupling with the POC flux and primary consumers (Feder and Shaw, 1994). Given the extensive data base that we have on organic carbon contents as well as accumulation rates of sediments, studies to determine water column POC fluxes would help to complete the carbon budget, and define food web linkages within the overall ecosystem of Prince William Sound. Our proposed investigation will include the deployment of a mooring with two sediment traps at a selected location in central Prince William Sound, to obtain time-series (monthly) and sequential samples of mass particle and POC flux. This project will be closely integrated with the proposed studies by Drs. McRoy and Eslinger on nutrient dynamics and primary production and will ultimately have strong bearing on the investigations on zooplankton and juvenile pink salmon and Pacific herring led by Dr. Cooney under the SEA project.

## NEED FOR THE PROJECT

## A. Statement of Problem

In Prince William Sound during the 1980s prior to the Exxon Valdez oil spill a wide fluctuation in the yearly returns of pink salmon were documented, with a maximum return in 1984 and a minimum in

1988. In 1993 and 1994 following the period of the oil spill in spring 1989 a notable decline in the pink salmon population was reported. Likewise there have been fluctuations in the biomass of the Pacific herring in the sound, with a record biomass in 1992 and a precipitous (75%) decline since spring 1993. The causes of these declines in the two fish populations are unknown, and are being addressed under the auspices of a number of EVOS-supported investigations. The research foci relate to possible factors such as natural environmental causes, decease (in herring), and to toxic effects of the Exxon Valdez oil spill. In 1993 the EVOS Trustees initiated the Sound Ecosystem Assessment (SEA) project with an objective "to provide information needed for the informed restoration of pink salmon and Pacific herring in Prince William Sound" (EVOS Trustee Council, 1995). The premise of one of the four principal hypotheses of the project, the river-lake hypothesis, is that the yearly survival potential of the pink salmon and Pacific herring during their critical early life stages is mainly determined by natural factors such as yearly/seasonal fluctuations in the hydrodynamic conditions prevailing within the sound. Our proposal intends to test an implied component of this hypothesis, which relates to the determination of the seasonal flux and nutritional quality of particulate organic carbon and its partitioning between the pelagic and benthic systems. Our specific objective will be to determine how in Prince William Sound the amount and quality of food available as POC to primary consumers affects the survival of juvenile pink salmon and Pacific herring.

## B. Rationale

In attempting to address damage assessment/restoration of the Prince William Sound ecosystem subsequent to the Exxon Valdez oil spill, it is critical first to have a quantitative understanding of the natural forces and processes which drive the ecosystem of the sound. This concern has been identified by the EVOS Trustee Council (1994, p.26-27) as a high priority research topic. Without the above baseline it would be difficult, except in obvious high direct impact situation, to make any value judgement as to what the damages and restorations may have occurred consequent to the spill. Therefore, the investigations proposed under the SEA hypothesis, of which our studies will be a complementary component, will serve an useful purpose in assessing damage and designing steps for remediation and/or restoration of pink salmon and Pacific herring in the sound. If the year to year survival rate and abundance of the two fish stocks can be related solely to fluctuations in natural environmental forcing factors, then there would be no necessity in developing any oil-spill related remediation steps. If this were to be true then results of our investigations could be applied by fishery managers to optimize the two fish populations by taking appropriate steps (e.g. releasing hatchery-raised pink salmon fries coincident with periods of highest fluxes of POC and of nutritional value). Our study will link the individual yet related investigations that are being proposed by Drs. McRoy and Eslinger on nutrient dynamics and primary production and by Dr. Cooney on zooplankton studies. Additionally, we will examine our data on time-series changes in the carbon flux within the water column in context of the investigation on hydrodynamics that are being proposed by Dr. Salmon. In fact, all the above studies have been conceived, with mutual understanding, from the standpoint of a multidisciplinary holistic approach to ecosystem analysis. Perhaps, the results of our investigations and that of the SEA, could be extended to nearshore regions of the sound which are now being impacted by crude oil reworked from the beaches, to help assess the anthropogenic impact on natural environmental forcing factors.

# C. Summary of Major Hypothesis and Objectives

Hypothesis: We hypothesize that in Prince William Sound the yearly survival potentials of pink salmon and Pacific herring during their critical early life stages are ultimately related to the seasonal flux and nutritional quality of particulate organic carbon (POC) available to the primary herbivore consumers on which the preys of the two juvenile fish thrive.

Objectives: Briefly, the major objectives would be to determine the monthly/seasonal fluxes and nutritional values of particulate organic carbon (POC), and relate these to the understanding of the natural causes that are being investigated, under the SEA project, on the survival potential of pink salmon and Pacific herring during their early life stages.

Please refer to a following section for listing of specific research objectives.

## D. Completion Date

The work will be completed by end of FY 98.

# **COMMUNITY INVOLVEMENT**

There are two ways we would like the involvement in our project of the Prince William Sound community. First, we would encourage the participation throughout the project of the native students from the PWS Tribal Council. This could be in the form of collection in the field and laboratory processing of samples at the Fairbanks laboratory. We will sponsor the student's internship at the Institute of Marine Science, University of Alaska-Fairbanks under the auspices of an ongoing Native Student Internship program, which will support the student with a monthly fellowship and tuition waiver at no cost to this project. We will be willing to serve as mentors to the students. Dr Naidu, P.I., is already strongly involved in this internship program. Second, the results of our investigation will be a valuable input to the regional fisherman, and to areas resource and fish hatchery managers in predicting the survival potential of juvenile pink salmon and Pacific herring for any specific year and returns of adults in subsequent years.

# **FY 96 BUDGET**

Please refer to the attached detail budget. The cost estimate for FY 96 is \$156,607. In the subsequent two years we have projected a substantial decrease in the operational cost because no cost will be involved for purchasing sediment traps. The traps bought in the first year will be reused in subsequent years.

Personnel	29.9
Travel	8.6
Contractual	46.0
Commodities	.5

Equipment	36.0
Subtotal	121.0
Gen. Admin.	35.5
Total	156.6

## **PROJECT DESIGN**

## A. Objectives

The specific objectives of the proposed studies are as follows:

- 1. To estimate the time-series (seasonal) variations in the natural vertical fluxes of particulate organic carbon (POC) in Prince William Sound, and the partitioning of the flux between pelagic and benthic systems.
- 2. To establish the relationship between our data on time-series changes in the POC fluxes and the timing and biomass of phytoplankton cycles that Drs. McRoy and Eslinger have proposed to measure and the time-series changes in hydrodynamics that would be recorded at the C-Lab and other buoy stations in Prince William Sound. The overall objective of this task would be to test the SEA hypothesis.
- 3. To integrate the water column POC flux data with the sediment POC accumulation rate estimates that are available from our previous work in the sound. This will assist in assessing the demand and consumption of POC by benthos and the rates of organic matter remineralization and burial.
- 4. To determine the seasonal nutritional quality of settling POC, with an objective to obtain a measure for the assimilation efficiency of food and potential energy available to herbivore primary consumers.

## B. Methods:

To successfully meet the task objectives of this proposal the flux measurements must be closely integrated with the studies that have been proposed by other investigators of the SEA project, especially with the phytoplankton and zooplankton studies. The flux measurements will be carried out by taking time-series (monthly) samples of POC flux using two sets of sediment traps. The trap design will be after the prototype model PARFLUX Mk6 (Asper, 1988), which is one of the most sophisticated types in use today. This trap has the capability of collecting time-series, sequential flux of settling particles with flexible intervals without hiatus for 18 months. The sampler has a 0.5m<sup>2</sup> intake vent which opens into individual receptacles that rotate into position sequentially at preset time intervals programmed by a microprocessor (refer to Asper, 1988 for further details on the trap design and operation).

We propose to deploy two sediment traps, effective November 1995, at different depths on a vertical mooring. The flux measurements will be carried out for three years, which will allow assessment of the changes in fluxes between years and several seasonal cycles that will encompass significant shifts in the

rate of primary production. Care will be taken to ensure minimum interference by the mooring apparatus during the collection of vertical flux of settling particles. One of the traps will be emplaced just below the thermocline and the other near the bottom of the sound at water depth where resuspension of particles is assumed to be absent. The upper trap samples will provide estimates of the time-series fluxes of POC out of the euphotic zone and thus the food supply available to the primary consumers. The lower trap samples will provide estimates of the time-series fluxes of POC to the sound floor. Each of the sample receptacles in the trap will be filled with water having a density higher than the surrounding water to help retain the trapped particles in the receptacle. This high density water will be poisoned with  $HgCl_2$  to preserve the samples from bacterial degradation. The exact time of deployment and retrieval of the traps will be noted.

Each of the samples collected in the field will be transferred into prewashed glass bottles and stored frozen (-20° C) until ready for analysis. The determination of the total particulate content, POC, N and C/N will be after the methods outlined in Feely et al. (1991), Knauer (1991) and Bodungen et al. (1991). Briefly, each of the samples will be filtered through GF/F glass filter membrane which has been prewashed with deionized water, precombusted at 500° C for 4 hrs and preweighed. Following filtration the samples will be rinsed in deionized water to free the samples of salts. The dry weight of particulates retained on the membrane divided by the days of deployment and the trap mouth cross-sectional area will provide the total flux rate of particulates. Prior to analysis of the POC the samples will be exposed to vapors of a weak acid to remove carbonates. The concentrations of POC and N, which will be analyzed in an automatic CHN analyzer, will be reported on a dry weight basis. The sediment traps will be calibrated against known rates of Pb-210 based sediment accumulation rates for the study area (Naidu and Klein, 1988).

To assess the nutritional quality of the settling POC we will analyze on the time-series trap samples the ratios of organic carbon and nitrogen (OC/N) and stable carbon isotopes ( $\delta^{13}$ c), as well measure the caloric and lipid contents. The rationale for these analyses in context of food quality, and the analytical methods are discussed in Valiela (1984), Feder et al, (1991) and Naidu et al. (1993).

# C. Contracts and other Agency Assistance

A subcontract will be issued to Dr. D. Salmon of the Prince William Sound Science Center, Cordova, to assist us in the deployment and retrieval of the sediment traps in Prince William Sound. Dr. Salmon has an ongoing research contract from the EVOS Trustee Council to investigate the hydrography of the sound. His experience in deployment of instrument mooring and acquaintance with the logistics of working in the sound will be an invaluable help to us and we will be able to start the project with minimum time loss. Please refer to the budget for the cost estimate of the subcontract.

# D. Location

The project will be undertaken in Prince William Sound, with the deployment of the sediment traps at a location adjacent to where an instrumented package on the C-Lab is moored for transmission of time-series data through a satellite on water currents, temperature, and plankton.

References:

- Asper, V. L. 1988. A review of sediment trap technique. MTS Jour., 21: 18-25.
- Bodungen, B. v, M. Wunsch and H. Furderer. 1991. Sampling and analysis of suspended and sinking particle in the northern North Atlantic. In D. C. hurd an D. W. Spencer (eds.), Marine Particles: Analysis and Characterization. Am. Geophysical Union, Washington, D.C.47-56.
- Feder, H. M. and D. G. Shaw. 1994. Environmental Studies in Port Valdez, Alaska: 1993. Final report submitted to Alyeska Pipeline Service Co., Anchorage. Inst. Marine Sc., Univ. Alaska, Fairbanks.
- Feder, H. M., A. S. Naidu, M. Baskaran, K. Frost, J. M. Hameedi, S. C. Jewett, W. R. Johnson, J. Raymond, and D. Schell. 1991. Bering Strait-Hope Basin: Habitat Utilization and Ecological Characterization. Final report submitted to NOAA/OAD Office (Anchorage), IMS Report 92-2. 457 pp.
- Feely, R. A., J. H. Trefry and B. Monger. 1991. Particle sampling and preservation. In D. C. Hurd and D. W. Spencer (eds), Marine Particles: Analysis and Characterization. Am. Geophysical Union, Washington, D.C. 5-22.
- Klein, L. H. 1983. Provenance, Depositional Rates and Heavy Metal Chemistry of Sediments, Prince William Sound, Southcentral Alaska. M. S. Thesis. Univ. Alaska, Fairbanks. 96 pp.
- Knauer, G. A., J. H. Martin and D. M. Karl. 1984. The flux of particulate organic matter out of the euphotic zone. In Global Ocean Flux Study. Natnl. Acad. Press, Washington, D.C.137-150.
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- Naidu, A. S. and L. H. Klein. 1988. Sedimentation processes. In D. G. Shaw and M. J. Harneedi (eds.), Environmental Studies in Port Valdez, Alaska. Springer-Verlag, Berlin. 70-91.
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- Naidu, A. S., R. S. Scalan, H. M. Feder, J. J. Goering, M. J. Hameedi, P. L. Parker, E. W. Behrens, M. E. Caughey, and S. C. Jewett. 1993. Stable organic carbon isotopes in sediments of the north Bering-south Chukchi seas, Alaskan-Soviet Arctic shelf. Cont. Shelf Res., 13:669-691.
- Valiela, I. 1984. Marine Ecological Processes. Springer-Verlag, New York, 546 pp.

## SCHEDULE:

## A. Measurable Project Tasks for FY 96

The start date for this project during the first year will be October 1, 1995 and the end date will be September 30, 1996. It is intended to collect flux samples using sediment traps for every month starting from November 1995, so that we will have samples corresponding to seasons of peak and slack cycles of primary productivity and fluctuating hydrodynamic conditions. Sediment traps will be deployed continuously for 10 months. During the above duration it is assumed that productivity, zooplankton and hydrographic data will be simultaneously collected by the various investigators of the SEA project. The sediment trap experiments will be repeated in the second and third years of studies. The schedule details follow:

October 1-30, 1995:	Start-up, order sediment traps, arrange logistics through the subcontract and run test trials
November 1, 1995:	Deployment of sediment traps.
September 1, 1996:	Retrieval of sediment traps, collection of time-series flux samples and transfer
•	to Fairbanks.
September 1-20, 1996:	Estimation of total particles, and concentrations of organic carbon (OC),
•	nitrogen(N), OC/N, stable carbon isotopes ratios and lipid, and caloric values of
	the POC samples.
G	Statistical surfaces of data and A much second properties and submission

September 1-30, 1996: Statistical analysis of data and Annual report preparation and submission.

# B. Project milestones and Endpoints

The milestones for each year during the three years of project will be identical to those projected for the first year (please refer to Section A of SCHEDULE).

# C. Project Reports

At the end of each of the first two FY annual reports will be submitted providing results of each year, and the second FY report will consist of discussion of data comparing the two years. The final report will be submitted by the end of FY 98 and will include an extensive discussion of the three years data in context of the research objectives and goals defined earlier.

# **COORDINATION AND INTEGRATION OF RESTORATION EFFORT**

As mentioned earlier this project will closely interact with other studies, especially those that are being proposed under the SEA project and by Dr. D. Salmon on water circulation. Sample collection will be in conjunction with the SEA project and the deployment of the sediment traps will be in conjunction with the C-LAB and any additional hydrographic moorings to be set by the SEA project and/or by Dr. Salmon. The POC flux data will be integrated and examined in context of the data that will be obtained by the investigators addressing the phytoplankton, zooplankton, and water mass and nutrient dynamics. We will fully cooperate and be involved with the modelers who will be testing the SEA hypothesis and other ecosystem modelers working in Prince William Sound. The proposed study has been discussed with the investigators of the SEA project and with Dr. Salmon, all of whom have agreed to collaborate. Our budget reflects support for the effort involved by Dr. Salmon in the mooring operations connected with the trap deployments. We will be needing four days of ship time in a year for the deployment and retrieval of sediment traps will be the responsibility of Dr. Salmon as part of his subcontract. Sufficient funds have been budgeted in our proposal to cover the cost of the trap deployment as an independent effort.

# ENVIRONMENTAL COMPLIANCE

None needed.

# PERSONNEL

The proposed studies and the contract will be managed by Drs. A. Sathy Naidu and Bruce P. Finney, Professors at the Institute of Marine Science. University of Alaska Fairbanks.

Dr. A. Sathy Naidu, Professor in Marine Science, University of Alaska Fairbanks received his Ph.D. from the Andhra University, Waltair (India). Dr. Naidu has had 30 years of experience (26 years in Alaska) on a variety of multidisciplinary projects relating to marine sedimentological. geochemical, pollution and ecosystem investigations. Some of these investigations have involved carbon flux measurements using sediment traps in the Alaskan arctic and subarctic. Research funding to support these projects have been provided since 1969 by the U. S. Atomic Energy Commission, NOAA/OCSEAP, MMS, U. S. Geol. Survey and U. S. Bureau of Mines. He has taught and guided several graduate students. Dr. Naidu has published 45 papers in several journals and books. He has chaired and participated in the United Nations EP/SCOPE Carbon Cycling Study, as well as chaired Federally-sponsored workshops to design pollution monitoring in Alaska. Dr. Naidu was elected a Life Member to the Clare Hall, University of Cambridge (U.K.). He has extensive research experience in the Prince William Sound and Port Valdez regions. Dr. Naidu will be responsible for supervising all phases of the analysis, managing the project, report submission and coordinating with the P.I.s associated with the SEA project.

Dr. Bruce Finney, Assistant Professor at the Institute of Marine Science, received his Ph.D. from Oregon State University in 1986 and conducted postdoctoral research at Duke University. He has experience in sedimentary processes, geochemistry, and paleoenvironmental reconstruction. His analytical experience includes both sediment and water column particulates. He has been involved with several major marine and geological field programs, including a multidisciplinary study that developed a carbon budget for a basin off Southern California. He has given talks at more than 15 national/international meetings, and has more than 15 publications.

Whonayon Naidh

A. Sathy Naidu
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Lin Bruce P. Finney

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April 26, 1995 Date Prepared

## 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

		Authorized	Proposed						
Budget Category:		FFY 1995	FFY 1996						
Personnel			\$29.9						
Travel			\$8.6						
Contractual			\$46.0						
Commodities			\$0.5						
Equipment			\$36.0		LONG	RANGE FUND	ING REQUIREM	ENTS	
Subtotal		\$0.0	\$121.0	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Indirect			\$35.5	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total		\$0.0	\$156.5						
Full-time Equivalents (F	TE)		0.3						
				Dollar amoun	ts are shown in	thousands of	dollars.		
Other Resources									
				•					
1996 Prepared:		Project Num Project Title Name: A. S	ber: : flux and Ni athy Naidu	utritional Qua	ality of Partic	culate Organi	c Carbon:		FORM 4A Ion-Trustee DETAIL
#### 1996 EXXON VALDEZ TRUSTL\_\_\_\_ JUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Pers	onnel Costs:	· · · · · ·		Months	Monthly		Proposed
	Name	Position Description		Budgeted	Costs	Overtime	FFY 1996
	A. Sathy Naidu	Principal Investigator		2.0	11,418		22.8
	B. Finney	Co-Investigator		1.0	7,091		7.1
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
		Subtotal		3.0	18,509	0	
NAMES OF TAXABLE &					ľ	ersonnel Total	\$29.9
Frav	el Costs:		Ticket	Round	Total	Daily	Proposed
1.1.1.1.555	Description		Price	Trips	Days	Per Diem	FFY 1996
	R/T Fairbanks-Valdez		600	4	12	150	4.2
	R/T Fairbanks-Anchorage		300	4	14	150	3.3
	R/T Fairbanks-San Diego		800	· 1	3	115	1.1
							0.0
							0.0
							0.0
							0.0
							0.0
						Travel Total	0.0 A 82
			-			110461 10(0)	+0.0
	1996	litu of Dorti-	ulata Oraani	Corboni		Personnel	
	1550	muy or Partic	uiate Organie	arbon:		& Travel	
		Name: A. Sathy Naidu					DETAIL
					L		

#### **1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET** October 1, 1995 - September 30, 1996

Contractual Costs:		Proposed
Description		FFY 1996
Publications/Page Charges		0.5
Communications		0.5
Biochemical analyses		2.0
Shipping		4.0
Subcontract to PWSSC		39.0
	Contractual Te	otal \$46.0
Commodities Costs:		Proposed
Description		FFY 1996
Glassware, filters, chemicals		0.5
	Commodities To	tal \$0.5
		FORM 4B
1006	Project Number:	Contractual &
1990	Project Title: flux and Nutritional Quality of Particulate Organic Carbon:	Commodities
1	Name: A. Sathy Naidu	DETAIL

#### 1996 EXXON VALDEZ TRUSTI UUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

New	Equipment Purchases:		Number	Unit	Proposed
Desc	Description of Units				FFY 1996
	Sediment traps		2	18,000	36.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
Thos	e purchases associated with r	eplacement equipment should be indicated by placement of an R.	New Ed	quipment Total	\$36.0
Exist	ing Equipment Usage:			Number	
Desc	ription	of Units			
-					
		Project Number:			ORM 4B
	1996	Project Title: flux and Nutritional Quality of Particulate Organi	c Carbon:	E	quipment
		Name: A Sathy Naidu			DETAIL
				L	

96194

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## Pink Salmon Spawning Habitat Recovery

rioject Number:

96194

Restoration Category:

Proposer:	Mike Murphy and Stanley Rice NMFS, Auke Bay Laboratory
Lead Trustee Agency:	NOAA
Duration:	1.5 years
Cost FY 96:	\$182,500
Cost FY 97:	\$75,000
Geographic Area:	Prince William Sound
Injured Resource/Service:	Pink salmon

#### · ¬STRACT

This project would examine the level of oil contamination in pink salmon streams in 1989-90 and 1995 by analyzing sediment/gravel samples collected in 1989-90 by ADFG (Oil Spill Response) and similar samples collected in 1995 by the Auke Bay Laboratory. Over 800 samples from 200 streams were collected by ADFG in 1989 and 1990, but few were analyzed. An additional 300 similar samples will be collected by the Auke Bay Laboratory in 1995. Analyses would allow a better assessment of the oil exposure in 1989, in 1995, and would complement the elevated salmon egg mortalities measured by Sharr et al. since 1989. After determining the past and present potential for oil exposure, this study would synthesize the field contamination data, the elevated egg mortality data, and the controlled oiled gravel/pink salmon egg experiments of other Trustee studies to determine the likelihood of damage from oiled stream gravels. If restoration of contaminated stream gravels were contemplated, now or in future oil spills, the contamination levels in 1989 and 1995 would be valuable data for consideration, along with the synthesis effort for the three studies

#### INTRODUCTION

The Exxon Valdez oil spill caused increased mortality and possible long-term genetic damage in pink salmon (Oncorhynchus gorbuscha) eggs and embryos that incubated in oiled intertidal sections of freshwater streams. Damages appear to be long term and persistent. Embryo mortality was still higher in oiled streams in 1993, and pink salmon stocks in Prince William Sound have not yet recovered.

freshwater streams. Damages appear to be long term and persistent. Embryo mortality was still higher in oiled streams in 1993, and pink salmon stocks in Prince William Sound have not yet recovered.

Although impacts of oil on eggs and embryos appear evident, little information exists on the levels of oil contamination that the incubating embryos were initially exposed to. Only a small number of sediment samples from streams have been analyzed. Oil concentration ranged considerably between the two studies; total polynuclear aromatic hydrocarbons (PAH) concentration ranged as high 9,056,549 micrograms/g. Some workers (Heintz and Weidmer) found that the level of PAHs in 1990 was high enough to cause metabolic and mutagenic impacts, but other workers (Brannon et al.) disagree, claiming that PAH levels were too low to cause ill effects. The question of long-term impacts is difficult to answer without better knowledge of the actual exposure levels.

Furthermore, no monitoring of oil contamination in pink salmon spawning areas has been done since 1990; thus, whether or not oil still persists in these areas is a matter of speculation. Although the study by Sharr et al., in which eggs from oiled and non-oiled streams were incubated at the AFK Hatchery, indicated that the increased embryo mortality was due to genetic damage, the continued exposure to oil in the streams was not ruled out. Beached oil deposits may still be leaching toxic compounds into intertidal salmon spawning areas, and this seeping oil could still be contributing to embryo mortality, in addition to mortality from impaired genes.

Fortunately, the Alaska Department of Fish and Game collected over 800 intertidal sediment samples from about 200 salmon streams in 1989 and 1990 as part of the oil spill Response effort. For lack of funds, only 52 of these samples from 12 streams were ever analyzed. The rest were kept frozen and secure. Their existence was unknown to the Trustees until the samples were identified and acquired by the Auke Bay Laboratory in 1995. The critical importance of these samples is now evident because of the studies demonstrating the continuing impaired survival of pink salmon eggs and embryos. These samples can indicate how widespread and acute was the initial exposure of incubating pink salmon embryos after the oil spill. Data on oil levels in stream sediments were not collected in Sharr et al.'s pink salmon studies. Such data are critical to Sharr et al.'s continuing studies and Heintz et al.'s controlled laboratory studies.

This proposal requests funds to analyze these archived samples to determine better the levels of exposure in 1989 and 1990. In addition, ABL will collect new samples from intertidal salmon spawning areas at 11 of the ADFG sites in 1995 to determine habitat recovery and current oil exposure, if any. This proposal also requests funds to process these 1995 samples. Natural recovery in many areas is probably adequate by now; however, specific streams may still suffer. If persistent oil exposure is indicated by these samples, a proposal would be offered for FY 97 to further evaluate options for restoring intertidal spawning areas.

This study will provide data on the magnitude of the initial acute exposure and determine whether pink salmon spawning areas continue to be exposed to oil contamination from beached oil deposits. Data on the initial exposure are needed to evaluate better the potential for long-term genetic impacts; data on the persistence of oil are needed to assess habitat recovery and evaluate the need for additional restoration of pink salmon spawning habitat.

#### NEED FOR THE PROJECT

#### A. Statement of Problem

Pink salmon eggs and alevins that incubate in intertidal sections of streams contaminated by the *Exxon Valdez* oil spill continue to show poor survival compared to those from non-oiled streams. The cause of this difference is thought to be genetic damage from the initial acute exposure after the spill (Sharr et al. 1994). The mortality could also be due, at least in part, to continuing oil exposure from persistent oil deposits that seep toxic compounds into salmon spawning areas. Water draining through the beach during ebb tide could dissolve and carry to the stream low concentrations of hydrocarbons that are taken up by incubating embryos. Thus, the concentration of oil in the streambed would underestimate the actual dose of oil delivered to the eggs. The biology of salmon eggs is a contributing factor. Long-term incubation through the winter in stream gravels of intertidal zones, large yolk reserves to absorb low-level and intermittent oil exposures, and developing embryos are all factors that contribute to the vulnerability of this species/life stage. Existing data on oil levels in stream and beach sediments are insufficient to determine the magnitude of the initial exposure experienced by pink salmon embryos after the spill, or to evaluate present habitat condition.

#### B. Rationale

The proposed project would provide data on initial oil concentrations in stream and adjacent beach sediments and on their current condition. Data on initial oil concentrations would allow a more accurate assessment of the probability of genetic damage, and data on current condition would provide an assessment of the recovery of spawning habitat and the need for additional restoration efforts. This project relates directly to the Oil Spill Restoration Plan objective to recover healthy and productive pink salmon populations at prespill abundance.

## C. Summary of Major Hypotheses and Objectives

The major hypotheses are 1) that the initial oil concentrations were sufficient to cause long-term genetic damage in pink salmon, and 2) that residual oil from beached deposits continues to seep into salmon spawning areas, contributing to poor embryo survival.

Objectives:

- 1. Measure oil in ADFG-collected stream gravels collected in 1989 and 1990.
- 2. Measure oil in ABL-collected stream gravels collected in 1995.
- 3. Measure PAH profiles in 1989-90 and 1995 samples and compare to *Exxon Valdez* crude for confirmation of source of oil.
- 4. Prepare a report on the stream gravel concentrations, rate of recovery, and evaluate need and potential for restoration.
- 5. Synthesize the results of this study, with the field impact study by ADFG Sharr et al. and the laboratory toxicity study by Heintz et al. to determine the past and present potential of oil levels in stream gravel to cause long-term damage to pink salmon eggs.

If results indicate that beached oil persists at salmon streams, further work would be proposed to determine the extent of the beached oil reservoirs, describe pathways for how oil moves from these

reservoirs into salmon spawning areas, measure the dosage of oil contaminants that incubating salmon embryos are actually exposed to in the streams, and develop options for additional restoration.

#### D. Completion Date

The completion date for analyses and reporting of objectives 1 through 4 would be during FY 96 The completion date for a synthesis involving this study, Sharr et al., and Heintz et al. would be June 1, 1997 If oil concentrations in 1995 continue to be high and wide spread, and additional work or restoration is warranted, further work would be proposed for FY 97 and beyond. That is not suspected at this time.

## **COMMUNITY INVOLVEMENT**

Only limited community involvement is envisioned for this project. We would submit an article and photographs for the Trustee Council newsletter.

#### FY 96 BUDGET

The requested funds for this project include only funds needed to analyze existing samples and report results. The Auke Bay Laboratory has already contributed considerable funds and labor in acquiring and securing the samples and documentation for the ADFG samples collected in 1989-90, and has contributed further effort to gather samples in 1995 because of the importance of this study. Logistics supporting the collections in 1995 were added to other trustee charters at no cost, and the labor was contributed by ABL.

Personnel	139.6
Travel	6.0
Contractual	0.0
Commodities	16.0
Subtotal	161.6
Gen. Admin.	20.9
Total	182.5

## **PROJECT DESIGN**

#### A. Objectives

- 1. Measure oil in ADFG collected stream gravels collected in 1989 and 1990;
- 2. Measure oil in ABL collected stream gravels collected in 1995;
- 3. Measure PAH profiles in 1989-90 and 1995 samples and compare to *Exxon Valdez* crude for confirmation of source of oil;
- 4. Prepare a report on the stream gravel concentrations, rate of recovery, and evaluate need and potential for restoration; and
- 5. Synthesize results with those of Sharr et al.'s field study and Heintz et al.'s lab study to determine the

past and present potential of stream-gravel oil levels to cause long-term damage to pink salmon eggs.

## B. Methods

Existing unanalyzed sediment samples collected by ADFG in 1989-1990 consist of a total of 768 samples, including 673 from Prince William Sound, 80 from Kodiak, 13 from the Alaska Peninsula, and 2 from the Kenai Peninsula. Because samples were taken in pairs, about one-half of the samples are duplicates. All of the non-duplicate samples will be analyzed by a fast-screening technique (ultraviolet fluorescence, UVF) that will provide a semi-quantitative measure of the total concentration of *Exxon Valdez* hydrocarbons. Approximately 380 samples would be analyzed by UVF, and 10% would be fully analyzed by gas chromatography/mass spectroscopy (GCMS) to determine concentrations of individual PAH analytes and to confirm the source of the oil.

Twelve streams sampled by ADFG (Weidmer) in 1989-90 will be resampled in May 1995. Included will be the seven oiled streams that were intensively sampled by ADFG at which permanent sampling stations were "mapped" with survey techniques. Also included will be most oiled streams used by Sharr et al. (1994) in their AFK Hatchery experiment. Of the eight oiled streams used by Sharr et al., seven were also sampled by ADFG and three were mapped (Table 1). One stream that was used as a control by Sharr et al. will also be sampled as a control in this study.

Sampling at the 12 streams in 1995 (11 oiled, 1 non-oiled) will duplicate the ADFG 1989-90 sampling At the seven mapped streams, samples will be taken at the same locations as in 1989 to assess persistence of oil and recovery rate. At each of these streams, ADFG established three to four permanent sampling stations, and also took paired samples from the lower, middle, and upper intertidal zone (locations documented by video). In 1995, we will take single samples from each of these locations at the seven mapped stream and the control stream. In addition, at all 12 streams, ad hoc samples will be taken at 20-30 pits in areas most likely to have oil to document persistence of oil reservoirs. A sample will be taken from the pit if oil is detected by sight or smell.

A total of about 300 samples will be taken in 1995, including 25 from permanent stations, 24 from lower, middle, and upper intertidal stations at each stream, and up to 260 from "ad hoc" locations. All samples will be fast-screened by UVF, and 40 will be analyzed by GCMS.

Bay Laboratory in 1995. Streams mapped by ADFG and also used by Sharr et al. are bold. Number of							
Response samples taken by ADFG in 1989-90 are shown on right.							
Station Segment Lo	cation	Samples taken	Samples analyzed				
ADFG Mapped stream	<u>S</u>						
2262016180 CH002	Chenega Island, north tip	26	11				
2264016630 EV017	Evans Island, Little Shelter Bay	19	2				
2264016780 LA018	Latouche Island, Sleepy Bay	21	7				
2261016922 KN103	Knight Island, Lower Passage	11	0				
2261016982 KN132	Knight Island, Herring Bay, west side	15	3				
2263016840 KN701	Knight Island, Marsha Bay	22	6				
2264016613 EV025	Evans Island, Shelter Bay	13	4				
Other Sharr et al. sites	Other Sharr et al. sites sampled by ADFG but not mapped						
2262016280 CH001	Chenega Island, west coast	10	2				
2264016650 EV900	Evans Island, Latouche Passage	6	0				
2263016820 KN401	Knight Island, Snug Harbor	11	1				
2265016370 LA041	Latouche Island, southwest	6	0				
2265016320 WH003	Mainland, Whale Bay (Control)	2	0				

Table 1. Twelve streams sampled by ADFG (Weidmer) in 1989-90 that will be resampled by the Auke

#### C. Contracts and Other Agency Assistance

No contracts or other agency assistance are anticipated.

#### **D.** Location

All sampling in 1995 will be within Prince William Sound at the sites listed in Table 2. Samples to be analyzed from 1989-1990, however, are from the entire oil spill impact area, including Prince William Sound, Kodiak, and the Alaska and Kenai Peninsulas.

#### SCHEDULE

#### A. Measurable Project Tasks for FY 96

October 1995:	Prioritize samples for fast screening and GCMS analysis
November-March:	Analyze samples for hydrocarbons
April-May 1996:	Data entry and statistical analysis
May-August 1996:	Write final report and prepare DPD for FY 97 if warranted

Oct 1996-June 1997: Synthesize analytical results of this study with those from the Sharr et al. and Heintz et al. studies.

#### B. Project Milestones and Endpoints

All analytical objectives will be met on the same schedule because both archived and new sets of samples will be analyzed concurrently. All samples will be in hand at start of fiscal year.

March 1996:	Sample analysis completed
May 1996:	Data entry and statistical analysis completed
September 1996:	Final report submitted
June 1997:	Synthesis manuscript completed

#### C. Project Reports

A final report will be submitted by September 1996. This report would address results of the analysis of all samples, including initial oil concentrations in 1989-1990 and present habitat condition. It will confirm the match to *Exxon Valdez* oil.

A synthesis manuscript will be completed in June 1997, comparing the analytical results of this study with the biological impacts measured in two other Trustee studies.

#### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project will be coordinated with other projects conducted by ABL. Much coordination has already been achieved during acquisition of the samples through shared logistics and data and in developing the objectives for this project. The data will be directly relevant to ongoing Restoration projects dealing with the recovery of pink salmon and oil-related egg and alevin mortalities.

#### ENVIRONMENTAL COMPLIANCE

No permits need to be obtained for this project.

#### LITERATURE CITED

Sharr, S., J. E. Seeb, B. Bue, A. Craig, and G. D. Miller. 1994. Injury to pink salmon eggs and preemergent fry in Prince William Sound -- Restoration Study 93003. ADFG Regional Information Report No. 2A94-48. ADFG, Division of Commercial Fisheries Management and Development. 333 Raspberry Rd. Anchorage, AK 99518-1599.

#### PERSONNEL

Project Leader: GS-12 Fishery Biologist - Michael L. Murphy

Received a BA (1974) in Zoology from University of Wisconsin, Madison, WI, and an MS (1978) in Fisheries from Oregon State University, Corvallis, OR. Mike has been employed at the Auke Bay Laboratory since 1981. His principal studies have included research on stream/riparian habitat issues and ecology of juvenile salmonids, and he has written more than 40 papers related to these topics. Mike presently leads the Anadromous Fish Habitat Task at the Auke Bay Laboratory.

ABL Habitat Investigations Program Manager. GM-14 Physiologist - Stanley D. Rice

Dr. Rice received a BA (1966) and MA (1968) in Biology at Chico State University, and Ph.D. (1971) in Comparative Physiology at Kent State University. Employed at the Auke Bay Laboratory since 1971 as a research physiologist and task leader, Dr. Rice has been Habitat Program Manager since 1986. He has researched oil effects since 1971 and has published over 70 papers. His studies have ranged from field to lab tests, behavioral to biochemical studies, and salmonids to invertebrates. Dr. Rice has conducted and managed soft-funded projects since 1974, including the Auke Bay Laboratory's *Exxon Valdez* damage assessment studies. Activities since the oil spill include management of 10 damage assessment projects, establishment of chemistry lab and analyses, establishment of 'hydrocarbon database management. Dr. Rice has provided principal investigators and managers in NOAA and other agencies with reviews and critical input into agency decisions, and he has interacted closely with other agencies on logistics coordination, critiquing study design, and interpreting observations.

Chemistry Laboratory Manager: GS-13 Chemist - Jeffrey Short

Mr. Short is an analytical chemist, leading the hydrocarbon analysis at the Auke Bay Laboratory, which is one of the two laboratories analyzing *Exxon Valdez* hydrocarbon samples. Mr. Short holds a BS in biochemistry and an MS in physical chemistry from the University of California. He was principal investigator of NRDA projects Subtidal Study #3. Mr. Short has conducted extensive research on the effects of Alaska crude oil on marine biota before and after the *Exxon Valdez* oil spill.

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Project Leader Michael L. Murphy NMFS Auke Bay Laboratory 11305 Glacier Hwy Juneau, AK 99801-8626 Phone: (907) 789-6036 Fax: (907) 789-6094 E-mail: mmurphy@abl.afsc.noaa.gov

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Project Manager Dr. Stanley D. Rice NMFS Auke Bay Laboratory 11305 Glacier Hwy Juneau, AK 99801-8626 Phone: (907) 789-6020 Fax: (907) 789-6094

30 April 1995 Date Prepared

#### 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$139.6						
Travel		\$6.0						
Contractual		\$0.0						
Commodities		\$16.0						
Equipment		\$0.0		LONG RA	ANGE FUNDIN	IG REQUIRE	MENTS	
Subtotal	\$0.0	\$161.6	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$20.9	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$182.5	\$75.0					
Full-time Equivalents (FTE)		2.3						
			Dollar amount	s are shown ir	n thousands of	dollars.		
Other Resources	\$85.0	\$54.0	\$54.0					
NOAA contribution of Habitat Program Manager, J Hice, 3 mo = \$32.7K Senor Chemist, J Short, 2 mo = \$14.6K NOAA contribution in FY 95 estimated at \$85.0K. This includes obtaining Response samples from ADFG, consultation to identify and verify that collection data is compatible with fields in the NRDA database and field work to collect comparable samples in PWS in 1995. This project was not funded by the Trustee Council in FY95.								
1996 Project Number: 96xxx 96190 Project Title: Pink Salmon Spawning Habitat Recovery Agency: National Oceanic & Atmospheric Admin.								

#### **1996 EXXON VALDEZ TRUSTE**

#### **JUNCIL PROJECT BUDGET**

Personnel Costs:			GS/Range/	Months	Monthly	T T	Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	M Murphy	Project Leader	12/3	6.0	6,300		37.8
	M Larsen	Sr. chemist	11/6	4.0	5,800		23.2
	L. Holland	Chemist	11/6	5.0	5,800		29.0
1	L. Ewing	Fish Biol	7/5	12.0	3,700		44.4
t.	B. Wright	NOAA Program Manager	12/5	0.8	6,500		5.2
							0.0
							0.0
							0.0
							0.0
							0.0
		1					0.0
	Subtotal			27.8	28,100	0	\$100.0
Ino	se costs associated with pro	gram management should be indicated by	placement of a	n .	Per	sonnel lotal	\$139.6
Tra	vel Costs:		Ticket	Round	Total	Daily	Proposed
PM •	Description		Price	l rips	Days	Per Diem	FFY 1996
-	Anchorage, workshop & oti	her Planning Migs., 4	444	4	15	225	5.2
	Car Hental, h	hiscellaneous for above					0.8
							0.0
							0.0
		:					0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
Those costs associated with program management should be indicated by placement of an *.						Travel Total	<b>\$6</b> .0
<u> </u>							
<b></b>							

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#### 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

<b>Contractual Cos</b>	ts:	·····	Proposed
Description			FFY 1996
When a non-trust	ee organization is used, the form 4A is required.	ntractual Total	\$0.0
Commodities Co	sts:		Proposed
Description			FFY 1996
Chemicals fo	r hydrocarbon analyses		6.5
Chemistry la	poratory supplies: disposables, glassware, etc.		8.5
Computer re	pairs, maintenance		0.5
Computer so	ftware upgrades		0.5
		÷	
	Comr	nodities Total	\$16.0
· · · · · · · · · · · · · · · · · · ·			
		F	ORM 3B
1006	Project Number: 96xxx	Cor	ntractual &
1330	Project Title: Pink Salmon Spawning Habitat Recovery	Cor	nmodities
	Agency: National Oceanic & Atmospheric Admin.	[	DETAIL
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#### **1996 EXXON VALDEZ TRUST**

#### OUNCIL PROJECT BUDGET

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October 1, 1995 lember 30, 1996

Nev	v Equipment Purchases:		Number	Unit	Proposed
Des	cription		of Units	Price	FFY 1996
					0.0
	none				0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
Tho	se purchases associated with	h replacement equipment should be indicated by placement of an R.	New Equ	ipment Total	\$0.0
Exi	sting Equipment Usage:			Number	Inventory
Des	cription	· · · · · · · · · · · · · · · · · · ·		of Units	Agency
	1996	Project Number: 96xxx Project Title: Pink Salmon Spawning Habitat Recovery Agency: National Oceanic & Atmospheric Admin.		F	ORM 3B quipment DETAIL

4 of 4

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## Pristane Monitoring in Mussels and Predators of Juvenile Pink Salmon & Herring

Project Number:	96195
Restoration Category:	Research and Monitoring
Proposer:	Jeffrey W. Short NMFS, Auke Bay Laboratory
Lead Trustee Agency:	NOAA
Duration:	5 years
Cost FY96:	\$112,700
Cost FY97:	\$85,000
Cost FY98:	\$85.000
Cost FY99:	\$85,000
Cost FY00:	\$85,000
Geographic Area:	Prince William Sound
Injured Resource/Service:	Pink Salmon, Pacific Herring

#### ABSTRACT

This project will measure pristane in predators of juvenile pink salmon and larval herring to determine the dietary dependence of these predators on alternative prey, *Neocalanus spp.* copepods. This project will also monitor pristane in mussels as an indirect index of potential year-class strength for pink salmon and herring. These results will be used to evaluate the prey-switching hypothesis of the SEA plan, and to identify critical marine nursery habitat in Prince William Sound.

#### **INTRODUCTION**

Pristane is a hydrocarbon biosynthesized from chlorophyll by herbivorous copepods in the genera *Calamus* and *Neocalanus*. These copepods are the only proven modern marine source of pristane (Avigan & Blumer, 1968, J. Lipid Res. 9:350; it also occurs in petroleum), and they typically contain concentrations that approach 1% dry weight (i.e. 10,000,000 ppb). As a branched alkane, pristane is highly lipophilic and resistant to metabolic degradation, which suggests that it may be a useful "tracer" molecule that would quantitatively label fats in predators of these copepods (Blumer *et al.*, 1964, Helgo.

Wiss. Meeres. 10:187). The low detection limit (about 100 ppb) of the inexpensive analytical method further suggests the utility of pristane as a natural indicator of energy flow from these copepods to higher trophic level predators.

The hydrocarbon database produced for the *Exxon Valdez* Natural Resources Damage Assessment (NRDA) and Restoration phases from 1989 to 1995 provide an opportunity to evaluate the distribution of pristane among species in an ecosystem where *Calanus* and *Neocalanus* copepods are important prey. *(Neo)Calanus spp.* are marine zooplankters about 3 - 8 mm in length, and can be the dominant marine herbivores in Prince William Sound (PWS) during the spring phytoplankton bloom. They are consequently important prey during the reproductive period of many predator species. Following the *Exxon Valdez* oil spill, some 50+ species and 20+ tissue types were collected and analyzed for hydrocarbons, including pristane.

Examination of the *Exxon Valdez* database shows that the distribution of pristane among these species and tissues is generally consistent with known trophic relationships. We see about a 10-fold decrease of pristane concentrations in lipids at successive trophic levels (herbivore to grazer to primary predator to secondary predator). Important direct copepod predators identified include storm petrels, herring, and juvenile pink salmon. In addition, pristane concentrations that range to 50,000 ppb (dry weight) are evident in filter feeding organisms such as mussels and some clams during spring. Recent experiments conducted at the Auke Bay Laboratory confirm that an important route of pristane accumulation in these filter feeders is through ingestion of fecal material derived from *(Neo)Calanus* predators, e.g. juvenile pink salmon and herring. Pristane concentrations in PWS mussels therefore reflect the timing and simultaneous abundance of *(Neo)Calanus spp.* and their predators in seawaters adjacent to sampled mussels.

Together, these results suggest that tissue analysis of pristane may be used as an inexpensive new tool to investigate the PWS marine ecosystem in at least 3 ways. First, such analyses may identify predators that have a direct dietary dependence on (*Neo*)*Calanus spp.*, and these predators may include heretofore unrecognized "prey-switching" species that switch predation to larval herring and juvenile salmon in years of relatively low copepod abundance. Prey-switching has been hypothesized as major determinant of pink salmon and herring recruitment success in the SEA studies. Second, a regular monitoring program for pristane in mussels during spring could provide a quantitative basis for comparing inter-annual energy flow through (*Neo*)*Calanus spp.* to commercially important predators such as herring and pink salmon This may provide a relatively inexpensive indicator of survival through the early juvenile stages for these species. Finally, the monitoring program could identify locations where this flow is consistently high, i.e. critical marine habitats. These approaches may clarify some of the important natural factors that affect recruitment of e.g. juvenile salmon and herring, which is necessary for determining the restoration of these resources.

#### NEED FOR THE PROJECT

#### A. Statement of Problem

Determination of the causes of the dramatic declines in populations of pink salmon and herring following the *Exxon Valdez* oil spill requires an assessment of the natural factors that affect recruitment of these

species, because any toxic effects of the spill may otherwise be confounded with these natural factors. In addition, these natural factors impose constraints on the recovery potential of these species. Pink salmon and herring are identified as species that have not recovered. If the recent population declines of these two species are the result of changes in the basic ecology of Prince William Sound due to natural phenomena (e.g. El Nino), then recovery of these populations to pre-spill levels may not be possible, and the criteria for recovery must recognize these changes.

### B. Rationale

The proposed project will provide evidence that may be used to evaluate why populations of pink salmon and herring are not recovering. One of the major natural factors hypothesized as a constraint on the recovery potential for these species is prey-switching by predators on the larval and juvenile stages. Under this hypothesis, predators are thought to concentrate on larval and juvenile pink salmon and herring predation in years of low copepod abundance, but switch their concentration to copepods in years of higher abundance. The proposed project addresses this hypothesis in two ways: first, by identifying unrecognized "pre-switching predators", and second, by indirectly monitoring survival through juvenile stages. Identification of prey-switching predators will permit subsequent evaluation of whether the identified species really do substantially determine recruitment success of pink salmon and herring.

Annual monitoring of pristane concentrations in mussels throughout Prince William Sound will permit an indirect evaluation of whether pink salmon and herring survival through the juvenile life stages primarily determines year class strength in the first place. In addition, the monitoring will identify important marine nursery areas for these species, the conservation of which may promote their recovery. Monitoring pristane in mussels will be necessary for at least 5 consecutive years to provide a minimal statistical basis for any observed relationship between variation of pristane concentrations in mussels and recruitment success of pink salmon and herring.

## C. Summary of Major Hypotheses and Objectives

This project has three objectives: (1) identify "prey-switching predators", i.e. predators that prey on juvenile pink salmon and herring, but may switch to *(Neo)Calanus spp.* during years of higher copepod abundance; (2) provide an annual quantitative index of pink salmon and herring survival through the juvenile life stages, as evidenced by measurements of pristane in mussels; and (3) identify important marine nursery areas for the juvenile life stages of pink salmon and herring in Prince William Sound.

## D. Completion Date

The project elements that address the identification of prey-switching predators will be completed in FY 96. The monitoring element will be performed annually for 5 years, FY 96 through FY 00.

## **COMMUNITY INVOLVEMENT**

Involvement of spill-area residents in the monitoring element of this project is more than just appropriate The most expensive part of this project is collecting mussels from beaches in Prince William Sound at specific times during spring and summer. Hatcheries in the Sound have already cooperated with the development of this project by collecting nearby mussels at the appropriate times and storing them until the end of the season for pick-up. It would be highly desirable to expand such cooperative efforts to include high schools in communities and villages in the Sound. To this end, we will try to recruit interested students and teachers to establish convenient collection stations in their communities, and we will provide a "science-unit" for each participating school that explains the rationale of the project at the high school level, and compares specific results for each school with the results for the whole effort. The underlying biology of this project gets to the heart of how the Sound turns sunlight into fish, which we believe can provide a very useful teaching resource at the high school level.

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#### FY 96 BUDGET

Personnel	56.0
Travel	32.3
Contractual	0.2
Commodities	15.8
Equipment	0.0
Subtotal	104.3
General Administration	8.4
Total	112.7

#### **PROJECT DESIGN**

#### A. Objectives

- 1. Measure concentrations of pristane in 500 tissue samples of 5 fish and 1 squid species to evaluate the dietary dependence of these juvenile pink salmon and larval herring predators on an alternative prey species, the copepod *Neocalcunus plumchrus*, in Prince William Sound (FY96 only).
- 2. Measure pristane concentrations in mussels collected biweekly during spring fro 30 stations in Prince William Sound to evaluate inter-annual variability of energy conversion from *(Neo)Calanus* copepods to their nearshore, shallow sea-depth predators (FY96 FY00).
- 3. Determine the existence and location of regions inside Prince William Sound where the energy conversion of objective 2 above is consistently above average, and synthesize these data over time and geographic location each succeeding project year (FY96 FY00).

#### B. Methods

Objective 1: This will be addressed by comparison of pristane concentrations in the muscle or mantle tissues of these predators collected in early April before the zooplankton bloom, in mid-May during the peak of the bloom, and in late summer after the bloom. Pristane concentrations in these predators will also be compared with concentrations in known copepod predators which are archived in the *Exxon Valdez* NRDA hydrocarbon database. The predator species include: adult pollock (*Theragra* 

chalcogramma), juvenile tom cod (*Microgadus proximus*), juvenile pacific cod (*Gadus macrocephalus*), capelin (*Mellotus vellosus*), juvenile northern smoothtongue (*Leuroglossus stilbius schmidti*), and squid (*Berryteuthis magister*).

Samples of each of these species will be collected in early April, mid-May, and late summer from each of 2 distinct geographic regions in the Sound under project 96320i (SEA: Confirming food-web dependencies). A total of 500 samples are anticipated, which will permit about 14 observations for each classification. This relatively high replication is necessary to estimate the magnitude and form of the underlying variance distribution for pristane concentrations in these matrixes. Tissues will be excised and freeze-dried for stable isotope analysis for project 96320i, and a sub-sample of the freeze-dried tissues will be sent to Auke Bay Laboratory for pristane analysis. Thus, results produced under this project and project 96320i will be directly comparable, so results from both projects may cross-validate.

The significance of differences among sample means will be determined by 2-factor analysis of variance (ANOVA) for each predator species independently, where factors include season and geographic location for each species, after appropriate transformation of the concentration data to satisfy the homoscedastic requirements of ANOVA if necessary.

Objectives 2 & 3: These objectives will be addressed by determining the seasonal variability of pristane concentrations in mussels (*Mytilus edulis*) collected from 30 stations established in 1994 in Prince William Sound. Mussels will be collected biweekly beginning on or about April 1 through June 1, then July 1 and August 1 for a total of 7 collection periods and 210 mussel samples. The collection frequency is initially higher to more accurately establish the onset of the initial rise of pristane concentrations in the mussels, which may vary from year to year. Collected mussels will be stored frozen and analyzed for whole-body pristane concentration.

Mussels (20) will be collected from selected mussel beds and placed into a plastic bag together with collection documentation (i.e. date, time, location, collector). Selected mussels will ideally be in the length range 20 - 45 mm. Mussels are collected along a transect parallel with the shoreline, with 1 mussel collected every consecutive meter. Previous results archived in the *Exxon Valdez* restoration database for hydrocarbons indicates that pristane concentrations in mussels collected in this way are representative of entire mussel beds.

Pristane concentrations in mussels will be analyzed statistically using repeated-measures ANOVA, both intra- and inter-annually. The intra-annual repeated-measures ANOVA will be used to determine whether pristane concentrations in mussels differ significantly among stations. The inter-annual ANOVA will be used to evaluate variability of a pristane accumulation index (PAI) calculated for each station each year The PAI is calculated as the product of pristane concentration and sampling interval, and is an approximation of the integral of concentration and time at each station. Variability of this index will be used to evaluate the significance of pristane concentration differences among years for the Sound as a whole, and to evaluate persistent annual differences among stations. Results from FY96 will be combined with results from 1994 and 1995 to examine annual variability, although the power will be low. The power will increase substantially with each succeeding year of results.

Pristane Analysis: The chemical analysis of pristane involves dichloromethane extraction of macerated or freeze-dried tissues, lipid removal with silica gel, and separation and measurement of pristane by gas

chromatography equipped with a flame ionization detector. Pristane measurement will use the internal standard method, with deuterated hexadecane added to the dichloromethane initially as the internal standard. Pristane identification will be based on retention time relative to the internal standard. Quality control samples include method blanks, spiked method blanks, and reference sample analyzed with each batch of 20 samples to verify method accuracy, precision, and absence of laboratory introduced artifacts and interferences. Recovery of the internal standard will be determine by adding a second internal standard prior to instrumental analysis. Method detection limits will be assessed annually for the mussel tissue matrix, and these detection limits will be assumed for the other matrixes analyzed. Based on previous performance, we anticipate accuracy of  $\pm 15\%$  of National Institute of Science and Technology (NIST)-certified values for the spiked blank and reference samples, precision of 95% of reference samples within  $\pm 15\%$  of sample means, and laboratory artifacts below detection limits more than 99% of the time. This level of analytical performance will insure that variability due to sample analysis is negligible compared with variability among replicate mussel samples.

Percent moisture and percent lipid will also be determined in samples so that results may be analyzed on dry weight and lipid weight bases. Dry weights will be determined by heating samples at 60 C to constant final weight. Lipid proportions will be determined from weight loss due to dichloromethane extraction

#### C. Contracts and Other Agency Assistance

There will be no contracts under this project

#### D. Location

All field sampling will be in Prince William Sound; all pristane analyses will be in Juneau, Alaska. The science units will be most appropriate for residents and students of Prince William Sound, but will be available for others as well.

#### SCHEDULE

#### A. Measurable Project Tasks for FY96

FY96:

1 1 20.	
Oct 1 - Jan 1:	Analyze data from FY95.
Jan 1 - Feb 1:	Prepare and present results from 1994 & 1995 at workshop.
Feb 1 - Mar 1:	Prepare annual report, report for public & high schools (94 & 95 data); prepare logistics for FY96 field season.
Apr 1 - Aug 1:	Collect mussel and predator tissue samples.
Aug 1 - Sep 30:	Analyze collected samples for pristane
<b>FY97</b> :	
Oct 1 - Jan 1:	Analyze data from FY96
Jan 1 - Feb 1:	Prepare and present results from 1994 & 1995 at workshop
Feb 1 - Mar 1:	Prepare annual report, report for public & high schools (94, 95 & 96 data)

#### B. Project Milestones and Endpoints

Objective 1 will be met in FY96. Objectives 2 & 3 should be met by FY00; and possibly sooner, depending on how the results turn out. The endpoints are completion of the statistical analyses described under Methods above.

#### C. Project Reports

This project requires consistent multi-year funding to be successful. Annual reports are therefore appropriate, but publication in a peer-reviewed journal is also anticipated for all project objectives, when collected data become sufficiently definitive. Annual reports will be submitted on March 1 of each year

#### **COORDINATION AND INTEGRATION OF RESTORATION EFFORT**

This project is closely coordinated with the SEA projects in general, and with SEA project 96320i in particular. The proposed methods afford an independent assessment of hypotheses initially advanced by SEA participants. Project 96320i will supply the tissue samples of the predator species, obviating the expense of duplicative collection and insuring data comparability. Collection of mussels will be coordinated with project 96090 (mussel bed project) as appropriate.

#### ENVIRONMENTAL COMPLIANCE

This project will have no environmental impact, therefore does not need an Environmental Assessment or Environmental Impact Statement.

#### PERSONNEL

Project Leader Jeffrey W. Short

Education: BS, 1972, University of California, Riverside (Biochemistry & Philosophy) MS, 1982, University of California, Santa Cruz (Physical Chemistry)

Relevant Experience:

1989- Present: Established and managed the hydrocarbon analysis facility at ABL to analyze hydrocarbon samples generated by the *Exxon Valdez* NRDA effort (about 20% of these samples were analyzed at ABL).

1989 - 1992: Principal Investigator, *Exxon Valdez* project Air/Water #3: Determination of petroleum hydrocarbons in seawater by direct chemical analysis and through the use of caged mussels deployed along the path of the oil spill.

1991 - 1992: Principal Investigator, *Exxon Valdez* project Subtidal #8: Development of computer-based statistical methods for global examination of sediment and mussel hydrocarbon data produced for the *Exxon Valdez* NRDA effort for systematic bias, and for identification of probable sources of

hydrocarbons. In addition, this project produced both hard-copy and computer display maps of all the sediment and mussel hydrocarbon data.

1994 - 1995: Initiated data analysis and pilot projects that established the role of pristane in Prince William Sound.

Patricia M. Harris

Education: University of Alaska Fairbanks; B.S. Biological Science 1966 Graduate work at U of A Fairbanks, U of A Southeast, University of British Columbia

Experience: 1986 - present. Researcher, Auke Bay Laboratory, National Marine Fisheries Service, Juneau, Alaska. As co-principal investigator of NRDA study Subtidal 3, was responsible for field logistics and sample collection and assisted in data analysis and report preparation, also assisted other NRDA projects in field collections. In 1992 and 1993, participated in study design, field work, and proposal preparation for restoration Project R103 and 93036. Other areas of research have been habitat requirements of juvenile red king crab and sockeye salmon stock separation using parasites.

Relevant publications: Co-author of final reports for NRDA study Subtidal 3. Several public presentations of oil-related scientific research.

Responsibilities: Coordinate sample collection logistics and collect mussel samples; data analysis; report preparation; and preparation of science unit educational materials and reports.

Project/Leader Jeffrey W. Short NOAA/NMFS Auke Bay Laboratory 11305 Glacier Highway Juneau, Alaska 99801-8626 Phone: (907) 789-6065 FAX: (907) 789-6094 e-mail: jshort@abl.afsc.noaa.gov

Byran Morrie for

Bruce Wright NOAA Program Manager NMFS Office of Natural Resource Damage Assessment and Restoration 11305 Glacier Highway Juneau, Alaska 99801-8626 Phone: (907) 789-6601 FAX: (907) 789-6608 e-mail: bwright@abl.afsc.noaa.gov

April 30, 1995 Date prepared

## 1996 EXXON VALDEZ TRU: COUNCIL PROJECT BUDGET

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October 1, **1995 - September 30, 1996** 

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	Authonzed	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$56.0						
Travel		\$32.3						
		\$0.2						
		\$13.8					(CLIZO	
		\$0.0		LONG RA	ANGE FUNDIN	GREQUIREN	MENIS	
Subtotal	\$0.0	\$102.3	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$8.4	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$110.7	\$85.0	\$85.0	\$85.0	\$85.0		
Full-time Equivalents (FTE)	ļ	0.9						
		0.0	Dollar amount	s are shown ir	n thousands of	dollars.		
Other Resources	\$55.6	\$57.7	\$60.0	\$61.5	\$62.5	\$63.0	I	
NOAA Contribution includes: Prc Hal In FY95 and FY94, field collectiv Sound Aquaculture Association NOAA's ABL contributed substa Estimated at \$55.6K.	oject Leader and bitat Investigatic ons were partial ; in FY95 ABL k antial start up fu	I Senior Cherr on Program M Ily coordinated ogistics costs nding to this p	nist, J. Short, 6 lanager, J Rice d with Project 9 were funded th project in FY94	9 mo = \$46.8K 9, 1 mo = \$10.9 95090, Prince 95090 #95090 9 and FY95 ove	9K William Sound D. er and above fu	Science Cent unding receive	ter, and Prince ed under 95090	William D.

## **1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET** October 1, 1995 - September 30, 1996

Personnel Costs:		GS/Range/	Months	Monthly		Proposed	
ΡM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	P Harris	Zoologist	9/5	6.0	4,600		27.6
	L Holland	Chemist	11/6	4.0	5,800		23.2
*	Bruce Wright	NOAA Program Manager	12/5	0.8	6,500		5.2
	•						0.0
							0.0
							0.0
							0.0
							0.0
							0.0
	·						0.0
							0.0
		[		10.0	16.000		0.0
Tho	se costs associated with pro	Subiolal gram management should be indicated by	placement of a	10.8]	10,900	, U sonnel Total	\$56.0
Tra	vel Costs	gran management should be indicated by	Ticket	Bound	Total	Daily	Proposed
PM	Description		Price	Trips	Davs	Per Diem	FFY 1996
*	Anchorage, Workshop, 1		444	1	4	225	1.3
	Miscellaneou	S					0.1
1							0.0
	Cordova & PWS to collect n	nussels, 7 trips	352	7	28	159	6.9
	Car Rental, N	lisc.					1.6
1			1 1				0.0
	AirCharter to	PWS					0.0
		28 days @ \$800/d					22.4
							0.0
							0.0
							0.0
The	l	arem management should be indicated by	placement of a	l		Traval Tatal	0.0
	se cosis associated with pro	gram management should be indicated by	placement of a	11 . 		inaver iotal	<u> </u>
<u> </u>				·····			
		Project Number: 96195					-ORM 3B
	1996	Project Title: Pristane in Muscole a	and Eich Dradatora			F	Personnel
1	1000	Aganavi National Occopia & Atma		valuis			& Travel
		Agency: National Oceanic & Atmo	spheric Adr	inistration			DETAIL
L					1		

# 1996 EXXON VALDEZ TRUSCOUNCIL PROJECT BUDGETOctober 1, 1995 - September 30, 1996

Contractual Costs	s:	Proposed
Description		FFY 1996
Transportatior	n/Freight	0.2
NOAA consid	ars fixed wing aircraft charters as TRAVE!	
	ore inter wing anothic elasters as think the	
When a non-truste	e organization is used, the form (A) is required	\$0.2
Commodities Co	sts:	Proposed
Description	·	FFY 1996
Chemicals, so Chemistry lab	olvents for pristane analyses supplies (consummables, glassware, equipment repairs)	5.6 7.2
Collecting gea	ar and supplies (coolers, plastic bags, film, filed notebooks, etc.)	1.0
	Commodities Total	\$13.8
1996	Project Number: 96195 Project Title: Pristane in Mussels and Fish Predators Agency: National Oceanic & Atmospheric Administration	ORM 3B ntractual & mmodities DETAIL

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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

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	October 1, 1995 - September 30, 1996			
New Equipment Purchases:		Number	Unit	Proposed
Description		of Units	Price	FFY 1996
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
Those purchases associated wit	h replacement equipment should be indicated by placement of an R.	New Equ	ipment Total	\$0.0
Existing Equipment Usage:			Number	Inventory
Description			of Units	Agency
Camera			1	NOAA
Computer, Compaq			2	NOAA
NEC Monitor			1	NOAA
Hand held VHS Radio			1	NOAA
GPS Unit			1	NOAA
				j
[]				<u> </u>
	Project Number: 96195		F	ORM 3B
1996	Project Title: Pristane in Mussels and Fish Prodators		E E	quipment 丨
	Agonavi National Oceanic & Atmospheric Administration		[	DETAIL
	Agency. National Oceanic & Altrospheric Administration			
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#### Genetic Structure of Prince William Sound Pink Salmon

Project Number:	96196 (WAS 95370D)
Restoration Category:	Research and Monitoring
Proposer:	Alaska Department of Fish and Game
Lead Trustee Agency:	Alaska Department of Fish and Game
Cooperating Agencies: Wildlife	Washington Department of Fish and
Duration:	4 years
Cost FY 96:	178.5K
Cost FY 97:	178.5K
Cost FY 98:	130.0K
Geographic Area:	Prince William Sound
Injured Resource/Service:	Pink Salmon

#### ABSTRACT

Previous workers found that wild-stock pink salmon suffered both direct lethal and sublethal injuries as a result of the <u>Exxon Valdez</u> oil spill. An understanding of the population structure of pink salmon in Prince William Sound is essential to assess the impact of these injuries on a population basis and to devise and implement management strategies for restoration. This project is designed to delineate the genetic structure of populations of wild pink salmon inhabiting the Sound.

#### INTRODUCTION

In this continuing project we delineate the genetic structure of populations of wild pink salmon inhabiting Prince William Sound. We are testing for both temporal and geographical structuring among evenand odd-year races by examining genetic differences between early-and late-season spawners, upstream and intertidal spawners, and stream of spawning. This knowledge of genetic structure will be used in order to:

- A. Correctly interpret and apply the findings obtained from the proposed ecosystem analyses (96320 A-P) on a population basis.
- B. Provide genetic information needed for risk assessment and genetic monitoring of supplementation programs (e.g., proposed as a result of Trustee Council Projects R105, 95320 A-P, or 95093)

to guide population-specific restoration and enhancement.

C. Better direct harvest management decisions made for restoration purposes on a population-specific rather than species-specific basis. Our goal is to provide the basis for key management decisions by defining the genetic structure of representative populations from throughout PWS, measuring both within- and between-population diversity.

We propose to examine spawning populations from the even-year broodline and the odd-year broodline each for two years. Two years of analysis is needed in order to confirm stability of population structure across years.

To date the Trustee Council has funded collection of 18 odd- and 45 even-year putative populations for genetic analyses. A comprehensive suite of both nuclear (allozyme) and mitochondrial (mtDNA) markers is being screened. In 1994 we contracted with Washington Department of Fish and Wildlife to analyze 32 even-year and two odd-year collections using allozymes. The report on those results is pending. In 1995 we are continuing to collect and analyze samples; thus far we have analyzed seven odd-year populations for allozyme variation and eight even-year populations for restriction fragment length polymorphism of mtDNA. Preliminary results show significant differences between upstream and intertidal spawning populations within the same stream; we have also observed significant differences between west-Sound, east-Sound, and island populations.

#### NEED FOR THE PROJECT

#### A. Statement of Problem

Historically, wild stocks produced approximately five-hundred-million pink salmon (<u>Oncorhynchus gorbuscha</u>) fry which emerged from streams throughout Prince William Sound (PWS) each year to migrate seaward. Adult returns of wild pink salmon averaged from 10 to 15 million fish annually. Unlike returns of adult hatchery fish, these returning wild-stock adults play a critical role in the total Prince William Sound ecosystem: they convey essential nutrients and minerals from the marine ecosystem to estuaries, freshwater streams, and terrestrial ecosystems. Both juveniles and adults are important sources of food for many fishes, birds, and mammals. 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.

Wild-stock pink salmon suffered both direct lethal and sublethal injuries as a result of the <u>Exxon Valdez</u> oil spill (EVOS). Pink salmon embryos and alevins suffered increased mortality, diminished growth, and a high incidence of somatic cellular abnormalities as a result of spawning ground contamination and rearing in oiled areas. Elevated mortality of embryos in the oiled streams has continued through 1993, three generations after the oiling, suggesting that genetic damage may have occurred (see discussions in Sharr et al. 1993; Miller et al. 1994). Also, in 1989 the commercial harvest of pink salmon had to be shifted away from the hatchery and wild stocks in the oiled areas to target only the wild stocks in East Prince William Sound. This resulted in over-harvest and depletion of these stocks evidenced by general run failures of East Prince William Sound stocks of non-hatchery origin in 1991.

Prince William Sound is also the center of one of the State of Alaska's largest aquacultural industries. Alaska Department of Fish and Game has been grappling with management of the wild stocks in face of intractable hatchery/wild-stock interactions for nearly a decade. The EVOS-related damages to wild stocks, coupled with full-scale hatchery egg takes, has exacerbated wild-stock management concerns. The commercial fishing industry and the two aquaculture associations are facing serious financial challenges due to the alterations in management imposed resulting from declines in abundance of wild pink salmon.

#### B. Rationale

It is essential to manage and restore the damaged pink salmon resources on a population basis in order to conserve betweenpopulation diversity. While "stock" is used by biologists as a convenient term designating fish that spawn at a certain time at a certain place, stocks may not be genetically distinct from each other; also, a stock may be composed of multiple genetically divergent "Population" describes genetically distinct groups of fish groups. which are the building blocks of species. Gene flow is restricted between populations (thus carbon flow is restricted--see related proposals in Trustee Council project 96320), and this resulting between-population diversity is responsible for many aspects of the fitness of the species. In the case of commercially harvested species like pink salmon, fitness is defined to include the peak productivity and long-term sustainablity. Between-population diversity provides optimal production for species inhabiting diverse ecosystems such as PWS; highly diverse population mixes also provide a biological buffer to environmental change (droughts, floods, major earthquakes, and other routine events that occur in Alaskan ecosystems).

Understanding genetic structure of the wild stocks inhabiting PWS is critical to their management and conservation. For example, managing on too fine a scale may adversely affect the fishing industry and waste management resources, while managing on too large a scale may result in loss of genetic adaptations and diversity in the wild pink salmon populations within Prince William Sound. Knowledge gained through this project is needed to correctly interpret and apply the findings obtained from the proposed ecosystem analyses on a population basis, more properly define the population-level nature of the damage documented in previous study of EVOS damaged pink salmon, and otherwise guide the decision-making process in the management-oriented restoration of the EVOS-damaged pink salmon populations. The same knowledge of population structure will be used for genetic monitoring and risk assessment, required to evaluate any supplemental restoration programs (e.g., related work in projects such as Trustee Council Project 95093). This monitoring and risk assessment is analogous to the process currently being conducted to evaluate supplemental

restoration of damaged populations on the Columbia River by the Northwest Power Planning Council (Waples et al. 1991). Finally, the baseline information provided by this study will be essential for any future gene flow studies such as those proposed in Trustee Council project 95093.

Even- and odd-year classes may have independent population structures because of the rigid two-year life cycle of pink salmon. For example, climactic, tectonic or other such events (such as the 1964 earthquake or the 1989 oil spill) may affect the population structure of one year class, cycle through subsequent generations, and leave the alternate cycle of year-classes relatively unchanged. Therefore, we are examining the population structure of both even- and odd-year classes.

We are continuing to examine population structure by using both nuclear (using allozyme electrophoresis) and mitochondrial (mtDNA) approaches in this ongoing project. Both allozyme analysis and mtDNA analysis will be used to discriminate populations and describe population structure. Genetic studies using allozyme analysis have proven especially useful for the conservation and management of populations of pink salmon (e.g., Shaklee et al. 1991; White and Shaklee 1991); we are also expanding our pilot analysis using mtDNA analyses, as our preliminary data has shown potential usefulness for detecting geographic isolation.

Allozyme analysis remains the preferred approach for study of population genetics of salmonids because of its power to resolve populations of many species in the tetraploid-derived family by assaying many nuclear loci rapidly and at low cost (Allendorf 1994). Additional advantages of allozymes in this study include the fact that a pre-oilspill allozyme data set exists for comparison, and also many laboratories cooperate on inter-institutional examinations of pink salmon using allozymes, providing a support structure including a wealth of compatible data for comparison among Pacific rim populations (e.g., Beacham et al. 1985, 1988; Shaklee et al. 1991; White and Shaklee 1991; Shaklee and Varanskya 1994).

The utility of mtDNA approaches to diversity studies is controversial (especially for study of salmonids) for reasons such as high relative cost and slow relative throughput (Allendorf 1994; Smouse et al. 1994); additionally, sometimes mtDNA data reveal less diversity than that detected through allozymes because mtDNA loci are absolutely linked, cannot recombine, and are maternally inherited as a single locus (compare the lack of diversity observed for mtDNA in chum salmon in Park et al. (1993) with the abundance of allozyme diversity scored for similar populations in Winans et al. (1994)). However, adjacent pink salmon populations tend to be closely related (Shaklee and Varanskya 1994), and our FY 95 haplotype data indicate an east-westisland and upstream-intertidal separation of populations within Prince William Sound. We believe that the complementary use of the two techniques should provide optimal resolution of the population structure for this study.
### C. Summary of Major Hypotheses and Objectives

The major hypothesis of this study is that gene flow is restricted among temporal and spatial isolates within Prince William Sound. That restricted gene flow results in genetic structure; knowing that structure is important in order to conserve and restore the damaged populations.

Our primary objective is to identify the structure of pink salmon populations inhabiting Prince William Sound. We will investigate both temporal and spatial separation of populations. Temporal separation will be tested by investigation both odd- and even-year spawning aggregates and early- and late- spawning aggregates from the same streams. Spatial separation will be investigated by testing for genetic differences between upstream- and downstream-spawning adults within streams, stream to stream differentiation, and region to region differentiation.

#### D. Completion Date

September, 1998

#### COMMUNITY INVOLVEMENT

This project also has had strong support from the Prince William Sound Aquaculture Corporation and the Cordova fishing community since it was first drafted in 1991. Wherever possible, local-hire will be used to fill field positions required for sampling or for routine laboratory positions. People from the communities in PWS will have an opportunity to participate in this project as employees of the ADF&G which gives local residents priority in hiring for state employment.

The laboratory portion of the project is currently performed in Anchorage. It will be moved to the Alaska Sealife Center in Seward when that facility is available. Again, local hire will be used when possible, and ADFG plans to participate in all of the educational and outreach programs scheduled for the Center.

FY 96 BUDGET

Personnel	114.4				
Travel	4.0				
Contractual	17.2				
Commodities	24.5				
Equipment	0.0				
Subtotal	160.1				
Gen Admin.	18.4				
Total	178.5				

#### PROJECT DESIGN

#### A. Objectives

Our objective is to define the genetic structure of pink salmon stocks in the EVOS-affected area of Prince William Sound. We will test for:

- 1. genetic differences between upstream and intertidal pink salmon spawners within the same streams.
- 2. genetic differences between pink salmon spawners from different streams within Prince William Sound.
- 3. genetic differences between pink salmon spawners from different regions within Prince William Sound.
- 4. genetic differences between pink salmon spawners with different run timings within the same streams.
- 5. genetic differences between odd- and even-year pink salmon spawners.
- 6. inheritance of untested putative allozyme alleles.

### B. Methods

1. Field Sampling

### Physiography of Prince William Sound

Tissues for baseline genetic data will be collected from up to 100 individuals from each of 30 spawning aggregations of each year class. Pink salmon have a two-year life cycle. Even and odd-year pink salmon are genetically distinct (Beacham et al. 1988), so both must be sampled.

At the recommendation of a peer reviewer, sampling will be based on the physiography of Prince William Sound and will include areas uplifted and areas unaffected by the 1964 earthquake (Figure 1). Sampling locations will incorporate a broad geographical distribution within the Sound (Table 1) including three hatcheries (Valdez Arm, Cannery Creek and Armin F. Koernig) and 27 spawning aggregates from wild-stock streams.

Sampling will be designed to include both early and late stocks and inter-tidal and upstream-spawning stocks. Because abundance of pink salmon varies annually, selection of spawning aggregations will be determined by field personnel who will be instructed to sample streams that maximize the ability to investigate temporal (between years and within years) and spatial (between streams and within streams) comparisons. Tissue samples from heart, liver, muscle, and aqueous humor from each individual will be immediately frozen on liquid nitrogen and returned to Anchorage for storage at  $-80^{\circ}$  C.

### 2. Laboratory Analysis

### <u>Allozymes</u>

Genetic data will be collected using the techniques of allozyme electrophoresis on all samples (Utter et al. 1987; Seeb et al. 1987). A pre-oilspill data base of allozyme frequencies from 12 loci exists for Prince William Sound pink salmon (Seeb and Wishard 1977) which facilitates analyses of potential changes of population structure and gene flow. An extensive allozyme screening was undertaken by Washington Department of Fish and Wildlife (WDFW), subcontractor on this project in 1994, to maximize the potential number of available gene markers for examination in this project. The 72 loci resolved (Table 2) are greater in number than those examined in any previous study (Beacham et al. 1988; Shaklee et al. 1991; Shaklee and Varanskya 1994).

Allozyme techniques will follow those of Harris and Hopkinson (1976), May et al. (1979), and Aebersold et al. (1987); nomenclature will follow the American Fisheries Society standard (Shaklee et al. 1990). Gels will be scored using on-line scoring programs developed by the ADFG and WDFW Genetics Laboratories. Both data collection and management systems provide extensive documentation of results and error checking capabilities; and both facilitate rapid collation, analysis, and reporting of genetic data in order to ensure rapid turnaround, complete documentation, and immediate availability of summary statistics. A photographic record of each gel will be made.

A Windows based application (Microsoft Windows 3.1) developed by ADFG Genetics Laboratory will be used to calculate allele frequency estimates, to test for conformation of genotype frequencies to Hardy-Weinberg expected frequencies using likelihood ratios, and calculate Nei's (1978) genetic distance and Cavalli-Sforza and Edwards (1967) genetic distance. This application will also be used to perform hierarchical analyses using G-Statistics (modified from Weir 1992) to determine if significant population substructuring exists among Prince William Sound pink salmon based on the following criteria: even versus odd-year, upstream versus intertidal spawning location, early versus late run, and geographic location of spawning.

We will estimate genetic relationships by deriving a neighborjoining tree (Saitou and Nei 1987) with Cavalli-Sforza and Edwards (1967) genetic distance and a UPGMA tree (Sneath and Sokal 1973) with Nei's (1978) genetic distance. RESTSITE (Nei and Miller 1990) and BIOSYS-1 (Swofford and Selander 1981) will be used to calculate the neighbor-joining and UPGMA trees, respectively. The stability of these trees will be tested using Lanyon's jackknife (Lanyon 1985).

Finally, all allozyme data will be merged into the state and federal inter-agency databases maintained by NMFS, ADFG, and WDFW.

### Mitochondrial DNA

A pilot study using mtDNA analyses was conducted on a subset of samples in 1994. Those results and additional analysis in 1995 are promising, showing heterogeneity between eastern and western and island PWS populations for haplotype variation detected at the NADH5/6 region. Some, but not all comparisons, show heterogeneity between upstream and intertidal spawners as well. Scope of analysis of mtDNA will be increased to include an examination of 40 individuals each from a subset of the 30 stocks analyzed for allozyme variation.

DNA will be extracted using Puregene DNA isolation kits for animal tissues (Gentra Systems, Inc. P.O. Box 13159, Research 27709-13159). This process includes: Triangle, N.C. (1) a buffered solution that protects the DNA from degradation; (2) a Proteinase K digest to deactivate the proteins; (3) an RNase treatment to digest RNA; (4) protein precipitation to remove Proteinase K, RNase, and denatured proteins; (5) isopropanol to precipitate the DNA; (6) 70% ethanol to wash the DNA; and finally (7) a hydration solution to rehydrate the DNA. After extraction, the DNA will be amplified using the polymerase chain reaction (PCR; Saiki et al. 1988; Kocher et al. 1989; Amplified DNA Chapman and Brown 1990; Carr and Marshall 1991). will be cut with the seven restriction enzymes found to detect haplotype polymorphisms (of the 30 screened in 1994; Table 3) and electrophoresed on agarose gels. Fragments will be visualized under UV light, and a photographic record will be made of each gel.

Since genes which are encoded by the mitochondrial genome are inherited as a single unit (i.e., analogous to linked loci), the restriction sites detected for each enzyme, for all regions examined, will be pooled as composite haplotypes. The frequencies and distributions of these composite haplotypes will then be used to examine the structure of salmon populations.

Nucleotide ( $\underline{d}$ ) and haplotype ( $\underline{h}$ ) diversity measures (Nei 1987) will also be calculated for all populations using the restriction enzyme analysis package (<u>REAP</u>) of McElroy et al. (1992). These measures estimate the number of nucleotide substitutions per site between DNA sequences (i.e., sequence divergence) and the amount of DNA polymorphism within populations, respectively. These values will then be used to calculate an overall genetic distance (Nei 1978) between populations, which in turn, will be used to generate a branching diagram using the Fitch and Margoliash (1967) least-squares algorithm in the <u>PHYLIP</u> (Felsenstein 1993) package. This dendrogram will depict relationships among the populations.

#### Experimental Matings

In addition to collecting allozyme data from field collections, we will do experimental matings to verify the genetic basis of isozyme variation for putative allelic polymorphisms that have not been tested in pink salmon. In the 1994 examination of even-year collections, the subcontractor identified numerous isozyme polymorphisms that were previously undescribed (Table 4). The recently tetraploid salmonids often express an abundance of isozymes from the duplicated loci, and new alleles can initially be difficult to score (cf., Marsden et al. 1987). Difficulty can arise in distinguishing among cryptic variation, single-locus variation from isolocus pairs, and phenotypic variation with a non-genetic basis. The genetic basis and state of duplication for these newly-found polymorphisms must be confirmed before they are incorporated into population structure analyses (e.g., see May et al. 1975; Seeb and Seeb 1986).

The best method to confirm the genetic basis of such polymorphisms is though inheritance studies. We will screen 50 males and 50 females from the Armin F. Koernig Hatchery to identify those individuals expressing polymorphism for the isozymes listed in Table 4. Tissues and gametes will be collected at the hatchery and flown to Anchorage. Allozyme analysis will be conducted on the same day, and single-pair matings will be done producing one or more families segregating for each of the polymorphisms. Families will be raised at the ADFG Genetics Laboratory in Anchorage until electrophoresis can be performed on the appropriate tissues. Inheritance will be determined by scoring phenotypes of the progeny and performing a goodness-of-fit test to Mendelian values expected from both duplicated and non-duplicated loci. Scores for polymorphisms with confirmed genetics basis will be incorporated into the data base for further analyses (above). Joint segregation, if observed, will be reported as a courtesy to the scientific community (cf., May et al. 1982).

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Table 1. Tributaries and hatcheries in Prince William Sound targeted for sampling of odd-year class. Samples were collected opportunistically from 16 spawning aggregates in 1991. The early, late, upstream, and intertidal aggregations to be sampled in 1996 will be chosen from those listed and will depend on abundance of spawning adults. Physiogeographic characteristics and approximate sampling dates for collecting early and late runs are included. Map #'s correspond to numbered locations on Figure 1. Tectonic change is the vertical shift (in meters) resulting from the 1964 earthquake (derived from Plafker and Mayo 1965; isobase map).

Location		Physic charact	Physiographic characteristics				
 Map #	Name	Tidal/Upstrea m	Tectonic change	1991	1995		
 1	Rocky	Both	+2.4 to $+3.0$		8/23		
2	Wilby	Tidal	+3.0	8/30			
3	Hayden	Tidal	+3.0	8/18			
4	AFK	Hatchery	+2.4	9/02			
5	Erb	Both	+0.6	8/04*	7/24		
				9/05*	8/24		
6	Mink	Both	-0.6	7/28*	7/25		
					8/25		
7	Swanson	Tidal	-1.2 to -1.8	8/06	7/26		
					8/26		
8	Cannery	Hatchery	0.0	9/12			
9	Long	Tidal	0.0		8/15		
10	VFDA	Hatchery	0.0	8/08			
				8/20			
11	Duck	Tidal	+0.6 to +1.2	8/20			
12	Lagoon	Both	+.2	8/02*	7/27		

Le	ocation	Physiog characte	Year			
Map #	Name	Tidal/Upstrea m	Tectonic change	1991	1995	
	•				8/27	
13	Olsen	Both	+0.6 to +1.2	7/21*	7/28	
					8/28	
14	Koppen	Both	+1.2 to +1.8	9/06*	7/29	
				8/03**	8/29	
15	Humpback	Tidal	+1.8 to +2.4	7/25		
				8/31		
16	Hartney	Tidal	+1.2 to +1.8	7/31		
17	Constantin e	Both	+1.8	8/24*	8/01	
					9/01	

\* Tidal samples only\*\* Upstream samples only.

Table 2. Enzymes or proteins to be analyzed for genetic variation. Enzyme nomenclature follows Shaklee et al. (1990), and locus abbreviations are given. Information provided by Washington Department of Fisheries, stewards of the Washington/British Columbia/Alaska interagency database for pink salmon population genetics.

Enzyme or Protein	Enzyme Number	Locus	Tissue
Aspartate aminotransferase	2.6.1.1	<u>saat-1,2</u>	Heart
		<u>saat-3</u>	Eye
		SAAT-4	Liver
		<u>mAAT-1</u>	Heart
		<u>mAAT-2</u>	Muscle
Adenosine deaminase	3.5.4.4	<u>ADA-1</u>	Muscle
		<u>ADA-2</u>	Heart
Aconitate hydratase	4.2.1.3	<u>mAH-1</u>	Heart
		<u>mAH-2</u>	Heart
		<u>mAH-3</u>	Muscle
		<u>mAH-4</u>	Muscle
		<u>sah</u>	Liver
Adenylate kinase	2.7.4.3	<u>AK</u>	Muscle
Alanine <sup>(</sup> ) aminotransferase	2.6.1.2	ALAT	Muscle
Creatine kinase	2.7.3.2	<u>CK-A1</u>	Muscle
		<u>CK-A2</u>	Muscle
		<u>CK-B</u>	Eye
		<u>CK-C1</u>	Eye
		<u>CK-C2</u>	Eye
Esterase-D	3.1.1	<u>ESTD</u>	Muscle
Fumarate hydratase	4.2.1.2	<u>FH</u>	Muscle
B-N- Acetylgalactosaminidase	3.2.53	<u>BGALA</u>	Muscle
Glyceraldehyde-3- phosphate dehydrogenase	1.2.1.12	<u>GAPDH-2</u>	Heart

Enzyme or Protein	Enzyme Number	Locus Tissu			
		GAPDH-4	Eye		
		<u>GAPDH-5</u>	Eye		
Guanine deaminase	3.5.4.3	<u>GDA-1</u>	Liver		
N-Acetyl-B- glucosaminidase	3.2.1.53	<u>BGLUA</u>	Liver		
Glycerol-3-phosphate dehydrogenase	1.1.1.8	<u>G3PDH-1</u>	Muscle		
		<u>G3PDH-2</u>	Heart		
		G3PDH-3	Heart		
Glucose-6-phosphate isomerase	5.3.19	<u>GPI-B1,2</u>	Muscle		
		<u>GPI-B2</u>	Heart		
		<u>GPI-A</u>	Muscle		
Glutathione reductase	1.6.4.2	GR	Heart		
Hydroxyacylglutathione hydrolase	3.1.2.6	<u>HAGH</u>	Heart		
L-Iditol dehydrogenase	1.1.1.14	IDDH-1	Liver		
Isocitrate dehydrogenase (NADP+)	1.1.1.42	mIDHP-1	Muscle		
		mIDHP-2	Heart		
		sIDHP-1	Liver		
		sIDHP-2	Liver		
L-Lactate dehydrogenase	1.1.1.27	LDH-A1	Muscle		
		LDH-A2	Muscle		
		LDH-B1	Eye		
		LDH-B2	Liver		
		LDH-C	Eye		
Lactoylġlutathione lyase	4.4.1.5	LGL	Muscle		
αMannosidase	3.2.1.24	<u>aman</u>	Heart		
Malate dehydrogenase	1.1.1.37	<u>sMDH-</u> A1,2	Heart		

Enzyme or Protein	Enzyme Number	Locus	Tissue
		<u>sMDH-</u> <u>B1,2</u>	Heart
		mMDH-1	Heart
		mMDH-2,3	Heart
Malic enzyme (NADP+)	1.1.1.40	mMEP-1	Muscle
		<u>mMEP-2</u>	Muscle
Mannose-6-phosphate isomerase	5.3.1.8	MPI	Heart
Dipeptidase	3.4	<u>PEPA</u>	Eye
Tripeptide aminopeptidase	3.4	<u> PEPB-1</u>	Heart
Proline dipeptiase	3.4.13.9	<u>PEPD-1,2</u>	Heart
Peptidase-LT	3.4	PEPLT	Muscle
Phosphogluconate dehydrogenase	1.1.1.44	PGDH	Muscle
Phosphoglucomutase	5.4.2.2	PGM-2	Heart
Superoxide dismutase	1.15.1.1	<u>sSOD-1</u>	Heart
		sSOD-2	Heart
		mSOD	Heart
Triose-phosphate	5.3.1.1	<u>TPI-1</u>	Еуе
100m01 400		ጥ <b>Ρ</b> Τ-2	Eve
			Бус
		<u>TP1-3</u>	гуе
		<u>TPI-4</u>	Еуе

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ŕ • • Table 3. Restriction enzymes that were used to screen for RFLP markers in mtDNA during Trustee Council Project 94320D. Approximately 100 each of even- and odd-year-class pink salmon from Prince William Sound were initially analyzed. Asterisk indicates enzymes that revealed polymorphism, and these seven will be assayed in 40 individuals each from even-year and odd-year populations for Trustee Council Project 96320D.

1994 Restriction Enzyme Screen	Recognition Site
Apa I *	GGGCC'C
Ase I	ATTAAT
Ava II *	C ' YCGRG
BamH I	G'GATCC
BCl I	T 'GATCA
Bgl I	<b>GGCNNNN ' NGGC</b>
Bgl II	A 'GATCT
BstE II	G'GTNACC
BstUI *	CG ' CG
Dpn II	'GATC
ECOR I	G'AATTC
ECOR V *	GAT ' ATC
Hae III	GG ' CC
Hha I *	GCG ' C
Hind III	A 'AGCTT
Hinf I *	G'ANTC
Kpn I	GGTAC'C
Mse I	T'TAA
Msp I	C'CGG
Nci I	CC ' SGG
Pst I	CTGCA'G
RsaI	GT'AC
Sac I	GAGCT ' C
Sac II	CCGC 'GG
Sau96 I	G'GNCC
Sca I	AGT ' ACT
Stu I	AGG ' CCT
Taq I	T ' CGA
Xba I *	T ' CTAGA
Xho I	C'TCGAG

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Table 4. Putative alleles that will be progeny tested in 1995-1997. Tissue-buffer combinations are those identified by Washington Department of Fish and Wildlife that optimally resolve phenotypes. Alleles expressed as relative mobility to common allele. Buffers: LIOH-R (Ridgway et al. 1970; "UC Davis recipe"); TRIS-MAL7.4 (Shaw and Prasad 1970); TRIS-GLY (Holmes and Masters 1970); TC-4 (Schaal and Anderson 1970, buffer "a"); CAM(E)(N)6.1 and 6.3 (Clayton and Tretiak 1972, (E) = with EDTA, (N) = with NADP). Alleles in BOLD are alleles found in our 1994 analysis of even year pink salmon in PWS that were previously undescribed in pink salmon. Only those previously undescribed alleles associated with loci that have not been subjected to inheritance studies are included.

				Allel es							
Locus	1	2	3	4	5	6	7	8	9	Tissue s	Buffers
<u>saat-3</u>	<u>100*</u>	<u>91*</u>	<u>79*</u>							E	LION-R
ACP-1	_ 100*	-340*								H	TRIS-MAL7.4
ACR	<u>100*</u>	<u>80*</u>	<u>113*</u>							H,M	TRIS-GLY
<u>AK</u>	 100*	-145*								М	TRIS-GLY
<u>FH</u>	100*	<u>136*</u>								м	TC-4
<b>bGALA</b>	<u>100*</u>	<u>111*</u>	<u>91*</u>	<u>105*</u>						M	TRIS-GLY
GDA	<u>100*</u>	<u>108*</u>	<u>113*</u>	<u>113*</u>	<u>118*</u>	<u>115*</u>	<u>123*</u>	82*	<u>110*</u>	L,M	TRIS-GLY
	<u>100*</u>	<u>130*</u>	<u>155*</u>	<u>100*</u>	<u>189*</u>	<u>167*</u>	222*	<u>93*</u>	<u>106*</u>	L,M	CAM(E)6.8
<b>bGLUA</b>	100*	200*								L	CAMEN6.8

				Allel es							
Locus	1	2	3	4	5	6	7	8	9	Tissue s	Buffers
<u>GAPDH-2</u>	100*	127*	<u>87*</u>			*****				M	CAM6.1
G3PDH-2	<u>100*</u>	<u>120*</u>	90*							Н	CAMEN6.8
G3PDH-3	<u>100*</u>	90*								Н	CAMEN6.8
IDDH	100*	134*								L	LION-R
LGL	100*	80*								М,Н	TRIS-GLY
aMAN	<u>100*</u>	85*								н	TRIS-GLY
<u>mMDH-2,3</u>	<u>100*</u>	228*								Н,М	CAME(N)6.8
NTP	<u>100*</u>	<u>53*</u>	130*							M,L	CAME6.8
mSOD	<u>100*</u>	145*	<u>14*</u>	185*	118*	<u>69*</u>				Н	TC-4
sSOD-2	<u>100*</u>	<u>122*</u>								Н	CAM6.1

Figure 1. Locations for sampling odd-year pink salmon in Prince William Sound and isobases indicating vertical shift (in feet) resulting from the 1964 earthquake. Numbers on map correspond to Map # on Table 1.



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**.**:

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### C. Contracts and Other Agency Assistance

Because of the 1994 State of Alaska hiring freeze, Alaska Department of Fish and Game Genetics Laboratory subcontracted the allozyme portion of Project 94320D to Washington Department of Fish and Wildlife as the best-qualified bidder identified through the state procurement process. The soundness of this decision was confirmed through the peer review of Project 95320 by independent consultants to the Chief Scientist of the Trustee Council.

However, the cost of the subcontract to WDFW in 1994 exceeded the total amount awarded by the Trustees to the ADFG Genetics Lab. This cost increase was due to many factors including: (1) elevated costs of performing the work outside of ADFG, (2) accommodation of Project 94320D to peer-review recommendations for increased analysis of stocks in southwestern PWS to test outbreeding-depression hypothesis (to explain embryo mortalities observed in results of Trustee Council Project 94191), and (3) a decision to add additional loci to the locus screen made by the principal investigator (JES) as a result of negotiations with the subcontractor. ADFG handled the resulting budget problem internally in FY 94 by appropriately supplementing the subcontract with funds from Trustee Council Project 94191 and by postponing some of the ADFG mtDNA analyses until FY 95.

These contractual shortfalls were ameliorated in the budget for FY 95. That budget included a subcontract for continued work by WDFW for the analyses of 2000 samples of odd-year origin. The provision for this contract-extension was included in the terms of the 1994 award to WDFW.

At this writing, it is our intent to contract the allozyme portion of project 95320 to Washington Department of Fish and Wildlife. However, they are unable to commit to this or future contracts until they perform an internal program review.

Budgets for FY 96 and beyond reflect costs for analysis of allozyme samples in Anchorage or Seward at ADFG facilities.

### D. Location

The field portion of this project will be conducted in Prince William Sound (based out of Cordova, Alaska); part of the allozyme analyses may be performed by WDFW in Olympia, Washington; and the remaining allozyme analysis, the mtDNA analysis, experimental matings and fish culture, and data analyses will be completed in Anchorage, Alaska. The laboratory and fish-rearing portions of the project will be moved to the Alaska Sealife Center in Seward when that facility is available.

### SCHEDULE

### A. Measurable Project Tasks for FY 96

Start-up - March:	Collaboration with WDFW on FY 95 allozyme analysis
Start-up - September:	In-house allozyme analysis of archive samples collected prior to 1995; mtDNA analysis
July - September:	Field collections of 1996 samples
September - April 1977:	Numerical analysis of laboratory data
April 1977:	Final report of FY 96 results

#### B. Project Milestones and Endpoints

May 30, 1995:	Contractor's report for allozyme screen of 1994 samples
December 30, 1995:	Complete mtDNA screen of population samples collected during 1994
April 30, 1996:	Complete evaluation of population structure of populations collected during 1994-1995
December 30, 1996:	Complete screen of population samples collected during 1995
April 30, 1997:	Evaluation of population structure of Prince William Sound and other related populations collected through 1996; planning for mop-up sample collection for spawning aggregates missed in previous years
December 30, 1997:	Complete screen of population samples collected 1996
September 30, 1998:	Complete evaluation of stability of population structure across years
C. Project Reports	3
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April 30,	1996:	Final report	for	FΥ	95	ın	the	iorm	OÍ	manuscript
		submitted to	joui	rna]	1					
April 30,	1997:	Final report	for	FY	96					
September	30, 1998:	Final project submitted to	rep jou	port rna]	t in l	n tl	ne fo	orm of	E ma	anuscript

#### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Previous assessments of egg and fry survival in oiled and unoiled streams demonstrated detrimental effects of EVOS on pink salmon (Natural Resources Damage Assessment Fish/Shellfish Study # 2 <u>Injury</u> to <u>Salmon Eggs and Preemergent Fry</u> and EVOS Trustee Council Projects R60C, 93003, and 94191 <u>Oil Related Egg and Alevin Mortalities</u>). The heritable, genetic nature of the damage was revealed in matings performed as a part of Project 93003. In response to those findings, coded-wire tag recoveries from pink salmon in PWS (e.g., Natural Resources Damage Assessment Fish/Shellfish Study # 3 and Projects R60A and 93067) were used to reduce the fishing effort on wild pink salmon "populations" through fisheries management. Yet the actual genetic structure of pink salmon populations in Prince William Sound remains unknown.

Therefore, Trustee Council Project 96320-D was designed to provide a genetic basis for the hatchery/wild-stock components of Project 96320 <u>Prince William Sound Ecosystem Investigation</u> and to provide the information essential for population-specific management through such projects as 94184 Coded-Wire-Tag <u>Recoveries from Pink Salmon in Prince William Sound Fisheries</u> and others that may be proposed as a consequence of 96320.

Also, sampling for 96320D will be done in coordination with other restoration programs in order to reduce costs and facilitate

cross-referencing of biological data. For example, some suitable samples were collected as a part other studies including Trustee Council Projects R60C and 94191, and 95191. Sampling for 1996 will be integrated between Trustee Council Project 96191 and this project.

#### ENVIRONMENTAL COMPLIANCE

The studies proposed provide for data collection and field sampling programs. No environmental effect of these programs occurs beyond that of traditional fisheries management data collection activities. These activities are within existing collecting permits or Federal special use permits issued to the Department of Fish and Game for scientific data collection. No other permits or other coordination activities are involved. This project received a categorical exclusion under the National Environmental Policies Act.

#### PERSONNEL

A. James E. Seeb, Principal Geneticist Commercial Fisheries Management and Development Alaska Department of Fish and Game Anchorage, Alaska 99518 (907) 267-2385

PROJECT RESPONSIBILITIES: Design, analysis, reporting

EDUCATION: B.S., Biology, 1974, University of Puget Sound M.S., Fisheries, 1982, University of Washington Ph.D., Fisheries, 1987, University of Washington

### **PROFESSIONAL EXPERIENCE:**

1990- Principal Geneticist, CFMD Division, ADF&G 1991- Affiliate Associate Professor, U. of Alaska, Fairbanks 1988-1990 Assistant Professor, Southern Illinois University 1987-1988 Research Assistant Professor, University of Idaho 1982-1986 Graduate Research Assistant, University of Washington 1980-1982 Fish Biologist, Pacific Fisheries Research, Olympia,WA 1978-1980 Fish Biologist, Washington Department of Fisheries

### SELECTED PUBLICATIONS:

- Seeb, J. E., L. W. Seeb, and F. M. Utter. 1986. Use of genetic marks to assess stock dynamics and management programs for chum salmon. Trans. Amer. Fish. Soc. 115:448-454.
- Seeb, J. E., and L. W. Seeb. 1986. Gene mapping of isozyme loci in chum salmon (<u>Oncorhynchus keta</u>). J. Hered. 77:399-402.
- Seeb, J. E., L. W. Seeb, D. W. Oates, and F. M. Utter. 1987. Genetic variation and postglacial dispersal of populations of northern pike (<u>Esox lucius</u>) in North America. Can. J. Fish. Aquat. Sci. 44:556-561.

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- Utter, F. M., J. E. Seeb, and L. W. Seeb. 1993. Complementary uses of ecological and biochemical genetic data in identifying and conserving salmon populations. Fisheries Research. Fish. Res. 18:59-76.
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**B.** Lisa W. Seeb (L. Wishard), Statewide Geneticist Division of Commercial Fisheries Management and Development Alaska Dept. of Fish and Game Anchorage, Alaska 99518 (907) 267-2249

PROJECT RESPONSIBILITIES: Biometrics, analysis, reporting

EDUCATION:

A.B. Zoology, 1973, University of California, Berkeley M.A. Zoology, 1977, University of Montana Ph.D. Fisheries, 1986, University of Washington

**PROFESSIONAL EXPERIENCE:** 

1991- Statewide Geneticist, ADF&G, Anchorage 1991- Affiliate Associate Professor, U. of Alaska, Fairbanks 1988-1990 Assistant Professor, Southern Illinois University 1984-1988 Research Assist. Prof., University of Idaho 1978-1981 Fish Geneticist, Pacific Fish. Research, Olympia WA 1977-1979 Geneticist, National Marine Fisheries Service, Seattle

#### SELECTED PUBLICATIONS:

- Wishard, L. N., J. E. Seeb, F. M. Utter, and D. Stefan. 1984. A genetic investigation of suspected redband trout populations. Copeia 1984(1):120-132.
- Seeb, J. E., L. W. Seeb, and F. M. Utter, 1986. Use of genetic marks to assess stock dynamics and management programs for chum salmon. Trans. Amer. Fish. Soc. 115:448-454

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- Crane, P. A., L. W. Seeb, and J. E. Seeb. 1994. Genetic relationships among <u>Salvelinus</u> species inferred from allozyme data. Can. J. Fish. Aquat. Sci. 51(Suppl. 1):182-197.

C. Christopher Habicht, Fisheries Biologist II Commercial Fisheries Management and Development Alaska Department of Fish and Game Anchorage, Alaska 99518 (907) 267-2385

PROJECT RESPONSIBILITIES: Supervision of experimental matings, laboratory analysis, coordination of laboratory and field efforts

EDUCATION:

B.S., 1986, Fisheries Science, Cornell University, Ithaca NY M.S., 1994, Zoology, Southern Illinois University, Carbondale IL

#### **PROFESSIONAL EXPERIENCE:**

- 1992- Fisheries Biologist, C.F.M.D. Division, ADFG Supervising laboratory analysis of genetic markers for EVOS Trustee Council study 93012 (Genetic Stock Identification of Kenai River Sockeye Salmon). Conducting laboratory evaluations of genetically altered salmonids. Analyzing straying data from pink salmon and chinook salmon tag recoveries.
- 1989-1992 Graduate Assistant, Southern Illinois University Conducted allozyme species identification, developed <u>in</u> <u>vivo</u> ova storage techniques, and optimized triploid induction and gynogenesis protocols for moronids.
- 1986-1989 Research Associate, Ohio State University Provided field and laboratory support for aquatic ecology studies on bioenergetics of essocids.

#### PUBLICATIONS AND PRESENTATIONS:

- Habicht, C. 1993. Electrophoretic Identification of <u>Morone</u> species, and <u>In Vivo</u> ova storage, induced gynogenesis, and induced triploidy in white bass (M. chrysops). Masters Thesis, Southern Illinois University, Carbondale IL.
- Seeb, L. W., J. E. Seeb, C. Habicht. 1993. Population genetic analyses facilitate restoration of sockeye salmon stocks damaged by the <u>Exxon Valdez</u> oil spill. Presented at National Chapter American Fisheries Society, Portland, OR.
- Habicht, C. 1994. Gene conservation of triploids in the management of salmonids. Presented at North American Fish and Wildlife Conference, Anchorage, AK.
- Habicht, C., J. E. Seeb, R. B. Gates, I. R. Brock, and C. A. Olito. 1994. Triploid salmon outperform diploid and triploid hybrids between coho salmon and chinook salmon during their first year. Can. J. Fish. Aquat. Sci. 51(Suppl. 1):31-37.

James E. Seeb Alaska Department of Fish and Game 333 Raspberry Road Anchorage, Alaska 99518 907-267-2385 (Phone) 907-349-2231 (Fax) JSEEB%FISHGAME@STATE.AK.US

h.R. Sallein

Joséph Sullivan Alaska Department of Fish and Game 333 Raspberry Road Anchorage, Alaska 99518 907-267-2385 (Phone) 907-349-2231 (Fax) JOES&FISHGAME@STATE.AK.US

Date prepared

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# 1996 EXXON VALDEZ TRUSIEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

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	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$45.9						
Travel		\$1.8						
Contractual		\$3.5						
Commodities		\$13.0						
Equipment		\$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	\$0.0	\$64.2	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		<b>\$7.</b> 1	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$71.3	\$178.5	\$130.0				
Full-time Equivalents (FTE)		1.1						
			Dollar amount	s are shown in	thousands of o	dollars.		
Other Resources					l		<u> </u>	1
1996	Project Num Project Title:	ber: 96196 Pink Salmo	n Genetics					FORM 3A AGENCY PROJECT
Prepared: 1 of 4					<del></del>			DETAIL 8/8/95

# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

PM       Name       Position Description       Step       Budgeted       Costs       Overtime       FFY 1996         Eric Kretchmer       FBI       14A       4.0       3,700       14.8         FWT II (2 positions)       9B       8.0       3,100       24.8         Moore       FBIII (PCN 7021)       18L       1.0       6,333       0.0         0.0       0.0       0.0       0.0       0.0       0.0	Personnel Costs:		GS/Range/	Months	Monthly		Proposed	
Eric Kretchmer       FBI FWT II (2 positions)       14A       4.0       3,700       14.8         *       Moore       FWT II (2 positions)       9B       8.0       3,100       0.0         *       Moore       FBIII (PCN 7021)       18L       1.0       6,333       6.3         0.0       0.0       0.0       0.0       0.0       0.0	PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
FWT II (2 positions)       9B       8.0       3,100       24.8       0.0		Eric Kretchmer	FBI	14A	4.0	3,700		14.8
* Moore FBIII (PCN 7021) 18L 1.0 6,333 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1		FWT II (2 positions)	9B	8.0	3,100		24.8
*       Moore       FBIII (PCN 7021)       18L       1.0       6,333       0.0	ł.							0.0
* Moore FBIII (PCN 7021) 18L 1.0 6,333 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1							0.0
*       Moore       FBIII (PCN 7021)       18L       1.0       6,333       6.3         0.0								0.0
	*	Moore	FBIII (PCN 7021)	18L	1.0	6,333		6.3
								0.0
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Subtotal 13.0 13,133 0			Subtotal		13.0	13,133	<u>, 0</u>	
Those costs associated with program management should be indicated by placement of an *. Personnel Total \$45.9	Tho	se costs associated with progr	am management should be indicated by place	ment of an *.		F	Personnel Total	\$45.9
Travel Costs: Ticket Round Total Daily Proposed	Trav	Travel Costs:			Round	Total	Daily	Proposed
PM Description Price Trips Days Per Diem FFY 1996	PM Description			Price	Trips	Days	Per Diem	FFY 1996
1 Round trip Anchorage to Juneau 444 1 0.4	1 Round trip Anchorage to Juneau			444	1			0.4
2 Round trip Anchorage-Cordova 224 2 0.4	2 Round trip Anchorage-Cordova			224	2			0.4
2 Round trip Anchorage-Cordova (advance purchase) 70 2 0.1		2 Round trip Anchorage-Cord	ova (advance purchase)	70	2			0.1
Per Diem 6 150 0.9	Per Diem					6	150	0.9
1 Scientific meeting 0.0	1 Scientific meeting							0.0
0.0	1							0.0
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0.0			:					0.0
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				*	<u> </u>		Travel Tetal	0.0
Those costs associated with program management should be indicated by placement of an ". Travel Total 31.8	Those costs associated with program management should be indicated by placement of an *.					Travel Total	\$1.0	
	Project Number: 96196				r			
FORM 3B								FORM 3B
Project Number: 96196 Personnel	1996 Project Number: 96196 Project Title: Pink Salmon Genetics Agency: AK Dept. of Fish & Game							Personnel
Project Title: Pink Salmon Genetics							& Travel	
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8/8/95

# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

Contractual Costs:		Proposed
Description		
Aircraft charter		0.5
Lab equipment	maintenance	1.0
Truck rental		0.0
Photographic d	eveloping	0.3
Communicatio	ns-phone	0.4
Freight		0.3
Liquid nitrogen	/dry ice	1.0
When a non-trustee	organization is used, the form 4A is required. Contractual Tot	al \$3.5
<b>Commodities</b> Costs		Proposed
Description		FFY 1996
Field sampling	supplies, cryovials	1.0
Office supplies		0.0
Misc. lab supp	ies	3.0
Biochemicals		9.0
		1.
1		
	Commodities Tota	<b>I</b> \$13.0
		FORM 3B
	Project Number: 96196	ontractual &
1996	Project Title: Pink Salmon Genetics	`ommodition
	Agency: AK Dept. of Fish & Game	
		DETAIL

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# 1996 EXXON VALDEZ TRU----- COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

New Equipment Pu	chases:	Number	Unit	Proposed
Description		of Units	Price	FFY 1996
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
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				0.0
				0.0
				0.0
				0.0
Those purchases as	sociated with replacement equipment should be indicated by placement of an B	Now E	auïnment Total	0.0
Existing Equipment	lisage:		Number	
Description	Usage.		of Units	Agency
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			;	
[				
	Project Number: 96196			FORM 3B
1006			F	auinment
1990	Project litie: Pink Salmon Genetics			DETAIL
	Agency: AK Dept. of Fish & Game			
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8/8/95

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April 26, 1995

Exxon Valdez Oil Spill Trustee Council 645 G. Street, Suite 401 Anchorage, AK 99501



EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL

# **REF: LETTER OF INTENT**

To whom it may concern,

The City of Port Lions would like to apply for funds for projects within Port Lions. I am sorry for being so late in getting this into you, however I was just made aware of the possibility of funds being available from your organization a couple of days ago. I called your office yesterday and asked for an application packet to be sent so that it can be filled out and returned as soon as possible.

The following is a brief description of three projects that we are considering for this funding:

1. PUBLIC SAFTEY BUIDING/EMERGENCY OPERATIONS CENTER

96201

This project is currently on the City's Capital Improvement List. The City of Port Lions currently does not have adequate space for it's Department of Public Safety, which includes the Village Public Safety Officer (VPSO), Fire Department, Emergency Medical Services, Search and Rescue, and Emergency Management. At the present time the different components of this department are split up and located in different buildings throughout the village. The plan calls for the construction of a new building capable of housing the fire engine and ambulance with space for the VPSO office, training/conference room, holding facility, and VPSO housing. The Kodiak Island Borough has agreed to provide the land for this building. The land is located above the high water mark and is across the street from Port Lions School which has been designated as the evacuation shelter and Emergency Operations Center. The proposed Public Safety Building would also serve as a permanent Emergency Operations Center in the event of a natural or man-made disaster, such as a Tsunami or oil spill. A permament communications system with telephones, fax machine, and VHF radios would be installed in the VPSO's office. A back up generator would also be incorporated into the plan, either contained in the building or by moving one of the power companies smaller backup generators to the site so that power could be supplied to the Public Safety Building and the School. Since the VPSO is the designated Emergency Management Coordinator, all emergency operations would be coordinated out of the Public Safety Building along with all of the functions of the Department of Public Safety.

The estimated cost for construction of this facility is \$800,000.00. A copy of the CIP narrative is attached to this letter.

# 2. COMMUNITY HALL

96202

96253

The City of Port Lions had planned for and received funding for a new Community Hall prior to Exxon Valdez Oil Spill. However, due to the spill no man power was available for construction of this project and the funding was lost. We are currently asking for a reappropriation from the legislature to transfer funds from the Harbor Water Main grant to the Community Hall. We are asking that \$175,000.00 be reappropriated and we would be asking for matching funds from the Council in the amount of approx. \$150,000.00.

# 3. WASTE OIL/GARBAGE COLLECTION SYSTEM FOR BOAT HARBOR

The City of Port Lions currently has a waste oil heater for the Harbor Master Building. However we do not have adequate facilities to collect waste oil from vessels using our harbor facilities. We would like to set up a waste oil tank with a pumping system so that the oil could be transfered to the waste oil burner system. As part of this project we would also like to put in a new garbage collection system for the harbor, currently garbage is collected in fish totes and is collected on a weekly basis. These fish totes are placed on the ground and there is no protection from vermin or birds. We would like to install a new garbage collection and recycling station for the harbor, along with a vehicle to remove the waste from the harbor and take it to the landfill. This project would prevent the indiscriminate dumping of waste oil and refuse into the harbor and water ways. This project is estimated at approx. \$150,000.00.

These are the projects I am currently looking at for this application, after I receive the application packet a decision would be made by the Port Lions City Council on what project(s) would be applied for according to the rules of the application process.

Thank you for your time and attention in this matter, if you have any questions or comments, please feel free to contact me.

Sincerely,

Robert Himes Deputy Mayor

attachment

CC: file

# CITY OF PORT LIONS CAPITAL IMPROVEMENT PROGRAM FY 1996 - FY 2000

## PROJECT NO, 3 NARRATIVE

## **COMMUNITY HALL BUILDING**

The City of Port Lions operates the major programs for the entire community at the Community Hall which is located on Lot 5, Block 8, of the Port Lions Subdivision. This large city lot, zoned Public Lands, is located in the center of the community and is used by the public year round.

The Port Lions Community Hall was the very first building constructed in Port Lions after the 1964 earthquake and tidal wave, and has been the focal point of the community for years. The building first housed and fed the volunteers and Afognak Village people who began to build Port Lions after the 1964 destruction of Afognak Village. The Hall was used to feed those workers who constructed the original housing and water and sewer systems for the new town. The Hall was then used as the school and teachers quarters until an elementary school was constructed. Over the years the Community Hall has been used for a variety of community programs and functions. For three (3) years the Kodiak Island Borough School District rented the facility for their athletic programs, until the Port Lions High School was constructed.

Currently the Port Lions Community Hall is used by the Port Lions City Council for public meetings, the Village Public Safety Officer for his office, the Senior Citizens for their senior meals and functions, the Library for fund raising functions, and by the entire community for village gatherings.

The building which was constructed in 1964, has been remodeled many times in the last 29 years, and there are very few improvements that can be done to the existing structure at this time to make it safe and functional. The building has a number of code violations which cannot be corrected unless the building is stripped down to the frame. The foundation has begun to seriously rot and the building is "sinking". This facility is at the end of its normal life.

The Community Hall building will provide a safe and functional Community Building for all user groups. The cost of this project was estimated based on the existing "Jobs Bill" Grant #7/88-672 which was to provide funding for a new site developed on Lot 2A, Block 10. In 1988 materials were purchased under this Jobs Bill Grant. If not utilized in the near future these materials will no longer be adequate for the construction of a new Community Hall Building.

The estimated cost of this project is \$400,000.00.

# CITY OF PORT LIONS CAPITAL IMPROVEMENT PROGRAM FY 1996 - FY 2000

# PROJECT NO, 5 NARRATIVE

## PUBLIC SAFETY BUILDING

The City of Port Lions has found that there is no longer proper facilities available in the community for the Village Public Safety Officer (VPSO) program. The city has identified the need for a Public Safety Building which will include the Port Lions Department of Public Safety, VPSO office, VPSO living quarters, adequate holding facility, conference/meeting space for training, and equipment and apparatus storage for the fire engine, ambulance and other Public Safety related equipment.

The basis for the design of this new facility shall be the Bayside and Women's Bay Fire Departments constructed by the Kodiak Island Borough.

The Port Lions City Council has estimated the cost of this new facility to be \$800,000.00.

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# KODIAK SUBSISTENCE RESOURCE RESTORATION PLANNING

Project Number:	96204
<b>Restoration Category:</b>	General Restoration
Proposer:	Alaska Department of Fish and Game
Lead Trustee Agency:	Alaska Department of Fish and Game
<b>Cooperating Agencies:</b>	None
Duration:	One year
Cost FY 96:	39.4
Cost FY 97:	0
Cost FY 98:	0
Cost FY 99:	0
Cost FY 00:	0
Cost FY 01:	0
Cost FY 02:	0
Geographic Area:	Kodiak Island
Injured Resource/Service:	Subsistence

# ABSTRACT

The project would implement a more intensive subsistence resource restoration planning effort in Kodiak Island Borough communities as a follow-up to Projects 94428 and 95428 (Subsistence Restoration Planning). The goal would be to develop a coordinated set of resource restoration proposals for consideration in the FY 97 work plan. Methods will include several workshops and a series of community meetings.

# INTRODUCTION

In FY 94 and FY 95, the Trustee Council funded Projects 94428 and 95428, Subsistence Restoration Planning, as a means to assist communities in the oil spill region to develop subsistence restoration project proposals and to develop a better understanding of and become more involved in the restoration process. In the Prince William Sound and lower Cook Inlet areas, two rounds of community meetings took place, as well as a Chugach Region-wide workshop. As a consequence, a range of project proposals was submitted for consideration in both the FY 95 and FY 96 work plans. Involvement by Kodiak Island Borough communities in this planning effort was more limited. Two workshops took place in which representatives from each of the seven borough communities met in Kodiak to review the restoration process and generate some preliminary ideas for project proposals. Because these communities had not been as involved in the restoration process as the Chugach Region communities, project ideas which came up at the work shops were less developed and a great deal of basic information about the restoration process needed to be covered. Also, while the regional workshop format proved useful in beginning discussions about restoration needs, representatives had had little opportunity to get feedback from their communities. In addition, most of the project ideas which came up at the workshops involved resource enhancement proposals, such as enhancing salmon runs or clam beds. Developing proposals for these projects required more technical expertise and time than was available to the subsistence restoration planning team. It is also necessary that these proposal ideas be developed through the assistance of the ADF&G Salmon Regional Planning Team. This project would provide funding to continue and expand subsistence resource restoration planing efforts in the Kodiak Island Borough communities with the goal to develop detailed project proposals for the FY 97 planning and funding cycle.

### **NEED FOR THE PROJECT**

#### A. Statement of Problem

In the year after the Exxon Valdez oil spill, subsistence harvest levels in Kodiak Island Borough communities dropped from 9 to 77 percent compared to prespill averages. Although by 1993, subsistence harvests had rebounded in most of these communities, harvest levels in some, such as Ouzinkie, remained below pre-spill averages. Also, a substantial shift in harvest composition had occurred, with a larger portion of the harvest composed of fish, and a corresponding decline in harvests of marine mammals. Also, suspicions remained among some borough residents about the long term implications of the spill on human health and on subsistence resources. In order to identify potential projects to restore subsistence uses and resources, the Trustee Council funded a Subsistence Restoration Planning Project (94428 and 95428) in FY 94 and FY 95. Representatives of Kodiak Island Borough communities participated in two workshops to come up with project ideas. Much of the time at these workshops was spent reviewing the restoration process, with which most community representatives were unfamiliar. Although a start was made at identifying subsistence resource restoration needs, most of the project ideas concerned salmon or other resource enhancement (such as clams), which require a great deal of technical assistance to develop into viable proposals. The Department of Fish and Game has established a Regional Planing Team to develop comprehensive salmon enhancement plans, largely focusing on commercial fisheries needs and objectives. A need

exists to link these planing efforts and to more fully involve Kodiak Island subsistence users at the community level.

# B. Rationale

Strategies for restoring injured subsistence uses include restoring injured subsistence resources, enhancing or replacing subsistence resources, facilitating the participation of subsistence users in the restoration process, and restoring injured resources used for subsistence. The project directly addresses these strategies by directly involving Kodiak area residents in the restoration process with the goal to develop resource restoration project proposals.

# C. Summary of Major Hypotheses and Objectives

Project objectives include:

- 1. A borough-wide workshop in October 1995, during which community and regional organizations representatives meet with Trustee Council and ADF&G Regional Planning Team staff to review the status of subsistence restoration effort on Kodiak, review the findings of the 1995 Kodiak Shoreline Assessment Survey, and the goals and objectives of salmon enhancement efforts in the Kodiak Island Area.
- 2. A series of community meetings (seven; one in each community) to review workshop findings and develop project proposals.
- 3. A second regional workshop during which the project proposals are reviewed prior to submission to the Trustee Council for consideration for FY 97 funding.

# **D.** Completion Date

All meetings and workshops would be completed by approximately early April 1996 in order to prepare project proposals for consideration in the FY 97 Work plan.

# COMMUNITY INVOLVEMENT

The specific goal of the project would be to improve community involvement in the restoration process.

# FY 96 BUDGET

Personnel	21.6
Travel	12.8
Contractual	1.5
Commodities	0.2
Equipment	<u>0.0</u>
Subtotal	36.1

Gen.	Administration	<u>3.3</u>		
	Total	39.4		

# **PROJECT DESIGN**

### A. Objectives

- 1. A borough-wide workshop in October 1995, during which community and regional organizations representatives meet with Trustee Council and ADF&G Regional Planning Team staff to review the status of subsistence restoration effort on Kodiak, review the findings of the 1995 Kodiak Shoreline Assessment Survey, and the goals and objectives of salmon enhancement efforts in the Kodiak Island Area.
- 2. A series of community meetings (seven; one in each community) to review workshop findings and develop project proposals.
- 3. A second regional workshop during which the project proposals are reviewed prior to submission to the Trustee Council for consideration for FY 97 funding.

### B. Methods

Methods include two workshops and a series of community meetings. The Division of Subsistence would organize and facilitate these workshops and meetings. Attendance by members of the ADF&G Regional Planning Team at the workshops and community meetings would be funded through this project. The Planning Team would provide technical assistance to the communities in developing project proposals.

### C. Contracts and Other Agency Assistance

No contracts are anticipated. Participation in the planning process will be requested of each Borough community, the Kodiak Island Borough Planning Department, the Kodiak Area Aquaculture Association, and the ADF&G Regional Planning Team.

### D. Location

Kodiak Island Borough

### SCHEDULE

# A. Measurable Project Tasks for FY 96

Start-up to October 15	Plan first workshop
Late October	Hold first workshop
November-December 1995	Hold community meetings(seven)
January 1996	Plan second workshop

Late January or FebruaryHold second workshopMay 1996Submit project proposals for Trustee Council consideration

# **B. Project Milestones and Endpoints**

First regional workshop:	October 1995
Community meetings:	November - December 1995
Second regional workshop	January or February 1996
Submission of project Proposals	May 1996
Final report	September 1996

### C. Project Reports

A final report will be prepared by September 1996.

# COORDINATION AND INTERGRATION OF RESTORATION EFFORT

Because this is a planing project, every effort will be made to coordinate the development of project ideas and proposals with other planning and restoring efforts.

# ENVIRONMENTAL COMPLIANCE

### PERSONNEL

Jim Fall: Dr. Fall is the regional program namager for the Division of Subsistence, Alaska Department of Fish and Game, for southcentral and southwest Alaska. He has held this position since 1981. Since 1989, he has supervised the division's oil spill response and research program. Also, he has served as the department's representative on the Oil Spill Health Task Force. Dr. Fall has written several articles and reports on the effects of the oil spill on subsistence activities and harvest, based upon division research.

Craig Mishler: Dr. Mishler has been a Subsistence Resource Specialist with the Division of Subsitence since 1989, with primary responsibility for Kodiak Island. He organized and conducted the division's subsistence resourced collection and testing program in the Kodiak Island area in 1990 and has participated in Oil Spill Health Task Force informational meetings there in 1989 and 1992.

Vicki Vanek: Ms. Vanek is a Fish and Wildlife technician III with the Division of Subsistence and has extensive experience in conducting subsistence research in Kodiak Island communities.

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Proposed Project Leader: Dr/Jim Fall Subsistence Division Alaska Department of Fish and Game 333 Raspberry Road Anchorage, Alaska 99518 phone number: 267-2359 fax number: 349-4712

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Proposed Project Manager: Dr. Joseph R. Sullivan Habitat & Restoration Division Alaska Department of Fish and Game phone number: 267-2213 fax number: 522-3148

Date Prepared

October 1, 1995 - September 30, 1996

	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$21.6						
Travel		\$12.8						
Contractual		\$1.5						
Commodities		\$0.2						
Equipment		\$0.0		LONG I	RANGE FUNDIN	IG REQUIREME	NTS	
Subtotal	\$0.0	\$36.1	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$3.3	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$39.4	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Full-time Equivalents (FTE)		0.4						
			Dollar amount	s are shown in	thousands of c	tollars.		
Other Resources								
			<b>,</b>					
<b>1996</b> Prepared: James Fall 1 of 4	Project Numl Project Title: Agency: AK	per: 96204 Kodiak Sub Dept. of Fis	osistence Res sh & Game	ource Restor	ration Plannin	ıg		FORM 3A AGENCY PROJECT DETAIL 5/2/95

October 1, 1995 - September 30, 1996

onnel Costs:		GS/Range/	Months	Monthly	T	Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
C. Mishler	Subsistence Resource Specialist III	18C	1.5	5,203		7.8
V. Vanek	Fish and Wildlife Technican III	11D	3.0	3,760		11.3
Vacant	Fisheries Biologist III	18C	0.5	5,047		2.5
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Subtotal 5.0 14,010 0						
Those costs associated with program management should be indicated by place				Pe	ersonnel Total	\$21.6
el Costs:		Ticket	Round	Total	Daily	Proposed
Description		Price	Trips	Days	Per Diem	FFY 1996
Anchorage - Kodiak	176	5	8	150	2.1	
Kodiak - Ouzinkie		60	. 6	4	150	1.0
Kodiak - Port Lions		60	6	4	150	1.0
Kodiak - Larsen Bay		100	6	4	150	1.2
Kodiak - Karluk		150	6	4	150	1.5
Kodiak - Old Harbor		120	6	4	150	1.3
Kodiak - Akhiok			6	4	150	1.4
Juneau - Kodiak			2	5	150	1./
Kodiak - Anchorage (worksho	ps attendance)	176	2	8	150	1.6
						0.0
						0.0
L	om management should be indicated by place			L	Trough Total	0.0
se cosis associated with progr	ant management should be indicated by place	ement of an .			riavei rotai	712.0
	onnel Costs: Name C. Mishler V. Vanek Vacant Se costs associated with progr rel Costs: Description Anchorage - Kodiak Kodiak - Ouzinkie Kodiak - Ouzinkie Kodiak - Port Lions Kodiak - Larsen Bay Kodiak - Karluk Kodiak - Karluk Kodiak - Old Harbor Kodiak - Akhiok Juneau - Kodiak Kodiak - Anchorage (worksho	onnel Costs:       Position Description         C. Mishler       Subsistence Resource Specialist III         V. Vanek       Fish and Wildlife Technican III         Vacant       Fisheries Biologist III         Subtota       Subtota         se costs associated with program management should be indicated by plac         rel Costs:       Description         Anchorage - Kodiak       Kodiak - Quzinkie         Kodiak - Ouzinkie       Kodiak         Kodiak - Karluk       Kodiak - Cold Harbor         Kodiak - Akhiok       Juneau - Kodiak         Kodiak - Anchorage (workshops attendance)       se costs associated with program management should be indicated by place	onnel Costs:       GS/Range/ Step         Name       Position Description       Step         C. Mishler       Subsistence Resource Specialist III       18C         V. Vanek       Fish and Wildlife Technican III       11D         Vacant       Fisheries Biologist III       18C         Vacant       Fisheries Biologist III       18C         Subtotal       Subtotal       18C         se costs associated with program management should be indicated by placement of an *.       Ticket         Perception       Price       Price         Anchorage - Kodiak       176       60         Kodiak - Ouzinkie       60       60         Kodiak - Ouzinkie       60       100         Kodiak - Ouzinkie       100       120         Kodiak - Arshuk       150       120         Kodiak - Akhiok       140       140         Juneau - Kodiak       487       487         Kodiak - Anchorage (workshops attendance)       176         se costs associated with program management should be indicated by placement of an *.       176	Onnel Costs:         GS/Range/ Name         Months Budgeted           Name         Position Description         Step         Budgeted           C. Mishler         Subsistence Resource Specialist III         18C         1.5           V. Vanek         Fish and Wildlife Technican III         11D         3.0           Vacant         Fisheries Biologist III         18C         0.5           Subtotal         Subtotal         5.0         5.0           se costs associated with program management should be indicated by placement of an *.         5.0           Percentry         Ticket         Round           Description         Price         Trips           Anchorage - Kodiak         176         5           Kodiak - Ouzinkie         60         6           Kodiak - Cuzinkie         60         6           Kodiak - Cuzinkie         120         6           Kodiak - Cuzinkie         120         6           Kodiak - Karluk         150         6           Kodiak - Akhok         140         6           Juneau - Kodiak         176         2           Kodiak - Anchorage (workshops attendance)         176         2           se costs associated with program management should be indicated by placem	Onnel Costs:         Position Description         GS/Range/ Step         Monthly Budgeted         Monthly Costs           C. Mishler         Subsistence Resource Specialist III         18C         1.5         5,203           V. Vanek         Fish and Wildlife Technican III         11D         3.0         3,760           Vacant         Fisheries Biologist III         18C         0.5         5,047           secosts associated with program management should be indicated by placement of an *         Price         Trips         David           Anchorage - Kodiak         176         5         8         60         6           Kodiak - Port Lions         60         6         4         100         6         4           Kodiak - Akriok         120         6         4         467         2         5           scosts associated with program management should be indicated by placement of an *         Price         Trips         Days	Onnel Costs:         Position Description         GS/Range/ Step         Months Budgeted         Monthly Costs         Overtime           C. Mishler         Subsistence Resource Specialist III         18C         1.5         5,203         Overtime           V. Vanek         Fish and Wildlife Technican III         11D         3.0         3,760           Vacant         Fisheries Biologist III         18C         0.5         5,047           Secosts associated with program management should be indicated by placement of an *         Personnel Total         Daily           Description         Price         Trips         Days         Per Diem,           Anchorage - Kodiak         176         5         8         150           Kodiak - Ouzinkie         60         6         4         150           Kodiak - Araluk         150         6         4         150           Kodiak - Araluk         150         6         4         150           Kodiak - Anchorage (workshops attendance)         120         6         4         150           Kodiak - Anchorage (workshops attendance)         176         2         8         150           Kodiak - Anchorage (workshops attendance)         176         2         8         150

1996		Project Number: 96204 Project Title: Kodiak Subsistence Resource Restoration Planning Agency: AK Dept. of Fish & Game	FORM 3B Personnel & Travel DETAIL
	2 of 4		1/95

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#### 1996 EXXON VALDEZ TRUS. \_\_\_ JOUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

			<u> </u>
Contractual Costs:			Proposed
Description			FFY 1996
Phones			1.0
Copying			0.5
When a non-trustee organization	is used, the form 4A is required.	Contractual Total	\$1.5
Commodities Costs:		· · · · · · · · · · · · · · · · · · ·	Proposed
Description			FFT 1990
Misc. Office supplies			0.2
	· · · · · · · · · · · · · · · · · · ·		
		Commodities Total	\$0.2
[]			ORM 3B
	Project Number: 96204		
1996	Project Title: Kodiak Subsistence Resource Restoration Planning		
	Ageney, AK Dest, of Eich & Come	Co	mmodifies
	Agency: AN Dept. of Fish & Game		DETAIL
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3 of 4			5/2/95

October 1, 1995 - September 30, 1996

New E	quipment Pu	rchases:	· · · · · · · · · · · · · · · · · · ·	Number	Unit	Proposed
Descrip	otion			of Units	Price	FFY 1996
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
<u> </u>						0.0
Those	purchases a	ssociated with	replacement equipment should be indicated by placement of an R.	New E	quipment lotal	\$0.0
Existing	g Equipment	Usage:			Number	Inventory
Descrip	ption				of Units	Agency
			Project Number: 96204		1	
1	996		Project Title: Kodiak Subsistence Resource Restoration Plannir	na	E	quipment
•			Agency: AK Dent of Fish & Game			DETAIL
			Agency. All Dept. of Fish & Dame			
L		4 of 4		·		5/2/95

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# Eyak Subsistence Recovery Camp Planning Project Submitted to the EVOS Trustee Council

Project Number: 96205

Project Category: General Restoration

Proposer: Native Village of Eyak

Lead Trustee Agency: National Park Service

Cooperating Agency:

Duration: 1 year

Geographic Area: Cordova

Injured Service: Subsistence Services

#### Abstract

The Native Village of Eyak proposes a planning project to establish a Subsistence Recovery Camp for Alaska Native subsistence users affected by the Exxon Valdez oil spill. As identified by Picou and Gill (1992), Post-traumatic Stress Syndrome is directly linked to the environmental damage done by the oil spill and the subsistence way of life that Alaska Native people have used for thousands of years. With the results of the oil spill still being felt by the communities through lack of or reduced abundance of specific species (i.e. harbor seal, herring, herring spawns) there has been an upsurge of addictive behaviors exhibited in the oil spill impacted communities. As in the case of harbor seal the research scientist have asked for a voluntary reduced harvest. This may be warranted from the scientific view point, but is extremely frustrating to the subsistence user and increases the emotional and psychological trauma that they have experienced.

### Introduction

Fish and marine mammals were not the only species to be injured by the Exxon Valdez oil spill. "We would like to elevate the status of the people in Prince William Sound to the level of sea otters and seal. We know that elevating them to the level of killer whales would be asking too much." Such statements are being voiced in our communities as an example of the frustration harbored over the effects of the oil spill affected ecosystem.

# **NEED FOR THE PROJECT**

# A. Statement of Problem

The Exxon Valdez oil spill created problems for every species living in the Prince William Sound ecosystem. Alaskan Natives have experienced numerous losses throughout many generations. Each loss experienced exacerbates previous losses. The oil spill triggered many addictive behaviors and expanded Post Traumatic Stress Disorder. Native people have always had an inextricable tie to land and water which can only be described as a "living relationship." This relationship has been severed and manifested in an increase in alcohol and drug abuse. The time for healing has come. A place for healing is needed. The Traditional Healing and Recovery Camp would uplift our traditional ways of being and help us put this man-made spill into proper perspective.

# B. Rationale

Planning for the Eyak Subsistence Recovery Camp is the first step to conducting necessary group activities aimed at combating substance abuse caused by the Exxon Valdez oil spill. In an effort "to efficiently restore the environment injured by the Exxon Valdez oil spill to a healthy, productive world renowned ecosystem, while taking into account the quality of life and the need for viable opportunities to establish and sustain a reasonable standard of living," the Trustee Council must begin to look at the integral part local lives play in this ecosystem.

Local residents have found poor tasting seal meat, declining crab and nonexistent herring in the years that have followed the spill. There is little trust in the environment to provide a reasonable quality of human life. These losses has left communities physically, spiritually and emotionally defeated. Such problems have manifest themselves in destructive and harmful ways within the communities.

Local residents personally felt the injury of other species. There is a human relationship to the environment that must be addressed. The Exxon Valdez oil spill violated the bond between humans and the environment, a connection that is paramount to subsistence activities.

There must be a holistic approach to ecosystem recovery. By this, local residents must be enlisted for support in current projects, and assisted in their recovery process.

# C. Summary of Major Hypothesis and Objectives

The Eyak Subsistence Recovery Camp study is designed to test traditional healing practices of post-traumatic stress disorder and its symptomatic addictive behaviors. The Native Village of Eyak believes that this is an effective means to bring the entire ecosystem back into natural order and to instill respect for natural resources in their recovering state.

# **D.** Completion Date

The planning process for creating the Eyak Subsistence Recovery Camp would take one year, so the planning would be completed by the summer of 1996.

# **COMMUNITY INVOLVEMENT**

We envision extensive collaboration with numerous elders, traditional healers, agencies, and professionals involved in the healing sciences. The philosophy of the Eyak Subsistence Recovery Camp is both interactive and interdisciplinary. The primary therapeutic method would involve all aspects of the community: residents of the camp will serve the village as a way to begin the healing process in themselves. The residents will undertake the care of the elders, education of the youth, organization of the Sobriety Celebration and Potlatch, development of traditional dance and song groups, the building of a talking circle lodge and a sweat lodge. In return, the village of Eyak will be responsible for the fiscal and philosophical development and planning of the camp.

# FY 96 BUDGET

Personnel	\$26,800
Travel	\$ 8,600
Contractual	\$ 2,000
Commodities	\$ 500
Equipment	\$ 300
Subtotal	\$38,200
Indirect	\$ 2,600
Total	\$40,800

# **PROJECT DESIGN**

### A. Objectives

An in depth analysis of the oil spill effects on local residents in the first step in reaching the human recovery stage. In an effort to deal with the personal struggles that have resulted both by the oil spill and the restoration process the following objectives have been identified:

- 1. Bring the community of Eyak and any other surrounding communities together that are interested in communicating the their personal obstacles to recovery.
- 2. Research and develop traditional healing techniques.
- 3. Set out a plan to work with the existing environment, involved research agencies and organizations and current restoration activities.

4. Produce a final study and report.

# B. Methods

The Native Village of Eyak will conduct a study on the effects and solutions to the human consequences of the Exxon Valdez oil spill. This will be completed through community interaction, consultation with traditional healing centers and practical information on the operation of treatment facilities.

The community of Eyak, Cordova and any other outlying areas will come together to discuss and brainstorm problems and solutions to the current emotional state that the oil spill has put affected communities.

The tribal worker will travel to various traditional healing camps and centers both in Alaska and in Washington state. From this, a basis for effective recovery and be planned out. In addition, professional treatment center personnel will address the Native Village of Eyak's tribal council to address the operation of treatment facilities and camps.

A report will be written in conclusion of the activities and information gathered. Both the tribal worker and the project coordinator will be responsible for its completion.

# C. Contracts and other Agency Assistance

Various agencies and organizations are actively involved in the emotional recovery of oil spill impacted communities. Such organizations include: Sound Alternatives in Cordova, Alaska Native Health Board, Howard Luke Recovery Camp in Fairbanks, the Native American Children of Alcoholics in Seattle and Middleton/Moz & Associates. In addition, Dr. Picou from the University of Alabama is conducting research on the psychological impact of natural resources on the community of Cordova.

### D. Location

Mile fifteen of the Copper River Highway on an Eyak land holding.

# **SCHEDULE**

# A. Measurable Project Tasks for FY 96

October 1- October 15, 1995:	Begin coordination of community meeting
November 15 - 19, 1995:	Hold community healing and brainstorming session
November 23 - 30, 1995:	Compile conclusions from community meeting
December 1-15, 1995:	Contact various treatment centers for information
January 15 - February 28, 1996:	Travel to various treatment centers
March 1 - 15, 1996:	Compile information on treatment center visits

March 21 - 24, 1996:	Treatment center professional meets with tribal
	council
April 1 - May 1, 1996:	Draft report is written
May 7 - 15, 1996:	Draft report goes out for review
June 1 - July 1, 1996	Final report is written
July 15 - 21, 1996:	Tribal Council accepts report
August 1 - 7, 1996:	Council forwards report to Trustee Council
September 1 - 30, 1996:	Eyak begins report implementation process

#### **B.** Project Milestones and Endpoints

November 19, 1995:	Community meeting held
February 28, 1996:	Various treatment centers visited
March 24, 1996:	Treatment center professional meets with Tribal
	Council
May 1, 1996:	Draft report written
July 1, 1996:	Final report written
August 7, 1996	Report forwarded to Trustee Council

# C. Project Reports

All Trustee Council reporting requirements will be complied with. In addition, a final report will be completed by the end of the award period.

# **COORDINATION AND INTEGRATION OF RESTORATION EFFORT**

The Eyak Subsistence Recovery Camp Planning Project will complement the current community involvement activities, as well as the work that the Principal Investigators are beginning within the local communities.

### ENVIRONMENTAL COMPLIANCE

The Native Village of Eyak will comply with any and all environmental regulations.

### PERSONNEL

Robert Henrichs, Chief of the Native Village of Eyak, will oversee and administration of the project. He will be ultimately responsible for all fiscal and reporting requirements associated with an awarded grant.

Steve Donaldson, Drug and Alcohol Counselor in Cordova, will serve as the tribal worker that will assist in the coordination of activities associated with the project.

Harold Napoleon of the Alaska Federation of Natives will serve as a project consultant.

Mark Potvin, MSW, has worked with the community of Cordova as an alcohol counselor. He is currently a Ph.D. candidate and is expected to participate in the planning and reporting process.

Jane Middleton/Moz, Ph.D and Anna Latimer, MS from the Seattle area are noted academics and authors in traditional Native healing practices. They will serve as consultants to the project.

Bob Henrich

Bob Henrichs, Chief and Project Coordinator Native Village of Eyak Tribal Council P.O. Box 1388 Cordova, AK 99574 Phone: (907) 424-7738 Fax: (907) 424-7739

Jane

Don Callaway National Park Service 2525 Gambell Anchorage, AK 99503 Phone: (907) 257-2646 Fax: (907) 257-2410

Date submitted

October 1, 1995 - September 30, 1996

	Authorized	Proposed							
Budget Category:	FFY 1995	FFY 1996							
		.,							
Personnel		\$26.8							
Travel		\$8.6							
Contractual		\$2.0							
Commodities		\$0.5							
Equipment		\$0.3	LONG RANGE FUNDING REQUIREMENTS						
Subtotal	\$0.0	\$38.2	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	
Indirect		\$2.6	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002	
Project Total	\$0.0	\$40.8							
Full-time Equivalents (FTE)		0.8							
	Dollar amounts are shown in thousands of dollars.								
Other Resources		\$4.1			<u>.</u>				
Comments									
Personnel costs include .33 FTE	E @ \$35,500 =	\$11,715 for a	a Project Coor	dinator and .5	FTE @ \$24,3	88 = \$12,194	for a Tribal W	orker.	
	<b>–</b>		·		-				
Travel costs include various air	fare and per d	em to tradition	nal substance	abuse centers	<b>b</b> .				
Contractual costs include neces operation.	sary audit ser	vices and a pr	ofessional pre	sentation befo	ore the Eyak T	ribał Council o	n treatment ce	enter	
Commodities include printing co	osts, paper, pe	ns and genera	al offices supp	lies necessary	for conducting	g the study.			
Equipment costs include copier	rental.								
Indirect costs include utilities, te	elephone and p	ostage.							
						<u></u>	(	······································	
	Project Nur	nhor 91	505				5		
1006	Droject Tul								
1990	Project Inte	e: Eyak Sul	osistence R	ecovery Cal	mp				
	Name: The	e Native Vill	age of Eyak	Tribal Cou	ncil			DETAIL	
Prepared			·····		<u></u>	·····	] [		

October 1, 1995 - September 30, 1996

Personnel Costs:			Months	Monthly		Proposed
Name	Position Description		Budgeted	Costs	Overtime	FFY 1996
Project Coordinator	Supervises feasibility study objectives.		12.0	1		11.7
	Coordinates fiscal and narrative					0.0
	reporting.					0.0
						0.0
Tribal Worker	Coordinates objectives identified in the		12.0	1		12.2
	proposal.					0.0
						0.0
						0.0
						0.0
	Subtotal		24.0	2		0.0
				Per	sonnel Total	\$23.9
Travel Costs:		Ticket	Round	Total	Daily	Proposed
Description		Price	Trips	Days	Per Diem	FFY 1996
Cordova to Sitka		596	1	4	125	1.1
						0.0
Cordova to Shageluk		526	1	5	202	1.5
	۲					0.0
Cordova to Seattle		912	1	9	140	2.2
		004				0.0
Cordova to Anchorage		224	4	8	145	2.1
Ancherano to Cordova		224	e	2	160	0.0
Anchorage to Coldova		224	0	2	103	
	1997				Travel Total	\$8.6
	۵٬۰۰٬ ۲۰٬۰٬۰٬٬٬۰٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬٬					
						ORM 4B
1000	Project Number:				F	Personnel
1996	Project Title: Eyak Subsistence Re	ecovery Car	np			& Travel
	Name The Native Village of Eyak	Tribal Cour	ncil			
	_ ,			1	1	

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October 1, 1995 - September 30, 1996

<b>Contractual Cos</b>	ts:		Proposed
Description			FFY 1996
\$1,000 for this gr	ant's portion of a single audit.		1.0
\$1,000 for profes	sional drug and alcohol treatment center presentation (s).		1.0
	Cont	ractual Total	\$2.0
Commodities Co	)SIS:		Proposed
Description			FF1 1990
Printing costs for	study reports.		0.2
Paper, pens and	general office supplies necessary to complete the project.		0.3
	Comme	odities Total	\$0.5
r			
	Project Number:		
1996	Project Title Evak Subsistence Recovery Camp		
	Name. The Native Village of Evak Tribal Council		ninounies
<u> </u>			

October 1, 1995 - September 30, 1996

New Equipment Purcha	ises:	Number	Unit	Proposed
Description		of Units	Price	FFY 1996
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
Those purchases associa	ated with replacement equipment should be indicated by placement of an R.	New Equ	ipment Total	\$0.0
Existing Equipment Usag	je:		Number	
Description			of Units	
I his cost covers the proje	ect's use of copier equipment @ \$22 per month.		1	
			Г <sup></sup>	
	Project Number		F	ORM 4B
1006	Project Title: Evel: Subsistence Descuss: Comp		E	quipment
1330	Project fille. Eyak Subsistence Recovery Camp		l r	DETAIL
	Name The Native Village of Eyak Tribal Council			

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# OLD HARBOR LAGOON(MIDWAY CULVERT) SALMON ENHANCEMENT FEASIBILITY STUDY

Project Number:	96206
<b>Restoration Category:</b>	General Restoration
Proposer:	Old Harbor City Council
Lead Trustee Agency:	Alaska Department of Fish and Game
Cooperating Agencies:	None
Duration:	One Year
Cost FY 96:	28.8
Cost FY 97:	0
Cost FY 98:	0
Cost FY 99:	0
Cost FY 00:	0
Cost FY 01:	0
Cost FY 02:	0
Geographic Area:	Kodiak Island
Injured Resource/Service:	Subsistence

# ABSTRACT

As a step towards restoring subsistence uses and resources at the community of Old Harbor, this project will determine the feasibility for coho and chum salmon enhancement for the Old Harbor Lagoon system, by evaluating the potential for improvin; the early marine rearing opportunities for juvenile chum and coho salmon. It will evaluate the utility of raising the culvert under a road through which this system empties into Sitkalidak Straits to a level which would provide increased water retention in the lagoon and thus increase the rearing area.

# INTRODUCTION

The proposed project would support a study to determine the feasibility of enhancing the chum and coho salmon stocks on the Old Harbor Lagoon by raising the culvert under a village road which drains the lagoon into Sitkalidak Strait near the community of Old Harbor on Kodiak Island. The study would determine the potential enhancement benefits of creating more rearing habitat in the lagoon by raising the water level. If found to be feasible, additional funding will be sought to implement the project in FY 97. The purpose of enhancing these chum and coho runs would be to provide an additional source of subsistence salmon for the community of Old Harbor and other Kodiak Island Borough communities as a partial replacement for subsistence resources which were injured by the oil spill, such as harbor seals, waterfowl, and marine invertebrates. The project will also assist in restoring subsistence uses by directly involving subsistence users in the restoration process.

# NEED FOR THE PROJECT

# A. Statement of Problem

In the year after the Exxon Valdez oil spill, subsistence harvest levels in Kodiak Island Borough communities dropped from 9 to 77 percent compared to prespill averages. In the community of Old Harbor, harvests dropped to 272 pounds per capita, 40 percent less than before the spill. Although by 1991, subsistence harvests had rebounded to 391 pounds per person, a substantial shift in harvest composition had occurred, with a larger portion of the harvest composed of fish. and a corresponding decline in harvests of marine mammals. Also, suspicions remained among some community residents about the long term implications of the spill on human health and on subsistence resources. In order to identify potential projects to restore subsistence uses and resources, the Trustee Council funded a Subsistence Restoration Planning Project (94428 and 95428) in FY 94 and FY 95. Representatives of Kodiak Island Borough communities participated in two workshops to come up with project ideas. One set of suggestions is to enhance salmon stocks used for subsistence as an alternative resource to those injured by the spill, such as harbor seals, waterfowl, and marine invertebrates. The coho and chum salmon stocks of the Old Harbor Lagoon system were suggested as having enhancement potential, but insufficient information is presently available to assess if enhancement is a viable option. This project will provide the data necessary to determine the feasibility of enhancing these stocks.

# B. Rationale

Strategies for restoring injured subsistence uses include enhancing or replacing subsistence resources, facilitating the participation of subsistence users in the restoration process, and restoring injured resources used for subsistence. The project directly addresses the first two strategies by examining the enhancement potential of a sockeye stock as a replacement for injured subsistence resources such as harbor seals, and directly involving subsistence users in the project. It indirectly addresses the third strategy in that enhanced subsistence opportunities for salmon harvest may reduce harvest pressures on harbor seals.

This project will determine the feasibility for coho and chum salmon enhancement for the Old Harbor Lagoon system (ADF&G System Number 258-523). This system is located at the Village of Old Harbor. Old Harbor is located on the east side of Kodiak Island. This project will focus on evaluating the feasibility of improving the early marine rearing opportunities for juvenile chum and coho salmon. Specifically, it is proposed that the culvert under a major village road through which this system empties into Sitkalidak Straits (Midway Culvert), be raised to a level which would provide increased water retention in Old Harbor Lagoon and thus increase rearing area. The study will determine if such an action will lead to enhanced salmon runs.

All subsistence users in the Kodiak area, and especially those living in Old Harbor, would benefit from enhanced coho and chum production in the geographic proximity of this system during the mid-July to late August time period for chums and during the early August to mid-September period for coho.

### C. Summary of Major Hypotheses and Objectives

The goal of the project is to determine the enhancement potential of increasing the early marine rearing opportunities for juvenile chum and coho salmon in the Old Harbor Lagoon System by raising the culvert through which the system drains in order to increase water retention in the lagoon. Specific objectives include:

- 1. Evaluate chum and coho rearing areas
- 2. Evaluate spawning habitat
- 3. Evaluate rearing enhancement options, e.g. how high to raise the culvert

#### **D.** Completion Date

Fieldwork would commence in spring 1996, with all data collected and analyzed by September 1996.

#### COMMUNITY INVOLVEMENT

This project idea was identified through Project No. 95-248, Subsistence Restoration Planning, during a workshop in Kodiak in April 1995, by the Old Harbor community representative. Further community involvement could take place through a vessel contract and ATV rentals.

### FY 96 BUDGET

Personnel	14.1
Travel	4.0
Contractual	4.3
Commodities	0.5
Equipment	<u>3.5</u>
Subtotal	26.4

Gen.	Administration	<u>2.4</u>
	Total	28.8

# **PROJECT DESIGN**

# A. Objectives

The goal of the project is to determine the enhancement potential of increasing the early marine rearing opportunities for juvenile chum and coho salmon in the Old Harbor Lagoon System by raising the culvert through which the system drains in order to increase water retention in the lagoon. Specific objectives include:

- 1. Evaluate chum and coho rearing areas
- 2. Evaluate spawning habitat
- 3. Evaluate rearing enhancement options, e.g. how high to raise the culvert

#### B. Methods

The objectives will be met by a hydrological analysis.

### C. Contracts and Other Agency Assistance

A local seine boat owner will be contracted to provide vessel support.

#### D. Location

Old Harbor Lagoon System, near the community of Old Harbor on southeastern Kodiak Island

### **SCHEDULE**

### A. Measurable Project Tasks for FY 96

May 15 - September	30, 1996	Evaluate	biological/limnological	parameters
September 30, 1996		Complete	final report	

### **B. Project Milestones and Endpoints**

September 1996 Hydrological analysis of watershed data Complete final report

### C. Project Reports

The final project report, a feasibility analysis, will be completed by September 1996.

# COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The project idea was developed during a subsistence resource restoration workshop in Kodiak in April 1995.

# ENVIRONMENTAL COMPLIANCE

#### PERSONNEL

To be determined

Proposed Project Leader: To be determined. Interim: James A. Fall Division of Subsistence Alaska Department of Fish and Game 333 Raspberry Road Anchorage, Alaska 99518 Phone number: 267-2359 Fax number: 349-4712

Proposed Project Manager: Dr. Joseph R. Sullivan Habitat and Restoration Division Alaska Department of Fish and Game 333 Raspberry Road Anchorage, Alaska 99518 Phone number: 267-2213 Fax number: 522-3148

Date Prepared

October 1, 1995 - September 30, 1996

	Authorized	Proposed	anna an					
Budget Category:	FFY 1995	FFY 1996				•		
Personnel		\$14.1						
Travel		\$4.0				÷		
Contractual		\$4.3						
Commodities		\$0.5						
Equipment		\$3.5		LONG F	RANGE FUNDIN	IG REQUIREME	NTS	
Subtotal	\$0.0	\$26.4	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$2.4	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$28.8	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Full-time Equivalents (FTE)		0.2						
		Dollar amounts are shown in thousands of dollars.						
Other Resources								

October 1, 1995 - September 30, 1996

Pers	onnel Costs:		GS/Range/	Months	Monthly	1	Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	Vacant	Engineer II	20A	1.0	6,500		6.5
	Vacant	Fisheries Biologist II	16D	1.0	5,098		5.1
+	Vacant	Fisheries Biolgosit III	18C	0.5	5,047		2.5
							0.0
							0.0
							0.0
			i				0.0
							0.0
							0.0
							0.0
							0.0
							0.0
		Subtotal		2.5	16,645	0	
Thos	se costs associated with progr	am management should be indicated by place	ment of an *.		P	ersonnel Total	\$14.1
Trave	el Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description		Price	Trips	Days	Per Diem	FFY 1996
	Anchorage - Kodiak		176	2	6	150	1.3
	Kodiak - Old Harbor		120	• 2	6	150	1.1
	Anchorage - Kodiak (worksho	ips)	176	2	8	150	1.6
							0.0
							0.0
							0.0
							0.0
							0.01
ו וי							0.0
							0.0 0.0
							0.0 0.0 0.0 0.0
							0.0 0.0 0.0 0.0
Thos	e costs associated with progr	am management should be indicated by place	ment of an *.			Travel Total	0.0 0.0 0.0 0.0 0.0 \$4.0
Thos	e costs associated with progr	am management should be indicated by place	ment of an *.			Travel Total	0.0 0.0 0.0 0.0 0.0 \$4.0
Thos	se costs associated with progr	am management should be indicated by place	ment of an *.			Travel Total	0.0 0.0 0.0 0.0 0.0 \$4.0
Thos	se costs associated with progr	am management should be indicated by place Project Number: 96206	ment of an *.			Travel Total	0.0 0.0 0.0 0.0 0.0 \$4.0

Project Title: Old Harbor Lagoon Salmon Enhancement Feasibility Agency: AK Dept. of Fish & Game

October 1, 1995 - September 30, 1996

Contractual Costs:			Proposed	
Description			FFY 1996	
Freight to Old Harbor (2000 lbs	@ .35/lb)		0.7	
Aircraft charters: 206 @\$280/trip for 3 trips				
Aircraft charters: Beaver @ \$407/trip for 2 trips				
Vessel charters: seiner @ \$600 day for 1 day				
Hydrologist: 10 hours @ \$50/hour				
Rental of ATV, 30 hours @ \$30	/hour		0.9	
When a non-trustee organization	n is used, the form 4A is required.	Contractual Total	\$4.3	
Commodities Costs:			Proposed	
Description			FFY 1996	
includes hip boots, fuel, off	fice supplies, and groceries			
		Commodities Total	\$0.5	
1996	Project Number: 96206 Project Title: Old Harbor Lagoon Salmon Enhancement Feasibility Agency: AK Dept. of Fish & Game	F Coi Co	ORM 3B ntractual & mmodities DETAIL	
			14 10 5	

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October 1, 1995 - September 30, 1996

New Equipment Purch	nases:		Number	Unit	Proposed
Description			of Units	Price	FFY 1996
Flowmeter: measure outflow of culvert			1	2,000	2.0
Salinity Monitorin	ng Instrumen	t	1	1,500	1.5
in measure rearing habitat seasonal changes					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
Those purchases asso	bciated with	replacement equipment should be indicated by placement of an R.	New Ed	quipment Total	\$3.5
Existing Equipment Us	sage:			Number	Inventory
Description				of Units	Agency
				i	
			·		
			T	[	]
		Project Number: 96206			ORM 3B
1006		Project Number: 50200	111A. /		auipment
1330		Project Title: Old Harbor Lagoon Salmon Ennancement Feasib	inty		
		Agency: AK Dept. of Fish & Game			
				L	
	4 of 4				5/1/95

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#### OCEAN BEACH SOCKEYE ENHANCEMENT FEASIBILITY STUDY

Project Number:	96207
Restoration Category:	General Restoration
Proposer:	Old Harbor City Council
Lead Trustee Agency:	Alaska Department of Fish and Game
Cooperating Agencies:	None
Duration:	Two years
Cost FY 96:	92.7
Cost FY 97:	8.0
Cost FY 98:	0
Cost FY 99:	0
Cost FY 00:	0
Cost FY 01:	0
Cost FY 02:	0
Geographic Area:	Kodiak Island
Injured Resource/Service:	Subsistence

#### ABSTRACT

As a step towards restoring subsistence uses and resources at the community of Old Harbor, this project will determine the feasibility for sockeye salmon enhancement for the Ocean Beach Lake System, located on the east side of Sitkalidak Island, east of Kodiak Island. Feasibility determination efforts would focus on collecting stock status data, identifying minimum and optimum escapement requirements for natural production, and investigating the feasibility of enhancing wild production from this system.

#### INTRODUCTION

The proposed project would support a study to determine the feasibility of enhancing the sockeye salmon stock in the Ocean Beach Lake System, on Sitkalidak Island, near the community of Old Harbor on Kodiak Island. The feasibly of the enhancement effort will be determined by collecting data on escapement and collecting samples for limnological and hydrological analysis. If found to be feasible, additional funding will be sought to implement the enhancement in FY 98. The purpose of enhancing this sockeye salmon stock would be to provide an additional source of subsistence salmon for the community of Old Harbor and other Kodiak Island Borough communities as a partial replacement for subsistence resources which were injured by the oil spill, such as harbor seals, waterfowl, and marine invertebrates. The project will also assist in restoring subsistence uses by directly involving subsistence users in the restoration process.

#### NEED FOR THE PROJECT

#### A. Statement of Problem

In the year after the Exxon Valdez oil spill, subsistence harvest levels in Kodiak Island Borough communities dropped from 9 to 77 percent compared to prespill averages. In the community of Old harbor, harvests dropped to 272 pounds per capita, 40 percent less than before the spill. Although by 1991, subsistence harvests had rebounded to 391 pounds per person, a substantial shift in harvest composition had occurred, with a larger portion of the harvest composed of fish, and a corresponding decline in harvests of marine mammals. Also, suspicions remained among some community residents about the long term implications of the spill on human health and on subsistence resources. In order to identify potential projects to restore subsistence uses and resources, the Trustee Council funded a Subsistence Restoration Planning Project (94428 and 95428) in FY 94 and FY 95. Representatives of Kodiak Island Borough communities participated in two workshops to come up with project ideas. One set of suggestions is to enhance salmon stocks used for subsistence as an alternative resource to those injured by the spill, such as harbor seals, waterfowl, and marine invertebrates. The sockeye salmon stock of the Ocean Beach Lake system was suggested as one stock with enhancement potential, but insufficient information is presently available to assess if enhancement is a viable option. This project will provide the data necessary to determine the feasibility of enhancing this stock.

#### **B.** Rationale

Strategies for restoring injured subsistence uses include enhancing or replacing subsistence resources, facilitating the participation of subsistence users in the restoration process, and restoring injured resources used for subsistence. The project directly addresses the first two strategies by examining the enhancement potential of a sockeye stock as a replacement for injured subsistence resources such as harbor seals, and directly involving subsistence users in the project. It indirectly addresses the third strategy in that enhanced subsistence opportunities for salmon harvest may reduce harvest pressures on harbor seals.

As a step towards restoration of subsistence uses at Old Harbor in particular and in the Kodiak Island area in general, this project will determine the feasibility for sockeye salmon enhancement for the Ocean Beach Lake System (ADF&G System Number 258-401). This system is located on the east side of Sitkalidak Island which itself is located east of Kodiak Island. The system drains into Ocean Bay on the east side of Sitkalidak Island. Feasibility determination efforts would focus on collecting stock status data, identifying minimum and optimum escapement requirements for natural production, and investigating the feasibility of enhancing wild production from this system

Subsistence users from Kodiak Island Borough communities, and especially Old Harbor, would benefit from enhanced sockeye production in the geographic proximity of this system during the mid-June to

late July time period.

#### C. Summary of Major Hypotheses and Objectives

The goal of the project is to determine the enhancement potential of the Ocean Beach Lake system sockeye salmon stock by:

Determining escapement levels

Assessing the systems' carrying capacity and escapement requirements through a limnological analysis that includes lake sampling, water flow analysis, and spawning area evaluation. Conducting a hydrological analysis of watershed data to determine the potential to enhance production using current aquaculture techniques

#### **D.** Completion Date

Fieldwork would commence in spring 1996, with all data collected by September 1996. Analysis would be completed by Spring 1997 in time for the submission of an enhancement project proposal, if appropriate, for FY 98 funding.

#### **COMMUNITY INVOLVEMENT**

This project idea was identified through Project No. 95-248, Subsistence Restoration Planning, during a workshop in Kodiak in April 1995, by the Old Harbor community representative. Further community involvement could take place through a vessel contract and hiring a Technician I from the community to work on the weir.

#### FY 96 BUDGET

Personnel	41.6	
Travel	2.9	
Contractual	18.5	
Commodities	10.1	
Equipment	12.1	
Subtota	85.2	
Gen. Administr	7.5	
Total	92.7	

#### **PROJECT DESIGN**

#### A. Objectives

The goal of the project is to determine the enhancement potential of the Ocean Beach Lake system sockeye salmon stock by achieving the following objectives:

Determining escapement levels

Assessing the system's carrying capacity and escapement requirements through a limnological analysis Conducting a hydrological analysis of watershed data to determine the potential to enhance production using current aquaculture techniques

#### **B.** Methods

The objectives will be met by setting up and staffing a weir for total escapement enumeration (adult age, weight, length samples) and taking lake water samples for a limnological analysis.

#### C. Contracts and Other Agency Assistance

A local seine boat owner will be contracted to provide vessel support.

#### **D.** Location

Ocean Beach Lake system, on Sitkalidak Island, east of Kodiak Island, near the community of Old Harbor.

#### SCHEDULE

#### A. Measurable Project Tasks for FY 96

Office time (project planning, analysis, report writing): 9/20 - 11/25 Field camp: May 20 - September 20 Limnology sampling: 5/15 - 9/30

#### **B.** Project Milestones and Endpoints

Set up Weir: June 1, 1996 Determining escapement levels: September 1996 Limnological analysis: January 1997 Hydrological analysis of watershed data: March 1997

#### C. Project Reports

The final project report, a feasibility analysis, will be completed by April 1997.

#### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project proposal was developed during a subsistence resource workshop in Kodiak in April 1995.

#### ENVIRONMENTAL COMPLIANCE

PERSONNEL

To be determined.

roposed Project Leader

Dr. James Fall Subsistence Division Alaska Department of Fish and Game 333 Raspberry Rd. Anchorage, Alaska 99518 Phone number:267-2359 fax number:349-4712
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Proposed Project Manager Dr. Joseph Sullivan Habitat and Restoration Alaska Department of Fish and Game 333 Raspberry Rd. Anchorage, Alaska 99518 Phone number:267-2213 fax number: 522-3148

5-1-95

Date Prepared

October 1, 1995 - September 30, 1996

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	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
<b>_</b>								
Personnel		\$41.6						
		\$2.9						
Contractual		\$18.5						
		\$10.1						
Equipment		\$12.1						
Subtotal	\$0.0	\$85.2	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$7.5	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$92.7	\$8.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Full-time Equivalents (FTE)		0.9	_					
			Dollar amount	s are shown in	thousands of o	dollars.		<b></b>
Other Resources		•		:				l
				· · ·				

• October 1, 1995 - September 30, 1996

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Pers	onnel Costs:		GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	Vacant	Fisheries Biologist II	16D	0.5	5,090		2.5
	Vacant	Fisheries Biologist I	14C	2.0	4,400		8.8
	Vacant	Fisheries Technician III	13C	4.0	3,582		14.3
ľ	Vacant	Fisheries Technican I	9A	4.0	3,383		13.5
*	Vacant	Fisheries Biologist III	18C	0.5	5,047		2.5
							0.0
							0.0
							0.0
1			1				0.0
							0.0
	1		1				0.0
	l	l					0.0
L		Subtotal		11.0	21,502	0	
I ho	Those costs associated with program management should be indicated by placement of an *.				٩ 	ersonnel I otal	\$41.6
Tra	rel Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description		Price		Days	Per Diem	FFY 1996
	Kodiak - Anchorage		170	2	0	150	1.3
	Koulak - Anchorage		170	2	0	150	1.0
							0.0
8	· · · · · · · · · · · · · · · · · · ·						0.0
							0.0
							0.0
l							0.0
							0.0
							0.0
							0.0
							0.0
Tho	se costs associated with progr	am management should be indicated by place	ment of an *.			Travel Total	\$2.9
						1	ORM 3B
	1000	Project Number: 96207					Personnel
1	1996	Project Title: Ocean Beach Sockeye E	inhancement	Feasibility St	udy	'	8. Trovol
		Agency: AK Dept. of Fish & Game		-	-		
							DETAIL

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#### 1996 EXXON VALDEZ TRUS ..... COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Contractual Costs:			Proposed
Description			
Freight to Old Harbor (2400 lbs @	0 35/lb)		0.9
Shinning limpology samples 10 s	amples @ \$25/sample		0.0
Aircraft charters (logistics)			0.0
$206 \oplus 280$ /trip for 10 trips			29
Boayer @ 407/trip for 3 trips			2.0
Beaver @ 407/thp for 3 the	s v for 2 days		1.2
Vessel charter. Semer @ 000/da	a \$400/comple		1.8
Linnology analysis: TO samples (	200 bours @ \$50/bours (elevention successflows)		4.0
Noding wein E dave @ AEOO/de	Too hours @ \$50/hour (elevation waternow)		5.0
weiding weir: 5 days @ \$500/da	ay in the second se		2.5
When a non-trustee organization	is used, the form 4A is required.	Contractual Total	\$18.5
Commodities Costs:			Proposed
Description			FFY 1996
Food for 2 people for 120 days @	) \$15/day		1.8
Batteries			0.2
Rain gear and waders for 2 @ \$2	00/each		0.4
Lumber: platform, weir catwalk			2.0
Fuel: outboard, propane			0.3
Misc. camp equipment			0.4
Weir materials: 100 ft. weir			5.0
	С	ommodities Total	\$10.1
		F	ORM 3B
	Project Number: 96207		otractual &
1996	Project Title: Ocean Beach Sockeye Enhancement Feasibility Study		mmodition
	Agency: AK Dept of Fish & Game		animourlies
			DETAIL

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October 1, 1995 - September 30, 1996

New	Equipment Purchases:		Number	Unit	Proposed
Des	cription		of Units	Price	FFY 1996
	SSB Radio		1	2,100	2.1
	Raft (16' Zodiak)		1	4,000	4.0
	Outboard 35 hp		1	2,000	2.0
	Weatherport		1	4,000	4.0
					0.0
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					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
The	be purchases appealated with I	conferences a guinment should be indicated by placement of an P	Now Fr	winmont Total	<u> </u>
Evic	ting Equipment Usage:				
Das	cription				Agency
	1996	Project Number: 96207 Project Title: Ocean Beach Sockeye Enhancement Feasibility St Agency: AK Dept. of Fish & Game	udy	F	ORM 3B quipment DETAIL

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## KEMPFF BAY SOCKEYE ENHANCEMENT FEASIBILITY STUDY

Project number:	96208
Restoration category:	General Restoration
Proposer:	Akhiok City Council
Lead Trustee Agency:	Alaska Department of Fish and Game
Cooperating agencies:	None
Duration:	Two years
Cost FY 96:	70.7
Cost FY 97:	8.0
Cost FY 98:	0
Cost FY 99:	0
Cost FY 00:	0
Cost FY 01:	0
Cost FY 02:	0
Geographic Area:	Kodiak Island
Injured Resource/Service:	Subsistence

## ABSTRACT

As a step towards restoring subsistence uses and resources at the community of Akhiok, this project will determine the feasibility for sockeye salmon enhancement for the Akhiok Village Lake System, located at Kempff Bay on southern Kodiak Island. Feasibility determination efforts would focus on collecting stock status data, identifying minimum and optimum escapement requirements for natural production. and investigating the feasibility of enhancing wild production from this system.

#### INTRODUCTION

The proposed project would support a study to determine the feasibility for sockeye salmon enhancement for the Akhiok Village Lake Creek (ADF&G System Number 257-410). This system is located at the northern entrance of Kempff Bay, a small bay west of the village of Akhiok, which itself is situated on Alitak Bay on south Kodiak Island. The feasibly of the enhancement effort will be determined by collecting data on escapement and collecting samples for limnological and hydrological analysis. If found to be feasible, additional funding will be sought to implement the enhancement in FY 98. The purpose of enhancing this sockeye salmon stock would be to provide an additional source of subsistence salmon for the community of Akhiok and other Kodiak Island Borough communities as a partial replacement for subsistence resources which were injured by the oil spill, such as harbor seals, waterfowl, and marine invertebrates. The project will also assist in restoring subsistence uses by directly involving subsistence users in the restoration process

### NEED FOR THE PROJECT

#### A. Statement of Problem

In the year after the Exxon Valdez oil spill, subsistence harvest levels in Kodiak Island Borough communities dropped from 9 to 77 percent compared to prespill averages. In the community of Akhiok, harvests were 9 percent less than before the spill. Although by 1992, subsistence harvests had rebounded to 322 pounds per person, a shift in harvest composition had occurred, with a larger portion of the harvest composed of fish, and a corresponding decline in harvests of marine mammals. Also, suspicions remained among some community residents about the long term implications of the spill on human health and on subsistence resources. In order to identify potential projects to restore subsistence uses and resources, the Trustee Council funded a Subsistence Restoration Planning Project (94428 and 95428) in FY 94 and FY 95. Representatives of Kodiak Island Borough communities participated in two workshops to come up with project ideas. One set of suggestions is to enhance salmon stocks used for subsistence as an alternative resource to those injured by the spill, such as harbor seals, waterfowl, and marine invertebrates. The sockeye salmon stock of the Kempff Bay system was suggested as one stock with enhancement potential, but insufficient information is presently available to assess if enhancement is a viable option. This project will provide the data necessary to determine the feasibility of enhancing this stock.

#### **B.** Rationale

As a step towards restoration of subsistence uses at Akhiok in particular and in the Kodiak Island area in general, this project will determine the feasibility for sockeye salmon enhancement for the Akhiok Village Lake Creek at Kempff Bay (ADF&G System Number 257-410). This system is located at the northern entrance of Kempff Bay, a small bay west of the village of Akhiok, which itself is situated on Alitak Bay on south Kodiak Island. Feasibility determination efforts should focus on collection stock status data, identifying minimum and optimum escapement requirements for natural production, and investigate the feasibility of enhancing wild production from this system. Subsistence users from all Kodiak Island Borough communities, but especially Akhiok, would benefit from enhanced sockeye production in the geographic proximity of this system during the early June to mid-July time period.

## C. Summary of Major Hypotheses and Objectives

The goal of the project is to determine the enhancement potential of the Kempff Bay system sockeye salmon stock by:

Determining escapement levels

Assessing the system's carrying capacity and escapement requirements through a limnological analysis that includes lake sampling, water flow analysis and spawningarea evaluation.

Conducting a hydrological analysis of watershed data to determine the potential to enhance production using current aquaculture techniques

### **D.** Completion Date

Fieldwork would commence in spring 1996, with all data collected by September 1996. Analysis would be completed by Spring 1997 in time for the submission of an enhancement project proposal, if appropriate, for FY 98 funding.

### COMMUNITY INVOLVEMENT

This project idea was identified through Project No. 95-248, Subsistence Restoration Planning, during a workshop in Kodiak in April 1995. Further community involvement could take place through a vessel contract and hiring a Technician I from the community to work on the weir.

#### **FY 96 BUDGET**

Personnel23.4Travel2.2Contractual19.0Commodities9.2Equipment12.1Subtotal65.9

Gen. Administration 4.8 Total 70.7

## **PROJECT DESIGN**

## A. Objectives

The goal of the project is to determine the enhancement potential of the Akhiok Village Lake system at Kempff Bay sockeye salmon stock by achieving the following objectives:

Determining escapement levels

Assessing the system's carrying capacity and escapement requirements through a limnological analysis

Conducting a hydrological analysis of watershed data to determine the potential to enhance production using current aquaculture techniques

## **B.** Methods

The objectives will be met by setting up and staffing a weir for total escapement enumeration, adult age weight and length sample, and taking lake water samples for a limnological analysis consistent with similar analysis condcuted on other sockeye systems (zooplankton, water quality, dissolved oxygen etc.).

### C. Contracts and Other Agency Assistance

A local seine boat owner will be contracted to provide vessel support.

### D. Location

Akhiok Village Lake system, at Kempff Bay on southern Kodiak Island, near the community of Akhiok.

### SCHEDULE

### A. Measurable Project Tasks for FY 96

Office time (project analysis, report writting, planning etc.): 9/15 - 11/15 Field camp: May 20 - July 30 Limnology sampling: 5/15 - 9/30

### **B.** Project Milestones and Endpoints

Set up Weir June 1, 1996 Determining escapement levels September 1996 Limnological analysis January 1996 Hydrological analysis of watershed data March 1997

#### C. Project Reports

The final project report, a feasibility analysis, will be completed by April 1997.

### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The project was developed during a subsistence resource workshop in Kodiak in April 1995.

#### ENVIRONMENTAL COMPLIANCE

#### PERSONNEL

To be determined.

Proposed Project Leader: To be determined. Interim: James A. Fall Division of Subsistence Alaska Department of Fish and Game 333 Raspberry Rd. Anchorage, Alaska 99518 Phone number: 267-2359 Fax number: 349-4712

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Proposed Project Manager: Dr. Joseph R. Sullivan Habitat and Restoration Division Alaska Department of Fish and Game 333 Raspberry Rd. Anchorage, Alaska 99518 Phone number: 267-2213 Fax number: 522-3148

Date Prepared

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October 1, 1995 - September 30, 1996

	Authorized	Proposed				· · · · ·		
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$23.4						
Travel		\$2.2						
Contractual		\$19.0					2	
Commodities		\$9.2						
Equipment		\$12.1		LONG F	RANGE FUNDIN	G REQUIREME	NTS	
Subtotal	\$0.0	\$65.9	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$4.8	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$70.7	\$8.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Full-time Equivalents (FTE)		0.5						
			Dollar amount	s are shown in	thousands of c	Iollars.		
Other Resources								
Comments:								
Costs for FY 97 are for comple	ting the feasibility	analysis as par	t of the final rep	port.				
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[]		<u></u>					<u> </u>	FORM 3A
	Project Num	ber: 96208						FORM 3A
1996	Project Num Project Title:	ber: 96208 Kempff Bav	Sockeve Ent	nancement F	easibility Stu	dv		FORM 3A AGENCY
1996	Project Num Project Title:	ber: 96208 Kempff Bay	Sockeye Ent	nancement F	easibility Stu	dy		FORM 3A AGENCY PROJECT
1996	Project Num Project Title: Agency: AK	ber: 96208 Kempff Bay Dept. of Fis	Sockeye Ent h & Game	nancement F	easibility Stu	dy		FORM 3A AGENCY PROJECT DETAIL

October 1, 1995 - September 30, 1996

Pers	onnel Costs:		GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	Vacant	Fisheries Biologist II	16D	0.5	5,098		2.5
	Vacant	Fisheries Biologist I	14C	1.0	4,400		4.4
	Vacant	Fisheries Technician III	13C	2.0	3,582		7.2
	Vacant	Fisheries Technican I	9A	2.0	3,383		6.8
-	Vacant	Fisheries Biologist III	18C	0.5	5,047		2.5
							0.0
							0.0
l							0.0
							0.0
							0.0
							0.0
∦	L						0.0
Tho	a costa accogiated with prog	Subtotal		6.0	21,510	0	A00.4
Travel Oceans				ersonnei Totai	\$23.4		
DAA	el Costs:		Price	Hound	Total	Dally Por Diam	Proposed
r ivi	Kodiak - Anchorage		176	1	Days	rer Diem	rri 1990
<b>.</b>	Kodiak - Anchorage (worksho	ops)	176	. 2	8	150	1.6
		·F		-	Ű	100	0.0
							0.0
							0.0
							0.0
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							0.0
[							0.0
							0.0
							0.0
<b> </b>							0.0
Tho	se costs associated with prog	ram management should be indicated by place	ment of an *.			Travel Total	\$2.2
r					<u> </u>		
		Breiset Numbers 06208				F	FORM 3B
	1006	Project Number: 96208				F	Personnel
	1990	Project Litle: Kempit Bay Sockeye Er	nnancement H	easibility Stu	dy		& Travel
		Agency: AK Dept. of Fish & Game					DETAIL
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/1/95

October 1, 1995 - September 30, 1996

Contractual Costs:	<u></u>	Proposed
Description		FFY 1996
Freight to Limnology Laboratory, @ \$25/sample for 10 samples		0.3
Freight to Akhiok		1.2
Aircraft Charters: 206 @ \$448/trip for 5 trips (logistics)		2.2
Aircraft charters: Beaver @ \$703/trip for 2 trips (logistics)	1	1.4
Vessel charter: seiner @ \$800/day for 3 days (logistics)		2.4
Limnology Analysis: 10 samples @ \$400/sample		4.0
Hydrologist (watershed analysis): 100 hours @ \$50/hour (flows, lake water residence time)		5.0
Welding weir: 5 days @ \$500/day		2.5
When a non-trustee organization is used, the form 4A is required.	Contractual Total	\$19.0
Commodities Costs:		Proposed
Description		FFY 1996
Restories		0.9
Baingaar/wadars for 2 paopla @ \$200/each		0.2
hangeal/waders for 2 people @ \$200/each		2.4
Lumber: platform, weir catwaik, inpolos for weir		2.0
Miss, some motorials		0.3
White meterials		5.0
		5.0
	Commodities Total	\$9.2
<b>1996</b> Project Number: Project Title: Kempff Bay Sockeye Enhancement Feasiblity Sta Agency: AK Dept. of Fish & Game	Jdy	ORM 3B htractual & mmodities DETAIL

October 1, 1995 - September 30, 1996

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FFY 1996
SSB Radio	1	2,100	2.1
Raft (16' zodiak)	1	4,000	4.0
Outboard: 35 hp	1	2,000	2.0
Weatherport	1	4,000	4.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.	New Ec	uipment Total	\$12.1
Existing Equipment Usage:		Number	Inventory
Description	······································	of Units	Agency
<b>1996</b> Project Number: 96208 Project Title: Kempff Bay Sockeye Enhancement Feasibi Agency: AK Dept. of Fish & Game	ility Study	F	ORM 3B quipment DETAIL

96210-BAA

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## 2-25-451ENSUL

## Prince William Sound Youth Area Watch Revised DPD

Project Number: 96210

Restoration Category: Subsistence

Proposer: Chugach School District

Lead Trustee Agency: ADFG

Cooperating Agencies:

Duration: 3 years

Cost FY 96: \$105,500

Cost FY 97: \$200,000

Cost FY 98: \$175,000

Geographic Area: Prince William Sound, including: Cordova Harbor and Orca Inlet, Port San Juan and Evans Island, Tatitlek Narrows, Boulder Bay and Landlocked Bay

Injured Resource/Service: Multiple resources

## ABSTRACT

The project sets out a plan to involve students in current research projects funded by the Trustee Council and conducted in Prince William Sound. It is the intent of the project to identify four research projects that the participating students can be involved, and give them the option of working on one or all of them. These research projects include: pristane/mussel analysis, harbor seal biological sampling, oceanographic data collection and fish monitoring. This is a pilot project that will be expanded in the second year of this three year project. Students primarily from Chenega Bay and Tatitlek, but also youth from outlying areas, will be offered the opportunity to participate.

The Chugach School District will hire a project coordinator with a background in the fields of education and science. Under this supervision, the students will gain the techniques necessary to implement research activities that ultimately result in restoration. By involving someone who is both an educator and has science experience, the project can bridge the gap between scientific research and meaningful application of project activities. Youth can take part in the research process and understand its application to their environment through appropriate oversight.

This project seeks to increase the awareness of youth regarding the effects of the Oil Spill and encourage their involvement in research and restoration. The youth in the communities must become involved in the restoration process if they are to have any future understanding of what has occurred in the waters and on the shores of Prince William Sound. Youth involvement is also crucial to the ultimate success of any long-term effective restoration. By enlisting the support of local youth from within the oil impacted area, future responsibility, ownership and enhancement can occur.

## **INTRODUCTION**

When the Trustee Council efforts have been completed, the youth of the region will be responsible for Prince William Sound's ecosystem and ensuring that a subsistence lifestyle continues. Long-term projects such as the Seward Sealife Center need a fostering ground such as this project to increase local involvement. Through Youth Area Watch, the Trustee Council has the opportunity to prepare the region for assuming active roles in the major restoration and enhancement efforts.

This proposal, to be implemented through the Chugach School District, sets forth a plan to increase the awareness of youth in the oil impacted region through their involvement in identified research and testing in Prince William Sound. Students of the Chugach School District will have the opportunity to work in conjunction with agencies on research projects dealing with identified injured resources. The project will especially coordinate and consult with the spill area-wide coordinator of Project 96052 to strengthen locally driven restoration projects.

NOAA, the Alaska Native Harbor Seal Commission and the Prince William Sound Science Center have agreed to allow youth within the region to be a part of their current research proposals. Currently, there is a youth in a remote site that is assisting NOAA on its pristane/mussel analysis of the region. It is expected that this youth will continue his work and be included in the "Youth Area Watch Project" and he provides an excellent example of how this project can work. Youth involved in the project will be recognized for their work and receive appropriate school credit.

## NEED FOR THE PROJECT

## A. Statement of Problem

While monitoring and oceanographic testing currently are conducted through the SEA Program at the Prince William Sound Science Center (PWSSC) and NOAA projects, increasing the periods and locations of various testing will provide a more accurate picture of what is currently going on in Prince William Sound's ecosystem. The costs associated with increased numbers of testing sites are a continual problem, according to PWSSC and the information that was provided at the January 1995 Restoration meeting by the scientists working on various projects. Further research costs on the effects of the oil spill must be curtailed and Youth Area Watch will allow for increased periods and locations of testing sites.

Youth involvement in the restoration process is necessary to see that the effort extends beyond the life of the Restoration Office. The youth of the region are the link to the long-term restoration of the natural resources damages by the Oil Spill. By enlisting the support of local youth from within the Chugach School District, future enhancement and restoration can be developed.

## B. Rationale

As a result of EVOS funding, major research and learning facilities will be built with the hope of ongoing research. The plans for infrastructure, namely the Seward Sealife Center, have not to date accounted for how the impacted region can be more integrally involved. A feeding ground for future scientific research and restoration of the Sound will be developed through this project. In addition, those projects currently undertaken within the communities can better be understood at the local level with this increased involvement.

A local restoration initiative will ensure that monitoring continues at the community level and that not all of the costs are born by EVOS funding. The regional non-profit organizations, the Chugach School District and village councils have committed to supporting this project at the outset and will ensure that this project continues in future years. Community ownership of the problems and solutions will provide for successful restoration of the Sound. Youth within communities can be that link to ownership. Students in local communities will be used to conduct research once the proper protocol has been provided by professionals.

This project involves combining the efforts of the Chugach School District, Chugachmiut, the Prince William Science Center, Chugach Regional Resources Commission, the University of Alaska and NOAA to cut down on the costs and to pool existing activities; this project will have a significant cost benefit, given the increase in SEA Project testing sites that will not require the usual PWSSC staff time. The project will coordinate when possible with the Community Involvement project to combine travel to communities and exchange information on current community activities.

## C. Summary of Major Hypotheses and Objectives

The Chugach School District seeks to involve community youth by providing the necessary skills and responsibility to conduct research. Students will participate in various research and testing associated with EVOS funded restoration projects. Objectives for FY 96 include beginning to work cooperatively with research agencies to develop a database of information that will feed into agency databases.

Students will be given the option of participating in one or all of the research projects identified. The coordinator will serve as the day-to-day liaison between the scientists that serve on the bigger project and the students that will be providing information to those larger projects. The coordinator's main goal will be to monitor the student research and coordinate with the various entities involved in the research projects. See the "Project Coordinator Position Description" for a full list of duties. It is the ultimate goal that community students will be able to take away from this project skills that are applicable to restoration activities conducted in their communities and region.

## D. Completion Date

This proposed pilot research project will extend through 1998. By this date, the project will have become fully integrated into the Chugach School District science program. All communities within the region will then be asked to participate in the project by the indicated completion date.

## **COMMUNITY INVOLVEMENT**

This project is designed to increase local involvement in the restoration process at the grass roots level. By enlisting the support and assistance of youth in current projects, a system for community involvement will be instilled on a long-term basis. Youth will become familiar with the restoration activities taking place, will participate in research and can begin to take an active role in the restoration process.

Community Elders will be asked to participate in the field site testing by providing their knowledge and experience in the process. Traditional knowledge will be an important aspect of relating the relevance of conducting research in the local communities. Students will be asked to share their acquired skills and information cooperatively with the principal investigators that will visit the communities. During this process, elders of the communities will be able to provide feedback to the principal investigators and the students. This exchange of information will be coordinated with the Community Involvement Project.

By the middle of the second year, participating students will begin taking much of their information and implementing it through restoration activities. There is strong confidence that further community involvement will be fostered through this process and will help ensure the success of the project.

## FY 96 BUDGET

Funds requested:

Personnel	\$	31,800
Travel	\$	14,400
Contractual	\$	32,800
Commodities	\$	1,800
Equipment	\$	16,000
Subtotal	\$	96,800
Indirect Costs	\$	8,700
Total	<b>\$</b> ]	105,500

In-kind contributions include office space and utilities, project oversight, school teacher time, lodging and food from the school district; environmental health and EMS time from Chugachmiut; and general TA and database collection from PWSSC in the amount of \$73,000. These contributions are indicated on Page 1 of the project budget.

## **PROJECT DESIGN**

## A. Objectives

Selected students from the Chugach School District will participate in training and research that has been identified by the SEA Programs' principal investigators and NOAA staff as current tasks that should be further developed. Students will be a part of an area watch project to be set in place through the identified objectives of this project listed below. Local students will collect data that will funnel into the larger research projects, but the youth will also draw their own conclusions independent of the SEA Project before collaborating on the information that is gathered. This process will be essential to developing a local commitment to restoration. Main objectives of this project include:

 Pristane/mussel analysis, Project Number 96195. The NOAA Auke Bay laboratory, through Jeff Short and Pat Harris, is conducting a study on pristane levels in mussels. There are approximately thirty mussel collection sites in Prince William Sound and students will participate in monthly collections. Equipment needs are minimal. Attached is the "Pristane Project" procedure guideline that includes the specific sampling process that youth will undertake in the first year.

During the fall and winter months, students will be responsible for an overall mussel bed seasonal watch. Students will be involved in tagging, identifying bed characteristics and predator/prey activities.

- 2. Harbor seal management and biological sampling, Project Number 96244F. This project is to be conducted by the Alaska Native Harbor Seal Commission, in conjunction with University of Alaska research staff. Students will pair up with the local technicians on the project and assist with bio-sampling activities. It is expected that twenty samples will be taken from each identified community, giving ample opportunity for youth to assist in the process. In addition, sampling protocol can directly be ensured with technician oversight.
- Oceanographic data collection. Students will learn physical and biological oceanography. Dr. David Salmon, principal investigator for Project Number 96320-M, will work with students participating in projects #96320-M: Observational Physical Oceanography in Prince William Sound, and #96320-H: the Role of Zooplankton in Prince William Sound Ecosystem.

Physical oceanography activities will include measuring of basic oceanographic features

such as temperature, salinity and weather conditions. Students will also collect zooplankton samples as part of on-going SEA biological oceanographic research. Research activities include:

- Temperature: Dr. Salmon has offered to dedicate six reversing thermometer units and a temperature logger from the SEA-Ocean project to the Youth Area Watch project. These units would be installed in the field at the selected sites and monitored by participating students;
- Temperature and salinity: CTD (conductivity, temperature and depth) instruments would be donated by the SEA-Ocean project for use by Youth Area Watch sites. Participating students would be trained by Dr. Salmon to use the instruments and download data into a computer;
- Weather stations: a weather station instrument would be purchased and installed at a selected research site. These instruments measure wind speed and direction, air temperature and barometric pressure.

As part of on-going biological oceanographic research, students will also collect zooplankton samples from selected sites, thus increasing the sample range of Project Number 96320-H. Collecting nets are available from the Zooplankton project.

4. Fish monitoring. Several Trustee Council funded projects involve monitoring specific fish species. Youth Area Watch students will be monitoring all fish at selected research sites to learn about the trophic structure, or composition of predators and prey, found at these areas. Data collected regularly over an extended period of time will allow them to examine what happens over time in these predator/prey relationships. Students will be involved in Projects #96320-E: Juvenile Salmon Growth and Mortality; #96320-T, Juvenile Herring Growth and Habitats; and #96320-U, Pollock and Herring Energetics. Evelyn Brown, who works with the Juvenile Herring project, will assist in training students and work with them throughout the course of the project.

Students will monitor fish at their study sites one to four times per week using fixed gear. Gear will include small gillnets, fyke nets and hoop nets. Students will jig a fixed number of minutes per week. Data will be collected on: species composition observed; number of fish caught; stomach contents; length, weight and condition of fish caught; and analysis of otoliths and scales.

Students will be involved in analyzing the data from each of their sites, and data on specific species such as herring, salmon and pollock will be passed on to the projects mentioned above for inclusion in their data collection and analysis.

## B. Methods

The Chugach School District project coordinator will develop a protocol in conjunction with the research project scientists. The protocol will establish data collection and analysis techniques. Ensuring the continued protocol compliance will be crucial to the accuracy of the information and ultimate success of the project.

Eight students will be selected from the Chugach School District within Prince William Sound in the first year to participate in the project. Detailed training will be provided in developing the protocol necessary for specific scientific and systematic testing. Students will apply their acquired skills to both onshore and offshore research, testing and sampling. The onshore testing will be conducted near the respective community sites for continual monitoring throughout the year. Offshore research will be undertaken during strategic times in the year; both the times and locations of offshore or boat research are to be determined in collaboration with the research project staff.

All participating students will come together to be a part of an overall ecosystem research training session; this will occur both at the beginning and the end of the project year on a large equipped sea vessel. Small boats or skiffs from local communities will be used to collect information and conduct testing at offshore sites. In addition, onshore watch sites will be set in place for younger school-age youth.

A Memorandum of Understanding (MOU) will be developed between each research entity/partner and the Chugach School District. The MOUs will serve as a project work plan, and will state the roles and responsibilities of participating agencies. They will set out the responsibilities of the Youth Area Watch Project and the research projects, the coordination of activities, project milestones and schedules.

Because this project is grounded in developing sound research and analysis skills, students will be given careful training and guidance throughout the project period. The Chugach School District will coordinate with the Prince William Sound Science Center, NOAA and the Harbor Seal Commission to provide an intensive training period during which students and the coordinator and teachers will become familiar with data collection protocols and use of scientific instruments. Scientists will periodically review data reports as they are filed during the data collection period and monitor student adherence to the protocols established.

Data collection will be followed by an analysis period, during which students will work with teachers and scientists in examining their research and potential findings. The students will compile their information into a database format, both for their benefit as well as the overall goals of the respective projects. Student information both concerning their involvement and data that is collected will be provided to the agencies that the project will work in conjunction with.

Students will make presentations on their research and analysis as a means to increase the exchange of information. The presentation forum will introduce students to the peer review process, give them the opportunity to discuss possible future directions for their research. The

information will also be showcased within the communities' schools and at academic institutes as a means to keep the public aware of student research activities.

The information gathered will then be applied to the restoration plan to be implemented at the local level. This plan will be developed as a part of the research to be conducted by the students participating in the project and will be consistent with the EVOS restoration plan.

## C. Contracts and Other Agency Assistance

All identified agencies will continue to take an active role in the development of this project. The Chugach School District recognizes its role and commitment to the future of local youth within the district. Chugachmiut and Chugach Regional Resources Commission maintain responsibilities as the regional non-profits that provide health, social and natural resource services. Staff and the boards that govern their activities will continue to participate actively in the local involvement proposed through recent EVOS funding. It is the intent through this project to combine and leverage current research funds with the participating organizations resources.

The Chugach School District will administer the project through a contract with the Department of Fish and Game. This will be the most effective means to instill youth and community responsibility for conducting research.

Chugachmiut will provide support from its Environmental Health and EMS programs will assist with projects to be conducted on research boats. This will include staff time for general supervision and research assistance, as well and health and safety personnel.

A relationship will be arranged to offer college credit through the University of Alaska Fairbanks along with high school credit for progressively responsible research and reporting work. Currently, the Chugach School District has an memorandum of agreement with the University of Alaska to coordinate with the school district and this will be further enumerated.

This program will continue to sustain itself in subsequent years through the assistance of alternative funding sources. Ecotrust has been contacted as a future funding source and has indicated their interest in providing assistance. The Sail Alaska Fund will also be solicited for funding assistance, given their history of funding youth and environmental causes in Alaska. In addition, the Chugach School District will reallocate district funds that are currently applied to their comprehensive plan.

### D. Location

Research will be conducted in and around the communities of Chenega Bay and Tatitlek. With the exception of the harbor seal project, remote site students would also be included. Additional areas of research could involve Cordova Harbor, Orca Inlet, Port San Juan and Evans Island,

Tatitlek Narrows, Boulder Bay and Landlocked Bay. In the second year of the project, youth from larger communities such as Seward and Valdez will be included in the project.

For the pristane/mussel project, sites both at Tatitlek (within walking distance from the townsite) and Chenega Bay (near the hatchery) will be used as testing sites. Pat Harris from the NOAA pristane project has indicated that if the Tatitlek site was used, the Bligh Island research location could be dropped.

Harbor seal biological sampling will primarily be conducted at the harbors of the identified communities. As a result, students in Tatitlek and Chenega Bay can assist in the sampling process with logistical ease and little travel, if any.

Both the oceanographic data collection and fish monitoring can be conducted at almost any site where students participate. The projects would require that specified gear was provided at all locations.

## **SCHEDULE**

## A. Measurable Project Tasks for FY 96

October 1 - 7, 1995:	Students selected to participate in the Area Watch Project
October 14 - 21, 1995:	Students receive intensive offshore research protocol training
October 23 - 29, 1995:	Students set local onshore research and testing sites
October 30 - November 3,	
1995:	Students set offshore research and testing sites
November 13 - 24, 1995:	Students set up database gathering system
March 31, 1996:	Students complete interim research report for FY 96
September 30, 1996:	Students complete final research reports for FY 96
Ongoing tasks:	
October 95 - September 96:	Students check onshore testing sites twice weekly
October 95 - September 96:	Students check offshore area testing sites twice monthly
October 95 - September 96:	Students provide data to PWSSC weekly

### B. Project Milestones and Endpoints

October 7, 1995:	Student participants selected
October 21, 1995:	Intensive training completed
November 3, 1995:	All research sites set in place
September 30, 1996:	Student first year final report completed
April 30, 1997:	Students develop local restoration plan
May 30, 1997:	Students begin implementing restoration plan
September 30, 1997:	Students have integrated enhancement activities into natural resource activities at the local level

September 30, 1998: Students have fully integrated restoration activities at the local level

## C. Project Reports

Chugach School District will conduct all necessary reporting as required through the granting process. This reporting will be compiled through oversight of the project at the local school level.

Students will complete two major research reports, along with necessary log-book reporting while conducting research at testing sites. These reports will be completed by the middle of the fiscal year and upon completion of the grant year. This information will be provided to the communities as a whole, the Prince William Sound Science Center, the Department of Fish and Game and the granting agency/the Trustee Council.

## COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The direct research of this project involves the combined efforts of the Chugach School District, NOAA, the Prince William Sound Science Center and the Harbor Seal Commission. Without the participation of all parties, this the project a whole would not be a success. This project will step beyond mere research and emphasize the need for meaningful involvement by oil impacted community youth; this can not happen without the cooperation of research agencies and local entities.

This project will work cooperatively with the University of Alaska Fairbanks to provide both high school and college science credit for progressively responsible work. This is an incentive to foster skills, knowledge and interest in the fields of marine biology oceanography and related sciences for the purposes of internships with UAF (John Kelley) and future jobs resulting from EVOS funded projects.

The Chugach School District will also work with the Chugach Regional Resources Commission, the regional natural resource non-profit, given their prior experience with Trustee Council restoration projects. Activities and travel will be coordinated where possible, allowing for cost savings and the exchange of community involvement information.

The Chugach School District would also like to open up this project to any other research activity that would welcome the involvement of youth. This can ultimately result in cost savings as Trustee Council restoration funds dwindle. This would also provide an excellent opportunity for other projects to increase local involvement.

## ENVIRONMENTAL COMPLIANCE

The Chugach School District will comply with any and all environmental compliances as applicable to the individual research and testing to be conducted. All necessary permitting and documentation will be acquired prior to conducting research activities.

## PERSONNEL

Richard DeLorenzo, Assistant Superintendent of the Chugach School District, will be ultimately responsible for the oversight of this youth research project; he has significant experience in rural Alaska and specifically within the region. While a project coordinator will be hired, Richard will see that all objectives are being attained and the youth are acquiring the needed skills and information to successfully apply enhancement techniques in the local communities.

Patty Brown-Schwalenberg, Executive Director of the Chugach Regional Resources Commission will provide technical assistance throughout the grant process. She has had significant experience dealing with EVOS funded projects and works with a variety of natural resource projects in the Chugach region. She will be assisting with the Community Involvement project.

Pat Harris, zoologist for NOAA, currently works with the one student on the pristane project. She will be working with the Chugach School District to further develop youth involvement and will monitor the pristane/mussel sites.

Kate Wynne is the principal investigator for the Harbor Seal Management and Biological Sampling. She will be the research project contact for youth involvement, along with Monica Riedel from the Alaska Native Harbor Seal Commission.

Dr. David Salmon is the principal investigator for the oceanographic data collection. He has agreed to work with students participating in this project.

Evelyn Brown works with the Juvenile Herring project. She will assist with the student training and will be the contact for student involvement for the fish monitoring project.

## **JOB DESCRIPTION**

## PRINCE WILLIAM SOUND YOUTH AREA WATCH PROJECT COORDINATOR

The is a half-time, twelve month position that works directly with EVOS project scientists, local village teachers and community youth to implement an overall youth research involvement project in Prince William Sound. This position will work at the direction of the assistant superintendant of the Chugach School District to achieve the objectives of the Youth Area Watch Project and the goals of the Exxon Valdez Oil Spill Restoration Plan.

### **Responsibilities**

- 1. Coordinates with various research organizations and entities involved in EVOS funded projects.
- 2. Oversees student research at the local level. Ensures proper protocol is maintained.
- 3. Responsible for the coordination and on-going training of students in research and analysis process.
- 4. Responsible for coordinating research activities.
- 5. Works with EVOS and research agency staff to provide information on the progress of the project and makes changes as needed.
- 6. Coordinates meetings with appropriate project staff.
- 7. Fosters contacts with other research projects to expand youth involvement in research and restoration.
- 8. Responsible for coordinating student research and analysis presentations to be coordinated with the Prince William Sound Science Center.

### <u>Skills</u>

Creative problem solver

Excels at community relations

Positive interpersonal skills

Project Coordinator cont.

Ability to work with students in a rural environment

Excellent oral communication and writing skills

## **Qualifications**

Bachelors Degree

Background in marine sciences

Master Teacher

Computer technology expertise

## 1996 EXXON VALDEZ TRUE - \_\_ COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

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Budget Category:	FFY 1995	FFY 1996						
Personnel	,	¢5 0						
Travel		\$0.2 \$0.0						
Contractual		\$103.6	\$ \$					
Commodities		\$0.0						
Equipment	4	\$0.0		LONG	RANGE FUNDIN	G REQUIREME	NTS	
Subtotal	\$0.0	\$108.8	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$6.2	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$115.0	\$200.0	\$175.0	\$0.0	\$0.0	\$0.0	\$0.0
		· · · · · · · · · · · · · · · · · · ·					an a	
Full-time Equivalents (FTE)		0.1						
			Dollar amount	s are shown in	thousands of d	ollars.		
Other Resources		\$73.0	\$73.0	\$73.0			1	
1996	Project Num Project Title: Agency: Ak	ber: 96210 Youth Area Dept. of Fis	Watch sh & Game				ţ	FORM 3A AGENCY PROJECT DETAIL

Prepared:

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## **1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET** October 1, 1995 - September 30, 1996

Personnel Costs:		GS/Range/	Months	Monthly		Proposed	
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1 <b>9</b> 96
	Hughes	Program Manager	18C	1.0	5,230		5.2
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							0.0
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						~	0.0
							0.0
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<b> </b>	L	1	2. Standaren den bahardere arren a		F 000		0.0
		Subtotal	and a second sec	1.0	5,230	, <u> </u>	
Ino	se costs associated with progr	am management should be indicated by place	ement of an *.			ersonnel lotal	\$5.2
Trav	el Costs:		Ticket	Round	Total	Daily	Proposed
IPM	Description	l 	Price	l rips	Days	Per Diem	FFY 1996
							0.0
							0.0
							0.0
		<u>*</u>					0.0
							0.0
							0.0
							0.0
		:					0.0
							0.0
							0.0
							0.0
Tho	se costs associated with progr	am management should be indicated by place	ment of an *.			Travel Total	\$0.0
<u></u>							
							FORM 3B
		Project Number: 96210					Paraonnal
	1996	Project Title: Youth Area Watch					
		Agency: AK Dept of Fish & Game				3	& Iravel
		Agency. All Dopt. of Fish & Game					DETAIL
	2 of 8	L				Name of the second	8/18/95

## 1996 EXXON VALDEZ TRUSCOUNCIL PROJECT BUDGETOctober 1, 1995 - September 30, 1996

Contractual Costs:			Proposed
Description			FFY 1996
Contract with non-t	rustee agency		103.6
		,	
When a non-trustee orga	nization is used, the form 4A is required.	Contractual Tota	\$103.6
Commodities Costs:			Proposed
		<b>*************************************</b>	1 171 1990
		Commodities Total	\$0.0
1996	Project Number: 96210 Project Title: Youth Area Watch Agency: AK Dept. of Fish & Game	Cc ; Cc	FORM 3B ontractual & ommodities DETAIL

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# **1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET** October 1, 19**9**5 - September 30, 1996

New	/ Equipment Purchases:	Number	Unit	Proposed
Des	cription	of Units	Price	FFY 1996
				0.0
				0.0
				0.0
				0.0
	· ·			0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
	1	1		0.0
Tho	se purchases associated with replacement equipment should be indicated by placement of an R.	New E	quipment Total	\$0.0
Exis	ting Equipment Usage:		Number	Inventory
Des	cription		of Units	Agency
<u></u>			A	
				ORM 3R
	Project Number: 96210			critic out
	1996 Project Title: Youth Area Watch			
	Agency: AK Dept. of Fish & Game			DETAIL
L	4 of 8			
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## 1996 EXXON VALDEZ TRUSCOUNCIL PROJECT BUDGETOctober 1, 1995 - September 30, 1996

		Authorized	Proposed	an an ann a d'a stailtean an bhailtean stailtean a	an a				
Budget Category:		FFY-1995	FFY 1996						
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Personnel		ì	\$30.0						
Travel			\$14.4						
Contractual ·			\$32.8						
Commodities		i i	\$1.8				a a star manufacture and a star for some some some some some some some some		
Equipment			\$16.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal		, \$0.0	\$95.0	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Indirect			\$8.6	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total		\$0.0	\$103.6	\$200.0	\$175.0				
		1							
Full-time Equivalents (FTI	E)	0.5	0.5		An				
				Dollar amount	s are shown in	thousands of	dollars.		
Other Resources			\$73.0	\$73.0	\$73.0			,	
Travel expenses include Costs for research proto Commodities include for computers necessary for Indirect costs include fis Other resources include time, \$3,000 in lodging \$25,000 in general TA a	bringing s ocol trainin od for stuc r complyin scal and na \$11,000 i expenses and databa	tudents togethe g (PWSSC), con lents while on t g data for resea arrative reportin in office space a (school district) ase collection (P	er for group tra mmunity elder i he boats, rain g arch and transn g, general over and utilities (dis , \$10,000 in E WSSC).	ining, Project C research assista gear, shovels ar nission to PWSS head calculated strict and 3 sch nvironmental H	oordinator trave ance and boat r nd necessary ed SC. I at a rate of 99 ools), \$9,000 ( ealth and EMS	el and travel fo ental are includ quipment for o %. (School district) (Chugachmiut	or PI's to the res ded in contractu utside research in administrationstrationstrationstaff time), \$2,	search sites. Jal expenses. Equipment i on, \$12,500 ,500 in food (	ncludes in teacher (3) Chugachmiut),
1996 Prepared:	5 of 8	Project Num Project Title Namă: Chu	ber: 96210 : Youth Area gach School	Watch District					FORM 4A Non-Trustee DETAIL 8/18/95

## **1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET** October 1, 1995 - September 30, 1996

Personnel Costs:			Months	Monthly		Proposed
Name	Position Description		Budgeted	Costs	Overtime	FFY 1996
Project Coordinator	Position responsible for all coordination	a and a second secon	6.0	5,000		30.0
	of training and research. Will oversee					0.0
	the project collection of data and					0.0
	provision of information to PWSSC.					0.0
	Position will serve as the liaison between					0.0
	all involved agencies and organizations.					0.0
						0.0
						0.0
						0.0
						0.0
	· ·					0.0
				5.000		0.0
	Subtota		6.0	5,000		¢20.0
				1 	Personnel Total	\$30.0
Travel Costs:	Travel Costs:			Total	Daily	Proposed
Description	seventurinistand information anthonian	Price		Days	Per Diem	FF1 1990
Student travel for two g	Student travel for two group training and information gathering			4		0.0
sessions.						0.0
Project Coordinator to C	Brainet Coordinator to Changes. Tatitlak and remote site		7	21	45	0.0 5.8
	hellega, faither and femote site.	000	· · · · · · · · · · · · · · · · · · ·	21		0.0
Principal Investigator to	Chenega, Tatitlek and remote site	810	3	3	45	2.6
i melpar myöötigator to	chonoga, ratition and formers siter	0.00	Ű	Ū		0.0
						0.0
						0.0
						0.0
						0.0
						0.0
			4		Travel Total	\$14.4
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						FORM 4B
	Project Number: 96210					Personnel
1996	Project Title: Youth Area Watch				,	& Travel
	Name: Chugach School District				, i	
	<b>.</b>					DETAIL
6.0	40					0/10/05

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## **1996 EXXON VALDEZ TRU:** : COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

Contractual Costs:	Proposed
Description	FFY 19 <b>9</b> 6
While the Prince William Sound Science Center will provide research protocol training through their scientists, costs are included for their time given constraints in their budget. PWSSC staff, indicated in the proposal, will assist in providing the initial youth training, as well as periodic observation of the research projects and sites. Compensation has been calculated at a rate of \$200 per day up to 14 days.	2.8
Two boats will be hired for the first project year. The larger boat (up to 80ft) will be hired for initial youth training and site observation in the Sound for four days at \$5,000. A boat or skiff up to 24ft will be used for near site research at a rate of \$100 per day up to 100 days.	30.0
Contractual Total	\$32.8
Commodities Costs:	Proposed
Description	FFY 1996
\$1,000 has been allocated for food while students are on the larger boat for training	1.0
\$100 per student (8 youth) is necessary for rain gear and personal equipment that will be used during research.	0.8
Commodities Total	\$1.8
1996 Project Number: 96210 Project Title: Youth Area Watch Name: Chugach School District	ORM 4B ntractual & ommodities DETAIL 8/18/95

# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

New	Equipment Pu	rchases:		Number	Unit	t Proposed
Desc	scription of Units		Price	FFY 1996		
						0.0
	Two Power Bo	ooks will be pure	chased for research site and boat use.	2	2,000	4.0
Í						0.0
			-			0.0
	Three research	h kits including r	necessary nets and jigging equipment as indicated by PWSSC.	2	6,000	12.0
						0.0
						0.0
						0.0
ļ						0.0
						0.0
						0.0
					,	0.0
Tho	se purchases a	ssociated with r	eplacement equipment should be indicated by placement of an R.	New E	quipment Tota	I \$16.0
Exis	ting Equipment	Usage:			Number	
Des	cription				of Units	
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<u>.</u>		21111111111111111111111111111111111111			i	
<b></b>						FORM 4B
	1000		Project Number: 96210			Equipmont
	1996		Project Title: Youth Area Watch			
			Name: Chugach School District			DETAIL
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		8 of 8			I	8/18/95

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#### COMMUNITY-BASED HARBOR SEAL BIOLOGICAL SAMPLING PROGRAM (PILOT PROJECT)

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Project Number:	96211
<b>Restoration Category:</b>	General Restoration
Proposer:	Alaska Native Harbor Seal Commission
Lead Trustee Agency:	Alaska Department of Fish and Game
Cooperating Agencies:	National Marine Fisheries Service
Duration:	Three years
Cost FY 96:	44.0
Cost FY 97:	36.0
Cost FY 98:	15.0
Cost FY 99:	0.0
Cost FY 00:	0.0
Cost FY 01:	0.0
Cost FY 02:	0.0
Geographic Area:	Prince William Sound, lower Cook Inlet, -
Injured Resource/Service:	Harbor seals; subsistence

#### ABSTRACT

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A pilot project for collecting biological samples from subsistence-taken harbor seals from six communities of Prince William Sound and lower Cook Inlet would be designed, implemented, and evaluated. "User-friendly" data collection forms and an instructional video would be produced. Village-based technicians would be trained for collecting samples taken by hunters and transporting these samples to Anchorage for further sampling and transport for analysis. Findings would be disseminated by the Alaska Native Harbor Seal Commission through a newsletter network.

#### INTRODUCTION

The goal of this pilot project is to test the practicality and effectiveness of a community-based harbor seal biological sampling program. An additional goal is to assist communities in developing a longterm operating plan independent of restoration funds. In FY 94 (Project 94244) and FY 95 (95244), the Trustee Council provided funding for the Alaska Department of Fish and Game, Division of Subsistence, to compile available data about harbor seal population status, collect additional information, and to organize workshops and community meetings with scientists and subsistence users. One consensus point reached at the workshops was that subsistence hunters are in an excellent position to assist in scientific studies through providing biological samples from subsistence-taken animals. Also, participants in the workshops concluded that the lack of a formal organization which represents subsistence users of harbor seals is an major impediment to communication between scientists and hunters and to the inclusion of subsistence hunters as full partners in harbor seal research and restoration. To fill this gap, Alaska Native participants in the harbor seal restoration workshop of March 2, 1995 voted to form an Alaska Native Harbor Seal Commission. The Commission is presently seeking funding from several sources to support its activities, which include addressing the causes of the decline of the harbor seal population in the Gulf of Alaska and facilitating involvement of Native hunters and users in research and management activities. This project will jointly address the need to include subsistence hunters in a biological sampling program and assist the Commission in meeting its goals. This project will support other restoration projects proposed for FY 96 and beyond, such as the Marine Mammal Ecosystem Study. This project will also contribute to the Trustee Councils recovery objectives for subsistence by facilitating involvement of subsistence users in the restoration process.

#### NEED FOR THE PROJECT

#### A. Statement of problem

The harbor seal populations of Prince William Sound and the northern Gulf of Alaska were in decline before the oil spill for unknown reasons. The spill injured these populations, adding to the deeline, and they are not recovering. Harbor seals are a primary subsistence resource in the Alaska Native communities of the oil spill region. In order to identify measures which subsistence users could take to assist in harbor seal restoration, the Trustee Council funded projects in FY 94 and FY 95 to compile existing data, collect additional information, organize meetings of scientists and subsistence users, and develop recommendations for hunters. Two workshops took place. Among other things, participants at the workshops recognized that without a formal organization representing subsistence hunters of harbor seals, it was unlikely that a consensus on recommendations could be developed or that a dialogue between hunters and scientists could be maintained. Workshop participants stressed that strong involvement of hunters in research and management decisions was an essential ingredient in any plan for harbor seal recovery, as is the integration of traditional knowledge into research efforts. Several other proposed restoration projects will examine the potential causes of the harbor seal population decline and lack of recovery, including mortality caused by humans.

#### **B.** Rationale

The recovery objective for harbor seals states that recovery will have occurred when harbor seal population trends are stable or increasing. Other projects proposed to the Trustee Council will monitor the seal population and conduct research to find out why harbor seals are not recovering. Assessing parameters that affect marine mammal abundance and health requires access to and examination of animals or tissues. Marine mammals are inherently difficult to study and the collection and examination of tissues is further complicated by legal limitations imposed by federal protective

measures and permitting procedures. Sacrificing animals for research purposes is either undesirable or illegal and beachcast carcasses are often too decomposed to be of value. A potentially invaluable source of fresh specimens exists in Alaska, where coastal Natives still legally use marine mammals for subsistence or handicraft purposes.

For a harvest sampling program of this nature to succeed, it is important that:

1. Local people be involved in the sample collection, understand the significance of the data to be collected, support the program and its goals, be willing to store and ship samples from villages to a central receiver, and be trained and willing to record data and collect samples as instructed.

2. Samples must be easily collected, stored and shipped; may be subsequently sub-sampled by lab technicians; and must be analyzed in due time and results returned to villages.

#### C. Summary of Major Hypotheses and Objectives

A village-based program for collecting biological samples from harbor seals from key villages in the oil spill region is proposed as a pilot program, which may serve as a model for a more inclusive program throughout the range of the species. The six communities to be included in the pilot study are Cordova, Tatitlek, Chenega Bay, Seldovia, Port Graham, and Nanwalek. Specific objectives include to:

- 1. Develop a cooperative sampling program based on shared concern for the health of the harbor seal population
- 2. Produce an instruction video in biological sampling procedures
- 3. Train local hunters and technicians in collection procedures
- 4. Maximize sampling for efficiency and coordination with other programs while minimizing inconvenience of sample collection
- 5. Ship samples to appropriate laboratories for subsequent analysis
- 6. Advise villages and scientists of analytical results when available
- 7. Evaluate the programs' effectiveness and develop a more long-term funding plan.

#### D. Completion Date

The pilot program should continue for two years in order to get the system in place and provide enough time for an evaluation of its performance.

#### COMMUNITY INVOLVEMENT

Community involvement in the restoration process and in harbor seal recovery is a central purpose of this project. A facilitator will be hired in each community to help with collecting samples. Hunters will supply the samples. Periodic review of the project and results will occur during workshops organized by the Alaska Native Harbor Seal Commission and results will be provided through quarterly newsletters produced by the Commission.

#### FY 96 BUDGET

Personnel	12.0
Travel	3.7
Contractual	19.9

Commodities	5.1
Equipment	0.1
Subtotal	40.8
Gen. Admin.	3.2
Total	44.0

#### **PROJECT DESIGN**

#### A. Objectives

A village-based program for collecting biological samples from harbor seals from key villages in the oil spill region is proposed as a pilot program, which may serve as a model for a more inclusive program throughout the range of the species. The six communities to be included in the pilot study are Cordova, Tatitlek, Chenega Bay, Seldovia, Port Graham, and Nanwalek. Specific objectives include to:

- 1. develop a cooperative sampling program based on shared concern for the health of the harbor seal population
- 2. produce an instructional video on biological sampling
- 3. train local hunters and technicians in collection procedures
- 4. maximize sampling efficient and coordination with other programs while minimizing inconvenience of sample collection
- 5. ship samples to appropriate laboratories for subsequent analysis
- 6. advise villages and scientists of analytical results when available
- 7. evaluate the programs' effectiveness and develop a more long-term funding plan.

#### B. Methods

1. Training

Biologist, K. Wynne of the University of Alaska, will compile protocols, synthesize these into useable formats, develop data forms, labels, sampling kits, and a database, and incorporate instructions for their use into a training program.

Instruction: Sampling will require two levels of instruction or training: subsistence seal hunters and community-based sampling technicians. Village technicians and ADF&G technicians involved in subsampling or hunter training will attend a half-day regional sampling training session in Anchorage in which Wynne will: provide a detailed explanation of project goals, significance and use of data to be collected; distribute sampling kits and sub-sampling supplies; explain and demonstrate sampling techniques and use of equipment; distribute written, graphic, and video instructional materials to take to villages.

Hunters will be informed of program objectives and specified sampling requirements through communication with village technicians and other project personnel and through written, graphic, and video instructional materials

#### 2. Training materials

Video: This will include: project rationale and objectives; footage of current research and population declines; interviews with villagers and biologists about their concerns; significance and use of data to be collected; demonstrate how to fill in data forms and labels; demonstrate how to use sampling kit and supplies; show where and how to remove tissues from animals; and show how to sub-sample, bag, and label tissues.

Manual: This will include step-by-step diagrams and a visual guide. It will be waterproof and be included in the sampling kit.

Examples: At the training session participants will work through a hypothetical animal, filling in data forms and labels.

#### 3. Sample collections

Collectors and samplers include: a facilitator/expediter in each community, whose responsibilities are to assure access to freezer and sampling supplies, notify ADF&G when supplies are low or freezer is nearly full, and load and ship coolers with samples to Anchorage; and, key hunters, at least two per village, who are willing to collect samples and record data as requested.

Sample size and distribution: It is impossible to predict the number of samples that may be collected in this program annually or by community, but we have set a target of 20 animals per community while designing the sampling strategy and estimating project costs.

Tissues to be collected: A minimal sample can be collected by hunters with relative ease and subsequently sub-sampled to provide the suite of tissue samples required. We will train and ask hunters to record information about harvest location and animals' sex, evidence of tags or markers, and standard measures of length and girth. Hunters will be trained to collect the whole head (with hide and blubber intact); stomach (after tying off both ends), fist-sized sample of liver, heart, and kidney; female reproductive tract, and claws. Although collecting the reproductive tracts and claws is highly desirable, it may be realistic to assume they will be collected opportunistically only from those hunters willing to dedicate extra effort required to collect them.

#### Sampling procedure

In the field: The data form will be filled out immediately at the harvest site. Basic sample information will be filled in on a detachable specimen label at the bottom of the data form which will be placed inside the specimen bag with samples for transport to village-based storage. Hunters will be provided with a kit that includes supplies adequate for sampling of 20 animals. Among the items in each kit will be: 1) ziploc sampling bags for collection of the head, stomach, and tissues, 2) large garbage bags in which to place the sample bags collected from each animal and transport the samples to the village, and 3) data forms with a detachable specimen label. The head, stomach, and tissues will each be individually bagged in a two gallon ziploc bag. All these sample bags will then be placed in one large garbage bag along with the specimen label from the bottom of the data form. The specimen bag and top portion of the data form will be taken to the village for handing and cold storage as soon as possible following the kill.

#### Onshore:

Step 1: Village technician receives sample from hunter, then: places whole sample (garbage bag) in freezer without sub-sampling, enters information on freezer log and deposits data form in file, and contacts ADF&G when full shipment has accumulated or sends to Anchorage as requested.

Step 2: ADF&G Technician in Anchorage receives samples and stores for periodic sub-sampling effort, then: removes canine teeth, whiskers, and samples of skin, blubber, and skeletal muscle from the head and places each in a separate bag with a label containing information from the specimen label (date, species, sex, village); repackages each tissue into individual bag and labels as above, specifying organ; places all individual labeled sample bags back into single garbage bag along with original specimen label. Tie securely, refreeze, and ship to laboratory doing the analysis.

#### 4. Data collection

Data will be requested on data forms which will allow for standardization of data with other harvest-

sampling programs. See sample, attached. Sample labels and freezer log forms will be developed to assure adequate sample tracking.

Data management: Data collected from this program will be managed and maintained in a data base using software that is easily translated or integrated with software used by other agencies and organizations. This database will be centrally maintained (initially by Wynne) and a summary of the samples collected and analyzed will be included in the projects annual and final reports to the Trustee Council, with copies to pertinent agencies, such as NMFS.

Activities related to this project and all results will be reported in quarterly newsletters produced by the Alaska Native Harbor Seal Commission, and will be reviewed at biannual workshops organized by the Commission under Project Number 96244.

#### C. Contracts and Other Agency Assistance

Kate Wynne, University of Alaska Sea Grant Marine Advisory Program, will be subcontracted to develop the training and coordinate the sampling components of this project. She will:

- 1. help design and manage the sample collection procedures
- 2. assist ADF&G in production of the instructional video
- 3. synthesize technical information into: "user friendly" data forms, labels, and sampling kits
- 4. develop and deliver instructions for sample collection.

The Alaska Native Harbor Seal Commission will be subcontracted to help introduce the project into communities, participate in the training sessions, hire and supervise local community facilitators, and provide periodic summary reports on project performance. As part of its responsibilities under Project 96244, the Commission will organize two workshops per year during which, among other things, this projects performance and findings will be evaluated. This will also provide for coordination with other harbor seal research projects.

#### D. Location

The project will primarily focus on sample collection from the Prince William Sound communities of Cordova, Chenega Bay, and Tatitlek; and the lower Cook Inlet communities of Seldovia, Port Graham, and Nanwalek. If funding and scheduling permit, additional collection sites on Kodiak Island and the Alaska Peninsula will be added, probably in subsequent years of the project.

#### SCHEDULE

#### A. Measurable Project Tasks for FY 96

Start-up to October 31:	develop subcontracts
November:	hold regional training session (Anchorage produce training video
December:	Workshop (Alaska Native Harbor Seal Commission)
December to September 1996:	Sample collection
September 1996:	Workshop (Alaska Native Harbor Seal Commission): evaluate first year of program
April 1997:	Workshop to evaluate program and develop long-range funding plans
September 1997:	Workshop to review pilot programs results

#### **B.** Project Milestones and Endpoints

1.	Development of sampling program:	November 1995
2.	Instructional video:	November 1995
3.	Train local hunters and technicians	
	in collection procedures:	November 1995
4.	Maximize coordination	
	with other programs:	Ongoing
5.	Ship samples to appropriate	
	laboratories for subsequent analysis:	Ongoing
6.	Advise villages and scientists of	
	analytical results when available:	Ongoing
7.	Evaluate the programs effectiveness an	d
	develop a more long-term funding plan:	April 1996, April 1997
8.	Final project report:	April 1998

#### C. Project Reports

Annual report:	April 1997
Final report:	April 1998

#### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Several program exist or are planned to sample tissues from harbor seals from the spill area. We will make every effort to coordinate our efforts with these programs to minimize the burden and confusion of hunters and communities, maximize logistical efficiency, collect comparable or standardized data whenever possible, and limit the likelihood of duplication of efforts. The National Marine Fisheries Service has expressed interest and may have funding available to expand this pilot program in FY 96 or in subsequent years. This agency may also have funds available to perform analysis of samples as part of its normal agency management functions. Additionally, NMFS will assist with coordinating the harbor seal sampling and testing programs.

#### ENVIRONMENTAL COMPLIANCE

#### PERSONNEL

Kate Wynne is a biologist with the University of Alaska.

Craig Mishler has been a Subsistence Resource Specialist with the Division of Subsistence since 1989, with primary responsibility for Kodiak Island. He organized and conducted the division's subsistence resource collection and testing program in the Kodiak Island area in 1990 and has participated in Oil Spill Health Task Force informational meetings there in 1989 and 1992.

Monica Riedel, of Cordova, is the interim executive director of the Alaska Native Harbor Seal Commission. She has extensive experience in marine mammal issues through her work with the Alaska Sea Otter Commission.

Proposed Project Leader:

Proposed Project Leader: Dr. Jim Fall Project Director Subsistence Division Alaska Department of Fish and Game 333 Raspberry Rd. Anchorage, AK 99518 phone number:267-2359 fax number:349-4712

Sublin

Proposed Project Manager Pr. Joseph Sullivan Habitat & Restoration Division Alaska Department of Fish and Game 333 Raspberry Rd. Anchorage, AK 99518 phone number: 267-2213 fax number: 522-3148

Date Prepared

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## 1996 EXXON VALDEZ TRUS OUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

	Authorized	Proposed		and the second		· · · · · · · · · · · · · · · · · · ·		
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$12.0						
Travel		\$3.7						
Contractual		\$19.9						
Commodities		\$5.1		and a second	-			and the second
Equipment		\$0.1		LONG	RANGE FUNDI	NG REQUIREME	NTS	
Subtotal	\$0.0	\$40.8	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$3.2	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$44.0	\$36.0	\$15.0				
Full-time Equivalents (FTE)		0.3			A CARLES	a water the amount of the most added in the second	and analysis of an experimental second second	
			Dollar amount	ts are shown ir	thousands of	dollars.		T
Other Resources			1		1	<u></u>	<u> </u>	
1006	Project Num	ber: 96211	, based Harbs	er Sool Pielo	riad Samplin			FORM 3A AGENCY
Prepared: James Fall 1 of 4	Agency: Ak	Dept. of Fis	sh & Game	or Seal Blolog	jicai Samplin	g		PROJECT DETAIL 5/1/95

## 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Personnel Costs:		GS/Range/	Months	Monthly		Proposed	
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	A. Chartrand	Fish and Wildlife Technician III	11C	1.5	2,800		4.2
	C. Mishler	SRS III	18C	1.0	5,203		5.2
<b>  </b> *	Vacant	Fisheries Biologist III	18C	0.5	5,203		2.6
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		Subtotal		3.0	13,206	0	
Tho	se costs associated with progr	am management should be indicated by place	ment of an *.		P	ersonnel Total	\$12.0
Trav	rel Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description		Price	Trips	Days	Per Diem	FFY 1996
	Cordova - Anchorage		70		2	150	0.4
	Latitlek - Anchorage		550		2	150	0.9
l	Chenega Bay - Anchorage	·	900	1	2	150	1.2
	Nenwolak Anchorage		200	1	1	150	0.4
	Port Graham Anaborage		200		1	150	0.4
	Fort Granam - Anchorage	·	200	'	1	150	0.4
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Tho	se costs associated with progr	am management should be indicated by place	ment of an *.	L	··········	Travel Total	\$3.7
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Project Number: 96211 <b>1996</b> Project Title: Community-based Harb							Personnel
			or Seal Bioloc	ical Sampling			
Agency: AK Dent of Fish & (		Agency: AK Dept. of Fish & Game	-		-		a iravei
							DETAIL
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2 of 4

5/1/95

## 1996 EXXON VALDEZ TRUS OUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Description         FFY 1996           Subcontract with Kate Wynne, University of Alaska Seagrant Program, to provide training in sample collection, help produce training video, and oversee technical aspects of sampling program         7.3           Subcontract with Alaska Native Harbor Seal Commission to hire community facilitators, assist with training, provide review of project through workshops, and report project findings in newsletters         0.9           Pestage for video distribution         0.9           Postage for video distribution         2.0           Cost of electricity for running freezers in sampling communities Annual rental ocid storage space in Anchorage of internsit samples         0.3           Unheated Indoor storage space for coolers and sampling supplies in Anchorage Supplies for training video production         7.4           When a non-trustee organization is used, the form 4A is required.         Contractual Total         \$19.9           Commodities Costs:         0.6         0.6           Description         FFY 1996         0.3           Substance hunters sampling kits (15 @ \$42 each)         0.4         0.4           Insulated coolers (30 @ \$45 each)         0.4         0.4           Bue ice packs         Commodities without cold storage (6 @ 420 each)         0.1         0.2           Contractual Kort is for minisampling         0.1         0.1         0.1           Project Number: 96211 / Proje	Contractual Costs:		Proposed	
Subcontract with Kate Wynne, University of Alaska Seagrant Program, to provide training in sample collection, help produce     7.3       training video, and oversee technical aspects of sampling program     4.0       Subcontract with Alaska Native Hatro Seal Commission to hire community facilitators, assist with training, provide review of project through workshops, and report project findings in newsletters     0.9       Rental of editing studio with technican, production of training video     0.5       Postage for video distribution     2.0       Shipping sampling kits, coolers, tool sets, and freezers     2.2       Annual rental of cold storage space in Anchorage for in-transit samples     0.3       Unheated indoor storage space for coolers and sampling supplies in Anchorage     1.2       Air freight costs for shipping frozon samples (assumes testing at NMFS lab, Seattle)     1.5       When a non-trustee organization is used, the form 4A is required.     Contractual Total     \$19.9       Commodities Costs:     Proposed       Description     1.4       Subsistence hunters sampling kits (15 @ \$42 each)     0.3       Insulated coolers (30 @ \$45 each)     0.4       Isel is for minisampling     0.1       Vois sets for minisampling     0.2       Tool sets for minisampling     0.1       Project Number:     96211       Project Number:     96211       Project Number:     96211       P	Description		FFY 1996	
training video, and oversee technical aspects of sampling program     4.0       Subcontract with Alaska Native Harbor Seal Commission to hire community facilitators, assist with training, provide review     4.0       of project through workshops, and report project findings in newsletters     0.9       Rental of editing studio with technican, production of training video.     0.5       Shipping sampling kits, coolers, tool sets, and freezers.     2.0       Cost of electricity for running freezers in sampling community facilitators, assist with training, provide review     0.3       Annual rental of cold storage space in Anchorage for in-transit samples     0.3       Unheated indoor storage space for coolers and sampling supplies in Anchorage     1.2       Air freight costs for shipping frozen samples (assumes testing at NMFS lab, Seattle)     1.5       When a non-trustee organization is used, the form 4A is required.     Contractual ¢19.9       Commodities Costs:     Proposed       Description     FPK 1996       Subsistence for communities without cold storage (6 @ 420 each)     0.3       Isulated coolers for communities without cold storage (6 @ 420 each)     0.1       Commodities for minisampling     0.1       Project Number: 96211 , Project Title: Community-based Harbor Seal Biological Sampling     0.1       FORM 3B     Contractual & Commodities       Commodities Cost:     Project Number: 96211 , Project Title: Community-based Harbor Seal Biological Sampling	Subcontract with	ate Wynne, University of Alaska Seagrant Program, to provide training in sample collection, help produce	7.3	
Subcontract with Alaska Native Harbor Seal Commission to hire community facilitators, assist with training, provide review     4.0       of project through workshops, and report project findings in newsletters     0.9       Rental of additing studie, with technican, production of training video     0.9       Postage for video distribution     0.5       Shipping sampling kits, coolers, tool sets, and freezers     2.0       Cost of electricity for running freezers in sampling communities     0.3       Annual rental of cold storage space in Anchorage for in-trensit samples     0.3       Unheated Indoor storage space for coolers and sampling supplies in Anchorage     1.2       Air freight costs for shipping frozen samples (assumes testing at NMFS lab, Seattle)     1.5       When a non-trustee organization is used, the form 4A is required.     Contractual Total     \$19.9       Commodities Costs:     Proposed       Description     FFY 1996       Subsistence hunters sampling kits (15 @ \$42 each)     0.4       Insulated coolers (30 @ \$45 each)     0.4       Blue ice packs     0.2       Cost for minisampling     0.5       Tool sets for minisampling     Storage (6 @ 420 each)       Project Title: Community-based Harbor Seal Biological Sampling     Contractual & Commodities Contractual & Commodities DETAIL	training video	and oversee technical aspects of sampling program		
of project through workshops, and report project findings in newsletters     0.9       Rental of editing studio with technican, production of training video     0.5       Postage for video distribution     0.5       Shipping sampling kits, coolers, tool sets, and freezers     2.0       Cost of electricity for running freezers in sampling communities     2.2       Annual rental of cold storage space in Anchorage for in-transit samples     0.3       Unheated Indoor storage space for coolers and sampling supplies in Anchorage     1.2       Air freight costs for shipping frozen samples (assumes testing at NMFS lab, Seattle)     1.5       When a non-trustee organization is used, the form 4A is required.     Contractual Total     \$19.9       Commodities Costs:     Proposed     0.3       Subplies for training video production     0.3     0.4       Subplies for training video production     0.3     0.4       Bule ice packs     0.2     0.3       Chest freezers for communities without cold storage (6 @ 420 each)     0.1       Project Title: Community-based Harbor Seal Biological Sampling     0.1       Project Title: Community-based Harbor Seal Biological Sampling     Contractual & Commodities Commodities Commodities Commodities Det Title: Community-based Harbor Seal Biological Sampling IDETAIL	Subcontract with A	Naska Native Harbor Seal Commission to hire community facilitators, assist with training, provide review	4.0	
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Postage for video distribution     0.5       Shipping sampling kits, coolers, tool sets, and freezers     2.0       Cost of electricity for running freezers in sampling communities     0.3       Annual rental of cold storage space in Anchorage for in-transit samples     0.3       Unheated indoor storage space for coolers and sampling supplies in Anchorage     1.2       Air freight costs for shipping frozen samples (assumes testing at NMFS lab, Seattle)     1.5       When a non-trustee organization is used, the form 4A is required.     Contractual Total     \$19.9       Commodities Costs:     Proposed       Description     0.3       Subjistence hunters sampling kits (15 @ \$42 each)     0.3       Insulated coolers (30 @ \$46 each)     0.4       Blue ice packs     0.2       Chest for exists for minisampling     0.3       Chest for exists of somunities without cold storage (6 @ 420 each)     0.3       Insulated coolers (30 @ \$46 each)     0.2       Chest for exists for minisampling     0.1       Verify the exist for minisampling     0.1       Verify the exist for minisampling     0.1       Project Number:     96211 / Project Title: Community-based Harbor Seal Biological Sampling Agency: AK Dept. of Fish & Game	Rental of editing st	udio with technican, production of training video	0.9	
Shipping sampling kits, coolers, tool sets, and freezers     2.0       Cost of electricity for running freezers in sampling communities     2.2       Annual rental of cold storage space for coolers and sampling supplies in Anchorage     1.2       Air freight costs for shipping frozen samples (assumes testing at NMFS lab, Seattle)     1.2       When a non-trustee organization is used, the form 4A is required.     Contractual Total     \$19.9       Commodities Costs:     Proposed       Description     FFY 1996       Subjected colorers (13) @ \$45 each)     0.3       Blue lee packs     0.1       Chest for minisampling     0.1       Coll sets for minisampling     0.5       Tool sets for minisampling     0.5       Project Number: 96211 / Project Number: 96211 / Project Title: Community-based Harbor Seal Biological Sampling     \$15.1       Project Number: 96211 / Agency: AK Dept. of Fish & Game     Dertail	Postage for video of	listribution	0.5	
Cost of electricity for running freezers in sampling communities     2.2       Annual rental of cold storage space in Anchorage for in-transit samples     0.3       Unheated indoor storage space for coolers and sampling supplies in Anchorage     1.2       Air freight costs for shipping frozen samples (assumes testing at NMFS lab, Seattle)     1.5       When a non-trustee organization is used, the form 4A is required.     Contractual Total     \$19.9       Commodities Costs:     Proposed       Description     FFY 1996       Subsistence hunters sampling kits (15 @ \$42 each)     0.3       Insulated coolers (30 @ \$45 each)     0.6       Isulated coolers (30 @ \$45 each)     0.4       Blue ice packs     0.2       Chest for minisampling     2.5       Tool sets for minisampling     0.1       Project Number: 96211 , Project Title: Community-based Harbor Seal Biological Sampling Agency: AK Dept. of Fish & Game     Sampling	Shipping sampling	kits, coolers, tool sets, and freezers	2.0	
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Air freight costs for shipping frozen samples (assumes testing at NMFS lab, Seattle)       1.5         When a non-trustee organization is used, the form 4A is required.       Contractual Total       \$19.9         Commodities Costs:       Proposed         Description       FFY 1996         Subsistence hunters sampling kits (15 @ \$42 each)       0.3         Insulated coolers (30 @ \$45 each)       1.4         Blue ice packs       0.2         Chest freezers for communities without cold storage (6 @ 420 each)       2.5         Tool sets for minisampling       0.1         Project Number: 96211 ,       Project Number: 96211 ,         Project Title: Community-based Harbor Seal Biological Sampling       FORM 38         Contractual & Commodities DETAIL       DETAIL	Unheated indoor st	orage space for coolers and sampling supplies in Anchorage	1.2	
When a non-trustee organization is used, the form 4A is required.       Contractual Total       \$19.9         Commodities Costs:       Proposed         Description       FFY 1996         Subplies for training video production       0.3         Subsistence hunters sampling kits (15 @ \$42 each)       0.6         Insulated coolers (30 @ \$45 each)       1.4         Blue ice packs       2.5         Chest freezers for communities without cold storage (6 @ 420 each)       2.5         Tool sets for minisampling       0.1         Project Number:       96211 _         Project Number:       96211 _         Project Title: Community-based Harbor Seal Biological Sampling       FORM 3B         Contractual & Commodities DETAIL       DETAIL	Air freight costs fo	r shipping frozen samples (assumes testing at NMFS lab, Seattle)	1.5	
When a non-trustee organization is used, the form 4A is required.       Contractual Total       \$19.9         Commodities Costs:       Proposed         Description       FFY 1996         Subsistence hunters sampling kits (15 @ \$42 each)       0.3         Insulated coolers (30 @ \$45 each)       1.4         Blue ice packs       2.5         Chest freezers for communities without cold storage (6 @ 420 each)       0.1         Tool sets for minisampling       0.1         Project Number:       96211         Project Title: Community-based Harbor Seal Biological Sampling       FORM 3B         Commodities       Commodities         Description       Description         Subsistence hunters appling       Entractual & Commodities         Description       Status         Chest freezers for community-based Harbor Seal Biological Sampling       Commodities         Description       Status         Commodities       DETAIL				
Commodities Costs:       Proposed         Description       FFY 1996         Supplies for training video production       0.3         Subsistence hunters sampling kits (15 @ \$42 each)       0.6         Insulated coolers (30 @ \$45 each)       1.4         Blue ice packs       0.2         Chest freezers for communities without cold storage (6 @ 420 each)       2.5         Tool sets for minisampling       0.1         Project Number:       96211         Project Title: Community-based Harbor Seal Biological Sampling       FORM 3B         Commodities       Commodities         Descry:       AK Dept. of Fish & Game	When a non-truste	e organization is used, the form 4A is required. Contractual Tota	I \$19.9	
Description       FFY 1996         Supplies for training video production       0.3         Subsistence hunters sampling kits (15 @ \$42 each)       0.6         Insulated coolers (30 @ \$45 each)       0.4         Blue ice packs       0.2         Chest freezers for communities without cold storage (6 @ 420 each)       0.1         Tool sets for minisampling       0.1         Project Number: 96211       96211         Project Title: Community-based Harbor Seal Biological Sampling       FORM 38         Commodities       Commodities         Det Title: Community-based Harbor Seal Biological Sampling       Det Tatl	Commodities Costs	··	Proposed	
Supplies for training video production       0.3         Subsistence hunters sampling kits (15 @ \$42 each)       0.6         Insulated coolers (30 @ \$45 each)       1.4         Blue ice packs       0.2         Chest freezers for communities without cold storage (6 @ 420 each)       2.5         Tool sets for minisampling       0.1         Project Number:       96211         Project Title:       Community-based Harbor Seal Biological Sampling         FORM 3B       Contractual & Commodities         Details       Details         Agency:       AK Dept. of Fish & Game	Description		FFY 1996	
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Insulated coolers (30 @ \$45 each)       1.4         Blue ice packs       0.2         Chest freezers for communities without cold storage (6 @ 420 each)       2.5         Tool sets for minisampling       0.1         Commodities Total         Project Number:       96211         Project Title:       Community-based Harbor Seal Biological Sampling         Project Title:       Commodities DETAIL         DETAIL       DETAIL	Subsistence hunter	s sampling kits (15 @ \$42 each)	0.6	
Blue ice packs       0.2         Chest freezers for communities without cold storage (6 @ 420 each)       2.5         Tool sets for minisampling       0.1         Commodities Total         1996       Project Number: 96211         Project Title: Community-based Harbor Seal Biological Sampling       FORM 3B         Agency: AK Dept. of Fish & Game       DETAIL	Insulated coolers (3	30 @ \$45 each)	1.4	
Chest freezers for communities without cold storage (6 @ 420 each)       2.5         Tool sets for minisampling       0.1         Commodities Total       \$5.1         Project Number:       96211         Project Title:       Community-based Harbor Seal Biological Sampling         Agency:       AK Dept. of Fish & Game	Blue ice packs		0.2	
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Commodities Total       \$5.1         1996       Project Number:       96211       FORM 3B       Form 3B       Contractual & Contra & Contractual & Contractual & Contractual &	Tool sets for minis	ampling	0.1	
Commodities Total       \$5.1         1996       Project Number:       96211       FORM 3B       FORM 3B       Contractual & Contractual & Contractual & Contractual & Commodities         1996       Agency:       AK Dept. of Fish & Game       DETAIL				
Commodities Total \$5.1         1996       Project Number: 96211       FORM 3B         Project Title: Community-based Harbor Seal Biological Sampling       Formedities         Agency: AK Dept. of Fish & Game       DETAIL				
Commodities Total       \$5.1         1996       Project Number: 96211 Project Title: Community-based Harbor Seal Biological Sampling Agency: AK Dept. of Fish & Game       FORM 3B Contractual & Commodities DETAIL				
Commodities Total       \$5.1         1996       Project Number: 96211       FORM 3B         Project Title: Community-based Harbor Seal Biological Sampling       Formatical & Contractual & Commodities DETAIL				
Commodities Total       \$5.1         1996       Project Number: 96211 Project Title: Community-based Harbor Seal Biological Sampling Agency: AK Dept. of Fish & Game       FORM 3B Contractual & Commodities DETAIL				
1996       Project Number: 96211       FORM 3B         Project Title: Community-based Harbor Seal Biological Sampling       Contractual &         Agency: AK Dept. of Fish & Game       DETAIL			45.4	
<b>1996</b> Forgiect Number: 96211       FORM 3B         Project Title: Community-based Harbor Seal Biological Sampling       Contractual &         Agency: AK Dept. of Fish & Game       DETAIL		Commodities Total	\$5.1	
1996Project Number: 96211 Project Title: Community-based Harbor Seal Biological SamplingFORM 3B Contractual & Commodities DETAIL				
<b>1996</b> Project Number: 90211       Contractual &         Project Title: Community-based Harbor Seal Biological Sampling       Contractual &         Agency: AK Dept. of Fish & Game       DETAIL		Project Numbers 06211		
Project Title: Community-based Harbor Seal Biological Sampling       Commodities         Agency: AK Dept. of Fish & Game       DETAIL	1006		ontractual &	
Agency: AK Dept. of Fish & Game DETAIL	1990	Project Litle: Community-based Harbor Seal Biological Sampling	ommodities	
		Agency: AK Dept. of Fish & Game	DETAIL	

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## 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

New Equipment Pu	urchases:		Number	Unit	Proposed
Description			of Units	Price	FFY 1996
One wireless	lavalier microph	one and transmitter	1	120	0.1
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
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					0.0
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					0.0
	secciated with	replacement equipment should be indicated by placement of an B	Now E	winment Total	<u> </u>
Existing Equipmon				Aupment Total	Unventory
Description	t Usage.			of Units	Agency
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		Project Numbers 06211		l F	ORM 3B
1006					quinment
1330		Project Litle: Community-based Harbor Seal Biological Samplin	g		
		Agency: AK Dept. of Fish & Game			
l				L	
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## KODIAK TRIBAL COUNCIL



Post Office Box 1974 Phone (907) 486-4449

Kodiak, Alaska 99615 Fax (907) 486-3361

ic.e

April 28, 1995

Exxon Valdez Oil Spill Trustee Council 645 G Street, Suite 401 Anchorage, AK 99501

Dear Members of Council,

The enclosed proposal from the Kodiak Tribal Council is not yet fully developed according to the DPD guidelines set forth in the <u>Invitation to Submit Restoration</u> <u>Projects for Federal Fiscal 1996</u>. However, we are coordinating with the Fishery Industrial Technology Center of the University of Alaska to file this letter of intent to the Trustees in expectation that a full proposal will be forthcoming within the next 30 days. As we envision it, the proposal will have two components: a sampling collection component and a testing component.

We are submitting a research and testing component previously developed by the FITC for submission to the Sea Grant program, accompanied by our own component which would involve local Kodiak Island communities in a systematic sample collection program. The FITC component will develop a rapid chromatographic screening method for detecting the levels of toxins which produce paralytic shellfish poisoning. The communities that would participate in the project include Kodiak City, Ouzinkie, Port Lions, Larsen Bay, Karluk, Akhiok, and Old Harbor.

We feel this is an extremely important public health issue, one that has become more acute in the Kodiak area since the EVOS. While it is difficult to determine whether the EVOS played any part in the rise in PSP cases in Kodiak communities since the spill, it is indisputable that the oil spill shook people's confidence in the food safety of shellfish and that a systematic PSP testing program is sorely needed to restore that confidence.

By the end of May, 1995, we hope to submit a complete formal proposal that integrates both components--the laboratory testing and the community participation in sample collections. We trust that this preliminary proposal will be accepted as a place holder until the full formal proposal can be developed.

Sincerely,

Margaret Roberts President

## PSP SHELLFISH RESTORATION TESTING PROGRAM

Project Number:	96212		
<b>Restoration Category:</b>	General Restoration		
Proposer:	Kodiak Tribal Council		
Lead Trustee Agency:	Alaska Department of Fish and Game		
Cooperating Agencies:	Alaska Department of Environmental Conservation		
Project Start-up/Completion Dates: 2/1/96-1/31/98			
Duration:	Three years		
COST FY 96: COST FY 97: COST FY 98: COST FY 99: COST FY 00: COST FY 01: COST FY 02:	\$ 84,949 \$ 137,502 \$ 41,840		
Geographic Area:	Kodiak Island (7 communities)		
Injured Resource/Service:	Subsistence use of intertidal organisms		

## ABSTRACT

Subsistence users in the Kodiak Island Borough probably consume more shellfish (clams and crabs) per capita than any other region of Alaska. Since the oil spill, numerous cases of severe paralytic shellfish poisoning (PSP) have created fear about the safety of consuming these traditional foods. This proposal addresses the health concerns of subsistence users through active participation in a systematic testing program. Faster lab results should curtail the number of cases of PSP and save lives.

## PSP SHELLFISH RESTORATION TESTING PROGRAM (preliminary proposal)

I. Community Participation Component: Sample Collection and Administration

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II. Laboratory Testing Component: Development of a rapid chromatographic screening method

## submitted by

## The Kodiak Tribal Council and The Fishery Institute Technology Center

## **RESEARCH PROPOSAL: COMMUNITY PARTICIPATION COMPONENT**

It is thought that a testing program for paralytic shellfish poisoning in the Kodiak area will be of tremendous help to subsistence users in rural off-road communities as well as to the many residents living on the Kodiak road system. Kodiak communities traditionally consume large amounts of butter clams and littleneck clams each year, along with lesser amounts of cockles, razor and pinkneck clams, and dungeness, king, and tanner crab. All of these species are highly vulnerable to toxins, but currently there is no quick way to determine whether they are safe to eat. At the present time only a few beaches in Alaska are certified by the Department of Environmental Conservation (DEC), and these beaches are commercial beaches well outside of the Kodiak area. The old adage about avoiding clams in the non-R months of May, June, July, and August does not hold up under scientific scrutiny, since shellfish can be poisonous in the winter months and safe to eat in the summer.

We are proposing the establishment of a network of seven local technicians. These technicians will be responsible for collecting samples of various species of clams and crabs from their traditional harvest areas. One technician will be contracted in each of the following communities: Kodiak City, Akhiok, Old Harbor, Karluk, Larsen Bay, Port Lions, and Ouzinkie. The samples they collect will be sent to the FITC lab in Kodiak City for screening. These persons will be trained by the Fishery Industrial Technology Center (FITC) prior to the commencement of sample collection. They will be instructed in collection procedures, as well as labeling, storing, and shipping samples, and the interpretation of test results.

Samples will be collected biweekly for a period of two years, and in most cases results will be reported back to the communities within a few days after samples are received. This is a substantial improvement over the present system, whereby samples must be sent to the Palmer DEC lab for mouse bioassay. Because of the distance and cost of forwarding samples to Palmer, results of the bioassay tests often do not get back to the communities for a week or more, which means subsistence users may lose the opportunity to collect and consume shellfish when they are most readily available--during infrequent low tide cycles.

The chromatographic screening test will allow quick community notification whenever the results are negative, so people will know right away when their clams and crabs are safe to eat. However, when test results are positive, or when they indicate marginal toxicity, the mouse bioassay method will still be used, and subsistence users will be cautioned to wait until samples can be processed by the DEC for more conclusive findings. With chromatographic screening, health risks will be greatly reduced.

The Kodiak Tribal Council will administer the grant funds, negotiate a subcontract with the FITC for testing samples, contract with local technicians, and perform clerical tasks such as payroll. The Council will also maintain voice and fax communication with the technicians, and coordinate the shipment of sample collections to the FITC. The FITC will train the local technicians and report results back to the communities through the technicians and community health aides.

## BUDGET FOR COMMUNITY SAMPLE COLLECTIONS AND ADMINISTRATION

## Salaries and Wages:

-

Year 1 only: Community Technician Training (7 positions) 16 hours x \$13/hour x 7	\$ 1,456
Years 1 and 2: Community Technicians (7 positions) Collection of 48 samples x \$50/sample x 7	16,800
Finance Director (Walter Sapp) \$21.50/hour x 80 hours	1,720
Project Manager/Administrator (Margaret Roberts) \$22/hour x 60 hours	1,320
Clerk-typist/receptionist/project watchdog (Virginia Abston) \$15/hour x 640 hours	9,600
Subtotal	\$30,896
Travel:	
Round-trip air fare from Old Harbor, Port Lions, Ouzinkie, Larsen Bay, Karluk, and Akhiok to Kodiak City (Year 1)	600
Per diem for training session: \$100/day x 2 days x 6 persons (Year 1)	1,200
Car mileage for Kodiak road system collections (950 miles x 30¢/mile)(Years 1 and 2)	285
Gasoline for skiffs and 4-wheelers to access beaches (Years 1 and 2)	1,000
Subtotal	\$3,085
Communications and Supplies (Years 1 and 2):	
Sampling kits (48 kits x \$10/ea. x 7 communities) Shipment of samples via air freight	3,360
(48 samples x \$15 x 6 communities) Long distance telephone calls to technicians	<b>4,320</b> 700
Subtotal	\$8,380
Total Salaries, Travel, and Supplies 12% Overhead	\$42,361 5,083
Total Sample Collections and Administration	\$47,444

## Margaret L. Roberts P.O. Box 3208 Kodiak, Alaska 99615 (907) 486-3955

#### Objective

<u>Senior Executive Level</u> position in a native-owned or Indian organization where my technical skills, organizational dynamics, cultural sensitivities and leadership capabilities can be demonstrated.

#### Experience

#### Kodiak Tribal Council

#### Kodiak, Alaska

#### President

#### 1987-Present

As Chief Operating Officer of the Kodiak Tribal Council, I work directly with the council which functions as the Board of Directors for the Shoonag' Tribe of Kodiak. I interface with the following groups of people: the Elders and assist them where necessary; and tribal leaders as well as community leaders on a local, regional, state and national scale. I am solely responsible for organizing an economic development effort for the Shoonaq' Tribe. At the present time, there are two responsibilities that I am managing: 1) Programs for the tribe in excess of \$750,000; and 2) Twelve employees of the tribe. The following are duties I fulfill as the chief operating officer: writing proposals, administering grants and contracts, employing and dismissing staff, and perform other general duties necessary for the successful operation of a tribal office. Specifically, I am responsible for accounting, payroll, IRS Quarterly Reports, and Bi-weekly tax deposits. 1 prepare Quarterly Objective Progress Reports, as well as Quarterly Federal Cash Transactions Reports and Financial Status Reports for the Tribe. I maintain excellent working relationships for the Tribe and its membership, with officials, staff, and representatives from the State, Federal Government, Kodiak Island Borough, the Kodiak Area Native Association, Inc., and the other six village tribal councils, namely Karluk, Larsen Bay, Akhiok, Old Harbor, Port Lions and Ouzinkie.

#### Kodiak Tribal Council

#### Kodiak, Alaska

#### Manager

Mar 1987-Sep 1987

Previously a manager of the Kodiak Tribal Council, my responsibilities included the following: Implementing a P.L. 638-104(a) grant, which was a subgrant through the Natives of Kodiak, Inc., from the Bureau of Indian Affairs; Reported directly to BIA as well as the Natives of Kodiak, Inc.; Maintained enrollment for the Shoonaq' Tribe and drafted a constitution for the Constitutional Convention; Managed a Tribal Action Plan for combating alcohol and drug abuse problems; Drafted, typed and disseminated all tribal correspondence; Prepared quarterly financial and narrative reports to the Bureau of Indian Affairs, grant modifications and revisions,

#### Margaret L. Roberts

payroll, Federal Tax Report forms, tax deposits and payments, and year-end W-2 forms; Reconciled bank statements; and sought funding sources and wrote grant proposals. I also worked very closely with the Tribal Council and the tribal members.

Kodiak Transfer, Inc.	Kodiak, Alaska
Office Manager	1973–1980

As office administrator for Kodiak Transfer, inc., I performed general office duties for this moving and storage company. I worked with tariffs, and provided bids on moving intra-inter state goods. Bookkeeping, preparing payroll and payroll deposits, bills of lading and other paperwork involving accounts receivable and payable was among the necessary duties I needed to render.

Kodiak King Crab, Inc.

Kodiak, Alaska

1972--1973

Bookkeeper

Performed general accounting procedures, prepared fish tickets, payroll and general fishing settlements.

#### Education

Received extensive post-secondary training in planning, managing, organizing and developing various programs to meet specific needs of Native non-profit organizations. Extensive training includes management, contract negotiation, powerful presentations, employing and dismissing, labor laws, resolving disputes, contracting, and most importantly, knowledge of the Alaska Native Claims Settlement Act.

Kodiak High School

Kodiak, Alaska

Completed secondary education and graduated with high school diploma in 1967.

#### Special Accomplishments

I am the or one of the original founder(s) of the following: Kodiak Alutiiq Dancers; Alaska Sea Otter Commission; Alaska Inter-Tribal (-runcil; and Kodiak Island Inter-Tribal Council. I was the recipient of the 1992 Community Enterprise Development Corporation of Alaska President's Award and was presented with a Chief's Traditional Knife. I was also the recipient of the 1987 National Indian Health Board Award. I am responsible for the reorganization of the Kodiak Tribal Council.

As the chair of the Alaska Sea Otter Commission, I signed a memorandum of agreement for cooperative-management on sea otter management issues with the United States Fish and Wildlife Service and State of Alaska.

I served as an integral member of the Kodiak Area Native Association's By-Law Committee;

#### Margaret L. Roberts

Personnel Committee; Building Committee; Scholarship (Skip Eaton) Committee; Cultural Museum Committee; Natives of Kodiak's By-Law Committee; and Koniag, Inc., Election and Rules Committee. I served as the editor of the Natives of Kodiak Newsletters and also designed their logo.

#### Current Affiliations

-Kodiak Tribal Council, President - Seven (7) Years

-Koniag, Inc., - Shareholder

--Natives of Kodiak, Inc., - Shareholder

--Kodiak Island Inter-Tribal Council - Chair

-Kodiak Area Native Association, Chairperson, Health Committee - Two (2) Years

-Kodiak Area Native Association - Crisis Management for three (3) months

-Shoonaq' Tribe of Kodiak - Member

-Kodiak Area Native Association - Member

--Alaska Native Health Board - Officer

--Alaska Sea Otter Commission - Chair

-Alaska Inter-Tribal Council - Officer

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#### Personal Information

Maiden Name:	Margaret Wagner-Fadaoff
Birthdate:	November 28, 1948
SSN:	574-20-1958
Marital Status:	Married; Four Children; Two Grandchildren
Alaska Residency:	Since Birth-

References will be furnished upon request.

## VIRGINIA ABSTON P.O. Box 294 Kodiak, Alaska 99615-0294 (907)486-3685

#### EDUCATION

Graduated from Kodiak High School - 1961 Clerical Certificate - Kodiak Community College - 1973 Class on Stain Glass - Kodiak Community College - 1974 Class on Glass Etching - Kodiak Community College - 1974 Class on Egg Dyeing - Koidak Community College - 1974 Class on Ventura Publishing - Kodiak Community College - 1990

#### EMPLOYMENT

Owner/Operator Fish Net Site (Seasonal Work - every summer) 1961 to present

Naughtons Bakery, 9 months out of the year -Bookkeeper 1963-1964 Koniag, Inc., Secretary 9 months out of the year form 1974-1979 Kodiak Tribal Council, Secretary, Enrollment Clerk, Recording Administrative Ass't; 9 months out of the year; 1988 to present

#### AFFILIATIONS

Koniag, Inc. - Member Kodiak Tribal Council - Member Kodiak Area Native Association - Member Kodiak Area Native Association Board Member - 1978 Kodiak Area Native Association Personnel Committee - 1978 Kodiak Tribal Council - Secretary - 1988 Kodiak Tribal Council - Enrollment Clerk - 1988 to present Koniag, Inc. - Secretary Kodiak Island Seafoods Inc., - Secretary Cape Chiniak Joint Venture, Secretary and Recording Secretary Nu-Nachk-Pit, Inc., Secretary and Recording Secretary Member, Kodiak Mid-Eastern Dance Troupe Member, Kodiak Women's Bowling Association Kodiak Dart League Two Newsletters Kodiak Tribal Council Pioneers of Alaska Election and Rules Committee for Koniag, Inc.

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## WALTER SAPP

1515 Lynden Way

## Kodiak, Alaska 99615-6282 Office: (907) 486-6990 Home: (907) 486-3386 Fax: (907) 486-2441

Senior Executive experienced in management, finance, accounting, business development and marketing who managed annual budgets up to \$50 million.

Creative, bottom-line business leader with exceptional ability to define business problems, design innovative solutions, assess marketing potential, and achieve business goals.

- Developed successful grants for Native non-profits from \$15,000 to \$750,000.
- Developed and implemented computerized accounting systems for non-profit and for-profit organizations.
- Increased staff efficiency from a two-week turnaround on inquiries to 2-days.

Proven track record in start-ups, strategic planning, high-level problem solving and finance.

-Spearbeaded Board of Directors Negotiating Team that ended a labor strike that halted the production of a \$54 million electric cooperative.

- Spearheaded Board of Directors Team that reduced operations cost by 3%.

Natural communicator and hands-on team builder with strong supervisory and motivational skills who can initiate change and implement new processes in fast growth business and multimedia environments.

Established reputation as a motivated professional taking pride in quality accomplishments with the ability to communicate, coordinate and motivate a wide range of diversified, culturally sensitive, operational and administrative personnel.

MBA, George Washington University, 1981. BA, University of the District of Columbia, 1974. Lieutenant Commander, U.S. Coast Guard, Retired.

## \_PROFESSIONAL EXPERIENCE\_

## SYNERGETICS BUSINESS SERVICES, KODIAK, ALASKA Founder and Owner

#### 1986 - Present

- Founded successful management consulting and accounting practice.
- Expertise in grant writing and administration for non-profits.
- Specialist in fund accounting, tax preparation and consulting.
- Expertise in strategic project management including strategic assessment of competitive environment, critical success factors and in-depth analysis of company strengths and weaknesses.

## KODIAK ELECTRIC ASSOCIATION, INC.

## President, Board of Directors

## - Spearheaded policy making body that directed the activities of a \$54 million electric cooperative.

- Initiated cost-cutting measures that resulted in a 3% savings to the consumers.
- Spearheaded negotiating team that ended labor strike after less than 72 hours of work stoppage.

### KODIAK ELECTRIC ASSOCIATION, INC.

#### Member, Board of Directors

#### 1989 - Present

1993 - Present

- As chairman of the budget committee, established time tables for budget preparation and presentation to the Board.
- Initiated inquiries to staff that resulted in the discovery of an under billing error of \$1.2 million.
- As chairman of the engineering committee, reviewed construction work plans, power requirement studies and planning documents for future direction of the cooperative.

#### PROJECT MANAGEMENT COMMITTEE, FOUR DAM POOL Treasurer

#### 1992 - Present

- Review documents and prepare payment vouchers for multibillion dollar statewide electric energy operation
- Prepare documents for legislative testimony regarding impact of legislative decisions on energy needs within the State of Alaska.

#### PROJECT MANAGEMENT COMMITTEE, FOUR DAM POOL

#### Voting Member

1991 - Present

 Voting representative to multibillion dollar statewide electric energy governing body.

#### KODIAK TRIBAL COUNCIL, INC.

## **Finance Director**

1927 - Present

- Established computerized accounting system to track funding obligations and expenditures based on grant reporting.
- Provide financial management decisions to President and Board of Directors on a daily basis.
- Established internal control measures for cost accountability and control.

## KARLUK IRA TRIBAL COUNCIL

Finance Director

1993 - Frescai

- Provide financial management and accounting decision to the Native Village of Karluk on a drihy basis.

## KARLUK IRA TRIBAL COUNCIL

## Finance Director (cont...)

1993 - Present

- Write grants and prepare grant administration documents on a contractual basis.
- Provide management consulting services on a daily basis.

## U.S. COAST GUARD

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Seaman Apprentice to Lieutenant Commander

1961 - 1986

- Retired Comptroller Officer for U.S. Coast Guard.

- Alaska Sea Grant College Program TO: 304 Eielson Building University of Alaska Fairbanks Fairbanks, AK 99775-5040
- Fishery Industrial Technology Center FROM: School of Fisheries and Ocean Sciences 900 Trident Way Kodiak, AK 99615-7401
- Development of a rapid chromatographic screening method for paralytic TITLE: shellfish poisoning

PRINCIPAL INVESTIGATORS:

Brian Himelbloom Associate Professor SS# 323-42-0855

John S. French Professor SS#200-38-1217

John Kennish Professor SS# 136-36-3636

NEW/CONTINUING: PROPOSED START DATE: PROPOSED DURATION:

New 1 FEB 1996 2 years

Year 1

Year 2

Date

AMOUNT REQUESTED:

rench

Principal Investigator (907)486-1505

Total	<del>م</del> \$216	·848
25	Eman	Aimel
·- [	Brian Hime	mooldle
	Principal in	vestigator
	(907)486-1	529

Date

\$102,168

\$114,680



French onn S Director, Fishery Industrial **Technology Center** (907)486-1505

anda

in Osterkamp Executive Officer, School of Fisheries and Ocean Sciences (907)474-7824

316165 Vera Alexander Date Dean, School of Fisheries and Ocean Sciences (907)474-7531

Ted DeLaca Director, Office of Arctic Research (907)-474-7314

Date

March 1995

## Development of a rapid chromatographic screening method for paralytic shellfish poisoning

John S. French Professor of Seafood Blochemistry

Brian H. Himelbloom Associate Professor of Seafood Microbiology Fishery Industrial Technology Center University of Alaska Fairbanks

and John Kennish Professor of Chemistry Department of Chemistry and Physics University of Alaska Anchorage

John S/French Principal Investigator

Al Tyler Date Associate Dean, School of Fisheries and Ocean Sciences, UAF

Brian H. Himelbioom Principal Investigator

John Kennish Principal Investigator Wayne Miller Date Dean, College of Arts and Sciences, UAA

## PROJECT SUMMARY

TITLE: Development of rapid chromatographic screening method for paralytic shellfish poisoning INITIATION DATE: February 1, 1996 COMPLETION DATE: January 31, 1998

PRINCIPAL INVESTIGATORS: John S. French; Brian H. Himelbloom, and John M. Kennish

AFFILIATION: 1. UAF School of Fisheries and Ocean Sciences 2. UAA College of Arts and Sciences

KEYWORDS: PSP, Shellfish Toxin, TLC, FID, latroscan

OBJECTIVES: To develop a new chromatographic assay to screnn for paralytic shellfish poison (PSP); to compare the accuracy of this assay with the standard mouse bioassay to screen for the samples below the action level; and to verify the assay on a survey of molluscan shellfish and viscera of crustaceans collected from shores and waters within the Kodiak Island Borough.

METHODOLOGY: The proposal uses a quantitative method employing thin-layer chromatography (TLC) combined with flame ionization detection (FID) as an appropriate compromise between the mouse bioassay and HPLC assay for quantifying saxitoxins. The goal is to develop a method to screen samples which will minimize the need for full bioassays on the large number of low, or non-toxic samples which occur during routine testing. The method will be verified by field sampling and correlation with the mouse bioassay.

RATIONALE: Paralytic shellfish poisoning is a national problem. However, the problem is especially acute in Alaska where shellfish are harvested by subsistence, recreational, and commercial users along thousands of miles of coastline. Subsistence users mostly rely upon testing for PSP by a single laboratory run by ADEC in Palmer, AK. Recent incidents of paralytic shellfish poisoning by Kodiak subsistence users, resulting in hospitalizations and fatalities, have emphasized the need to improve the testing of Kodiak beaches.

ACCOMPLISHMENTS: This project applies the TLC-FID method the authors used to analyze lipid changes to the detection of saxitoxin and neosaxitoxin. The authors have collaborated with ADEC, USFDA, and Alaska Sea Grant on recent surveys of *Protogonyaulax* in waters near shellfish farms in Alaska. This project is entirely consistent with the mission of the Fishery Industrial Technology Center of assisting the development of the Alaska seafood industry.

### Project Summary, page 2

ANTICIPATED BENEFITS: A screening method to quantify toxicity in shellfish harvested by subsistence and commercial users will benefit shellfish harvesters, growers, processors, residents, and state agencies such as the Division of Subsistence, Alaska Department of Fish and Game, and the Alaska Department of Environmental Conservation. Regulatory agencies such as ADEC will benefit by using the method for low to non-toxic samples. This will enable ADEC to test more samples with the same budget and develop toxicity data for new shellfish mariculture sites. Subsistence and recreational users can be given early warning about potentially toxic shellfish harvesting areas and harvesting times. Such warnings may indeed save lives.

## UNIVERSITY OF ALASKA SEA GRANT BUDGET

Project Title: Development of rapid chromatographic screening method for payalytic shellfish poisoning

Principal Investigators: Brian Himelbloom and John French (UAF)

Year 1 of\_2

	Person-Months Hr.	Sea Grant Funds	Grantee Share
A. SALARIES AND WAGES	1.21 (Himelbloom) 25.97 1.21 (French) 37.23	5,428 7,781	
a.(Co) Principal investigator(s)		······································	
b. Associate (Faculty or Staff)		· • • • • • • • • • • • • • • • • • • •	
SUBTOTAL	3.63	13.209	
2. Other Personnel			
a. Professionals			-
b. Research Associates			
c. Research Asst/Grad Student	12.0 (c-M.S. student)	11.438	
d. Prof. School Students			
e. Pre-Bac Students			
f. Secretarial/Clerical			
g. Technical-Shop	4.86 (g-Lab Tech.) 14.85	12.507	
SUBTOTAL	· .	37.154	
B. FRINGE BENEFITS: Salaries. Wages and F	ringe Benefits (A) and (B)	9,199	
	TOTAL	46.353	
C. PERMANENT EQUIPMENT			
D. EXPENDABLE SUPPLIES AND EQUIPMI		3.000	
E. TRAVEL			
1. Domestic			
2. International		· · · · · · · · · · · · · · · · · · ·	-
	TOTAL TRAVEL	2,000	<u></u>
F. PUBLICATION AND DOCUMENTATION	COSTS		
G. OTHER COSTS			
1. Computer Costs			
2. Drafting & Duplication			
3. Communications			
4. Equipment Rent/Maintenance		500(3)	
5. Postage, Shipping & Freight			
6. Workshop Expense/Speaker Travel			
7. Misc. Services			
8. Graduate Student Tuition		5,400(8)	
9. Contractual Services (except Sub-Contra	cts)		
10. Sub-Contracts			
	TOTAL OTHER COSTS	5,900	
TOTAL DIRECT COSTS (A through G)		57,253	
INDIRECT COSTS		21,882	
	TOTAL COSTS	79,135	
AA Form 90-4) BENEFITS: Himelbloom & Fr	ench 20.6 leave 29.3% Staff	Kennish 1.6 Student (sun	leave 29.2% Staff

## UNIVERSITY OF ALASKA SEA GRANT BUDGET

Project Title: Development of rapid chromatographic screening method for payalytic shellfish poisoning

Principal Investigators: Brian Himelbloom and John French (UAF)

Year 2 of 2

	Person-Months Hr.	Sea Grant Funds	Grantee Share
A. SALARIES AND WAGES	1.21 (Himelbloom) 27.27 1.21 (French) 39.09	5,699 8,170	
a.(Co) Principal investigator(s)			
b. Associate (Faculty or Staff)			
SUBTOTAL	3.63	13.869	
2. Other Personnel			
a. Professionals			
b. Research Associates			
c. Research Asst/Grad Student	12.0 (c-M.S. student)	11.438	
d. Prof. School Students			
e. Pre-Bac Students			
f. Secretarial/Clerical			
g. Technical-Shop	4.86 (g-Lab Tech.) 15.59	13.132	
SUBTOTAL		38.439	
B. FRINGE BENEFITS: Salaries. Wages and Fi	ringe Benefits (A) and (B)	9.646	
TOTAL		48.085	
C PERMANENT EQUIPMENT			
XPENDABLE SUPPLIES AND EQUIPME	NT	3.000	
E. TRAVEL 1. Domestic			
2. International	-	- · · ·	
	TOTAL TRAVEL	6,000	
F. PUBLICATION AND DOCUMENTATION	COSTS		
G. OTHER COSTS			
1. Computer Costs			
2. Drafting & Duplication			
3. Communications			
4. Equipment Rent/Maintenance		500(3)	
5. Postage, Shipping & Freight			
6. Workshop Expense/Speaker Travel		1,500(5)	
7. Misc. Services			
8. Graduate Student Tuition		5,670(8)	
9. Contractual Services (except Sub-Contrac	its)		
10. Sub-Contracts			
	TOTAL OTHER COSTS	7,670	
TOTAL DIRECT COSTS (A through G)		64,755	
INDIRECT COSTS		24,934	
	TOTAL COSTS	89,689	
NOAA Form 90-4) BENEFITS: Himelbloom & Student (sun	French 20.6 leave 29.3% S nmer) 0 leave 9.6%	taff Lab Tech. 21.5 lea Staff	ave 40.5% Staff

## UNIVERSITY OF ALASKA SEA GRANT BUDGET

Project Title: Development of rapid chromatographic screening method for paralytic shellfish poisoning				
Principal Investigators: John Kennish (UAA)	nen en		Year_1_ of_2_	
	Person-Months Hr	Sea Grant Funds	Grantee Share	
A. SALARIES AND WAGES	1.21 (Kennish) 38.56	6,789	Oranice onore	
a.(Co) Principal investigator(s)		·		
b. Associate (Faculty or Staff)				
SUBTOTAL	1.21	6.789		
2. Other Personnel				
a. Professionals				
b. Research Associates				
c. Research Asst/Grad Student				
d. Prof. School Students				
e. Pre-Bac Students	3.0 (e) 7.00	3.640		
f. Secretarial/Clerical				
g. Technical-Shop				
SUBTOTAL		10.429		
B. FRINGE BENEFITS: Salaries. Wages and Fri	nge Benefits (A) and (B)	1.982		
TOTAL		12.411		
C. PERMANENT EQUIPMENT				
D. EXPENDABLE SUPPLIES AND EQUIPMENT		3,000		
<u>E. TRAVEL</u> 1. Domestic				
2. International		•	-	
TOTAL TRAVEL		1,000		
F. PUBLICATION AND DOCUMENTATION C	COSTS			
C OTHER COSTS				
1. Computer Costs				
2. Drafting & Duplication				
3. Communications				
4. Equipment Rent/Maintenance		250(3)		
5. Postage, Shipping & Freight				
6. Workshop Expense/Speaker Travel		250(5)		
7. Misc. Services				
8. Graduate Student Tuition				
9. Contractual Services (except Sub-Contracts)				
10. Sub-Contracts				
	TOTAL OTHER COSTS	500		
TOTAL DIRECT COSTS (A through G)		16,911		
INDIRECT COSTS		6,122		
	TOTAL COSTS	23,033		

3,
## UNIVERSITY OF ALASKA SEA GRANT BUDGET

Project Title: Development of rapid chromatographic screening method for paralytic shellfish poisoning

## Principal Investigators: John Kennish (UAA)

Year 2 of 2

	Person-Month	s Hr.	Sea Grant Funds	Grantee Share
A. SALARIES AND WAGES	1.21 (Kennish)	40.49	7,128	
a.(Co) Principal investigator(s)				
b. Associate (Faculty or Staff)				
SUBTOTAL	2.42		7.128	
2. Other Personnel				
a. Professionals				
b. Research Associates				
c. Research Asst/Grad Student				
d. Prof. School Students	_			
e. Pre-Bac Students	3.0 (e)	7.00	3,640	
f. Secretarial/Clerical				
g. Technical-Shop				
SUBTOTA	L		10.768	
B. FRINGE BENEFITS: Salaries. Wages and	Fringe Benefits (A)	and (B)	2.081	
		TOTAL	12.849	
C. PERMANENT EQUIPMENT				
XPENDABLE SUPPLIES AND EQUIPM	MENT		3,000	
<u>RAVEL</u> 1. Domestic				
2. International				
	TOTA	LTRAVEL	2.000	• -
F. PUBLICATION AND DOCUMENTATIO	N COSTS			
G. OTHER COSTS		2.000		
1. Computer Costs	ALL DALL			
2. Drafting & Duplication				
3. Communications				The second second
4. Equipment Rent/Maintenance			250(3)	
5. Postage, Shipping & Freight				
6. Workshop Expense/Speaker Travel			250(5)	
7. Misc. Services				
8. Graduate Student Tuition	1		(	A Starting of the second
9. Contractual Services (except Sub-Contr	acts)			
10. Sub-Contracts			1000	1. 19 C
	TOTAL OTH	R COSTS	500	
TOTAL DIRECT COSTS (A through G	i)		18,349	
INDIRECT COSTS	18		6,642	
	TOTAL	COSTS	24,991	

## Development of a rapid chromatographic screening method for Paralytic Shellfish Poisoning

#### Abstract

Paralytic shellfish poisoning (PSP) is a serious concern for commercial, recreational and subsistence users of molluscan shellfish and crab viscera from Alaska coastal waters. Only a few beaches and mariculture sites are certified along Alaska's extensive coastline. Shellfish from uncertified areas must be lottested before being sold and there are no assurances for noncommercial users. Thus the limitations on PSP testing are a serious impediment to expanding the use of Alaska's shellfish resources. Most lots have very low levels of toxin so a rapid, low cost, screening method would be beneficial. This project will develop and field test a chromatographic screening method to accurately estimate maximum toxicity in edible tissues and minimize the need for further testing of low to non-toxic samples.

#### **Project Objectives**

- (1) to develop a new chromatographic assay to screen for paralytic shellfish poison (PSP).
- (2) to compare the accuracy of this assay with the standard mouse bioassay to screen for samples below the action level.
- (3) to verify the assay on a survey of molluscan shellfish and viscera of crustaceans collected from shores and waters within Kodiak Island Borough.

Introduction

Paralytic shellfish poisoning (PSP) is a national problem. However, the problem is especially acute in Alaska where shellfish are harvested by subsistence, recreational and commercial users along thousands of miles of coastline. Each year in Alaska, residents and visitors are stricken with PSP from inadvertently eating toxic shellfish collected from beaches. Molluscan shellfish become toxic when dinoflagellates that can produce the toxin are ingested through filter-feeding as done by clams and other bivalves.

Between May and June 1994, sixteen individuals in Kodiak became ill and one person died from consuming toxic shellfish and the whole archipelago was closed to further harvesting. Muscles collected from Chiniak Bay and Old Harbor had record levels of PSP at 18.700 - 19.400 mg of toxin per 100 g of shellfish tissue, whereas the action level is less than 0.080 mg per 100 g (Gessner, 1994; Waage, 1994a, 1994b; Meyerowitz, 1994). Alaska Department of Fish and Game subsistence surveys estimate annual per capita consumption of marine invertebrates to range between 11.7 and 32.6 pounds for four coastal villages surveyed (Fall, 1990). Testing for PSP has not extended to residents who are subsistence or recreational harvesters of molluscan shellfish or who use the crab viscera in home food preparations.

Alaska has abundant muscle and clam resources which are not being commercially exploited. A shellfish mariculture industry has emerged in recent years. However, for shellfish growers, PSP is a constant threat to their small but growing industry. The toxin and another marine toxin (domoic acid) have been detected in crab viscera and has become a problem in marketing whole crabs. The incidence of PSP and domoic acid has required commercial crab processors to sell sections rather than whole crabs. Although costly and time-consuming, these actions prevent the release of potentially toxic products on the commercial molluscan and crustacean markets. The vast majority of crabs tested are well below the action threshold. Thus there would be a high demand for a convenient screening method to identify food samples with very little toxin.

The major problem in PSP toxicity testing for seafood is due to the multiplicity of toxins present (Hall et al, 1990). There are twelve variants of four related classes of toxins (saxitoxin, neosaxitoxin and their congeners). There are at least ten related naturally occurring molecules which are non-toxic. High performance liquid chromatographic (HPLC) techniques can separate and quantitate the toxic forms of saxitoxin, but these techniques require extensive post-column derivatization and accurate knowledge of the toxicity of each form to determine total toxicity. Other disadvantages of HPLC are the reduction in assaying rate, the need for rare, purified, expensive saxitoxin standards and the requirement for highly trained personnel.

Toxin testing of commercially harvested shellfish is conducted by the Alaska Department of Environmental Conservation (ADEC) at the Palmer laboratory. The only approved method for measuring PSP toxin levels is the mouse bioassay. Although the method is very useful in quantifying toxicity, it is expensive and timeconsuming. Drawbacks to the mouse bioassay are the maintenance, care and the ethics of using animals for testing and the inability to determine saxitoxin specificity. The ADEC does not have the facilities or funding to test and certify a significant number of Alaskan beaches because the department requires lot testing before products can be sold. Most lots have very low levels of toxin thus a rapid, low cost, screening method would be beneficial. It would accurately estimate maximum toxicity in edible tissues and minimize testing of low to non-toxic samples.

The latroscan was developed as a means of speeding analysis and improving quantitation of thin-layer chromatographic (TLC) methods (Ackman, 1981). The method combines normal chromatography on coated, fine diameter quartz rods with flame ionization detection (FID). This approach maintains the resolution of TLC techniques while burning the sample off the rods with the FID provides the easy of quantitation of a gas chromatograph. This versatile instrument has proven useful in analyzing a variety of natural substances (Ackman, 1981).

#### Review of previous work

Paralytic shellfish poisoning has been extensively studied by a variety of scientists was reviewed fairly recently by Hall and Strichartz (1990). In addition to the public health implications of saxitoxins these compounds have proven very useful as sodium channel blockers in studies of neurobiology (Strichartz and Castle, 1990). The toxin chemistry of the most potent forms is well understood (Hall et al, 1990). In his early work, Hall (1981) showed that the sulfonated toxins in this family are hydrolyzed to saxitoxin or neosaxitoxin under acidic conditions.

Canadian researchers expect the use of animal bioassays to discontinue and the monitoring of seafood toxins to be performed by chemical and immunological assays or by instrumental methods of analysis (Quilliam et al., 1992). None of the marine toxins are volatile enough for direct analysis by gas chromatography. HPLC is the most valuable instrumental analytical tool for toxins because it is well-suited for separation of polar, non-volatile compounds (Quilliam et al., 1992). However, most of the toxins do not possess a chromophore for sensitive UV absorption or fluorescence detection, which has required the use of pre- or post-column dervitization methods (Quilliam et al., 1992). Yet, even if these procedures are applied the separations are very sensitive to the mobile phase composition and pH, the conditions of the post-column reaction system must be carefully controlled and the method suffers from a lack of accurate calibration standards (Quilliam et al., 1992). Adoption of these sophisticated procedures has resulted in complex chromatograms due to reagent impurities and numerous fluorescent derivatives of endogenous compounds in the samples (Quilliam et al., 1992).

Several attempts have been made to develop polyclonal antibody assays for the marine toxins. Many have been unsuccessful due to lack of cross-reactivity of various forms of PSP (Levin, 1991). Other difficulties in developing an immunoassay technique are in obtaining sufficient quantity of untibody, due to the toxicity of the toxins, and the low molecular weight of the toxins (Sullivan, 1988). Another technique that shows promise for total toxicity assay of shellfish extracts is the binding of toxins to sodium channels in nerve cell membranes (Sullivan, 1988).

In this project, our goal is to develop a screen to minimize the need for full mouse testing of the large number of low, or non-toxic samples which occur during routine testing. This process would be parallel to the use of the bile fluorescence assay for hydrocarbon metabolites to minimize the need for full analysis of polyaromatic hydrocarbons in environmental samples (Krahn et al, 1986).

This project team used the latroscan to quantitate changes in tissue lipids of salmon during partially frozen storage (Kramer et al, 1983; Whitsett et al, 1987). The quantitation methods developed during these studies significantly increases the accuracy of latroscan methods in separating biochemical substances such as fats containing long chain polyunsaturated fatty acids. Similar difficulties may arise during this project due to the difficulties in obtaining highly purified samples of toxins other than saxitoxin and neosaxitoxin.

## Project plan

This project will develop a rapid chromatographic screening method for quantitating the total saxitoxin levels in shellfish samples. The method will be tested to identify samples with low levels of total toxins with enough confidence to reduce the need to conduct the mouse bioassay on every lot of shellfish. Specific objectives are: 1) to develop a new chromatographic assay to screen for PSP. 2) to compare the accuracy of this assay with the standard mouse bioassay to screen for samples below the action level. and 3) to test the assays on a survey of molluscan shellfish and viscera of crustaceans collected from shores and waters within Kodiak Island Borough.

We propose that a quantitative method employing thin-layer chromatography (TLC) combined with flame ionization detection (FID) will be an appropriate compromise between the mouse bioassay and the HPLC assay for quantifying saxitoxins. Advantages of this technique are the ease in application of the samples and operation of the instrument, the flexibility to stop the scanning of the rod undergoing pyrolysis for additional separation with solvents, and the inexpensive reuse of the thin quartz rods after pyrolysis of the samples (Whitsett et al, 1987). Aspects of this research that we would investigate with the latroscan method are the detection limits of the toxins, the separation of toxin forms by chromatography solvents prior to pyrolysis and scanning, and the correlation with the mouse bioassay in toxin quantification.

Molluscan shellfish will be harvested from local shores in the Gulf of Alaska, primarily Kodiak Island and lower Cook Inlet. Initially samples will be collected at sites accessible by the Kodiak road system. Later surveys will encompass other village harvest areas. All molluscs will be collected by hand at low tide. Crustacean viscera will be collected from recreational harvesters of primary crab species. All samples will be handled with gloves and other precautions necessary to avoid ingestion of the toxins. A variety of shellfish will be harvested and identified taxonomically (Foster, 1994). The shellfish obtained will include blue mussels, butter clams, little neck clams, razor clams, cockles, surf clams, pink neck clams, horse clams and viscera from king crab, dungeness crab, tanner crab and opilio crab.

## Sample preparation

Samples will be cleaned throughly outside with fresh water. The shellfish will be opened by cutting adductor muscles. The inside will be rinsed with fresh water to remove sand and foreign materials. Undamaged bodies of molluscs (100-150 g) will be transferred to a gazed dish. The meat will be transferred as soon as possible to a No. 10 sieve and drained for five minutes.

#### Extraction for mouse bioassay

The drained muscle will be homogenized in a blender. A well mixed 100 g sample will be weighed in a tared beaker. The tared sample will be treated with

100 mL of 0.1 M HCl, stirred throughly, and the final pH adjusted to 3. The mixture will be transferred to a graduated cylinder and diluted to 200 mL. This solution will be mixed and then centrifuged at 300 rpm for five minutes. The necessary volume of supernatant will be taken to perform the bioassay.

#### Extraction for chromatographic assay

A 100 g sample of drained homogenized muscle will be blended in 50 mL of acidified 15% ethanol (pH 2.0 with HCl). An additional 50 mL of acidified ethanol and 2.5 g of trichloroacetic acid will be added and the mixture will be heated to room temperature. The supernatant will be decanted and stored at -30 °C until analyzed.

#### Sample cleanup

Ion-exchange chromatography will be used to remove interfering substances prior to TLC. Columns will be prepared by packing disposable Pasteur pipets with 3 mL of Amberlite resin in an acetate buffer (pH 5.6 for the sodium ion form and pH 5.2 for the acid form). Crude extract (2.0 mL) or toxin (0.02 mg) will be diluted to 3 mL with pH 5.6 buffer and run through the column, packed with the sodium ion form of the resin until even with the top of the resin bed. The column will be washed with 15 mL of water, 5 mL pH 4 acetate buffer, and 15 mL of water. The toxin will then be eluted form the column with 6 mL of 0.5 M HCI. The toxin should be in the first 3 mL.

The pH of the toxin containing fraction from the first column will be adjusted to pH 5.2 by addition of 1 mL of pH 5.2 buffer and approximately 0.2 mL 0.2 M NaOH. The sample will then be applied to the acid form Amberlite column and will be run through until even with the top of the resin bed. The column will be washed with 15 mL pH 5.2 buffer, followed by 15 mL water. The toxin containing fraction will be eluted with 6 mL of 0.5 M HCl collected in two 3 mL fractions. The toxin should be present in the first 3 mL. The solvent will be evaporated to dryness an a vacuum oven at 100 °C and 380 torr.

#### TLC-FID analysis

The dried residue from each sample will be taken up in 0.5 mL of 85% ethanol. A one microliter aliquot of each sample will be applied to a Type SIII Chromarod (5 micron Silica) The rods will then be developed in the solvent chamber containing 85% ethanol-water-acetic acid-acetone (20:5:5:1). The solvent will be evaporated and the rods scanned by the latroscan FID detector.

The latroscan is housed at the FITC and will be tested to determine the sensitivity with available PSP standards. The development of a standard curve for calculating unknowns will be devised. Interferences or masking (false-negatives) in the assay will be determined by adding crustacean tiscues to known PSP concentrations and quantitating the percent recovery.

The samples for bioassay will be sent to the ADEC Palmer laboratory for

mouse bioassays to confirm that all negative tests are well below the threshold for acceptance of the food product. Statistical correlations between the latroscan assay and the mouse bioassay will show if the former assay is reliable for additional study.

Once the correlation is established, we will conduct a seasonal survey of harvested shellfish. The latroscan assay will be run and an expected toxicity value will be calculated for the bioassay. The duplicate samples will be sent as above and the known values will be compared with the expected ones. We will also conduct the reverse analysis whereby duplicate samples tested at DEC will be sent for latroscan analysis and the data checked against the expected values. Maximum toxicity will be calculated using the worst possible case where 100% of the toxin came from the most toxic precursor.

#### Project justification and need

A new, rapid, inexpensive method for quantifying maximum toxicity in shellfish harvested by commercial and non-commercial practices will be developed. Shellfish growers, harvesters and processors, residents and state agencies will benefit from this research. Shellfish growers and processors in Alaska and the Northwest will benefit from more rapid lot testing. Regulatory agencies such as ADEC will benefit by using the screening method for low to non-toxic samples. This will enable ADEC to test more samples with the same budget and develop toxicity data for new shellfish mariculture sites. Recreational harvesters can be given early warning about potentially toxic shellfish harvesting areas.

The following individuals and organizations will be working in collaboration with us: Ray RaLonde (University of Alaska, Marine Advisory Program Aquaculture Specialist), Richard Barrett (Alaska Department of Environmental Conservation - Palmer Laboratory), Marleen Wekell (Food and Drug Administration - Botheli, WA laboratory), Alaska Shellfish Growers Association, and Mark Donohue (Kodiak Seafarms).

#### Facilities

The Fishery industrial Technology Center is located in a two-story, 21,000 sq.ft., structure with a 1,000 sq. ft. heated storage building and a 200 sq.ft HAZMAT module in Kodiak, AK. The main building houses a 40 ft x 60 ft pilot plant for seafood processing, roll-in freezers for storage at 4 °C, -20 °C or -40.°C, research laboratories for seafood engineering (600 sq.ft.), seafood chemistry (600 sq.ft.), seafood biochemistry (600 sq.ft.), seafood microbiology ( 700 sq. ft.), and sensory analysis (500 sq.ft.). The facilities are well equipped with modern analytical and food processing equipment, including the latroscan, an HPLC and gas chromatograph.

The UAA Department of Chemistry and Physics is located on the UAA campus in Anchorage, AK. Instrumental capabilities include a variety of chromatographic methods.

## Budget summary & justification

This two-year project will encompass two research components: a) development of a rapid chromatographic screening method for PSP and b) field survey for PSP in shellfish from mariculture farms and potential sites in the Kodiak Island area. The budget covers salary and benefits for one-months' time for each of three principle investigators, three-months' time for one technician, one full-time M.S. student, laboratory supplies, services and travel to collect samples and present project findings. The major supply categories are PSP standards (\$4,000), Chromarods and other latroscan supplies (\$3,500), supplies for sample collection and preparation (\$3,000) and laboratory acids, solvents and miscellaneous supplies (\$1,500).

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## JOHN S. FRENCH 200-36-1217

## Education

University of Michigan, Ph.D., Biological Chemistry, 1979 Oberlin College, A.B., Chemistry, 1971

#### Experience

- Director, 1992-present; Professor of Seafood Biochemistry, 1991-present; Associate Professor, 1985-91; Fishery Industrial Technology Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, AK
- Toxicological Expert Committee for Evaluating Data Related to the Consumption of Marine Subsistence Foods (*Exxon Valdez* Oil Spill), 1989-90
- Assistant Professor, 1980-5, Department of Chemistry, University of Alaska Anchorage, AK
- Postgraduate Research Biochemist 1979-80, Department of Biochemistry, University of California, Berkeley, CA
- Volunteer, Secondary School Math and Chemistry Teaching, United States Peace Corps, SMJK Gajah Berang, Melaka, Malaysia, 1971-3

## **Selected Publications**

- Kramer, D.E., McNeil, G., French, J.S. and Kennish, J.M. 1995. Postmortem reaction rates for nucleotide changes in Pacific salmon during partial freezing storage. Food Res. Intl. (submitted)
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## JOHN KENNISH 136-36-3636

## Education

Portland State University, Ph.D., Environmental Analytical Chemistry, 1978 Shippensburg State University. M.S., Chemistry, 1973

Rutgers University, A.B., Chemistry, 1967

## Experience

- Professor of Chemistry, 1988-present; Associate Professor, 1983-88; Assistant Professor, 1979-83, Department of Chemistry/Physics, University of Alaska Anchorage, AK
- Visiting Professor, 1988-89, Agricultural Chemistry, Toxicology Program, Oregon State University, Corvallis, OR
- Visiting Fellow, 1982-3, Cooperative Institute for Research in Environmental Sciences, University of Colorado Boulder, CO
- Research Associate, 1977-9, Pharmacology Department, Health Science Center, University of Oregon, Portland, OR

## **Selected Publications**

- Sharp-Dahl, J.L., Rice, S.D., Chambers, K.A. and Kennish, J.M. 1995. Lipid, cholesterol and fatty acid compositional changes in the muscle and eggs of chinook salmon (*O. tshawytscha*) during spawning migration. Trans. Am. Fish. Soc. (submitted)
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## BRIAN H. HIMELBLOOM 323-42-0855

## Education

North Carolina State University, Ph.D., Food Science with Microbiology minor, 1985

Louisiana State University. M.S., Food Science, 1980 Northern Illinois University, B.S., Biology, 1978 College of Lake County, A.S., Biology, 1976

## Experience

- 1994-present: Associate Professor of Seafood Microbiology; 1987-1994, Assistant Professor, Fishery Industrial Technology Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, Kodiak, AK
- 1985-1987: Postdoctoral Research Associate, Department of Microbiology, University of Massachusetts, Amherst, MA
- 1981-1985: Graduate Research Assistant, Department of Food Science, North Carolina State University, Raleigh, NC
- 1978-1980: Graduate Research Assistant, Department of Food Science, Louisiana State University, Baton Rouge, LA
- 1975: Microbiology Laboratory Assistant, College of Lake County, Grayslake, IL

## Selected Publications

- Himelbloom, B.H., Crapo, C. and Pfutzenreuter, R. 1995. Microbiological quality of Alaska Native smoked salmon processing. Lett. Appl. Microbiol. (in review).
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## List of Reviewers

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# ALASKA NATIVE HARBOR SEAL COMMISSION "Submitted Under the BAA"

Project Number:	96213
Restoration Category:	General Restoration
Proposer:	Alaska Native Harbor Seal Commission
Lead Trustee Agency: Cooperating Agencies:	ADFG, NMFS
Duration:	3 Years
Cost FY 96:	99.2
Cost FY 97:	94.5
Cost FY 98:	94.5
Geographic Area:	Habitat range of the harbor seal (phoca vitulina)

# ABSTRACT

The overall goal is to involve Alaska Natives directly in the research and monitoring process, to help find solutions to restore the health of the injured resource: the harbor seal. Harbor seals are one of the most common marine mammals harvested by coastal dwelling Alaska Natives and continue to be a vital economic, cultural, and social resource to many Alaska Natives. At this time, goals of the ANHSC include: educating and informing the public and western scientists on the traditional and contemporary relationship between harbor seals and the Alaska Natives; informing western scientists about the type and extent of knowledge held by the local people about the harbor sea; involving Alaska Natives in the regulatory and management process. Most critical to the ANHSC is the fact that the harbor seals in Prince William Sound appear to be declining, whereas harbor seals in Bristol Bay, the Aleutian Chain region and Southeast appear to be healthy. The structure of the ANHSC has taken a statewide ecosystem approach in the interest of the overall health of the harbor seal stock.

# INTRODUCTION

The formation of the ANHSC stemmed from several workshops sponsored by the ADF&G, funding provided by the Exxon Valdez Oil Spill Trustee Council (project no. 94244). The workshops centered on a discussion of actions that might be taken to aid in the recovery of harbor seal populations after the Exxon Valdez Oil Spill.

# NEED FOR THE PROJECT

In both of the workshops, it was stressed that direct involvement of subsistence hunters in scientific studies is highly desirable. Alaska Natives need to closely monitor and participate in the stock assessment program and conservation plan currently being conducted by the National Marine Fisheries Service. There is potential for furthering knowledge about harbor seal populations though a biological program that involves subsistence hunters. ADFG is coordinating with the ANHSC on those efforts, understanding the need for ethical research principles. NMFS has been instrumental in providing funding for the development of the ANHSC. Currently NMFS is coordinating with ANHSC for further interim funding until FY 96 funding is secured.

# A. Statement of Problem

The Harbor Seals are listed as an injured resource and are not recovering.

# B. Rationale

Overall, the stability of the harbor seal population is healthy. However, there is a dramatic decline in some areas which include the gulf of Alaska and Prince William Sound. To date, conventional scientists have been unable to determine the cause of the decline. Therefore, it becomes essential for the Native Hunters and users to become involved and to utilize the knowledge that we have developed over generations of use.

C. Summary of Major Hypotheses and Objectives

The immediate objective of this commission would be to address the population decline in the Gulf of Alaska, and become active participants in the ongoing research projects and conservation plans.

The long term objectives will be to blend and facilitate a combined effort of the State and Federal agencies with a fully funded Alaska Native Harbor Seal Commission to find solutions to the decline of the harbor seal population, and to insure that Native involvement and traditional ecological knowledge is included in equal partnerships and co-management agreements.

D. Completion Date

# COMMUNITY INVOLVEMENT

The Alaska Native Harbor Seal Commission spans a geographical area almost the width of the United States. The regions that we represent include: Kodiak, Chugach, Cook Inlet, Aleutian Pribiloffs Islands (spill impacted areas), and Southeast. The ANHSC have been coordinating with the Indigenous People's Council for Marine Mammals (IPCOMM) which has a statewide membership of other Marine Mammal Commissions. The Alaska Sea Otter Commission and the Chugach Regional Resources Commissions have been instrumental in providing models of existing research projects and technical assistance, Rural Alaska Resources Association is currently providing assistance to facilitate meetings for the ANHSC which was funded by the national Marine Fisheries Services. Supporting Resolutions for the ANHSC have been received from several Village Tribal Councils.

# FY 96 BUDGET

Personnel	52.9
Travel	22.5
Contractual	7.
Commodities	2.5
Equipment	5.5
Indirect	8.8
Total	99.2

In kind services and indirect costs are associated with administration, Postage and Printing (2,000), telephone/telefax (3,800), Office Space/Utilities (3,000)

# **PROJECT DESIGN**

A. Objectives

As outlined in the abstract: to have the executive director of the ANHSC oversee and coordinate the development and actions taken by the Alaska Native Harbor Seal Commission, pursue involvement in research, coordinate commission meetings, pursue and coordinate resource funding for programs including biological sampling, traditional ecological knowledge databases, and continue in the process of setting principle guidelines in co-management agreements with regard to marine resources. Ultimately, the objective is the restore the health of the Harbor Seal population and be directly involved in a cooperative conservation plan.

# B. Methods

The ANHSC will be modeled after species specific marine mammal commissions which have been proven successful in combining traditional ecological knowledge with western science in research, monitoring, and management of respective species.

C. Contracts and Other Agency Assistance

The ANHSC has executed successfully a contract with NMFS to hold meeting with presentations by both ADFG & NMFS.

The ANHSC is currently in discussion with NMFS for interim supportive funding for the Commissions operation until futher funding is secured.

The ANHSC is coordinating with ADFG on a training and biosampling program.

The ANHSC has submitted proposals for Congressional funding for FY 96.

# D. Location

The location of the ANHSC's office will be placed in Cordova, Alaska, in Prince William Sound. With daily jet service and the central locality of the habitat range of the harbor seal it will serve the commissions operations well.

# SCHEDULE

A. Measurable Project Tasks for FY 96

May 1995: Workshop to adopt by-laws: funded by NMFS and scheduled 5/4-5, 1995.

May 1995 - Oct. 1995: Continue to work with NMFS on submitted proposal for interim financing.

Continue to follow Congressional funding proposal and EVOS proposal.

Oct. 1995: Coordinate Commission Meetings and implement actions taken.

Participate in Coordination of training and biological sampling programs which will include hunters, with ADFG and other agencies.

Nov. 1995 - April 1996: Identify programs and projects needed to help restoration process.

Continue in implementation of programs that are on going in regard to harbor seals and marine resource environments.

May 1, 1996: Submit proposals for FY 97 Restoration Project funding

B. Project Milestones and Endpoints

Establishment of a strong Alaska Native Harbor Seal Commission which will be committed and instrumental in filling a needed aspect of blending of traditional ecological knowledge with western science to address restoration plans regarding harbor seals and the habitat of its marine environment.

The long range scope would be to continue to incorporate traditional ecological knowledge in full partnerships in regards to marine resource conservation and management plans.

C. Project Reports

Summary reports will be coordinated with prescribed projects.

# COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Coordination with Kodiak, Cook Inlet, Aleutian Pribaloffs, Chugach and Southeast tribal organizations will be on-going through the commission's operations.

Coordination with project leaders of the State and Federal agencies have already been done and will be on-going.

# ENVIRONMENTAL COMPLIANCE

## PERSONNEL

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The project leader/manager will be Monica Riedel the acting chair of the ANHSC. The qualification of the leader/manager are as follows: Monica Riedel has been an active participant in marine mammal issues since the mid 1980's. As a subsistence user, skilled in traditional uses of marine mammal resources and advocate for sustainable and healthy marine mammal populations. She has recently been voted in by Native leaders to the position of Acting Chair of the newly formed Alaska native Harbor Seal Commission. Monica will bring her cultural values and traditional knowledge to will bring her cultural values and traditional knowledge to the commission takes to conserve and restore the Harbor Seal, which has been relied and depended upon for generations by the Alaska Native Cultures.

Monica Kiedel

Monica Riedel, Project Leader/Manager Acting Chair, Alaska Harbor Seal Commission P.O. Box 1005 Cordova, Alaska 99574 (907) 424-3241 (907) 424-7739 e-mail address, None

4/28/95

Date prepared

## DOCUMENTARY ON SUBSISTENCE HARBOR SEAL HUNTING IN PWS

Project Number:	96214
Restoration Category:	General Restoration
Proposed by:	Tatitlek Village Council
Lead Trustee Agency: Cooperating Agencies	Alaska Department of Fish and Game
Duration:	One years
Cost FY 96:	\$68.1
Cost FY 97	\$50.0
Cost FY 98	\$50.0
Cost FY 99	\$50.0
Cost FY 00	0.0
Cost FY 01	0.0
Cost FY 02	0.0
Geographic Area:	Prince William Sound

Injured Resource/Service: Harbor Seals/Subsistence

## ABSTRACT

The purpose of this project is to make a documentary on the subsistence hunting of harbor seals in Prince William Sound. Presently there exists no thorough documentation of subsistence harbor seal hunting. This video will document all facets of harbor seal hunting including the ecological and biological knowledge hunters use to hunt harbor seals. By documenting this knowledge, the project will enhance the restoration of the seal population by providing an indigenous hunter's perspective on harbor seal ecology.

## INTRODUCTION

Subsistence uses of natural resources are essential to the economies and cultures of the communities of the oil spill region. Some residents of the region have expressed the concern that no vehicle exists for them to express their views about the importance of subsistence in their lives. The goal of this project is to help fill this void and produce a documentary on subsistence in the oil spill region. The project has been divided into a series of videos each of which will cover species affected by the oil spill. These include sea mammals, intertidal species, fish and waterfowl.

The proposers view this project as a pilot that will be produced through a contract by a professional documentary film maker. Subsequent videos may be produced using various methods and funding sources in addition to the Trustee Council. For example, we are considering having a future video include footage filmed by high school students in the communities. The current proposal focuses on subsistence hunting of harbor seals.

One subsistence species of particular importance, and one that may have been affected by the *Exxon Valdez* oil spill, are harbor seals. Because of the decline in harbor seal populations both subsistence uses of harbor seals and opportunities to train young hunters have diminished. This project will afford an opportunity to document this knowledge so that is can be transmitted to succeeding generations. At the same time this documentary will provide a medium for hunters to transmit their traditional knowledge and observations, gained from years hunting of harbor seals, to the scientific community.

#### NEED FOR THE PROJECT

#### A. Statement of Problem

The injured service this project addresses is subsistence. The injured resource is harbor seals. Generally, the oil spill disrupted the use of subsistence resources by injuring the natural resources and creating concerns about the safety of those resources contaminated by the oil spill. One subsistence species that was in decline before the spill and may have been affected by the presence of oil, and which is currently classified as not recovering, are harbor seals.

#### B. Rational

The objective of the restoration plan regarding sea mammals is a stable or increasing population of animals (p.59). By understanding and reversing the decline the population of harbor seals in Prince William Sound scientists hope to increase the availability of harbor seals to subsistence hunters and to minimize the impact of subsistence hunting on the harbor seal population. One strategy to meet this objective is to integrate traditional ecological knowledge and hunters observations into the restoration process. Currently no medium exists that presents hunter knowledge within its own contextual framework. Producing this video will help fill this void and enhance the restoration of the harbor seal population by providing a hunters' perspective on harbor seals funded by the Trustee council for FY 95: project 95001 Condition and Health of Harbor Seals and project 95064 Monitoring, Habitat Use, and Tropic Interactions of Harbor Seals in PWS. This project may also facilitate the Sound Ecosystem Assessment or SEA program approved by the trustees in April of 1994.

The restoration objective for subsistence states that recovery will have occurred when "the cultural values provided by gathering, preparing, and sharing foods are integrated into community life" (p. 82). One strategy to meet this objective is to "facilitate the participation of and communication with subsistence users in the restoration process" (p. 86). The sharp decline in harbor seals has greatly effected subsistence hunting resulting in lost opportunities to teach subsistence skills and traditional knowledge associated with harbor seals. One means of insuring these skills and knowledge are transmitted to the next generation and integrated into on going restoration efforts is to document them on video. In this respect this project would complement and be an extension of the Heritage Camp sponsored by the village of Tatitlek, the Elders/Youth conference (project 95138) and the Community Interaction and Use of Traditional Knowledge project (project 95052). Like these projects, the proposed project is concerned with documenting and using traditional knowledge to enhance the restoration of subsistence in the oil spill region.

#### C. Completion Date

The video will be completed in 1996.

#### COMMUNITY INVOLVEMENT

This project is proposed by the community of Tatitlek. The production of this video relies heavily on community participation. It is planned to conduct interviews of local people, record their knowledge about the injured resources and their subsistence practices of hunting, fishing, gathering and processing.

#### FY 96 BUDGET

Personnel	\$9.5
Travel	\$3.7
Contractual	\$55.0
Commodities	0.0
Equipment	0.0
Subtotal	\$63.2
General Admin.	\$4.9
Total	\$68.1

#### PROJECT DESIGN

#### A. Objectives

The overall goal of this project is to promote the recovery of injured natural resources and subsistence uses of natural resources through the production of a documentary on subsistence in the oil spill region. The objective of this current project is the documentation of all aspects of harbor seal hunting in Prince William Sound. This includes hunting techniques, methods of processing, the distribution of seal products and the traditional ecological employed in hunting harbor seals.

#### B. Methods

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This is a general restoration project. Specific actions that will be taken to restore subsistence is the production of a video that will document subsistence activities and traditional environmental knowledge in the oil spill region. Through a contract a documentary film maker will produce a 20 minute video on subsistence, focusing on four interrelated topics: harvesting, processing, distribution and traditional ecological knowledge. The film maker will involve local people in discussions about developing the storyline and editing the footage taken in the community. This product would serve as an educational tool to further the recovery of natural resources and subsistence through the reintegration of subsistence uses, traditional knowledge and values into community life.

## C. Contract and Other Agency Assistance

The production of the video will be contracted out to a film maker who has the experience and expertise to make a quality film. In contracting out for this production the proposers want to hire someone who will actually create and produce the product rather than hiring someone to create it. By hiring a video production company the proposers will maintain control over all aspects of the process. In consultation with the community and ADF&G staff the video company will create a story line before shooting the film. All footage will be shot on location and include interviews with members of the community and footage of hunters out hunting. Once the filming is completed the production company will edited the footage. This process is very technical and requires equipment and expertise on available in the community.

## D. Location

Prince William Sound

## SCHEDULE

## A. Measurable Project Tasks for FY 96

September 1, 1995	Project Approval
Ocotber - November 1995 bids, award	Develop contract guidelines, evaluate contract.
December 1995 - Janaury 1996	In consultation with hunters and ADF&G staff contractor will develop story line and story board for video.
February 1996	Final approval of story line and story board. Complete logistics for traveling to Prince William Sound.
March- April - May 1996	Travel to Prince William Sound, Shoot necessary footage, conduct interviews.
June - July 1996	Edit Footage
August 1996	Compete editing of film
September 1996 copies	Complete project, contractor will deliver 50 of videos.

#### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

In documenting subsistence in the oil spill region this project would complement the Heritage Camp sponsored by the village of Tatitlek, the Elders/Youth conference (project 95138) and the Community Interaction and Use of Traditional Knowledge project (project 95052). Each of these projects are concerned with documenting and using traditional knowledge to enhance the restoration of subsistence in the oil spill region. In meeting the goal of the Trustee Council to incorporate traditional knowledge into the restoration process this project would compliment harbor seal research projects

no. 95001 Condition and Health of Harbor Seals and project 95064 Monitoring, Habitat Use, and Tropic Interactions of Harbor Seals in PWS. This project may also facilitate the Sound Ecosystem Assessment or SEA program approved by the trustees in April of 1994.

#### **ENVIRONMENTAL COMPLIANCE**

This project is likely to be categorically excluded under NEPA guidelines. The filmmaker would only be documenting hunting that would have occurred even in the absence of the project.

#### PERSONNEL

Gary Kompkoff. Mr. Kompkoff is chief of the Tatitlek village council.

Martha Vlasoff. Ms. Vlasoff was been a resident of Tatitlek for 14 years and has considerable experience documenting the subsistence culture of Prince William Sound.

James Fall. Dr. Fall has been regional supervisor for the Alaska Department of Fish and Game, Division of Subsistence in the Southcentral region for over ten years. He has considerable experience documenting the effects of the oil spill on subsistence.

Rita Miraglia. Ms. Miraglia is oil spill coordinator for the Division of Subsistence and has worked closely with oil spill communities in Prince William Sound and Lower Cook Inlet.

Ron Stanek. Mr. Stanek has worked extensively on subsistence and oil spill issues in lower Cook Inlet for the Division of Subsistence.

Craig Mishler. Dr. Mishler has worked extensively on subsistence and oil spill issues on Kodiak Island for the Division of Subsistence.

Lisa Scarborough. Ms. Scarborough has worked extensively on subsistence and oil spill issues on the Alaska Peninsula for the Division of Subsistence.

Name of the Proposed Project Leader Affiliation Mailing Address Phone Number Fax Number

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Name of the Proposed Project Manager Affiliation Mailing Address Phone Number Fax Number

Date Prepared

# 1996 EXXON VALDEZ TRUS TEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$16.6						
Travel		\$4.8						
Contractual		\$50.0						
		\$0.0			aanaa adaa addaa baysi yyaayo ii taa aanaa aanaa aan kaa k	en editoren entity of the entity of the	en e	e olimite o vonación interactivativa
Equipment		\$0.0		LONG F	RANGE FUNDIN		NTS	
Subtotal	\$0.0	\$71.4	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$6.0	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$77.4	\$50.0	\$50.0	\$50.0			
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Full-time Equivalents (FTE)		0.3			en ann breach ann an britten ann an a' an an an ann ann ann	enander, dans sy repairing an energy of the spectrum states of the second	a den - mai - capace, an inclusion de character de comi	a na antina anna an tha anna an tartha anna an tartha anna an tartha anna anna anna anna anna anna anna a
			Dollar amount	s are shown in	thousands of o	dollars.		·
Other Resources						L		L,
1996	Project Num Project Title:	ber: 96214 Documenta	ry of Subsist	ence Harbor	Seal Hunting	in PWS	] ,	FORM 3A AGENCY PBOJECT

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# **1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET** October 1, 1995 - September 30, 1996

Pers	onnel Costs:		GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
<b> </b>	William E. Simeone	Subsistence Resource Specialist II	16B	2.0	4,500		9.0
	Craig Mishler	Subsistence Resource Specialist III	18C	0.5	5,200		2.6
*	Dean Hughes	Fisheries Biologist III	18C	1.0	5,047		5.0
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Tray	rel Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description		Price	Trips	Days	Per Diem	FFY 1996
	Travel for ADF&G staff to 1	atitlek and Chenega Bay	\$900.00	2	20	150	4.8
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[[0		gran management enclare be indicated by place					1 110
						Г <sup></sup>	FORM 3B
		Project Number: 96214					Personnel
1	1996	Project Title: Documentary of Harbo	r Seal Hunting	a in PWS			
		Agency: AK Dept. of Fish & Game					
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# 1996 EXXON VALDEZ TRUS — COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

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Contractual Costs:	Proposed
Description	FFY 1996
The major cost of this project is the contractual cost of hiring a video production company. The contractor is to be responsible for all aspects of video production from development of project script to devlivery of the final product. That product is 100 copies of the video which will be distributed to agencies, and oil spill communities. Video production costs are calculated in terms of cost for each minute of video produced. The estimated cost is \$2,000 per minute of video. This figure includes all travel for the production company, all salaries, per diem, equipment, and commodities. It does not include the cost of reproducing the video. For a 20 minute video x \$2,000 a minute the cost comes to \$40,000. For copying the video and creating the final product the cost is \$5,000.	45.0
In addition to developing a contract for the video production company a contract for services will be developed for a consultant from the community.	5.0
When a non-trustee organization is used, the form 4A is required.	\$50.0
Commodities Costs:	Proposed
Description	FFY 1996
	0.0
Commodities Total	\$0.0
1996 Project Number: 96214 Project Title: Documentary of Harbor Seal Hunting in PWS Agency: AK Dept. of Fish & Game	ORM 3B ntractual & mmodities DETAIL

# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

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New Equipment Purch	hases:		Number	Unit	Proposed
Description			of Units	Price	FFY 19 <b>9</b> 6
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1996		Project Title: Documentary of Harbor Seal Hunting in PWS		E	quipment
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# **Ouzinkie Clam Restoration Project**

Project Number:	96218
Restoration Category:	General Restoration
Proposed By:	Ouzinkie Tribal Council
Lead Trustee Agency:	ADFG
Duration:	5 years
Cost FY 96:	-
Cost FY 97:	
Cost FY 98:	
Cost FY 99:	
Cost FY 00:	
Cost FY 01:	
Cost FY 02:	
Geographic Area:	Ouzinkie area
Injured Resource/Service:	Subsistence and clams

## ABSTRACT

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This project will begin to reestablish local clam populations for subsistence use in the Ouzinkie area. Clams were once a major subsistence food in the community of Ouzinkie, but local clam populations have decreased to low levels since the *Exxon Valdez* oil spill. Additionally, due to food safety concerns, clams no longer contribute to this communities subsistence harvest. This project will provide the community of Ouzinkie with an easily accessible source of clams for subsistence use.

## **INTRODUCTION**

The *Exxon Valdez* oil spill impacted wild clam populations in two ways. First, many clam beds suffered from direct oiling causing productive clam beds to be destroyed. Second, clams that weren't destroyed by the oil have a tendency to accumulate, concentrate and store toxic contaminants from non-lethal amounts of oil. Confidence of subsistence users that wild clam populations are safe to consume has been severely eroded.

By reestablishing local clam populations in the Ouzinkie area, traditional subsistence use will be restored. The FY 95 Nanwalek/Port Graham/Tatitlek Clam Restoration project will provide significant data on the Qutekcak shellfish hatchery's clam seed stock and its implementation in these Native villages, assisting the implementation of this project.

## NEED FOR THE PROJECT

## A. Statement of Problem

Since the *Exxon Valdez* oil spill, local residents of Ouzinkie have observed a significant decline in wild clam populations at Neva Cove, Entrance Point and Camel's Rock. These are traditionally major subsistence areas. Clams that still exist in these areas are observed by local users to have undergone noticeable changes over the past few years resulting in no harvests. With wild clam populations at low levels, the questionable safety as a food source of those that remain, the need to develop safe protected sources of clams for this village is greater than ever. If this project is successful, it will enable the village to develop their own supply of this traditional subsistence food.

## B. Rationale

By undertaking this project, the subsistence community of Ouzinkie will be allowed to one day resume its traditional harvest of clams. Subsistence restoration is vital to those who have carried forward their subsistence culture for generations. The *Exxon Valdez Oil Spill Restoration Plan* lists similar objectives for restoration by stating that subsistence will have recovered when injured subsistence resources are healthy and productive and exist at pre-spill levels and people are confident that the resources are safe to eat. This project will help accomplish these goals.

## C. Summary of Major Hypotheses and Objectives

This project will coordinate with the Qutekcak hatchery in receiving sufficient quantities of various sized clam seed. It will obtain the necessary permits for conducting field work. It will determine the survival and duration of culture to harvest size for different sizes of seed. It will determine the growth and survival rates in different types of substrate. The field season for testing the various culture scenarios will run from late April to the end of October. Reports will be done quarterly with an annual report issued in January.

## **D.** Completion Date

This project is anticipated to be completed in FY 00.

## **COMMUNITY INVOLVEMENT**

This project will be implemented by project teams selected and controlled by the Ouzinkie village council. Close community involvement will be maintained throughout the duration of this project.

**FY 96 BUDGET** 

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# **Ouzinkie Archeological Culture Center Project**

	Project Number:	96219
	Restoration Category:	Archeological Resources
	Proposed By:	Ouzinkie Tribal Council
	Lead Trustee Agency:	ADEC
	Duration:	l year
	Cost FY 96:	
	Cost FY 97:	
	Cost FY 98:	
	Cost FY 99:	
	Cost FY 00:	
	Cost FY 01:	
	Cost FY 02:	
)	Geographic Area:	Community of Ouzinkie
	Injured Resource/Service:	Archeological Resources

## ABSTRACT

The Ouzinkie Archeological Culture Center will preserve and protect artifacts and the associated data that would otherwise be lost to vandals, looters and erosion or that have been recovered from looters and will preserve local cultural resources and traditional Native culture. This facility will also provide an opportunity for neighboring communities to participate in mini-conferences focusing on issues such as archeological history and the effects of the *Exxon Valdez* oil spill on declining subsistence resources, life skills and native culture.

## **INTRODUCTION**

The Kodiak Archipelago has the highest density of archeological sites in the area affected by the *Exxon Valdez* oil spill. Archeological resources in this area were injured by the spill in several ways. Sites and artifacts were oiled resulting in difficulty when studying the artifacts. Looting and vandalism of archeological sites increased during the spill due to increased opportunity by those on the beaches and a greater knowledge of the location of sites. And, erosion at sites which have been vandalized has also increased.

Archeological resources are non-renewable. Once lost, these resources are lost forever. The Ouzinkie Archeological Culture Center will provide a repository for safe, secure storage of artifacts indigenous to the Ouzinkie community. Showcasing interpretative displays and Alutiiq artifacts, this facility will be utilized by local residents, surrounding communities and visitors alike. Close coordination with the Kodiak Alutiiq Archeological Repository will allow for information sharing and greater knowledge to be gained by village communities.
The Center will be located on the first floor and is envisioned to be designed as an open facility with archeological and historical displays lining the two side walls. The open area will provide space for cultural and heritage conferences on such topics as archeological history, subsistence, native crafts, dancing and historical teachings. Conference topics may include native craft demonstrations, traditional Alutiiq activities, archeological history, social and economic transitioning.

The second floor of the facility will be constructed and funded by Ouzinkie Native Corporation to house corporate offices for the Corporation and the Tribal Council. Land for the project is anticipated to be donated. Design and construction costs will be shared. Maintenance costs will be assumed by Ouzinkie Native Corporation, the City of Ouzinkie and Ouzinkie Tribal Council upon project completion.

The Ouzinkie Native Corporation, Ouzinkie Tribal Council, City of Ouzinkie, Ouzinkie School Advisory Board and Ouzinkie Community Church are committed to contributing artifacts for display, conference coordination, facility construction administration and on-going administration and support. The Center will be centrally located in Ouzinkie on a site to be selected from one of the many available. The Ouzinkie Native Corporation, the City of Ouzinkie and Ouzinkie Tribal Council will share operation and maintenance responsibilities upon facility completion.

## NEED FOR THE PROJECT

## A. Statement of Problem

The *Exxon Valdez* oil spill injured archeological resources through oiling of sites and artifacts and through vandalism due to increased opportunities and knowledge of sites. Archeological resources d cannot recover as injured biological resources may as artifacts are non-renewable. Site vandalism in the Kodiak region has increased greatly since the oil spill. Many artifacts that have been recovered on Spruce Island are presently housed by the University of Alaska. This project will restore this injured resource by providing safe storage of local artifacts and by education regarding the historical importance of archeological sites.

## B. Rationale

The *Exxon Valdez Oil Spill Restoration Plan* lists an end to spill-related injury, a return of looting and vandalism to pre-spill levels and the preservation of artifacts and scientific data which remain in vandalized sites as restoration objectives for archeological resources. This project will assist in archeological restoration by providing safe storage of artifacts as well as education for local and area residents concerning the importance of archeological resources and their history in shaping the region.

The need to construct a local repository can be evidenced by the number of artifacts recovered by the community since the oil spill. These artifacts that are presently within the community would be cataloged and displayed within the Center.

## C. Summary of Major Hypotheses and Objectives

This project will provide a local repository for artifacts and associated data that would otherwise be lost to vandals, looters and erosion or artifacts that have been recovered from looters. The Ouzinkie Archeological Culture Center will be constructed to provide preservation of cultural resources, traditional Native culture, education of the public and an open area for cultural and heritage conferences. As operating costs will be funded by the City of Ouzinkie and the Ouzinkie Tribal Council, this project is limited to constructing and furnishing the Center.

## D. Completion Date

This project is anticipated to be completed in FY 96.

## **COMMUNITY INVOLVEMENT**

 This project will be implemented by project teams selected and controlled by the Ouzinkie Village Council. Close community involvement will be maintained throughout this project. Facility operation and maintenance will be under the direction of the City of Ouzinkie supported through local sales taxes and modest user fees. The Ouzinkie Native Corporation and Ouzinkie Tribal Council are committed to the development and continued operation of the facility. That commitment may take the form of financial contributions, administrative support and on going coordination.

## **FY 96 BUDGET**

96220-BAA

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# EASTERN PWS WILDSTOCK SALMON HABITAT RESTORATION "Submitted Under the BAA"

Project Number:	96222 131717
Restoratation Category:	General Restoration
Proposer:	Native Village of Eyak
Lead Trustee Agency:	USFS
Duration:	3 Years
Cost FY 96:	\$77.200
Cost FY 97:	\$115,000
Cost FY 98:	\$12,000
Geographic Area:	Eyak Native Corporation lands in Eastern Prince William Sound
Injured Resource/Service:	Replacement of Lost Subsistence Services

- 2.3.

## ABSTRACT

This project will replace lost subsistence services resulting from the Exxon Valdez oil spill by increasing wild salmon production in eastern Prince William Sound. Instream fisheries habitat improvement techniques, primarily the installation of log structures, will be employed by local subsistence users to increase the capability of selected streams to produce additional salmon.

## INTRODUCTION

Subsistence use of salmon in Prince William Sound is a service that was injured by the *Exxon Valdez* oil spill. While levels of subsistence harvest have gradually increased throughout the spill area, they continue to remain below pre-spill levels in Prince William Sound. This project will target habitat enhancement of local salmon stocks that are utilized as a subsistence resource by the Native Village of Eyak. Habitat enhancement or restoration will increase the capability of local streams to produce additional salmon, and therefore provide increased subsistence resources and opportunities. A major

focus of the project is the direct involvement and participation of the local subsistence users throughout this process.

Since the 1960's, fisheries biologists have successfully utilized in-stream structures as a technique to improve habitat conditions for salmon spawning and rearing in Alaska. The strategic placement and proper anchoring of logs in stream channels can be an effective method to create additional habitat or improve existing habitat for spawning and rearing salmon. Working with the natural dynamics of the stream channel, log structures can be anchored in various ways to alter stream channels to produce desirable objectives, such as; increase pool habitat, disperse stream energy, prevent erosion, provide cover, enhance spawning habitat, and reduce bedload movement. Individual structures must be designed and installed with specific objectives in mind. These structures should be installed after a thorough analysis of the habitat conditions in the entire stream and requirements of the target salmon species.

The first step in this project will be the compilation and review of all existing information available for salmon streams within the project area. Over the years, several State and Federal agencies, as well as the regional aquaculture corporation, have conducted surveys and collected fisheries information in streams within the project area. This information is essential in identifying streams with the highest potential for habitat improvement. Local and traditional knowledge from the subsistence users in the area will also be an important factor in identifying potential project streams.

Following the identification during the winter of potential project streams months, habitat surveys in selected streams will be conducted over the course of the summer. Habitat surveys will be completed by student interns from the Native Village of Eyak under the guidance and direction of a professional fisheries biologist. Standardized fisheries habitat survey techniques used by the USDA Forest Service will be the method of inventory. The surveys will then be analyzed and prescriptions for structural improvement will be developed based upon the desired objectives.

Actual construction and installation of the habitat improvement structures will occur during May and early June, FY 1997. Work crews consisting of local subsistence users and student interns will construct and install the log structures with hand tools and gas powered winches. No heavy equipment or machinery will be required in the course of this project. Forest Service crews, utilizing similar techniques in the Montague Island Chum Salmon Restoration Project, demonstrated that a small crew using hand tools can be highly productive and can build effective structures in a creek with substantial flows.

### NEED FOR THE PROJECT

#### A. Statement of Problem

Levels of subsistence harvest have gradually increased in all of the spill area communities. However, subsistence harvests in Prince William Sound remain below pre-spill levels and, in some areas, the composition of the subsistence harvest has changed significantly. Subsistence users also report that the effort necessary to harvest resources has increased, and they continue to voice concerns about food safety.

Subsistence will have recovered when injured subsistence resources are healthy and productive and exist at pre-spill levels and people are confident that the resources are safe to eat. This project will attempt to replace injured subsistence services by enhancing salmon resources important to the Native Village of Eyak. Production of additional salmon through habitat improvement will reduce harvest effort and contribute to the overall restoration of subsistence resources in Prince William Sound.

## B. Rationale

This project will directly contribute to the subsistence recovery objective as identified in the *Exxon* Valdez Oil Spill Restoration Plan. This project will target habitat enhancement of local salmon stocks that are utilized as a subsistence resource by the Native Village of Eyak. Habitat enhancement or restoration will increase the capability of local streams to produce additional salmon, and therefore provide increased subsistence resources and opportunities.

The policy of the Trustee Council, as stated in the Restoration Plan, is that projects designed to restore or enhance an injured resource: 1) must have a sufficient relationship to an injured resource 2) must benefit the same user group that was injured 3) should be compatible with the character and public uses of the area. This project meets all three portions of the TC's policy toward restoring or enhancing an injured resource.

## C. Summary of the Major Hypothesis and Objectives

This project will contribute to the recovery of lost subsistence services injured from the *Exxon Valdez* oil spill. The primary objective of the project is to improve instream habitat conditions for spawning and rearing salmon in four streams in eastern Prince William Sound. Another major objective is to directly involve the local subsistence users in the planning, survey, and implementation of the project.

## D. Completion Date

Restoration objectives will be achieved in FY 1998, when monitoring and final project documentation are completed. Actual habitat improvement structure construction and installation will occur in FY 1997.

## **COMMUNITY INVOLVEMENT**

One of the primary goals in this restoration effort is the direct involvement of the community, specifically the Native Village of Eyak, in all aspects of the project. Traditional and historic knowledge will be used in the planning process to identify potential project streams important to subsistence users. Student interns from the Native Village of Eyak, under the guidance of a professional fisheries biologist, will carry out stream habitat inventories and surveys. Boat contracts and personnel involved in this restoration effort will also be solicited through the Native Village of Eyak.

## **FY 96 BUDGET**

Personnel 31.4

3

Travel	0.0
Contractual	45.0
Commodities	s 0. <b>8</b>
Equipment	- 0.0
Total	77.2

## **PROJECT DESIGN**

## A. Objectives

- 1. Improve salmon spawning and rearing habitat conditions in four eastern PWS streams through the installation of log structures.
- 2. Educate student interns in the concepts and application of fisheries habitat management.
- 3. Involve subsistence users from the Native Village of Eyak to the maximum extent possible.
- 4. Develop a baseline of information on existing wildstock salmon habitat conditions within the project area.

### B. Methods

The initial focus of this project will be the compilation and review of all available fisheries information relevant to salmon streams within the project area. Sources of information may include past studies, agency data bases, inhouse reports, publications, and personal communication with local subsistence users and agency staff. The collected information will be cataloged by ADF&G stream number in an accessible format. After the compilation, information for streams in the study area has been compiled, the data will be evaluated and ten streams with the highest potential for habitat improvement will be identified.

During the summer of FY 1996, a fisheries biologist and two student interns will conduct habitat surveys in the ten selected streams. Habitat surveys will be conducted following the methods described by Hankin and Reeves (1988) and the revised version of these methods in Dolloff et al. (1993). The habitat types will be classified according to the descriptions by Bisson (1982): riffle. glide, cascade, backwater pool, corner pool, dam pool, lateral scour pool, upsurge pool. side channel pool, and plunge pool. The survey will be conducted using one person to estimate habitat unit areas, one to record data, and another to measure habitat unit areas, depths, and spawning area. Every fifth pool, glide, or riffle will be measured with a 100' tape or stadia rod after the habitat is estimated visually. The measurements will be performed to obtain an accurate measure of the habitat area and to determine the accuracy of the estimator. Spawning area will be defined as sites with substrate 0.5 - 4.0 inches and less than 30% fine material (less than 0.1 inch or fine sand).

After the habitat surveys are completed, the data will need to be analyzed to determine whether the estimates of the observers were reasonably accurate and precise. This will be performed by plotting the area estimates versus the corresponding measured areas on a graph to see how well the two are correlated. To test this relationship with the data, a simple linear regression will be performed for

habitat distance estimates vs. their respective measured distances using the statistical package in Lotus 1-2-3. A correction factor will then be calculated by dividing the actual measurement of the habitat by the estimates made by each observer to obtain a better estimate of the true habitat areas (Dolloff et al. 1993). Once the corrected habitat type areas are determined, the area for each habitat type will be totaled.

During the winter of FY 1997, the field survey data will be analyzed to determine the habitat factors limiting the production of pink, chum, and coho salmon in the project streams. Based upon the limiting factors analysis and target salmon species, prescriptions will be developed for log structural habitat improvements in up to four of the project streams. These four streams will be representative of streams within the study area that offer the greatest opportunity for habitat improvement and the greatest likelihood of success. Work will occur in these representative streams in FY 1997.

The actual instream work will take place in early summer, FY 1997, to take advantage of lower flows in the creeks and to avoid working in streams when salmon are present. Work will be performed by two boat-based crews of four or five people using hand tools and small power tools such as chain saws, gas-powered drills, and a gas-powered winch. No vehicles or heavy equipment will be used. Work crews will construct and install various combinations of six structure types: diagonal log weir, wing deflector, log barb, tree top, erosion control structure, and upstream V check dam. These structures are designed to perform some or all of the following functions: reduce the energy of the stream flows, reduce bedload movement, reduce erosion, stabilize the channel, create pools, or improve spawning habitat. The type of structure prescribed will depend upon the shape of the existing channel, type of fish habitat available, bank stability, stream flow, and substrate. At each site, the effects of the proposed structures will be considered to ensure that the structure will not cause erosion or other problems at either high or low flows.

Immediately following the installation of the structures, their locations will be mapped with GPS, and affected habitats will be measured for future monitoring.<sup>7</sup> Pre-project habitat surveys will be compared to post-project habitat measurements to determine whether the desired objectives were achieved. During FY 1998, a final monitoring survey will be conducted to evaluate the effectiveness of the structures after being subjected to annual peak stream flows. Final report writing and data base management will also occur during FY 1998.

## C. Contracts and Other Agency Assistance

This project will require a service contract with the private sector for a boat and operator to transport a three person field crew from Cordova to the project sites during FY 1996. This contract will involve approximately 30 field days of transportation for the habitat survey crew. During FY 1997, a similar contract will be required to transport work crews, but will also include providing meals and quarters for the crews.

Technical assistance from the Cordova Ranger District of the USDA Forest Service will be required for several aspects of this project. USFS assistance will include: NEPA and other environmental compliance, fisheries habitat technical expertise, habitat survey training, data management and analysis, and report writing.

## D. Location

The initial study area will include all anadromous streams surrounded by Eyak Corporation lands in Port Gravina, Sheep bay, and the west arm of Simpson bay, Prince William Sound. The project benefits will be realized in eastern PWS, and will primarily affect the communities of Cordova and Tatitlik.

#### SCHEDULE

#### A. Measurable Project Tasks for FY 96

Start-up March 14:	Compilation and review of existing information
	Recruit fish habitat survey crew leader
March 15 - April 14:	Identify study streams
	Recruit student interns
March 15 - May 14:	Arrange logistics (boats, equipment, contracts, etc.)
May 15 - July 14:	Conduct fisheries habitat surveys
August - September:	Analysis of field data
April 1997:	Annual report on FY 96 work

#### B. Project Milestones and Endpoints

July 15, 1997	Improve salmon spawning and rearing habitat conditions through the installation of log structures in four eastern PWS streams.
August 15, 1996	Educate student interns in the concepts and application of fisheries habitat management.
April 15, 1998	Involve subsistence users from the Native Village of Eyak to the maximum extent possible.
September 30, 1996	Develop a baseline of information on existing wildstock salmon habitat conditions within the project area.

## C. Project Reports

- April 15, 1997 Annual progress report (address field habitat surveys, analysis, and habitat improvement prescriptions)
- April 15, 1998 Final report

## COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project proposal has been closely coordinated with the fisheries staff of the Cordova Ranger District, USDA Forest Service. The Native Village of Eyak will apply similar restoration techniques that were used effectively by the Forest Service with the Montague Island Chum Salmon Restoration project (94139). Results from the Forest Service monitoring efforts on Montague Island will be

incorporated into the habitat improvement prescriptions.

Future opportunities for coordination and integration with other restoration efforts will be explored during FY 1996. Shared equipment, boats, and personnel are all options that will be explored for the FY 1997 field work.

## ENVIRONMENTAL COMPLIANCE

The Forest Service will conduct the NEPA review for this project during FY 1997, if approved for funding. Given the scope of the project, it is

anticipated that a categorical exclusion (CE) will be required. Other environmental permits that will likely be required, include: US Army Corps of Engineers - 404 permit, State of Alaska - ADF&G Fish Habitat Permit, Coastal Zone Consistency determination, and possibly a State of Alaska - DNR Tidelands permit.

## PERSONNEL

Project Leader:

n Riol Steve Riedel

P.O. Box 1005 Cordova, AK 99574 (907) 424-3241

Steve Riedel is a commercial fisherman who has resided in the community of Cordova for the past twenty years. Since the age of 19, he has fished as both a seiner ans a gillnetter in Prince William Sound. His family are members of the Native Village of Eyak.

Project Manager:

David Schmid USDA Forest Service, Cordova Ranger District P.O. Box 280, Cordova, AK 99574 (907) 424-7661 (telephone) (907) 424-7214 (Fax)

David Schmid is the program manager and a fisheries biologist for the Cordova Ranger District. He has a B.S. degree in resource management from the University of Wisconsin, Stevens Point. He worked on the Glacier Ranger District for four years as a fisheries technician and two years as a fisheries biologist, during which time he managed the fisheries program and oversaw the construction of several fish ladders and other fisheries habitat restoration and enhancement projects. Since 1990 he has been the program manager on the Cordova Ranger District.

Project Technical Advisor:

Ken Hodges USDA Forest Service, Cordova Ranger District P.O. Box 280, Cordova, AK 99574 (907) 424-7661 (telephone) (907) 424-7214 (Fax)

Ken Hodges is a fisheries biologist on the Cordova Ranger District. He has a B.S. degree in fisheries from Humboldt State University. Before coming to the District in 1989, he had worked as a seasonal employee for the Oregon Dept. of Fish and Wildlife and conducted a one-year study on steelhead genetics in Northern California. In Cordova he has worked as a fisheries technician and now as a biologist.

Date Prepared

Literature cited

Bisson, P.A., J.L. Nielsen, R.A. Palmason, and L.E. Grove. 1982. A system of naming habitat types in small streams, with examples of habitat utilization by salmonids during low stream flow. p. 62-73. In N. B. Armantrout (editor), Acquisition and utilization of

aquatic habitat inventory information. Proceedings, Oct. 28-30, 1981. Western Division American Fisheries Society, Portland, Oregon.

- Dolloff, C. Andrew, D. G. Hankin, and G. H. Reeves. 1993. Basinwide estimation of habitat and fish populations in streams. General Technical Report SE-83. U.S. Department of Agriculture Forest Service Southeastern Forest Experiment Station. Asheville, North Carolina. 28 pp.
- Hankin, D.G. and G.H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. Canadian Journal of Fisheries and Aquatic Sciences 45:834-844.

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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

Budget Category:     FFY 1995     FFY 1996       Personnel     \$31.4       Travel     \$31.4       Contractual     \$45.0       Commodities     \$0.0       Subtotal     \$0.0       Subtotal     \$0.0       General Administration     \$0.0       Project Total     \$0.0       Budget Category:     FFY 1997       FFY 1997     FFY 1998       FFY 2000     FFY 2001       FI/-Itime Equivalents (FTE)     1.0       Dollar amounts are shown in thousands of dollars.       Comments:     Project Number:       96220     Revised & fridg       Project Title:     Eastern PWS Wildstock Salmon Habitat Restoration       AgEncy:     USFS		Authorized	Proposed					<u></u>	
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Pers	onnel Costs:		GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY-1996
	Schmid	USFS Project Manager	GS-11	0.5	4,950		2.5
	Hodges	USFS Technical Advisor	GS-9	1.0	3,864		3.9
	Vacant	Survey Leader	GS-7	6.0	3,000		18.0
	Vacant	Student Intern	GS-5	2.0	1,750		3.5
	Vacant	Student Intern	GS-5	2.0	1,750		3.5
	Riedel	Project Leader	Contributed				0.0
							0.0
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		Subtotal		11.5	15,314	<u>,</u> 0	
Tho	se costs associated with prog	ram management should be indicated by place	ement of an *.		P	ersonnel Total	\$31.4
Trav	vel Costs:		Ticket	Round	Total	Daily	Proposed
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	se costs associated with progr	an management should be indicated by place	Shione of an .				\$0.0
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Project Number: 96220							URIVI 3B
1996 Design Titler Fastern DM/S Wildstack Salman Habitat Destauction					,  F	Personnel	
	1000	Froject file: Eastern FWS Wildstock					& Travel
1		Agency: USFS					DETAIL
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Contractual Costs:				Proposed
Description				FFY 1996
Boat Charter		30 days @ \$1,500/day	······································	45.0
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				445.0
When a non-truste	e prganization i	s used, the form 4A is required.	Contractual Lota	945.0 Proposed
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Misc. equip.		tapes, stadia rod, notebooks, film		0.5
				4
				i i
				j i
	•			
			Commodities Tota	\$0.8
				FORM 3B
1006		Project Number: 96220	C	ontractual &
1990		Project Title: Eastern PWS Wildstock Salmon Habitat Restoration		ommodities
		Agency: USFS		DETAIL
	1			J
	3 of 4			8/7/95

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New Equipment Purchases:		Number	Unit	Proposed
Description	·	of Units	Price	FFY 1996
				. <b>0.</b> 0
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	3 F			0.0
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Those purchases associated with	replacement equipment should be indicated by placement of an R.	New E	quipment lotal	\$0.0
Existing Equipment Usage:		·	Number	Inventory
Description			of Units	Agency
USFS computer				
USFS data loader				
USFS office equipment				
USFS hand held radios				
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[]				
	Project Number: 96220		F	FORM 3B
1996	Project Title: Fastern PWS Wildstock Salmon Habitat Restoration	on	E	quipment
				DETAIL
	Agency: USFS			
L				9/7/95
4 UI 4				0///30

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Chevega Bay Salu Anderson Creek Fish Pass

\$125/95 version (defer)

Project Number:	96222 Revised 8/7/95
Restoration Category:	General Restoration
Proposer:	Chenega Bay IRA Council
Lead Trustee Agency:	USFS
Cooperating Agencies:	ADF&G
Duration:	2 years
Cost FY 1996:	\$16.1
Cost FY 1997:	\$50.0
Geographic Area:	Crab Bay, southwestern Prince William Sound
Injured Resource:	Subsistence/Salmon

## ABSTRACT

This project will help replace lost subsistence opportunities. The project will investigate the potential for opening up additional spawning and rearing habitat for salmon by installing a fish pass on a six-foot barrier fall located near the upper tide zone on Anderson Creek. Anderson Creek is located in Crab Bay on Evans Island, western Prince William Sound. Target species are pink, coho and chum salmon. In 1996 the stream will be surveyed and evaluated for enhancement and an environmental assessment will be completed. In 1997 the fish pass will be installed.

## **INTRODUCTION**

Subsistence activities of residents of Prince William Sound have been severely disrupted by the *Exxon Valdez* oil spill, none more than the residents of Chenega Bay. This project will increase salmon production in Anderson Creek by installing a fish pass over a barrier fall located near the upper tidal zone. The target species are pink chum and coho salmon. Anderson Creek (ADF&G stream number 667) is located adjacent to the village of Chenega Bay. Fish passage structures have been used in Prince William Sound for many years to improve or provide access to salmon to under and unutilized habitats. Anderson Creek was identified and recommended as a potential fish pass site in the Prince William Sound-Copper River Comprehensive Salmon Plan, phase II 5-year plan (1986-1991).

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The first step of this project will be to review escapement information and interview local residents about the fish runs in Anderson Creek. Timited documented escapement information is available because Anderson Creek is not monitored for escapements by Alaska Department of Fish and Game. Knowledge of local residents may be the only source of information for this system.

An inventory of available spawning and rearing habitat in the system will be conducted using standard survey methods. Inventory data will be analyzed and carrying capacities for target species will be estimated.

An engineering survey of the barrier falls will be conducted and a preliminary design developed.

An environmental analysis will be conducted.

Installation of the fish pass will occur in the summer of 1997.

Project monitoring and maintenance of the structure will be done by residents of Chenega Bay and the USFS.

## NEED FOR THE PROJECT

## A. Statement of Problem

Subsistence gathering of marine resources by Chenega Bay villagers has been reduced substantially since the oil spill. There are two reasons for this. One is that many of the marine resources used for subsistence was injured by the oil spill and are not as available. The second is that there is concern among the villagers whether or not resources affected by the spill are safe to eat.

Subsistence will have recovered when injured resources used for subsistence are healthy and productive and exist at prespill levels, and when people are confident that the resources are safe to eat. This project will help replace injured subsistence services by enhancing salmon population used by the people of Chenega Bay.

## B. Rationale

This project will enhance the salmon resources near the Chenega Bay village and provide a safe source of subsistence salmon. This project will provide additional salmon for subsistence users which contributes directly to the subsistence recovery objective identified in the *Exxon Valdez* Oil Spill Restoration Plan. The Restoration Plan also states that priority will be given to restoring resources and services which have economic, cultural and subsistence value to people living in the oil spill area.

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## C. Summary of Major Hypothesis and Objectives

The major objective of this project is to determine the feasibility of installing a fish pass to provide access for salmon over a barrier fall on Anderson Creek to previde a safe reliable source of subsistence salmon close to Chenega Bay. This will be accomplished by installing a fish pass on Anderson Creek. This will increase the production of salmon from this creek and allow for a greater subsistence harvest by the residents of Chenega Bay. Another objective of this project is to involve the local subsistence users in the survey, design and construction of this project.

#### **D.** Completion Date

Survey, design and environmental compliance will be completed in 1996 and all construction work on this project will be completed in 1997. Monitoring of project success and maintenance of the structure will be conducted by people from Chenega Bay with assistance from USFS.

#### **COMMUNITY INVOLVEMENT**

This project is being initiated at the request of the Chenega Bay IRA Council. As the project progresses village residents will be involved by providing historical information to USFS and ADF&G on the salmon runs in Anderson Creek, assist in collection data on the creek and provide labor during installation of the fish pass. The success of the project will be monitored by Chenega Bay village with assistance from the USFS.

## FY 96 BUDGET

<b>5</b> .	Personnel	10.6
	Travel	0.0
	Contractual	3.2
	Commodities	0.5
	Equipment	0.0
	Subtotal	14.3
	Gen. Admin.	1.8
	Total	16.1

#### **PROJECT DESIGN**

#### A. Objectives

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1. Investigate the feasibility of installing a fish pass on Anderson Creek to increase salmon available for subsistence harvest.

2. Install a fish pass on Anderson Creek to provide additional spawning and rearing habitat for salmon, thus making additional salmon available for subsistence harvest by residents of Chenega Bay.

3. Involve residents of Chenega Bay in the planning, survey, design and implementation of the project.

## B. Methods

During 1996 residents of Chenega Bay will be interviewed for information on fish runs in Anderson Creek. This will be followed by inventory of spawning and rearing habitat using standard survey methods. The standard Forest Service stream surveys include documentation of resident and anadromous fish utilizing the stream, channel typing and detailed habitat unit descriptions based on modified Hankin and Reeves (1988) survey techniques. The habitat survey data will be analyzed to determine carrying capacity for target salmon species.

Potential interactions between the target species and any resident populations will be analyzed during the Environmental Assessment required under NEPA.

A site survey will be conducted at the barrier falls and a preliminary design will be completed. Residents of Chenega Bay will be involved in the design of the fish pass.

The actual installation of the fish pass will be done in the summer of 1997 when stream flows are low and salmon and their eggs are not present.

Project monitoring and maintenance of the structure will occur in the years following the installation of the fish pass by residents of Chenega and the USFS. Increases in salmon production and subsistence use will be documented. The creek will be walked on a yearly schedule to document escapement and subsistence harvest will be documented by residents of Chenega Bay.

## C. Contracts and Other Agency Assistance

The Alaska Department of Fish and Game will assist with habitat inventory and provide assistance during development of the environmental analysis.

No contracts are planned for 1996 or 1997.

#### D. Location

Project location is Anderson Creek (ADF&G stream number 667), in Crab Bay, Evans Island.

### SCHEDULE

#### A. Measurable Project Tasks for FY 96

Start-up April 1, 1996

By June 1, 1996	Interview Chenega Bay residents about Anderson Creek.
By August 1, 1996	Complete habitat surveys.
By September 30, 199	Complete project EA and preliminary fish pass design.
B. Project Miles	tones and Endpoints
July 15, 1997	Complete installation of fish pass on Anderson Creek to increase numbers of salmon available for subsistence harvest.

## C. Project Reports

October 30, 1996 Progress report and EA.

September 30, 1997 Final Report.

## **\*** COORDINATION AND INTEGRATION OF RESTORATION EFFORTS

This project will not require coordination with other restoration projects.

## **ENVIRONMENTAL COMPLIANCE**

The Forest Service will conduct the NEPA review during 1996. Other environmental permits that may be required, include: US Army Corps of Engineers - 404 permit, State of Alaska - ADF&G title 16, Coastal Zone Consistency determination.

## PERSONNEL

vacant, Project Leader USFS Chugach National Forest 3301 C Street, Suite 300 Anchorage, AK 99503 phone (907) 271-2500 FAX (907) 271-3992

Project Manager:

Ray Thompson USDA Forest Service Chugach National Forest Oil Spill Restoration Program Leader 3301 'C' Street, Suite 300 Anchorage Alaska 99503 (907) 271-2536 (907) 271-3992 FAX

August 1, 1995

Date prepared

#### LITERATURE CITED

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- PWSAC. 1995. Regional salmon production plan, Prince William Sound Copper River Region (Area E), 1995. Prince William Sound Aqua. Corp. Production Planning Committee. Cordova.

- PWSRPT. 1983. Prince William Sound Copper River comprehensive salmon plan, phase I 20 year plan (1983-2002). Prince William Sound Regional Fish. Plan. Team. Cordova. 176 pp.
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1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

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	Authorized	Proposed	PROPOSED FFY 1996 TRUSTEE AGENCIES TOTALS					
Budget Category:	FFY 1995	FFY 1996	ADEC	ADF&G	ADNR	USFS	DOI	NOAA
Personnel	\$0.0	\$10.6						er e
Travel	\$0.0	\$0.0						
Contractual	\$0.0	\$3.2						
Commodities	\$0.0	\$0.5		·		а 1. 1. Арника (1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
Equipment	\$0.0	\$0.0	·	LONG RANGE FUNDING REQUIREMENTS				
Subtotal	\$0.0	\$14.3	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration	\$0.0	\$1.8	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$16.1	\$50.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Full-time Equivalents (FIE)	0.0	0.2						
	40.0	40.0	Dollar amount	s are shown in	thousands of d	ollars.	, <u>to o</u>	40.0
Other Resources	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
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1996	Project Title:	: Chenega Ba	ay Salmon Re	estoration			3	PROJECT
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	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
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Project Total	\$0.0	\$13.2		at provide and the				
	4	0.0						
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Other Descurres			Dollar amoun	ts are snown in I	thousands of (	dollars.		r
Uther Resources			I <u></u>			<u> </u>		·
Comments:								
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							[	FORM 34
	Project Num	ber: 96222						
1996	Project Title	Chenega B	av Salmon R	estoration				AGENCY
		=9					5	PROJECT
	Agency. USI	5						DETAIL
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Porc	onnel Coeter				ancol	Monthal	Monthlul		Proposed
PM	Name		Position Description	03/h	Sten	Budgeted	Costs	Overtime	FEY 1996
<u></u>	Tunio		Biologist	GS-11		0.2	5.000		1.0
			Fish Tech	GS-5		0.3	2.000		0.6
			Engineer	GS-11		0.5	4,000		2.0
			Engineer Tech	GS-5		0.2	2,500		0.5
			Biologist	GS-11		1.0	4,000		4.0
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			Subtotal			2.2	17,500	· 0	<u> </u>
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Irav	vel Costs:		, 	4	Drigo	Round	Total	Daily Por Diam	Proposed
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Tho	se costs associ	lated with prog	ram management should be indicated by place	ement of a	an *.	<b></b>		I ravel I otal	\$0.0
		1		·····					
			Project Number: 96222						FORM 3B
	1996		Dreiget Titler Changes Day Selmer D						Persönnel
1	1330		Project Title: Chenega Bay Salmon Re	estoratio	Я			2	& Travel
			Agency: USFS						DETAIL
L		J 3 of 9						L	8/1/95

Contractual Costs:						Proposed
Description						FFY 1996
air charter, An	chorage to Cher	nega Bay	8 hr @\$400/hr.			3.2
		Ť.				
			<sup>.</sup> .			
When a non-trustee	e organization is	used, the form 4A is	s required.	· · · · · · · · · · · · · · · · · · ·	Contractual Tota	al \$3.2
Commodities Costs	:					Proposed
Description						FFY 1 <b>9</b> 96
X. e						
	· · · · · ·				Commodities Tota	\$0.5
1996		Project Number:9 Project Title: Che Agency: USFS	96222 enega Bay Salmon Restora	ation	Ca	FORM 3B ontractual & ommodities
	4 of 9					8/1/95

New	w Equipment Purchases:	Numb	er Unit	Proposed
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Tho	ose purchases associated with replacement equipment should	he indicated by placement of an R	Equipment Total	0.0
Evic	leting Equipment lleage		Number	lavesterv
Des	scription		of Units	Agency
003				Agency
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<b></b>				
	Project Number: 96222			FORM 3B
	1996 Project Title: Chenega B	av Salmon Restoration	E	quipment
	Agency: LISES		3	DETAIL
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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

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· · ·	Authorized	Proposed						
Budget Category:	FEV 1995	FEV 1996						
Dudget Category.		111 1000						
Personnel		\$2.5						
Travel		: \$0.0						
Contractual		\$0.0						
Commodities		\$0.0						
Equipment		\$0.0		LONG	RANGE FUNDIN	NG REQUIREME	NTS	
Subtotal	\$0.0	\$2.5	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$0.4	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$2.9						
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Full-time Equivalents (FTE)		0.0						
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Other Resources							·	
Comments:								
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	Project Num	har 06222						FORM 3A
1006								AGENCY
1990	Project litle	: Chenega B	ay Salmon R	estoration			2	PROJECT
	Agency: Al	DF&G						DETAIL
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Prepared: 6 of 9	عمل المسلم ا		. <u>.</u>					0/ / 90

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Pers	onnel Costs:		GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	PCN 117023	FB-III	18B	0.5	5,047		2.5
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	·	Subtotal		0.5	5,047	· 0	
Tho	se costs associated with progr	am management should be indicated by place	ement of an *.		P	ersonnel Tota	\$2.5
Trav	el Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description	······································	Price	Trips	Days	Per Diem	FFY 1996
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Tho	Those costs associated with program management should be indicated by place			1		Travel Tota	\$0.0
<u>[</u>				······································	<u></u>		
r						[]	EORN 2P
		Project Number: 96222					
	1996	Project Title: Chenega Bay Salmon Br	estoration			.	Personnel
		A server ADESC	53101011			· · ·	& Travel
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DETAIL

Contractual Costs:	Proposed
Description	FFY 1996
When a non-trustee organization is used, the form 4A is required.	\$0.0
Commodities Costs:	Proposed
Description	<b>FFY 1996</b>
	÷0.0
1996 Project Number: 96222 Project Title: Chenega Bay Salmon Restoration Agency: ADF&G	ORM 3B htractual & mmodities DETAIL 8/1/95

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FFY 1996
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			0.0
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Those purchases associated with replacement equipment should be indicated by placement of an I	R. New E	quipment Total	\$0.0
Existing Equipment Usage:		Number	Inventory
Description		of Units	Agency
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		2	DETAIL
Agency: ADF&G			
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## Project Title: Port Graham Pink Salmon Subsistence Project

Rensed 7/14/95 Project Number: 96225 EXXON VALDEZ OIL SPILL **Restoration Category: General Restoration** TRUSTEE COUNCIL Port Graham IRA Council Proposer: Lead Trustee Agency: ADF&G Cooperating Agencies: Port Graham IRA Council, Chugach Regional Resources Commission Duration: Five years Cost FY 96 \$80.4 Cost FY 97 \$75.0 Cost FY 98 \$69.5 Cost FY 99 \$71.7 \$73.9 Cost FY 00 Geographic Area: Port Graham, lower Cook Inlet Pink Salmon/Subsistence Injured Resource/Service:

## ABSTRACT

This project will help supply pink salmon for subsistence use in the Port Graham area during the broodstock development phase of the Port Graham hatchery. Because local runs of coho and sockeye salmon, the more traditional salmon subsistence resource, are at low levels pink salmon are being heavily relied on for subsistence. This project will help ensure that pink salmon remain available for subsistence use until the more traditional species are rejuvenated.

## Introduction

This project will help underwrite the hatchery production of pink salmon for subsistence use in Port Graham. Normally pink salmon are not heavily utilized for subsistence. However, with the local sockeye run currently closed to all fishing and the coho subsistence harvest at about 15% of its historic level, pink salmon have played a major role in the subsistence harvest in recent years. Unfortunately, the pink run to Port Graham is also suffering. Escapement into the Port Graham River has barely met the minimum goal for three of the last four years (the 1991 return was somewhat better).

A salmon hatchery is being developed in Port Graham. Its principal mission is to build the pink salmon run back up to levels that will allow commercial exploitation. When this objective is achieved the impact of the subsistence harvest on pinks will be negligible. At this point in time however, the subsistence harvest has a significant impact. The hatchery is in the broodstock development phase. The more eggs that are put in incubation the faster the hatchery will achieve its goals. The low pink returns to the Port Graham River coupled with the subsistence harvest on the hatchery returns is limiting the number of eggs that can be put in the hatchery and extending the time it will take for the hatchery to build the broodstock it needs to become self sufficient.

The EVOS clean-up effort had a negative impact on the Port Graham pink salmon as it did on the local coho and sockeye runs. Boom deployment during the early phases of the clean-up trapped a large number of outmigrating pink salmon fry in the boom curtain on the ebbing tides causing high levels of

mortality. It is possible that these losses are contributing to the poor even year returns that have been experienced recently.

This project is a small piece of the overall Port Graham pink salmon enhancement program. It comprises about a third of the overall Port Graham pink salmon enhancement budget. Port Graham pink salmon enhancement program complies with all state policies governing salmon enhancement activities including disease, genetics and harvest management. All required reviews and permits have been obtained for the hatchery program including this project. This project is designed to become self-sustaining beyond the development stage which is currently estimated to occur by the end of the decade.

## NEED FOR PROJECT

## A. Statement of Problem

The salmon runs to the Port Graham area are at a low levels, partly as a result of the *Exxon Valdez* oil spill. As a consequence it has become more difficult for Port Graham villagers to meets their subsistence needs for salmon. Because of their four to five year life cycles, it will take a long time for the sockeye and coho runs to rebuild. A large number of the pink salmon that are being produced by the hatchery now being developed in Port Graham are being taken in the local subsistence fishery. Although the subsistence harvest of hatchery fish is helping to make up for the lack of wild fish, it is making it far more difficult for the hatchery to develop the broodstock it needs to become self sufficient. Unless the schedule for developing broodstock can be maintained, the hatchery will lose its positive benefit/cost ratio and may have to be closed.

It is appropriate that the hatchery contribute pinks to the subsistence fishery. However, extraordinary methods will need to be employed for the hatchery to provide for the subsistence fishery as well as maintain its broodstock development schedule. These will include procedures to enhance the survival of juvenile pinks released from the hatchery, and coordinating with ADF&G to maximize the number of wild adult pink salmon returning to Port Graham that can be collected for broodstock.

## B. Rationale

The importance of subsistence to the Native villages in the oil spill area has been recognized by the EVOS Trustee Council in its November 1994, *Exxon Valdez Oil Spill Restoration Plan*. This project will help preserve the subsistence lifestyle in Port Graham by providing additional salmon for subsistence needs. Harvest of these hatchery produced salmon will take pressure off the local wild runs; helping them in their recovery effort. Using an enhanced resource to replace harvest of an injured resource is an accepted strategy under the Restoration Plan.

## C. Objectives

Use the Port Graham hatchery to provide pink salmon for local subsistence use while maintaining the hatchery's pink salmon broodstock development schedule.
Project 96225: Port Graham Pink Salmon Subsistence

## **D.** Completion Date

This project will end when the broodstock development phase at the Port Graham hatchery is complete. This is expected to occur by the end of FY 00.

# COMMUNITY INVOLVEMENT

This proposal is being submitted by the Port Graham IRA Council. The Port Graham hatchery is owned and operated by Port Graham Hatchery, Inc., an arm of the Port Graham IRA Council. It is hoped that the Port Graham IRA Council will manage this project under a contract with ADF&G.

## FY 96 BUDGET

Personnel	\$30.4
Travel	<b>\$0</b> .0
Contractual	\$18.0
Commodities	\$5.0
Equipment	\$15.0
Indirect	\$12.0
Subtotal	\$ 80.4
Gen. Admin.	
Total	
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## **PROJECT DESIGN**

## A. Objectives

Use the Port Graham hatchery to provide pink salmon for local subsistence use while maintaining the hatchery's pink salmon broodstock development schedule.

## B. Methods

Two basic strategies will be employed to meet the objective. The first will be to supplement the ADF&G monitoring of the Port Graham pink salmon return and the second will be to enhance the juvenile to adult survival of the hatchery produced pink salmon through an extended rearing program. A brief discussion of each approach is given below.

The Port Graham River pink salmon run is the source of the hatchery broodstock. A program will be established to work closely with ADF&G in monitoring the pink salmon return to Port Graham each year in order to get as precise an estimate as possible on the wild and hatchery return. This program will supplement the normal management stream and bay surveys of Port Graham that ADF&G conducts. It will include additional stream surveys and closely monitoring the subsistence fishery

harvest. This program will also establish regular lines of communications between Port Graham and ADF&G. By coordinating effort and keeping close track of the pink salmon return, it will be possible to maximize the harvest of pink salmon while ensuring that the Port Graham river pink salmon escapement goal is met.

The other aspect of this project involves holding rearing pink salmon fry until they attain an average weight of 8 grams before being released. After emerging from the incubators hatchery pink salmon fry are held and fed in saltwater pens before being released at the hatchery site to go to sea. Studies undertaken at the hatchery over the last three years indicate that pink salmon reared to 8 grams before being released had more than twice the survival of pink salmon fry that were only reared a short time (until the first major zooplankton bloom) before being released. Long term rearing of pink salmon is not cost effective in a normal hatchery operation. However, considering the relatively small number of pinks involved in this strategy and the need to enhance the survival as much as possible to allow for a subsistence take as well as broodstock development, the additional cost or rearing pinks to 8 grams makes fiscal as well as practical sense.

SUPPLEMENTATION CRITERIA. This is a supplementation project. The following is a brief discussion of how the project fits under each of the supplementation criteria presented in the *Invitation to Submit* Restoration Projects for Federal Fiscal Year 1996 and Draft Restoration Program: FY 96 and Beyond, March 1995, pages 34-35.

<u>Benefits of Supplementation</u>. This project will provide additional pink salmon for harvest in the subsistence fishery in the Port Graham area. By shifting some of the subsistence harvest to hatchery salmon this project will help Port Graham wild salmon stocks recover from their present low levels.

<u>Generic Risk.</u> The Port Graham pink salmon hatchery program was reviewed by the ADF&G, CFMD Genetics Section who determined that the program (which includes this project) meets all criteria of the state Genetics Policy for Salmon Enhancement. The program (including this project) has been awarded a state Fish Transport Permit.

<u>Mixed-stock Fishery</u>. The potential for the Port Graham pink salmon hatchery program (including this project) creating or exacerbating a mixed stock fishery program is minimal. The harvest of Port Graham pink salmon are spatially and/or temporally separated from other Kachemak Bay pink salmon stocks as well as other salmon species. There is very little overlap. The same is true with the other salmon species that spawn in the Port Graham area.

Monitoring and Evaluation. A portion of the pink salmon reared to 8 grams will be coded wire tagged. The local fisheries and the hatchery egg take will be monitored for marked fish.

<u>Economic Criteria</u>. This project, especially long term rearing pink salmon fry to increase adult survival, will negatively impact the hatchery benefit/cost ratio. However, not doing this project would either cause a reduction in the overall subsistence harvest in Port Graham as well as put additional pressure on the wild stocks, and/or extend the hatchery broodstock development phase to the point where operating the hatchery stops making economic sense.

<u>Procedural Criteria</u>. All evaluations (Regional Salmon Planning Team, Coastal Project Certification) of the Port Graham hatchery program (including this project) have been conducted and all necessary permits (hatchery permit, fish transport permit, COE, DNR, CZM) have been obtained. This project has not been evaluated under the NEPA process.

# C. Contracts and Other Agency Assistance

The Port Graham IRA Council will operate this project under a contract with ADF&G. The funds for stream survey air charters will be retained by ADF&G to supplement the normal management surveys of Port Graham.

# D. Location

The project will be conducted at Port Graham with the bulk of the benefits accruing to the Port Graham village.

# SCHEDULE

# A. Measurable Project Tasks for FY 96

April 10 to October 30	250,000 pink salmon fry from the Port Graham hatchery placed in net
	pens and reared to an average weight of 8 grams.
July 7 to August 31	Monitor pink salmon escapement into Port Graham.
*August 10 to August 25	Capture hatchery broodstock.
August 28 to September 10	Egg take.
April 1997	Annual report on FY 96 work.

# B. Project Milestones and Endpoints

The project objective will be successfully met if broodstock development phase is completed on schedule at the end of FY 00.

# C. Project Reports

Annual reports	Describes project activities for the year, analyzes successes and
	problems, makes recommendations for improvements due April 1
	following fiscal year being reported on.
Final report	Synopsis of each tear's activities with analysis of project as a whole.
	Due April 1 following final year of project.

# COORDINATION AND INTEGRATION OF RESTORATION PROJECT

If funded, this project will be integrated into the overall pink salmon enhancement program in Port Graham.

## ENVIRONMENTAL COMPLIANCE

All federal, state and local permits have already been obtained for this project. NOAA will likely be the agency responsible for the NEPA review.

## PERSONNEL

The Port Graham IRA Council will oversee and manage this project. The council has managed numerous village projects of various types. It is amply qualified to oversee and manage this one. Ephim Anahonak, Jr., Port Graham hatchery manager, will direct the field activities under the oversight of the Port Graham Hatchery Corporation board of directors.

Elenore McMullen, Chief Port Graham IRA Council Box 5543 Port Graham, AK 99603 Phone (907) 284-2227 Fax (907) 284-2222

July, 12, 1995 First Revision

	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Percennel		A12.7						
Travel		\$12.7						
Contractual		76 4 4807						
Commodities		15.7 - <del>3</del> 80.4						
Equipment	2	\$0.0		LONG	RANGE EUNDIN			
Subtotal	\$0.0	00.0	Estimated	Ectimated	Estimated	Estimated	Fetimated	Estimated
General Administration	\$0.0	77 675	ESUITATEU	ESUMALEU EEV 1998	ESUITATED	EStimated FEY 2000	FFY 2001	EStimated FFY 2002
Project Total	\$0.0	1.L 41.5	¢83.1	\$77.2	\$79.6	\$81.9	111 2001	111 2002
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Other Resources								
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1006	Project Title	Bort Grobo	m Bink Colm	on Subsistor	Dea Brainet			AGENCY
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Pers	onnel Costs:		GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
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Tho	se costs associated with prog	ram management should be indicated by place	cement of an *.		P	ersonnel Total	\$12.7
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PM	Description		Price	Trips	Days	Per Diem	FFY 1996
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		Project Number: 96225					
- 15	1996	Project Title: Port Graham Pink Sal	mon Subeietenr	Project	l		Personnel
	1000	Floject fille. Fort Granam fills Sa	mon Subsistent			5	& Travel
	1	Agency: AK Dept. of Fish & Game			1	I	DETAIL
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Contractual Costs:			Proposed
Description			FFY 1996
Contract with non-trustee ag	ency		80.4
		,	
When a non-trustee organization i	s used, the form 4A is required.	Contractual Total	\$80.4
Commodities Costs:			Proposed
Description			FFY 1996
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		Commodities Total	\$0.0
L			
1996	Project Number: 96225 Project Title: Port Graham Pink Salmon Subsistence Project Agency: AK Dept. of Fish & Game	Co	FORM 3B ontractual & ommodities DETAIL

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Nev	/ Equipment Purchases:	Number	Unit	Proposed
Des	cription	of Units	Price	FFY 1996
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Tho	se purchases associated with replacement equipment should be indicated by placement of an R.	New E	quipment Total	\$0.0
Exis	ting Equipment Usage:		Number	Inventory
Des	cription		of Units	Agency
	<b>1996</b> Project Number: 96225 Project Title: Port Graham Pink Salmon Subsistence Project Agency: AK Dept. of Fish & Game			FORM 3B Equipment DETAIL
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1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

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	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Personnel		\$30.4						
Travel		\$0.0						
Contractual		13.8 \$18.0						
Commodities		\$5.0						
Equipment		\$15.0		LONG	RANGE FUNDI	NG REQUIREM	ENTS	
Subtotal	\$0.0	64.2 -008:4	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Indirect (1.5"/"	· · · · · · · · · · · · · · · · · · ·	11.2 \$12.0-	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	75.4 \$80.4	\$75.0	\$69.5	\$71.7	\$73.9	\$0.0	\$0.0
Full-time Equivalents (FTE)		1.0						
			Dollar amoun	ts are shown in	thousands of e	dollars.		
Other Resources		<u> </u>		L	L			<u> </u>
Comments:								
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	Project Nur	nhari Q6775						FORM 44
1000		nuer: 90225						
1990	Project little	e: Port Grah	am Pink Saln	non Subsiste	nce Project		, r	von-mustee
	Name: Por	t Graham Vil	lage Council					DETAIL
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Perse	onnel Costs:			Months	Monthly		Proposed
	Name	Position Description		Budgeted	Costs	Overtime	FFY 1996
		Fish Culturist		6.0	\$2,533		15.2
		Fish Culturist		6.0	\$2,533		15.2
							0.0
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			Tieleet	Davad	Tadal	Personner Total	\$30.4 Deserved
Irav	el Costs:		I ICKet	Rouna	Total	Daily Por Diam	Proposed
	Description		FICE	mps	Days	rei Diem	FF1 1930
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						Travel Total	\$0.0
		r					
							FORM 4B
	1000	Project Number: 96225					Personnel
	1996 Project Title: Port Graham Pink Salmon Subsistence Project					Ţ	& Travel
		Name: Port Graham Village Council					DETAIL
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Contractual Costs:		Proposed
Description		FFY 1996
Freight		1./
Utilities_		22
Maintenance & repair		0.8
telephone		0.4
Seine boats for broodstock co	ollection @ \$500/day	3.5
Building rent - 2 months		2.0
Air charter - stream surveys		2.4
Technical consultants		5.0
		13.8
	Contractual Tota	<b>\$18.0</b> -
Commodities Costs:		Proposed
Description		FFY 1996
Fish food		2.5
Skiff fuel/oil		0.4
Plumbing supplies		0.7
Building supplies		0.4
Rearing pen nets (2)		0.8
Electrical supplies		0.2
	Commodities Total	\$5.0
		FORM 4B
	Project Number: 96225	
1996	Breiset Titley, Bert Croham Bink Salman Subsistence Breiset	ontractual &
	C	ommodities
	Name: Port Graham Village Council	DETAIL

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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

New Equipment Purchase	es:	Number	Unit	Proposed
Description		of Units	Price	FFY 1996
Saltwater rearing pe	ens for long tern rearing	3	2,500	7.5
Fry emergence race	ways	2	1,700	3.4
Saltwater pump		1	1,800	1.8
Oxygen and temper	ature monitoring system	1	2,300	2.3
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
			1	0.0
Those purchases associa	ited with replacement equipment should be indicated by placement of an R.	New E	quipment Total	\$15.0
Existing Equipment Usag	e:		Number	
Description			of Units	
		:		
[]				
	Project Number: 96225			FORM 4B
1996	Project Titley Port Graham Pink Salmon Subsistence Project			Equipment
1000	Nerve Dert Grehem Mille - Organisti			DETAIL
	IName: Port Graham Village Council			
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Resurrection Boy Salman Stock Enlands -

9072245874

Project Number: 9(0225

Restoration Category: General Restoration

Proposer: Qutekcak Native Tribe

Lead Trustee Agency: ADFG, DEC

Cooperating Agencies:

Duration: 3 years, FY 96,97,98

Cost Fy 96:\$45,000 Cost FY 97: \$ 50,000 Cost FY 98: \$40,000

Geographic Area: Ressurection Bay ,Seward Alaska

Injured Resource: Local Salmon stocks

A salmon Restoration Project designed to enhance Salmon Resources and provide Employment at the Tribal level. By fiscal year 98, the project should prove to be self supporting, By providing a means of Value added marketting to purchase salmon Fry to be introduced yearly. The plan would entail the hiring of a Processor/ marketer, the purchase of a smoker, the purchase of fresh Salmon to be smoked and dried, from the sale of this product the revenue would be used to fund the continuation of the project. Introduction: Salmon stock restoration and a value added economic opportunity that would foster responsible Resource Management and utilization.

#### Need for the project

A. Declining Salmon stocks, a reduction by one-half of the amount of Salmon Fry introduced by the State of Alaska Department of Fish and Game Economic opportunity. B. Rationale; Enable Qutekcak Native Tribe to participate in a project that would be enhancing a natural Resource, while providing employment and experience in Natural Resource Management.

#### C.Summary of Major Hypothesis and Objectives

1. hire an administrator to carry out the goals of the project and to investigate permits needed and identify salmon fry sources ,market feasibility ,purchase fresh salmon for the initial product and work with the necessary Agencies to comply with corresponding regulations.

#### D. Completion date

Fiscal year '98 would be the target date for the project to be self supporting.

### Community Involvement

The Salmon restoration Project would benefit all users of the salmon resource of Resurrection Bay. Also the Qutekcak Tribal Members would benefit in the way of a couple of jobs and the ability to work with Governmental agencies to manage a renewable resource. The Chamber of Commerce of Seward derives it's funding in part by utilizing the Salmon resources of Resurrection Bay as well as the residents of Seward and Many surrounding communities and businesses.

### FY96 BUDGET

Personnel	25,000
Travel	1,000
contractual	000
Commodities	5,000
Equipment	10,000
subtotal	41,000
General administration	4,000
Total	45,000
FY97 Budget	
Personnel	30,000
Travel	500.0
contractual	10000
commodities	5,000.
equipment	500.
subtotal	46,000
general admin	4,000
Total	50,000
FY98 Budget	
Personnel	30,000
trave]	500.
contractual	2,500
commodities	3000.
equipment	0.00
subtotal	36,000
gen. admin	4,000
Total	40,000
	-

Historical Background- Qutekcak Native Tribe serves approximately 550 Natives that live in the Seward area. The 1990 census showed that there were 410 native people living in Seward at that time.

note: Qutekcak Native Tribe P.O.box 1467 Seward, Alaska 99664 (907)224-3118

> Kenneth E. Blatchford Tribal Chairman

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#### COMMUNITY-BASED HARBOR SEAL MANAGEMENT AND BIOLOGICAL SAMPLING

Project number	96244
Restoration category	General Restoration
Proposer	Alaska Native Harbor Seal Commission
Lead Trustee Agency	Alaska Department of Fish and Game
Cooperating agencies	National Marine Fisheries Service
	Rural Alaska Community Action Program (RurAL CAP)
	University of Alaska Sea Grant Program
Duration	Three years
Cost FY 96	128.5
Cost FY 97	100.0
Cost FY 98	85.0
Cost FY 99	0.0
Cost FY 00	0.0
Cost FY 01	0.0
Cost FY 02	0.0
Geographic Area	Prince William Sound, lower Cook Inlet,
Injured Resource/Service	Harbor seals; subsistence

#### ABSTRACT

This project will follow through on recommendations from two workshops supported through previous harbor seal restoration projects. One goal is to involve subsistence users in the restoration of this species through a pilot project for collecting biological samples from subsistence-taken animals from Prince William Sound and lower Cook Inlet. Village-based technicians will be selected by the Alaska Native Harbor Seal Commission (ANHSC) and trained to collect samples from hunters and transport these samples to Anchorage for further sampling and analysis. Also, an instructional video will be produced. Second, a traditional knowledge database will be developed, demonstrated, and distributed. The role of the Alaska Native Harbor Seal Commission will be supported and expanded. The Commission will organize two workshops, produce and distribute two newsletters, and participate in the biological sampling program.

#### INTRODUCTION

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The goal of this continuing project is to support collaboration between subsistence hunters of harbor seals, scientists, and resource management agencies to assess the factors which are affecting the recovery of the harbor seal population of the oil spill area and to identify ways to reduce these impacts. In FY 94 (Project 94244) and FY 95 (95244), the Trustee Council provided funding for the Alaska Department of Fish and Game, Division of Subsistence, to compile available data, collect additional information, and to organize workshops and community meetings with scientists and subsistence users. Participants in the workshops concluded that the lack of a formal organization which represents subsistence users of harbor seals is a major impediment to communication between scientists and hunters and to the inclusion of subsistence hunters as full partners in harbor seal research and restoration. To fill this gap, Alaska Native Participants in the harbor seal restoration workshop of March 2, 1995 voted to form an Alaska Native Harbor Seal Commission. The Commission is presently seeking funding from several sources to support its activities. In FY 96, this project will assist the Commission by providing it with funds to organize two workshops held in conjunction with commission meetings and to produce and distribute two newsletters and other communications.

A second consensus point reached at the workshops was that subsistence hunters are in an excellent position to assist in scientific studies through providing biological samples from subsistence-taken animals. The goal of this pilot project is to test the practicality and effectiveness of a community-based harbor seal biological sampling program, designed and administered cooperatively between the University

of Alaska, the Alaska Native Harbor Seal Commission, and the Department of Fish and Game. An additional goal is to assist the Commission in developing a long-term operating plan for biological sampling independent of restoration funds.

Another consensus point reached at the workshops was that there needs to be integration of the traditional knowledge and skills of subsistence hunters with the research efforts of western scientists. In order to facilitate this integration, a goal of this project will be the organization of a traditional knowledge database by the Division of Subsistence which incorporates available information along with information on selected topics (such as harbor seal distribution) specifically for this project. The Division will demonstrate the use of the database at one of the proposed workshops, and make the database accessible to subsistence users, resource managers, and scientists through an askSam read-only program.

Finally, this project will support other restoration projects proposed for FY 96 and beyond, such as the Marine Mammal Ecosystem Study (96001, 96064), the Community Involvement and Traditional Knowledge Project (96052), and the Prince William Sound Subsistence Harbor Seal Hunting Documentary (96214). The project will also contribute to the Trustee Council's recovery objectives for subsistence by facilitating involvement of subsistence users in the restoration process.

#### NEED FOR THE PROJECT

#### A. Statement of problem

The harbor seal populations of Prince William Sound and the northern Gulf of Alaska were in decline before the oil spill for unknown reasons. The spill injured these populations, adding to the decline, and they are not recovering. Harbor seals are a primary subsistence resource in the Alaska Native communities of the oil spill region. Subsistence harvests of harbor seals have declined in many of communities since the spill because of the reduced population size and voluntary efforts on the part of hunters to limit their harvests to aid in recovery. In order to assess these efforts and to identify measures which subsistence users could take to further assist in harbor seal restoration, the Trustee Council funded projects in FY 94 and FY 95 to compile existing data, collect additional information, organize meetings of scientists and subsistence users, and develop recommendations for hunters. Two workshops took place. Among other things, participants at the workshops recognized that without a formal organization representing subsistence hunters of harbor seals, it was unlikely that a consensus on recommendations could be developed or that a dialogue between hunters and scientists could be maintained. Workshop participants stressed that strong involvement of hunters in research activities and management decisions was an essential ingredient in any plan for harbor seal recovery, as is the integration of traditional knowledge into research efforts. Several other proposed restoration projects will examine the potential causes of the harbor seal population decline and lack of recovery, including mortality caused by humans. The need exists to follow through on the workshop recommendations to support these harbor seal restoration efforts.

#### B. Rationale

The recovery objective for harbor seals states that recovery will have occurred when harbor seal population trends are stable or increasing. Based on findings from two workshops which involved scientists and subsistence users of harbor seals (conducted under Projects 94244 and 95244), meeting this recovery objective will be enhanced by continuing dialogue between scientists and subsistence users, involving subsistence hunters in research efforts, integrating traditional knowledge into scientific studies, and collaborating in the development of recommendations for subsistence hunters about how they can assist in harbor seal recovery. For example, subsistence hunters can provide substantial information about the winter location and abundance of seals, the condition of seals taken for subsistence purposes, and seal behavior. This project will implement the recommendations of the workshops by supporting the activities of the newly formed Alaska Native Harbor Seal Commission, funding workshops and community meetings which review data and hypotheses, collecting and organizing traditional knowledge into an

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accessible database, developing a pilot biological sampling program, and providing other technical support to the Alaska Native Harbor Seal Commission.

Research projects have been proposed as part of the FY 96 Work Plan to monitor seal population trends and conduct research to discover why harbor seals are not recovering. Assessing parameters that affect marine mammal abundance and health requires access to and examination of animals or tissues. Marine mammals are inherently difficult to study and the collection and examination of tissues is further complicated by legal limitations imposed by federal protective measures and permitting procedures. Sacrificing animals for research purposes is either undesirable or illegal, and beachcast carcasses are often too decomposed to be of value. A potentially invaluable source of fresh specimens exists in Alaska, where coastal Alaska Natives still legally use marine mammals for subsistence or handicraft purposes.

For a harvest sampling program of this nature to succeed, it is important that:

1. Local people support the program and its goals, be involved in the sample collection, understand the significance of the data to be collected, be willing to store and ship samples from villages to a central receiver, and be trained and willing to record data and collect samples as instructed.

2. Samples must be easily collected, stored and shipped; may be subsequently sub-sampled by lab technicians; must be analyzed in due time; and results returned to villages.

C. Summary of Major Hypotheses and Objectives

The primary premise upon which this project is based is that restoration of harbor seal populations will be facilitated by developing the involvement of subsistence users in research and management activities, and through facilitating the integration of traditional knowledge in scientific studies. Key to the success of this effort will be support for the activities of the Alaska Native Harbor Seal Commission. Specific objectives include to:

1. Develop a community-based pilot program to collect biological samples and other information from harbor seals in Prince William Sound and the northern Gulf of Alaska involving hunters from Cordova, Tatitlek, Chenega Bay, Seldovia, Port Graham, and Nanwalek, which may serve as a model for a more inclusive program throughout the range of the species.

2. Collect biological samples and other information from harbor seals harvested by subsistence hunters in the six communities, and provide these samples to researchers for analysis.

3. Communicate information about results of harbor seal studies to hunters and scientists on a regular basis through community meetings, workshops, and newsletters organized and produced by the Harbor Seal Commission

4. Develop a Harbor Seal Traditional Knowledge Database for this region, demonstrate its use, and provide access to the database to potential users

5. Produce recommendations for subsistence users of harbor seals which derive from study findings and the discussions at community meetings and workshops

6. Evaluate the program's effectiveness and develop a more long-term funding plan.

#### D. Completion Date

This project should continue as long as the Marine Mammal Ecosystem Research package is underway. Presently, fieldwork and data analysis for this study package are proposed through FY 97, with close-out in FY 98. The biological sampling program should be viewed as a pilot project to continue for two additional years in order to get the system in place and provide enough time for an evaluation of its performance. ing, in the ≪inite

#### COMMUNITY INVOLVEMENT

Community and subsistence user involvement in the restoration process and in harbor seal recovery is a central purpose of this project. A primary goal is support of the activities of the Alaska Native Harbor Seal Commission. With project funds, the Commission, through a subcontract with the Rural Alaska Community Action Program (RurAL CAP), will organize two workshops for representatives of oil spill area communities which use harbor seals for subsistence purposes conducted in conjunction with Commission meetings. The Commission will also organize community meetings to inform hunters of restoration activities, harbor seal research, and Commission functions. These meetings can serve as a means to develop subsistence hunter involvement in ongoing research efforts. The Commission and RurAL CAP will also produce two newsletters. As part of the biological sampling effort, the Commission will select technicians in six communities. These technicians will be trained by a marine mammals biologist to collect samples. Subsistence hunters will supply the samples and will be trained through the use of an instructional video, and through hands-on instruction as needed. Division of Subsistence researchers will continue interviews with knowledgeable seal hunters and users to collect information for the a traditional knowledge database, which will be organized, demonstrated, and made available to potential users. The development of the database will also support efforts through Project 96052 to more fully involve local communities and traditional knowledge in the restoration process.

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#### FY 96 BUDGET

Personnel	28.8
Travel	4.4
Contractual	83.6
Commodities	1.4
Equipment	0.1
Subtotal	118.3
Gen. Admin.	10.2
Total	128.5

#### PROJECT DESIGN

#### A. Objectives

1. Develop a community-based pilot program to collect biological samples and other information from harbor seals in Prince William Sound and lower Cook Inlet, which may serve as a model for a more inclusive program throughout the range of the species.

a. Train local technicians and hunters in biological sample collection procedures

b. Design the program to maximize sampling for efficiency and coordination with other harbor seal projects

c. evaluate the program's effectiveness and develop a more long-term funding plan.

d. Produce an instructional video in biological sampling procedures

2. Collect biological samples and other information from harbor seals harvested by subsistence hunters in six communities: Tatitlek, Chenega Bay, Cordova, Seldovia, Port Graham, and Nanwalek.

a. Collect information about the number, sex, approximate age and place and date of harvest for harbor seals taken in each village

b. Collect biological samples to be analyzed in cooperation with other harbor seal projects, including blubber, whiskers, skin, female reproductive tracts, and stomachs

c. Store samples in a community freezer and periodically ship samples to Anchorage for further processing and distribution for analysis

3. Utilizing the services of the Alaska Native Harbor Seal Commission and its subcontractors, communicate information about results of harbor seal studies to hunters and scientists on a regular basis.

a. Conduct two workshops annually, in conjunction with meetings of the Alaska Native Harbor Seal Commission, which include hunters from oil spill communities, harbor seal biologists, and agency representatives, to review recent findings about harbor seals and discuss important issues
b. Conduct one community meeting per year in each of the six pilot program communities for hunters and scientists to review and integrate scientific information and traditional knowledge
c. Produce two informational newsletters per year describing results of harbor seals studies, ongoing harbor seal research, and community involvement

4 Develop a Harbor Seal Traditional Knowledge Database

a. Incorporate information obtained from previous research efforts by the Division of Subsistence ADF&G as part of Restoration Projects 94244 and 95244, National Marine Fisheries Service-sponsored research, and Division of Subsistence baseline studies into a database

b. Collect new information from hunters about topics such as: winter distribution and abundance; changes in distribution and abundance; seasonal use of haulouts; and observations about factors that may be affecting abundance, such as human activities or killer whales

c. Incorporate information collected during other restoration projects, such as 96052 (Community Involvement and Traditional Knowledge) and 96214 (Harbor Seal Video), and make sure that data from this project are available to support these other restoration efforts

d. Demonstrate the use of the database during one of the Harbor Seal Commission workshops, and make the database available to potential users such as local communities, schools, subsistence hunters, and scientists

5. Collaboratively produce recommendations for subsistence users of harbor seals

a. These recommendations will be based on traditional knowledge, contemporary observations, and scientific findings

b. Recommendations will be developed at workshops and community meetings.

6. Evaluate the program's effectiveness and develop a more long-term funding plan for Commission activities and the biological sampling program

B. Methods

Objectives 1 and 2: Biological Sampling Program

For Objectives 1 and 2, the Biological Sampling Program, the following procedures will be used:

1. Training. A marine mammal biologist, Kate Wynne of the University of Alaska, will compile protocols, synthesize these into useable formats, develop data forms, labels, sampling kits, and a database, and incorporate instructions for their use into a training program.

Instruction. Sampling will require two levels of instruction or training: community-based sampling technicians and subsistence seal hunters. Village-based technicians, ANHSC personnel, and ADF&G staff will attend a full-day regional sampling training session in either Cordova (for Cordova, Tatitlek, and Chenega.Bay technicians) or Homer (for Seldovia, Port Graham, and Nanwalek technicians) in which Wynne will: provide a detailed explanation of project goals, and significance and use of data to be collected; distribute sampling kits; explain and demonstrate sampling techniques and use of equipment; and distribute written and graphic instructional materials to take to villages.

Hunters will be informed of program objectives and specified sampling requirements through communication with village technicians and other project personnel and through written, graphic, and video instructional materials. If hunters or technicians need additional "hands on" training, Vicki Vanek of the Division of Subsistence or other division personnel may be available to travel to the communities to provide this assistance. This travel would be accomplished as part of other projects (and scheduled to be consistent with the goals and objectives of these projects), and funding for this level of assistance is not being sought through this project.

2. Training materials.

Manual: This will include step-by-step diagrams and a visual guide. It will be waterproof and be included in the sampling kit.

Examples: At the training session participants will work through a hypothetical animal, filling in data forms and labels.

Video. The video will be based upon the two training sessions, produced by ADF&G, and distributed subsequent to the two multi-community sessions. The video will include: project rationale and objectives; footage of current research and population declines; significance and use of data to be collected; demonstrate how to fill in data forms and labels; demonstrate how to use sampling kit and supplies; show where and how to remove tissues from animals; and show how to sub-sample, bag, and label tissues.

3. Sample collections

Technicians. There will be a village-based technician in each pilot program community, whose responsibilities will be to take samples from seals taken by participating hunters, record data as requested, assure access to freezer and sampling supplies, notify Wynne when supplies are low or freezer is nearly full, and load and ship coolers with samples to Anchorage.

Key hunters. Ideally at least two hunters per village will be willing to provide subsistence taken seals from which the technicians will take samples, and record data as requested.

Sample size and distribution: It is difficult to predict the number of samples that may be collected in this program annually or by community, but we have assumed an average of 20 animals per community while designing the sampling strategy and estimating project costs.

Tissues to be collected. A minimal sample can be collected by technicians in each village with relative ease and subsequently sub-sampled in Anchorage to provide the suite of tissue samples required. We will train and ask technicians and hunters to record information about harvest location and animals' sex, evidence of tags or markers, and standard measures of length and girth. Technicians will be trained to collect the whole head (with hide and blubber intact); stomach (after tying off both ends), fist-sized sample of liver, heart, and kidney; female reproductive tract, and claws. Although collecting the reproductive tracts and claws is highly desirable, it may be realistic to assume they will be collected opportunistically only from those hunters willing to dedicate extra effort required to collect them.

#### Sampling procedure.

Step 1. In the community: village technician receives sample from the hunter. The data form will be filled out by hunters in the field and in the community by the technicians. Basic sample information will be filled in on a detachable specimen label at the bottom of the data form which will be placed inside the specimen bag with samples for village-based storage. Technicians will be provided with a kit that includes supplies adequate for sampling of 20 animals. Among the items in each kit will be 1) ziploc sampling bags for collection of the head, stomach, and tissues, 2) large garbage bags in which to place the sample bags collected from each animal, and 3) data forms with a detachable specimen label. The head,

stomach, and tissues will each be individually bagged in a two gallon ziploc bag. All these sample bags will then be placed in one large garbage bag along with the specimen label from the bottom of the data form. The specimen bag and bottom portion of the data form will be placed in a freezer without sub-sampling, the technician will enter information on freezer logs and deposit data form in a file, contact Kate Wynne or the ANHSC when a full shipment has accumulated, and then send the samples to Anchorage.

Step 2. Kate Wynne in Anchorage receives samples and stores them at the UAA North Pacific Fisheries Observer Training Center, for periodic sub-sampling efforts, then: removes canine teeth, whiskers, and samples of skin, blubber, and skeletal muscle from the head and places each in a separate bag with a label containing information from the specimen label (date, species, sex, village); repackages each tissue into individual bag and labels as above, specifying organ and origin; ties securely, refreezes, and ships individually labeled samples to the appropriate laboratory (see Table 1).

#### Data collection.

Data will be requested on data forms which will allow for standardization of data with other harvestsampling programs. Sample labels and freezer log forms will be developed to assure adequate sample tracking.

#### Sample analysis.

The attached Table 1 provides a summary of the research programs involved in the tissue analysis. It is expected that participating scientists will acknowledge in any reports and publications the role of the ANHSC in facilitating the biological sampling program.

#### Data management and reporting

Biological data collected from this program will be managed and maintained in a data base using software that is easily translated or integrated with software used by other agencies and organizations. This database will be centrally maintained (initially by Wynne) and a summary of the samples collected and analyzed will be included in the project's annual and final reports to the Trustee Council, with copies to pertinent agencies, such as NMFS. Additionally, Wynne will collate the results of the sample analysis into a readily understandable report, that will be provided to all the project participants.

Summary: Proposed responsibilities of each cooperating group for Objectives 1 and 2:

Kate Wynne, University of Alaska, will:

1. Compile protocols, develop data forms and sampling kits, and incorporate instructions for their use into a training program

2. Assist ADF&G in the production of the training video

3. Synthesize technical information into "user friendly" data forms, labels, and sampling kits

4. Conduct one-day training workshops in Cordova and Homer, each attended by three of the community technicians, Commission staff, and agency personnel

5. Receive samples from village-based technicians, process samples in Anchorage, and ship samples to participating researchers for analysis

6. Maintain database of biological data collected from this project

7. Participate in the two Alaska Native Harbor Seal Commission workshops

8. Collate results of sample analysis (provided by various researchers) into a readily understandable report

9. Work with ADF&G to integrate these results with information being developed for the traditional knowledge data base being prepared under this project

n an star Na Star 10. Write a brief summary of the project for inclusion in the interim and final reports for the Trustee Council

Alaska Department of Fish and Game, Division of Subsistence will:

1. Lead in production of the instructional video, including purchase of supplies, rental of studio, and distributing video (Craig Mishler, 0.5 month)

2. Participate in training sessions (Craig Mishler, Vicki Vanek, Ronald Stanek)

3. Help answer community facilitator's questions (Vicki Vanek, Ronald Stanek)

4. In coordination with other ongoing projects, provide "hands on" training if necessary in the pilot program communities (Vicki Vanek, Ron Stanek)

The Alaska Native Harbor Seal Commission will:

1. Identify and subcontract with six community technicians

2. Purchase sampling kits and distribute kits and other supplies to village-based technicians

3. Set up air freight accounts for shipping samples

4. Through a subcontract with RurAL CAP, arrange travel to training workshops for Kate Wynne, Commission personnel, and the community technicians

5. Participate in the training workshop

6. Communicate study findings through workshops, community meetings, and the production of two workshop summaries (the latter produced through the subcontract with RurAL CAP)

7. Assist with production of the training video

#### Objective 4: Traditional Knowledge Database

Regarding Objective 4, the collection and organization of traditional knowledge, Division of Subsistence researchers will continue to conduct interviews with seal hunters in Prince William Sound and lower Cook Inlet communities to collect and review information on harbor seals. Although a variety of topics will be covered, the interviews will focus on such topics as harvest locations, winter distribution and abundance, changes in distribution and abundance, seasonal use of haulouts, and observations of factors that may be affecting seal abundance. These interviews will be taped (with permission of the hunters) and field notes taken. Opportunities will also arise to collect information through Project 96214, Prince William Sound Harbor Seal Hunting Documentary.

The results of these interviews, plus those from the two previous restoration projects, ongoing National Marine Fisheries Service-sponsored research, and division baseline studies, will be included in a database using the askSam program. Division personnel will demonstrate the use of the database in one of the Commission workshops and make the database available in a read-only format to potential users. Craig Mishler, the coordinator of the division's harbor seal and sea lion harbor assessment program (funded by NMFS), will provide technical assistance in the organization of the database (0.5 months funded from this project, with additional support from the NMFS project. Review of currently available information, new fieldwork, preparation of the database, and demonstration of and training in its use will be assigned to Ronald Stanek (2.0 months, lower Cook Inlet) and William Simeone (1.5 months, Prince William Sound).

Objectives 3, 5, and 6: Communications, Recommendations, and Evaluation

Regarding Objectives 3, 5, and 6, communication of study findings, development of recommendations, project evaluation, and development of a long-term funding plan, will be a collaborative effort met through a contract with the Alaska Native Harbor Seal Commission, which will subcontract with RurAL CAP to do the following:

1. Organize two workshops to be held in conjunction with meetings of the Commission. Because the commission is limited to one representative from each region which uses harbor seals (southeast Alaska,

the Chugach Region, Cook Inlet, Kodiak, and Aleutian/Pribilofs), participation in the workshop will be expanded to include hunters from spill area communities. These workshops will be modeled after those held under Projects 94244 and 95244, which involved review of information by scientists and subsistence hunters. A goal of the workshops is discussion of potential recommendations for subsistence hunters concerning how they can support efforts to restore harbor seal populations.

2. Hold community meetings in the six communities involved in the pilot biological sampling project, during which scientists and subsistence hunters review data, traditional knowledge is integrated into ongoing studies, and any recommendations developed at the workshops are discussed.

3. Write, produce, and distribute two workshop summaries which provide overviews of findings from harbor seal research and Commission activities.

Also,

4. The Commission co-lead for this project will attend Trustee Council workshops and contribute to Trustee Council's annual and final reports

The Division of Subsistence will provide technical assistance to the Commission as needed. Kate Wynne, through work on the biological sampling program, will write a report which summarizes the results of analysis of the samples taken as part of this project. The report will be written for a general audience.

Interim and final reports: the Division of Subsistence will prepare interim and final reports for the project overall, with contributions from the collaborating groups.

#### Contracts and Other Agency Assistance

A. Kate Wynne, University of Alaska Sea Grant Marine Advisory Program, will be contracted through an RSA with the ADF&G or through a subcontract with the Commission to develop the training and coordinate the sampling components of this project. She will:

1. Compile protocols, develop data forms and sampling kits, and incorporate instructions for their use into a training program

2. Assist ADF&G in the production of the training video

3. Synthesize technical information into "user friendly" data forms, labels, and sampling kits

4. Conduct one-day training workshops in Cordova and Homer, each attended by three of the community technicians, Commission staff, and agency personnel

5. Receive samples from village-based technicians, process samples in Anchorage, and ship samples to participating researchers for analysis

6. Maintain database of biological data collected from this project

7. Participate in the two Alaska Native Harbor Seal Commission workshops

8. Collate results of sample analysis (provided by various researchers) into a readily understandable report

9. Work with ADF&G to integrate these results with information being developed for the traditional knowledge data base being prepared under this project

10. Write a brief summary of the project for inclusion in the interim and final reports for the Trustee Council

Proposed Contract A: Budget

Salary and benefits

2 months plus benefits (plus 25% UAF overhead) = \$13,861 Travel: will be arranged and paid for out of RurAL CAP Subcontract

\$13,861

9

Total

In-kind contribution: The UAA North Pacific Fisheries Observer Training Center will provide facilities at no cost for storing samples in Anchorage and laboratory facilities for Wynne to process samples and send them to participating researchers.

B. A contract will be developed with the Alaska Native Harbor Seal Commission to undertake portions of the project. It is anticipated that the contract will be a cooperative agreement similar to that developed between the ADF&G and the Alaska Sea Otter Commission for the first two years of this restoration project. The general goal of the contract will be to support the role of the Commission through involvement in workshop organization, training sessions, newsletter writing, and use of databases. The Commission intends to subcontract with RurAL CAP for assistance in carrying out these responsibilities. Tasks for the Commission under this contract will include:

- 1. Participate in the biological sampling training sessions
- 2. Purchase sampling kits and distribute kits and other supplies to village-based technicians
- 3. Set up air freight accounts for shipping samples
- 4. Identify and subcontract with local community technicians in the six pilot study communities
- 5. Organize and participate in six community meetings in pilot study communities
- 6. Assist with development of the biological sampling training video
- 7. Prepare brief (letter format) quarterly reports on its activities as related to this project.
- 8. Attend Trustee Council Workshops and contribute to Trustee Council's annual and final reports

Through a subcontract with the Commission, RurAL CAP will do the following:

1. Arrange travel for village based technicians and Kate Wynne to the training sessions

2. Organize two workshops during which, among other things, this project's performance and findings will be evaluated. This will include making all travel arrangements and developing an agenda. This will include hunters from the six pilot communities, Valdez, four Kodiak Island Borough communities (tentatively Kodiak, Ouzinkie, Port Lions, and Old Harbor), and one Alaska Peninsula Community (tentatively Perryville).

3. Prepare workshop proceedings summary report

Through subcontracts with the Commission, community technicians in six communities (Cordova, Tatitlek, Chenega Bay, Seldovia, Port Graham, and Nanwalek will do the following:

1. Attend one day training session in either Homer or Cordova

2. Collect samples (stomach contents, female reproductive organs, liver, heart, kidney, claws, head)

3. Record information about harvest locations, sex, evidence of tags or markers, length, and girth

4. Label and freeze samples, notify Kate Wynne or the Commission when freezers are full, and load and ship coolers with samples to Anchorage

#### Contract B: Budget

Personnel Executive Director for 5.75 months @ \$4,000/month		\$23,000
Travel	Executive Director travel	3,865
Operational costs		
phone		1,000
mailing		1,000
Misc. Supplies		100
Sampling and Fr	9,000	
Total		\$37,965

Note: in kind contributions for the operations of the Alaska Native Harbor Seal Commission include office space and utilities from the Dineega Sewing Shop (Cordova) and technical assistance from the Chugach Regional Resources Commission (Anchorage).

Succontract D1. Vinage-based reclinicians	Subcontract.	B1:	Village-based	Technicians
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Training honorarium: \$100/day for six technicians for one day each:	\$600
Compensation for taking biological samples of seals	5,400

Note: it is anticipated that samples will be taken from an average of 20 seals per community, for a total of 120 seals, and that it will take about 3 hours per seal to take samples, store samples, and ship samples. At a rate of 15/hour, this gives:  $15 \times 3$  hours  $\times 20$  seals  $\times 6$  communities = \$5,400.

\$0,000
\$19,238
1,000
\$23,375

LOCATION

The biological sampling portion of the project will primarily focus on sample collection from the Prince William Sound communities of Cordova, Chenega Bay, and Tatitlek; and the lower Cook Inlet communities of Seldovia, Port Graham, and Nanwalek. If funding and scheduling permit, additional collection sites on Kodiak Island and the Alaska Peninsula will be added, probably in subsequent years of the project.

Harbor seal hunters from the spill area communities will be invited to participate in the two proposed workshops, with emphasis placed on hunters from Prince William Sound and Lower Cook Inlet communities which are involved in the biological sampling program. Participation will also be sought from Kodiak Island Borough communities and at least one representative hunter from the Alaska Peninsula (Chignik Area).

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SCHEDULE

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Measurable Project Tasks for FY 96

Start-up to October 15	develop contracts with the Alaska Native Harbor Seal Commission and the
-	University of Alaska; hire technicians
October/November	hold regional training sessions for biological sampling in Cordova and Homer produce training video
December	Organize and hold first workshop (Alaska Native Harbor Seal Commission)
December to September	1996 Biological sample collection
January 1996.	Produce and distribute first proceedings report (Alaska Native Harbor
	Seal Commission)
March or April 1996	Second Workshop (Alaska Native Harbor Seal Commission):
-	Demonstrate Traditional Knowledge Database
	Produce and distribute second proceedings report

September 1996 Evaluate first year of program

Project Milestones and Endpoints

- 1. Development of sampling program: October/November 1995
- 2. Production and distribution of Instructional video: November 1995
- 3. Workshop to train local hunters and technicians in collection procedures: October/November 1995
- 4. Workshop in conjunction with meeting of Alaska Native Harbor Seal Commission: December 1995
- 5. Produce and distribute first proceedings report: January 1996
- 6. Maximize coordination with other programs: ongoing
- 7. Ship samples to appropriate laboratories for subsequent analysis: ongoing
- 8. Advise villages and scientists of analytical results when available: ongoing
- 9. Conduct interviews with hunters to collect traditional knowledge: ongoing
- 10. Second workshop in conjunction with Commission meeting: March or April 1996
- 11. Produce and distribute second proceedings report: April 1996
- 12. Demonstrate Traditional Knowledge Database: March or April 1996
- 13. Evaluate the program's effectiveness and develop a more long-term funding plan: September 1996
- 14. Annual report: April 15, 1997
- 15. Final project report April 15, 1999

PROJECT REPORTS

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Annual report	April 15, 1997
Annual report	April 15, 1998
Final report	April 15, 1999

#### COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project will incorporate data on population status, distribution and degree of recovery of harbor seals from the Marine Mammal Ecosystem study package, including restoration project numbers 96001 and 96064. It will also draw on the results of research conducted by the Division of Subsistence under a contract with the National Marine Fisheries Service to monitor subsistence harvests. The project will provide information to researchers working on harbor seal restoration projects and facilitate their work with Alaska Native hunters. The project will provide biological samples from subsistence-taken harbor seals to address potential health and nutritional problems that may be impeding harbor seal recovery, for projects 96001 and 96064.

Several programs exist or are planned to sample tissues from harbor seals from the spill area. As noted above, we will make every effort to coordinate our efforts with these programs to minimize the burden and confusion of hunters and communities, maximize logistical efficiency, collect comparable or standardized data whenever possible, and limit the likelihood of duplication of efforts. The National Marine Fisheries Service has expressed interest and may have funding available to expand this pilot program in FY 96 or in subsequent years. This agency may also have funds available to perform analysis of samples as part of its normal agency management functions. Additionally, NMFS will assist with coordinating the harbor seal sampling and testing programs.

Additional funding for the operations of the Alaska Native Harbor Seal Commission has been sought from the National Marine Fisheries Service and the U.S. Congress. Such funding would support more extensive activities for the Commission across the entire range of the harbor seal in Alaska.

This project will also contribute to 96214, "Documentary on Subsistence Harbor Seal Hunting in Prince William Sound." Its findings will assist in developing themes for the documentary. In turn, the documentary project will provide data for incorporation into the traditional knowledge database.

Also, the traditional knowledge database component of this project will directly support efforts under Project Number 96052 to integrate traditional knowledge of injured resources more broadly into restoration efforts and scientific studies. This will include a model for database organization and training in uses of the database. In turn, Project 96052 will, among other things, develop guidelines and protocols for collecting and using traditional knowledge which will be supportive of the efforts for harbor seal restoration.

#### ENVIRONMENTAL COMPLIANCE

This project is a continuation of Projects 94244 and 95244, which were classified as categorically excluded under NEPA guidelines. While this project will collect biological samples from subsistence-taken harbor seals, the sampling effort will not result in any additional takings of seals.

#### PERSONNEL

Kate Wynne is a marine mammal biologist with the University of Alaska, stationed in Kodiak. She has extensive experience in working with Alaska Native subsistence hunters. Ms Wynne will be responsible for designing and implementing the biological sampling program objectives in this project, including holding two village based technician workshops, developing data forms and data management procedures, writing a report which summarizes findings from the sampling program, and assisting the Alaska Native Harbor Seal Commission in reporting study findings to local communities.

Monica Riedel, an Alaska Native resident of Cordova, is the chairperson of the Alaska Native Harbor Seal Commission. She has extensive experience in marine mammal issues through her work with the Alaska Sea Otter Commission. Ms Riedel will be responsible for the ANHSC activities under this project, including identifying and subcontracting with local village technicians, developing subcontracts, and participating in workshops and community meetings.

James Fall is the Regional Program Manager for the Division of Subsistence in Anchorage. Dr. Fall will be responsible for overall project performance. He will also coordinate preparation of annual and final reports. No restoration funds are being requested for support of his time on this project.

Craig Mishler has been a Subsistence Resource Specialist with the Division of Subsistence since 1989. He is presently the division's project manager for the Harbor Seal and Sea Lion Harvest Assessment Project. Dr. Mishler will be assigned 1 month as part of this proposed restoration project. He will assist with the production of the biological sampling training video, assist with training workshops, provide technical assistance to the Alaska Native Harbor Seal Commission, provide technical assistance in the development to the traditional knowledge database, and develop linkages between this restoration project and other division research efforts, including the harvest assessment project.

Ronald T. Stanek has been a Subsistence Resource Specialist with the Division of Subsistence since 2980, with extensive fieldwork experience in oil spill communities, especially lower Cook Inlet. He will be assigned two months to this project to conduct hunter interviews in Seldovia, Port Graham, and Nanwalek, organize the Traditional Knowledge Database, demonstrate the Database at a Harbor Seal Commission workshop, and provide other technical assistance to the Commission.

William Simeone. Dr. Simeone was added to the Division of Subsistence staff as a Subsistence Resource Specialist in 1995. He has extensive prior research experience in most communities in the oil spill area. He will be assigned for 1.5 months to this project to conduct hunter interviews in Cordova, Tatitlek, and Chenega Bay, organize the Traditional Knowledge Database, demonstrate the Database at a Harbor Seal Commission workshop, and provide other technical assistance to the Commission.

Vicki Vanek is a Fish and Wildlife Technician with the Division of Subsistence in Kodiak. She holds a Doctor of Veterinary Medicine degree, and has worked on previous Division projects in collecting marine mammal samples and training hunters. She will participate in the development of the instructional video and assist in the training workshop, and will be available as needed to assist hunters and community technicians. Since her work for the Division is covered in other special projects, including the NMFS-sponsored harvest monitoring effort, no additional funding is being requested through restoration funds.

Proposed Project Co-Leader James A. Fall Regional Program Manager Division of Subsistence Alaska Department of Fish and Game 333 Raspberry Road Anchorage, Alaska 99518 Phone number : 907-267-2359 FAX number: 907-267-2450

Proposed Project Co-Leader Monica Riedel Chairperson Alaska Native Harbor Seal Commission PO Box 1005 Cordova, AK 99574 Phone number: 907-424-3241 FAX number: 907-424-7739

Proposed Project Manager Dr. Joseph Sullivan Habitat & Restoration Division Alaska Department of Fish and Game 333 Raspberry Road Anchorage, AK 99518 Phone number: 267-2213 FAX number: 267-2474

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Primary		Subsample	
Researcher	Analytical Laboratory	from Head	Sample
Robin Westlake	Southwest Fisheries Center, La Jolla, CA	x	Skin
Kathy Frost	ADF&G, Fairbanks	х	Teeth
		х	Whiskers
		X	Blubber
			Female reproductive tracts
Joe Cook	Tissue Archive, UAF Museum, Fairbanks	x	Skulls
		X	Skeletal muscle
		х	Blubber
Don Schell	IMS, UAF, Fairbanks	x	Whiskers
John Sease	NMML, NMFS, Seattle	x	Whiskers
		х	Skeletal muscle
Mike Castellini	IMS, UAF, Fairbanks	x	Blubber
Kate Wynne	Pacific ID, Victoria, BC		Stomachs

# Table 1. Participating Research Programs Involved in Tissue Analysis

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	Aumonized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
	1							
Personnel		\$28.8						
Travel		\$4.4						
Contractual		\$83.6						
Commodities		\$1.4						
Equipment		\$0.1		LONG RA	ANGE FUNDI	NG REQUIRE	EMENTS	
Subtotal	\$0.0	\$118.3	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$10.2	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$128.5	\$100.0	\$85.0				
Full-time Equivalents (FTE)		0.5						
	Dollar amounts are shown in thousands of dollars.							
Other Resources							<u>````</u>	
1996Project Number: 96244 Project Title: Community-based Harbor Seal Management and Biological Sampling Agency: AK Dept. of Fish & GameFORM 3A AGENCY PROJECT DETAIL								

i. ł

Personnel Costs: GS/Range/ Months Monthly							Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	-*	4 - 2					0.0
	C. Mishler	SRS III	18D	1.0	5,335		5.3
*	Vacant 117064	Fisheries Biologist III	18C	1.0	5,203		5.2
	R. Stanek	SRS III	18J	2.0	5,831		11.7
	W. Simeone	SRS II	16B	1.5	4,418		6.6
		i					0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
		Subtotal		5.5	20,787	0	<u> </u>
Ino	se costs associated with progr	am management should be indicated by place	cement of an +.		Per	sonnel Total	\$28.8
Tra	vel Costs:	<u> </u>	Ticket	Round	Total	Daily	Proposed
PM	Description		Price	Trips	Days	Per Diem	FFY 1996
	Anchorage - Cordova		70	2	4	150	0.7
	Anchorage - Tattlek		550	1	3	150	1.0
	Anchorage - Chenega Bay		900	1	3	150	1.4
	Saldovia Nanwalak		200	1	2	150	0.5
l	Seldovia - Ivaliwalex		50	1	2	150	0.4
	Seldovia- Fort Granalli		50	1	2	150	0.4
							0.0
							0.0
							0.0
							0.0
							0.0
Tho	se costs associated with progr	am management should be indicated by place	cement of an *.			<b>Travel Total</b>	\$4.4
L'anna							
		Project Number: 96244				I I	ORM 3B
		Designed Titles Community have diffe	-h 01 7 f		. 4		orconnel
1	1996	Project Title: Community-based Ha	rbor Seal Ma	anagement a	na	ſ	ersonner
1		Biological Sampling				'	& Travel
		Agency: AK Dept. of Fish & Gam	e				DETAIL
						Baanny or other	

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<b>Contractual Costs</b>			Proposed
Description			FFY 1996
Contract with Kate training video	Wynne, University of Alaska Seagrant Program, to provide training in sample collection, help produce and oversee technical aspects of sampling program	e	13.9
Contract with Alas	ka Native Harbor Seal Commission to identify community technicians, assist with introducing the project	ect.	67.3
organize two v	vorkshops, prepare two proceedings reports, and subcontract with RurAL CAP and community technic	cians	
Rental of editing st	udio with technican, production of training video		0.9
Postage for video d	listribution		0.5
Phone			1.0
When a non-trustee	corganization is used, the form 4A is required.	actual Total	\$83.6
Commodities Cos	ts:		Proposed
Description			FFY 1996
Supplies for training	ng video production		0.3
Audio cassette tape	2S		0.1
Unlimited license	for one application of ask Sam Read-Only Runtime (for database distribution)		1.0
	·		
	Сотто	dities Total	\$1.4
	Project Number: 96244	FC	ORM 3B
1006	Project Title: Community-based Harbor Seal Management and	Cor	ntractual
1990	Biological Sampling	& C	ommoditi
	Agency: AK Dent of Fish & Came		es
	Agency. An Dept. of Fish & Game	L	,

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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FFY 1996
One wireless lavalier microphone and transmitter	1	120	0.1
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement	t of an R. New Equi	pment Total	\$0.1
Existing Equipment Usage:		Number	Inventory
Description		of Units	Agency
Project Number: 96244		я	ORM 3B
Project Title: Community-based Harbor Seal	Management and		uinmont
1996 Biological Sampling		E	
			DETAIL
Agency: AK Dept. of Fish & Game	L		

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Troject # 96254

Lower Cook Injet Fisheries Development Corporation R.O. Box 2421 Homer, Alaska 99603

May 1, 1995

Exxon Valdez Oil Spill Trustee Council Restoration Office 645 "6" Street Anchorage AK 99501

Re: 1996 Work Draft Plan: Delight and Desire Lakes Fertilization Project.

Dear Trustee Council:

Lower Cook Inlet Fisheries Development Corporation (LCI Fisheries Development Corporation,) a nonprofit group concerned with conserving and enhancing ocean resources located in Homer, would like to submit a project for the 1996 Work Draft Plan: Fertilization of Delight and Desire Lakes.

This project is a "draft," in that, LCI Fisheries Development Corporation continues to gather specifics and is in the process of securing the involved land owner's permission. Once LCI Fisheries Development Corporation gets the necessary permission and details, we will send you a completed <u>Exxon Valdez</u> Trustee Council FY/96 Detailed Project Description. If LCI Fisheries Development Corporation does not get the land owner's go ahead, we will withdraw our proposal.

The outer coast of the Kenai Peninsula, where Delight and Desire Lekes are located, was especially hard hit by the spill. This was graphically illustrated by the map on the cover of Trustee publication, "Restoration Framework Supplement," July 1992.

The proposed Delight and Desire Lakes Fertilization Project will directly rehabilitate/restore wild sockeye salmon stocks from Delight and Desires Lakes. To accomplish this project, limnological and biological investigation will be conducted in the Lake systems to determine the appropriate liquid fertilization formula and appropriate quantities. On site logistical support systems will be set-up in order to apply daily liquid fertilization. Simultaneous to fertilization application, evaluations studies will be conducted to determine the growth and age of subsequent smolt production. Adult sockeye returns will be monitored by the operation of weir systems at both Delight and Desire Lakes.

The proposed Delight and Desire Lakes Fertilization Project will have a duration of only five years. Once the Lakes' fertilization project is completed and returning adult sockeye salmon have reached prespill levels, their dead carcasses will provide the necessary fertilization level for the Lake systems. Although LCI Fisheries Development Corporation is still investigating the costs involved in this project, we would estimate that, for FY96, the project would cost \$ 110,000.

Thank you for your carefully consideration of Lower Cook Inlet Fisheries Development Corporation Delight and Desire Lakes Fertilization Project proposal.

Sincerely, Ken Castner

Ken Castner, Interim President Lower Cook Inlet Fisheries Development Corporation 07235265

May 1, 1995

Exxon Valdez Oil Spill Trustee Council Restoration Office 645 "G" Street Anchorage AK 99501

Re: Delight and Desire Lakes Fertilization Project.

Dear Trustee Council:

Cook inlet Seiners Association (CISA) is a Homer based non-profit organization that represents salmon seiners in the Lower Cook Inlet. Eighty-five percent of the permit holders for this area are members of CISA while over ninety percent are residents of the Kenai Peninsula.

The LCI seine fleet was heavily impacted by the 1989 Exxon Valdez oil spill as we have outlined in past correspondence with the Council. CISA continues to maintain the immediate need to begin restoration in LCI, especially in the outer coast of the Kenai Peninsula. As a result, we are excited by the project proposal submitted for the 1996 Work Plan by the Lower Cook Inlet Fisheries Development Corporation. The project clearly lies in a heavily damaged area and focuses on restoration of wild stock. CISA fully supports this projects and asks for the Council to fund and implement it.

Thank you.

Sincerely. charles Walkden, sr.

President, Cook Inlet Seiners Association

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# Kenai River Sockeye Salmon Restoration

Project Number:	96255
Restoration Category:	General Restoration
Proposer:	Alaska Department of Fish and Game
Lead Trustee Agency:	ADF&G
Cooperating agencies:	None
Duration:	One year
Cost FY 96:	\$ 244.7 Option 1; \$447.9 Option 2
Cost FY 97:	\$ To be determined
Geographic Area:	Upper Cook Inlet
Injured Resource/Service	Sockeye salmon (Kenai system)

#### ABSTRACT

Sockeye salmon (<u>Oncorhynchus nerka</u>) that spawn in the Kenai River system were injured by the <u>Exxon Valdez</u> Oil Spill. Greatly reduced fishing time in the Upper Cook Inlet due to the presence of oil caused sockeye salmon spawning escapement levels in the Kenai River to exceed the desired amount by three times. The overescapement resulted in reduced survival of juvenile sockeye salmon. Careful monitoring and possible reduction of Kenai River sockeye salmon harvests may be necessary to ensure adequate escapements. The goal of this project is to restore Kenai River sockeye salmon through improved stock assessment capabilities and more accurate regulation of spawning levels.

# INTRODUCTION

Fishing time in the Upper Cook Inlet was greatly reduced in 1989 due to the presence of oil from the <u>Exxon Valdez</u>Oil Spill, and as a direct result, sockeye salmon spawning in the Kenai River system greatly exceeded optimal escapement goals. The biological impact of the\_spill may be one of the most serious documented to date. This overescapement resulted in greatly reduced survival of juvenile sockeye salmon during the winter-spring rearing period. The number of sockeye salmon outmigrants in the Kenai River was reduced in 1991 (1989 parent year) and declined through 1993. Restoration of these injured Kenai River sockeye salmon can best be accomplished through improved stock assessment capabilities, more accurate regulation of spawning levels, and modifications to human use. Sockeye salmon harvested from the mixed-stock fishery of Cook Inlet include fish from the Kenai, Kasilof, and Susitna Rivers. In order to effectively manage the harvest of stocks damaged by the spill, Restoration Science Studies R53/93015/94255/95255 and R59/93012 were implemented in 1992 through 1995. These studies developed a genetic baseline to identify Kenai River stocks in mixed-stock fisheries of Cook Inlet. The statistical methods associated with the fishery estimates were refined, and the accuracy and precision of the estimates were evaluated. Area managers can now use this information to modify fishing areas and openings in order to facilitate the harvest of surplus Kasilof and Susitna River stocks while protecting the damaged Kenai River stocks. In addition, more accurate estimates of abundance of Kenai River sockeye salmon within Upper Cook Inlet has been accomplished through increased sampling power of the offshore test fishing programs. Restoration Science Study 96255 is the continuation of these projects through fiscal year 1996.

# NEED FOR THE PROJECT

## A. Statement of Problem

Data collected by NRDA Fish/Shellfish Study 27, <u>Sockeye Salmon</u> <u>Overescapement</u>, indicated greatly reduced survival of juvenile sockeye salmon beginning with the 1989 parent year. The extremely high escapement may have initially produced more rearing juvenile sockeye salmon than could be supported by nursery lake productivity. In general, when rearing salmon abundance greatly exceeds lake carrying capacity, the species and size composition of prey resources are altered, affecting all trophic levels. Because of such changes, juvenile growth is reduced, freshwater mortality is increased, greater proportions of fry remain in the lake for an additional year of rearing, smolt condition is reduced, and marine mortality is increased.

Limiting sockeye salmon fry production by closely regulating the number of spawning adults may be the only way to restore the productivity of these rearing areas. Sockeye salmon smolt outmigrations in the Kenai River declined through 1993. The number of adult sockeye salmon returning in 1995 may be low, and a reduction of Kenai River sockeye salmon harvests may be necessary to ensure adequate escapements. Knowledge of stock composition and abundance is critical to allow managers to monitor the harvest during the season.

# B. Rationale

Results from previous years' genetic studies indicate that Cook Inlet sockeye salmon are extremely heterogeneous not only within the Kenai River, but throughout Cook Inlet. This genetic heterogeneity can be used as an accurate stock identification tool. Extensive analyses of known mixtures indicate that Kenai River populations can be estimated with a high degree of accuracy, and precision in mixtures typically found in Cook Inlet drift and set net fisheries.

A pilot study of fishery sampling was conducted during 1993, prior to the return of the first impacted stocks anticipated in 1994 (age-5 sockeye salmon from the 1989 parent year). Two fishery samplings were completed using the genetic baseline collected during the 1992 field The emphasis shifted during 1994, and four in-river season. collections were analyzed from the Kenai River as a test of the Two of these collections were analyzed in-season. In method. addition, one drift net fishery sample was analyzed post-season in 1994. Completion of the laboratory and statistical analyses within 48 hours was demonstrated both in 1993 and 1994. Beginning in 1995 and potentially continuing into 1996, the technique will be incorporated into fishery management decisions on an in-season basis and into post-season evaluations.

# C. Summary of Major Hypotheses and Objectives

The major hypotheses of this study are that restoration of sockeye salmon in the Kenai River can be accomplished through improved harvest management techniques and that naturally occurring genetic differentiation among spawning populations can be used as an accurate stock identification tool. The specific objectives are to: 1) Develop a genetic stock identification (GSI) model to estimate the proportion of Kenai River stocks intercepted in mixed stock harvest in Cook Inlet, and 2) Provide more accurate estimates of abundance of Kenai River sockeye salmon within Cook Inlet through hydroacoustic assessment techniques.

# D. Completion Date

Recovery of Kenai River sockeye salmon stocks will be accomplished when the returns reach normal levels based on the return-per-spawner history of the Kenai/Skilak system and comparative data from the nearby Kasilof system. If restoration occurs in 1995, this project will be finalized and completed in 1996 (Option 1). If restoration has not occurred, a continuation of the project with be requested with fishery sampling in 1996 (Option 2).

#### COMMUNITY INVOLVEMENT

Residents of the Kenai Peninsula Borough are an important part of the Trustee Council-funded Kenai River restoration projects. Besides working on the projects in direct employment as ADF&G Fish and Wildlife biologist and technicians the people of the Peninsula are kept well informed about these projects. Major media outlets in Anchorage and Kenai cover the issues impacting the Kenai River, including the Trustee Council-funded projects. In addition, local ADF&G project biologists have made presentations on restoration efforts to local governments, in local schools, and to community groups. Further, detailed discussions and program suggestions have resulted from the involvement of the Upper Cook Inlet Regional Planning Team. This team is composed of members from the Cook Inlet Regional Aquaculture Association and ADF&G. The team has held numerous meetings with diverse public participation to discuss the results to date of the Kenai River projects related to the spill.

# FY 96 BUDGET

	Option 1 Closeout	Option 2 Continuation		
Personnel	172.4	298.1		
Travel	5.6	5.6		
Contractual	25.0	56.5		
Commodities	14.0	39.0		
Equipment	0.0	0.0		
Subtotal	217.1	399.2		
Gen. Admin.	27.6	48.7		
Total	244.7	447.9		

If the resource is fully recovered in 1995, the program will be finalized, and Option 1 will be requested for FY 96. If restoration has not been realized, a continuation of the project will be requested with the Option 2 budget.

# PROJECT DESIGN

## A. Objectives

The goal of this project is to restore Kenai River sockeye salmon injured by the oil spill. This will be accomplished through improved stock assessment capabilities, more accurate regulation of spawning levels, and modifications to human use. The specific objectives are to:

- 1. Obtain baseline genetic data (allozyme) from all significant spawning stocks contributing to mixed-stock harvests of sockeye salmon in Cook Inlet.
- 2. Use Genetic Stock Identification (GSI) algorithms to estimate the proportion of Kenai River stocks in mixed stock fisheries so that managers may modify area and time of harvest in order to protect these damaged stocks while targeting surplus Kasilof River and Susitna River stocks. Genetic data will be obtained from samplings of the various mixed-stock fisheries. Stocks composition estimates will be provided within 48 hours post-fishery.
- 3. Investigate the added utility of DNA-level markers to discriminate among Cook Inlet populations.
- 4. Provide more accurate estimates of abundance of Kenai River sockeye salmon within Cook Inlet through hydroacoustic assessment techniques.

Objective 1 has been completed with only limited baseline sampling planned for 1995. The majority of effort in 1996 will focus on Objective 2 and 3, refinement of the fishery models and estimation of the contribution of Kenai River stocks to 1995 fishery samples. In particular, we will complete the analysis of the 1995 samplings and abundance estimates. We will also finalize the DNA research and evaluate the GSI model after incorporation of the results from DNA studies.

Under Option 1 we are requesting funds for reporting of the 1995 results, finalizing the GSI model, and preparation of a final report for the project. However, if the resource has still not recovered in 1995 (Option 2), we will request funds to continue fishery sampling (Objectives 2 and 4) into the 1996 season.

# B. Methods

1. Stock Identification

#### Allozyme Analyses

We will continue to refine the comprehensive genetic database of sockeye salmon stocks in Cook Inlet. In 1992 we collected baseline genetic data using allozyme analyses from 28 subpopulations from Cook Inlet including the Kenai, Kasilof, and Susitna Rivers (Seeb et al 1993). Additional sockeye salmon were collected from approximately 34 baseline subpopulations in 1993 and 12 in 1994. Analyses of 1992-1994 collections are complete (Seeb et al. 1995). An additional five sites are planned for 1995 to refine the database for the Kenai River and monitor temporal stability. Final selection of sample sites will be made in May, 1995. Target sample sizes for allozyme baseline collections will be 100 individuals to adequately characterize spawning populations (Allendorf and Phelps 1981; Waples 1990).

Under Option 2, mixed-stock fishery samples will be collected from at least four drift fishery openings occurring during July (up to six openings may be sampled) in 1996. In addition, two Upper subdistrict set net samples will be collected during July. Set net samples will not be collected concurrent with drift samples because of budget and personnel limitations. Mixed-stock sample sizes will be set at 400 individuals to minimize the confidence intervals surrounding the estimates (Pella and Milner 1987). Laboratory and statistical analyses will be completed within 48 hours on at least two of the drift gill net samples.

Muscle, liver, eye, and heart will be dissected from freshly killed individuals. Tissues will be placed in labeled cryovials and transferred into liquid nitrogen. Tissues from baseline collections will be stored on liquid nitrogen until transferred to -80°C storage in Soldotna or Anchorage. Soldotna samples will be transferred to the Anchorage laboratory on dry ice or liquid nitrogen and again placed in -80°C storage where they will remain until laboratory analysis.

Allozyme data (Utter et al. 1987; Seeb et al. 1987) will be collected for the loci identified in earlier years of the study. Allozyme techniques follow those of Harris and Hopkinson (1976), May et al. (1979), and Aebersold et al. (1987); nomenclature will follow the American Fisheries Society standard (Shaklee et al. 1990). A phctographic record of each gel will be made. An extensive allozyme screening was undertaken to maximize the potential number of available gene markers. A total of 68 allozyme loci were resolved and will be collected from the baseline spawning populations. Of the 68 loci, 24 polymorphic loci will be used in the fishery estimation procedure (<u>mAAT-1; mAAT-2; mAH-1,2; mAH-4; sAH; ALAT; GAPDH-2; GPI-A; GPI-B1,2;</u> <u>sIDHP-1; LDH-B2; sMDH-A1,2; sMDH-B1,2; mMEP-1; PEPA; PEPB-1; PEPC;</u> PEPLT; PGM-1; PGM-2).

# Analytical Process

We have made considerable progress in developing the analytical and computational techniques to rapidly provide fishery estimates for inseason management. Development of a comprehensive package of genetic analysis programs in Windows 3.1 (Microsoft 1991) includes the following components: (1) an on-line gel scoring program providing extensive documentation of results and error checking capability; (2) a set of genetic analysis functions to estimate allele frequencies, heterogeneity, and fit to expected genetic models; and (3) revised input into the maximum likelihood estimation procedure to allow rapid fishery estimates and a flexible method to conduct multiple simulation The object-oriented genetics applications work synchronously studies. within the Windows environment to provide a user-friendly interface for data input and complicated analyses to allow a fast turn-around from field samples to fishery estimates. Fishery composition estimates will be available within 48 hours following the fishery so that management decisions can be based on the actual composition of the fisheries.

The population-level analyses previously completed will be enlarged to include all 1995 baseline. Genotypic and allelic frequency estimates will be calculated for all loci. Nei's genetic distance measures (Nei 1978), which summarize multi-locus data into a single number, will be calculated between all pairs of spawning locations. These values will be used to construct branching diagrams using numerical taxonomic techniques (UPGMA) which provide a representation of overall phenetic similarity. A neighbor-joining tree (Saitou and Nei 1987) will be constructed to provide a phylogenetic tree relating the populations. Cavalli-Sforza and Edwards (1967) chord distance will be calculated and used to perform a multidimensional scaling analysis (MDS, Krzanowski and Marriott 1994). This procedure uses distances to group populations in multidimensional space, so that the expected distance between populations closely match the observed distance in multidimensional space. Additionally, chi-square goodness-of-fit to Hardy-Weinberg equilibrium will be performed to test for random mating within each population. Homogeneity of allelic frequencies among the various collections will be tested using a log-likelihood ratio analysis (G-statistic; Smouse and Ward 1978;  $\alpha = 0.01$ ; Cooper 1968). Rejection of the null hypothesis of homogeneity is indicative of discrete spawning populations. The total gene frequency dispersion at each locus will be subdivided into within-and among-river system components in a hierarchical fashion. Hierarchical levels will be organized to test for homogeneity of (1) within drainages of the systems; (2) among drainages within river systems; and (3) among river The likelihood analysis will use the computational formula systems. of Sokal and Rohlf (1981). This statistic is distributed approximately as the chi-square statistic with (no. of alleles - 1) X

(no. of region - 1) = (degrees of freedom). The likelihood values (G) can be summed over all loci to obtain a total value at each level of analysis. All computations will be performed using functions written for <u>S-Plus</u> analytical software (Mathsoft, Inc., Seattle, WA.).

Stock contribution to mixed fishery samples will be estimated using a conditional maximum likelihood program (Statistical Package for the Analysis of Mixtures, SPAM, ADF&G (1995)), a program developed by this project. This program incorporates routines of (GIRLSEM) and conjugates gradient (CONJA-S) algorithms developed by National Marine Fisheries Service (NMFS; Pella and Milner 1987; Masuda et al. 1991; Pella et al. 1994). The precision of the stock composition estimates will be determined by a parametric bootstrap, where the mixture frequencies and baseline frequencies are assumed to be distributed multinomial (Efron and Tibshirani 1986). This same type of analysis can be used to evaluate the effect of mixture sample size on the accuracy and precision of the stock composition estimates and to adjust mixture sample size.

# DNA Analyses

In 1994, pilot studies using DNA techniques were conducted on a subset of the baseline samples. Techniques investigated included restriction fragment polymorphism (RFLP) analysis of mtDNA, microsatellite analysis, sequencing of <u>GH1</u> and <u>GH1</u> introns, and random amplified length polymorphism (RAPD) analysis. All of these approaches except <u>GH</u> sequencing show promise for discrimination of Cook Inlet stocks of sockeye salmon. We are currently evaluating the use of mtDNA analysis in-season. We will also complete the development of nuclear DNA markers for potential utility in postseason analyses. Particular care will be taken to test for an abbreviated DNA screen which may further refine allozyme-based <u>SPAM</u> estimates.

Following the recommendations of peer reviewers, we are focusing upon RFLP analysis of the NADH5/6 region of mtDNA. We have detected polymorphisms with the restriction endonucleases Apa I, KpnI, Stu I, Hinf I, and Tag I. In FY95 we will complete the survey of mtDNA variability for approximately 19 collections (including all major Cook Inlet populations) with a sample size of 40-50 individuals/populations. We will soon evaluate the additional resolving power of mtDNA for mixed fishery analyses through simulation studies. Results to date are quite promising, with significant differences occur in mtDNA frequencies among some populations poorly separated by the allozyme model. In FY96, we propose to finalize the mtDNA survey to include additional populations and increasing sample size from the already surveyed 19 populations. No additional field sampling will be required. This will allow full incorporation of mtDNA information into the GSI model. If Option 2 is chosen (1996 fishery sampling), we anticipate including mtDNA markers in both the in-season and post-season analyses.

Development of other DNA markers through contractors Dr. F. W. Allendorf (University of Montana) and Dr. P. Bentzen (University of Washington), as funded in Trustee Council Project 95255, is also continuing following the recommendations of peer reviewers. Based upon results to date, the focus of contractors in FY95 was narrowed to microsatellite analysis and possibly RFLP analysis of additional introns (Bentzen and Wright 1993; Devlin 1993). We propose to finalize these surveys in FY96. These data will then be evaluated for inclusion in the GSI model and could be used in combination with allozyme and mtDNA markers for analyzing fisheries in future years.

# 2. Offshore Test Fish Program

Total sockeye salmon returns to UCI has been estimated early in the season by test fishing between Anchor River and Red River delta (Tarbox et al. 1995). Northward migrating sockeye salmon are captured with a drift gill net at a series of stations. Salmon are identified to species and sex, and length measurements are recorded. Estimates of total sockeye salmon return are made several times during the season by estimating expected total test fishery catch per unit of effort for the season and catchability of sockeye salmon in the test fishery. Analysis of historical data has indicated that existing sampling effort and catch has not been proportional to abundance. To assess run size more accurately, additional sampling effort will be added to the existing program.

In 1992, 1993, and 1994, hydroacoustic equipment and techniques were tested in UCI offshore waters (Thorne and Salomone 1993; Thorne 1994). Results of this work indicated that hydroacoustic techniques could detect salmon and provide a population estimate for in season use. However, the primary constraint identified in the study was limitations (signal/noise ratio) of the hydroacoustic gear due to rough sea conditions or shallow water in the northern portion of UCI.

Beginning in 1995, a single abundance estimate will be made using the techniques developed in 1992, 1993, and 1994. Examination of the data set indicated that a minimum of 12 orthogonal transects sampled over 48 hours within Cook Inlet would be needed to provide a useable estimate of adult salmon abundance. Therefore, if Option 2 is chosen, a minimum of 12 transects will be completed during the survey. Exact timing of the survey will be determined during the commercial fishing season to meet commercial fishery management objectives.

# C. Contracts and Other Agency Assistance

We propose to complete the current developmental work on identification of DNA-level genetic markers with the support of contractors. This project is currently funding research at the University of Montana and University of Washington including analysis of both microsatellite (Bentzen and Wright 1993) and intron (Devlin 1993) polymorphisms. Contract amendments to complete these studies will be assigned for FY1996 based upon results reported from FY1995.

ADF&G is hosting an inter-agency coordination meeting in May, 1995. The focus of this meeting will be the exchange of information concerning DNA studies of salmonids. Representatives from federal and state agencies (NMFS, USF&WS, NBS, WDF&W) as well as university researchers will attend. Both contractors (University of Montana and University of Washington) are planning to attend which will improve coordination between the two universities and between ADF&G and the contractors. Information gathered at the workshop should be immediately applicable to this study.

# D. Location

Location of this project is in Upper Cook Inlet, north of a line from Anchor Point to the Red River Delta. Field work will be throughout Cook Inlet and based out of Soldotna; laboratory analyses will be conducted in Anchorage. Data analysis will be conducted in Anchorage and Soldotna.

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- Thorne, R. E. 1994. Feasibility study of acoustic techniques for adult salmon assessment in Upper Cook Inlet, 1993, Final Report. Biosonics, Inc., Seattle, WA.
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# SCHEDULE

A. Measurable Project Tasks for FY 96

Option 1

Oct 1995-Feb.1996: Oct. 1995-April 1996:	Laboratory analyses of 1995 allozyme samples Laboratory analysis of DNA samples
Oct. 1995:	Award contracts for completion of DNA analysis
April 1996-Sept. 1996: April 1996:	Refinement of fishery model Reports from contractors
April 1996-Sept. 1996:	Preparation of final report
Option 2	

Oct 1995-Feb 1996:	Laboratory analyses of 1995 allozyme samples
Oct. 1995-April 1996:	Laboratory analysis of DNA samples
OctNov. 1995:	Award contracts for DNA analysis
Jan 1996-Sept. 1996:	Refinement of fishery model

May 1996:	Draft status report for FY95
April 1996:	Reports from contractors
July 1996:	Fishery sample collection and in-season estimation
July 1996:	Hydroacoustic assessment
June-Sept. 1996:	Baseline sample collection (if needed)
August 1996:	Final status report for FY95

### B. Project Milestones and Endpoints

The endpoint of this project depends on the recovery of the resource. If the resource is deemed recovered after the 1995 season, the project will be completed and a final report drafted this year (Option 1). Under Option 2, incomplete recovery, the project will be continued into 1996 and 1997.

C. Project Reports

Option 1

If the resource has recovered in FY96, a final report will be drafted covering all aspects of projects R53/93015/94255/95255 and R59/93012.

Final report: Sept. 30, 1996

Option 2

Under Option 2, annual reports which cover all research conducted during each fiscal year will be prepared. In addition, the FY95 annual report wll include a comprehensive review of the DNA development research currently underway.

Annual	report	FY95	research:	May 1	15, 1	996
Annual	report	FY96	research:	April	l 15,	1997

Preparation of a peer-reviewed publication covering the allozyme genetics work is presently underway based on results from FY93 and FY94 (Seeb et al. 1995). A companion manuscript reporting the DNAlevel results is anticipated as soon as those data are finalized. In addition, a manuscript describing the Statistical Package for the Analysis of Mixtures (SPAM) (ADF&G 1995) is anticipated once the software has been adequately tested and evaluated by other laboratories. The software has already been distributed to several cooperating state and federal agencies.

# COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The investigations of Kenai River sockeye salmon have been integrated with long term research efforts by the Alaska Department of Fish and Game. These efforts are adult salmon enumeration by hydroacoustic techniques in various river systems, catch and escapement sampling of salmon for age, length, and weight, test fishing at the Central District southern boundary, and juvenile salmon rearing studies. Development of restoration strategies on the Kenai Peninsula are through a review process with the Regional Planning Team and with ADF&G review teams composed of personnel from all ADF&G divisions.

# ENVIRONMENTAL COMPLIANCE

The studies proposed provide for data collection and field sampling programs. No environmental effect of these programs occurs beyond that of traditional fisheries management data collection activities. These activities are within existing collecting permits or Federal special use permits issued to the Department of Fish and Game for scientific data collection. This project received a categorical exclusion under the National Environmental Policies Act (NEPA).

## PERSONNEL

Project Leader

Lisa Seeb Alaska Department of Fish and Game Commercial Fisheries Management and Development Division 333 Raspberry Road Anchorage, AK (907) 267-2249 (907) 349-2231 fax LSeeb%fishgame@state.AK.US

-myn K. Sullen Project Manager

Joseph Sullivan Alaska Department of Fish and Game 333 Raspberry Road Anchorage, AK (907) 267-2213 (907) 522-3148 JoeS%fishgame@state.AK.US

# I. PERSONNEL QUALIFICATIONS

Lisa W. Seeb (L. Wishard), Statewide Geneticist Division of Commercial Fisheries Management and Development Alaska Dept. of Fish and Game Anchorage, Alaska 99518 (907) 267-2249

EDUCATION:

A.B. Zoology, 1973, University of California, Berkeley M.A. Zoology, 1977, University of Montana Ph.D. Fisheries, 1986, University of Washington

**PROFESSIONAL EXPERIENCE:** 

1991- Statewide Geneticist, ADF&G, Anchorage
1991- Affiliate Associate Professor, University of Alaska
Fairbanks
1988-1990 Assistant Professor, Southern Illinois University
1984-1988 Research Assist. Prof., University of Idaho
1978-1981 Fish Geneticist, Pacific Fish. Research, Olympia WA
1977-1979 Geneticist, National Marine Fisheries Service, Seattle

SELECTED PUBLICATIONS:

- Wishard, L. N., J. E. Seeb, F. M. Utter, and D. Stefan. 1984. A genetic investigation of suspected redband trout populations. Copeia 1984(1):120-132.
- Seeb, J. E., L. W. Seeb, and F. M. Utter, 1986. Use of genetic marks to assess stock dynamics and management programs for chum salmon. Trans. Amer. Fish. Soc. 115:448-454
- Seeb, L. W. and D. R. Gunderson. 1988. Genetic variation and population structure of Pacific ocean perch (Sebastes alutus). Can. J. Fish. Aquat. Sci. 45:78-88.
- Seeb, L. W., J. E. Seeb, R. L. Allen and W. K. Hershberger. 1990. Evaluation of adult returns of genetically marked chum salmon, with suggested future applications. American Fisheries Society Symposium 7:418-425
- Seeb, L. W., J. E. Seeb and A. J. Gharrett. 1990. Genetic marking of fish populations. pp 223-239 in D. H. Whitmore, ed. Electrophoretic and isoelectric focusing techniques in fisheries management. CRC Press, Boca Raton, FL.
- Seeb, L. W., J. E. Seeb and J. J. Polovina. 1990. Genetic variation in highly exploited spiny lobster <u>Panulirus marginatus</u> populations from the Hawaiian Archipelago. Fishery Bulletin 88:713-718.
- Seeb, L. W. and A. W. Kendall. 1991. Allozyme polymorphisms permit the identification of larval and juvenile rockfishes of the genus <u>Sebastes</u>. Environmental Biology of Fishes 30:191-201.
- Utter, F. M., J. E. Seeb, and L. W. Seeb. 1993. Complementary uses of ecological and biochemical genetic data in identifying and conserving salmon populations. Fisheries Research. Fish. Res. 18:59-76.

Kenneth E. Tarbox

EMPLOYMENT:

May, 1980 to Present. Upper Cook Inlet Research Project Leader, Alaska Department of Fish and Game, Soldotna, Alaska. Responsibilities include planning, implementing, supervision, and reporting on various salmon related research and management projects. These involve hydroacoustic enumeration of salmon in glacial systems, defining salmon migratory behavior in both salt and fresh water, evaluation of potential impacts of resource development on habitat and populations, management of the UCI commercial salmon fisheries, stock identification studies using scale or genetic markers, and life history studies of sockeye salmon.

March, 1972 to May, 1980. Project manager and Senior Biologist, Woodward Clyde Consultants, Anchorage, Alaska. Responsibilities included supervision and research for a number of projects. These included an evaluation of existing methodologies for determining instream flow requirements for Alaskan fishes, determining the biological impact of a dredging projects located in lower New York Harbor and Lake Michigan, fishery investigations in the Zayandeh River, Iran, impact assessment of various oil related projects in Virginia, North Carolina, Texas, and Prudhoe Bay, Alaska, and studies and evaluation of impacts associated with nuclear power plants in New Jersey, Louisiana, Indiana, and Pennsylvania.

July, 1970 to March, 1972. Research Assistant, Louisiana Co-operative Fishery Unit, Louisiana State University, Baton Rouge, La. Responsibilities included the design and conduct of a one year investigation of juvenile fish behavior in an estuarine environment.

EDUCATION:

M.S. in Fisheries, 1974. Louisiana State University, Baton Rouge, La. B.S. in Fisheries Science. 1970. University of Washington, Seattle, Wa.

CERTIFICATIONS:

Fisheries Scientist, Certificate 1165, American Fisheries Society, 1976.

PUBLICATIONS:

Available on request

James E. Seeb, Principal Geneticist Commercial Fisheries Management and Development Alaska Department of Fish and Game Anchorage, Alaska 99518 (907) 267-2385 EDUCATION: B.S., Biology, 1974, University of Puget Sound M.S., Fisheries, 1982, University of Washington Ph.D., Fisheries, 1987, University of Washington

**PROFESSIONAL EXPERIENCE:** 

1990-Principal Geneticist, CFMD Division, ADF&G1991-Affiliate Associate Professor, University of AlaskaFairbanks1988-1990Assistant Professor, Southern Illinois University1987-1988Research Assistant Professor, University of Idaho1982-1986Graduate Research Assistant, University of Washington1980-1982Fish Biologist, Pacific Fisheries Research, Olympia,WA1978-1980Fish Biologist, Washington Department of Fisheries

SELECTED PUBLICATIONS:

- Seeb, J.E., L.W. Seeb, and F.M. Utter. 1986. Use of genetic marks to assess stock dynamics and management programs for chum salmon. Trans. Amer. Fish. Soc. 115:448-454.
- Seeb, J.E., and L.W. Seeb. 1986. Gene mapping of isozyme loci in chum salmon (<u>Oncorhynchus keta</u>). J. Hered. 77:399-402.
- Seeb, J.E., L.W. Seeb, D.W. Oates, and F.M. Utter. 1987. Genetic variation and postglacial dispersal of populations of northern pike (<u>Esox lucius</u>) in North America. Can. J. Fish. Aquat. Sci. 44:556-561.
- Utter, F.M., and J.E. Seeb. 1990. Genetic marking of fishes: overview focusing on protein variation. Am. Fish. Soc. Sym. 7:426-438.
- Seeb, J.E., G.H. Kruse, L.W. Seeb, and R.J. Weck. 1990. Genetic structure of red king crab populations in Alaska facilitates enforcement of fishing regulations. Proceedings of the International Symposium on King and Tanner Crabs. Alaska Sea Grant, Fairbanks, AK. pp 491-502.
- Seeb, J.E., and G.D. Miller. 1990. The integration of allozyme analyses and genomic manipulations for fish culture and management. <u>In</u>: D.H. Whitmore, Editor. Electrophoretic and Isoelectric Focusing Techniques in Fisheries Management. CRC Press, Boca Raton, pp 266-279.
- Gharrett, A. J. B. Riddell, J. Seeb, and J. Helle. 1993. Status of the Genetic Resources of Pacific Rim Salmon. In: J. Cloud, Editor. Genetic Conservation of Salmonid Fishes. Plenum Press, New York. pp. 286-292.
- Utter, F. M., J. E. Seeb, and L. W. Seeb. 1993. Complementary uses of ecological and biochemical genetic data in identifying and conserving salmon populations. Fisheries Research. Fish. Res. 18:59-76.

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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

	Authorized	Proposed						
Budget Category:	FFY 1995	FFY 1996						
Demonal		1000 0						
rersonnei Traval	······	\$293.8						
		\$5.6						
		\$56.5						
		\$39.0						
Equipment		\$0.0		LONG	RANGE FUNDI	NG REQUIREME	NIS	
Subtotal	\$0.0	\$394.9	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$48.0	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$442,9	REVIOLATING STORAGE	MAN DE MESENDER MENTANES			**************************************	2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -
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ruu-time Equivalents (FTE)		7.0						
			Dollar amoun	ts are shown in	thousands of	dollars.		
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	Project Num	ber: 96255						FUNIVI JA
1096	Project Title	· Konal Soot	kava Salman	Pactoration				AGENCY
1550	riojest ritle		vela gaimon	neatoration				PROJECT
	Agency: AD	ГäG					1	DETAIL
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Pers	onnel Costs:		GS/Range/	Months	Monthly	- I	Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	Davis	FB 1 PCN 1333	14J	10.0	4,726	1	47.3
	Vacant	FB 1	14 8	1.0	3,828		3.8
	Vacant ·	FWT 11 (9 positions)	90	20.0	2,888		57.8
	Seagren	AsstHClerk 111 PCN 1323	10K	3.0	3,628		10.9
							0.0
	Gates	BIOM II PCN 7011	198	1.0	5,200		5.2
		FB 1 PCN (2 positions)	14A	21.0	3,700		77.7
	••	FWT 111	11B	11.0	3,200		35.2
		FWT 11 (2 positions)	9B	16.0	3,100		49.6
•	Moore	FB III PCN 117021	18L	1.0	6,333		6.3
		·	Subtotal	84.0	36,603	) Ö	
Tho	se costs associated	with program management should be indicated	by placement of an *.		Pe	ersonnel Total	\$293.8
Trav	vel Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description		Price	Trips	Days	Per Diem	FFY 1996
	5 Round trips Kena	i to Anchorage	130	5			0.7
	10 days per diem a	t 125/day			10	125	1.3
							0.0
	1 Round trip Ancho	rege to Juneau	444	1			0.4
	4 Round trips Anch	orage to Kenai	130	4			0.5
	2 Round trip Scient	ific meeting	600	2			1.2
	10 days per diem a	t 150/day			10	150	1.5
							0.0
l							0.0
							0.0
							0.0
							0.0
Tho	se costs associated	with program management should be indicated	I by placement of an *.			Travel Total	\$5.6
						P	
					(		FORM 3B
	4000	Project Number: 96255					Personnel
	1996	Project Title: Kenai Sockeye	Salmon Restoration				& Travel

# **1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET**

October 1, 1995 - September 30, 1996

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Agency: ADF&G

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DETAIL

# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Contractual Costs:			Pronosed
Description			FFY 1996
Aircraft charter	ěit ·		8.0
Communications - ph	one state the second		0.5
Freight - sample trans	fer to Anchorage		0.5
Repair of vessels, net	s, acoustic equipment, booms, winches, biofin		4.0
Vessel charter for inle	a survey 8 days at 2.0 per day		16.0
Calibration of acoustic	cequipment		2.0
Truck rental for genet	ic and inlat survey crew		3.0
DNA development co	ntract		15. <b>0</b>
Communications-phor	10		1.5
Lab equipment mainte	nance		2.5
Truck rental			1.0
Photographic develop	ing	χ.	2.5
When a non-trustee organi	zation is used, the form 4A is required.	Contractual Total	\$56.5
Commodities Costs:			Proposed
Description			FFY 1996
Food for field camps			1.5
Survival gear including	g suits, fire ext, first aid kits, etc.		0.5
Misc operating expension	ses such as camp equipment, nets, acoustic chart paper, sample containers etc.		5.0
Liquid nitrogen			0.7
Fuel for boats and tru			0.8
Biochemicais			22.0
Misc. Lab supplies	ides, pipettors, gel rigs, platicware		3.0
Unice supplies and so	Ditware		0.5
Field sampling supplie	is, cryoviais		5.0
		Commodities Total	\$39.0
[]			FORM 3B
	Project Number: 96255		atractual 8
1996	Project Title: Kenal Sockeye Salmon Restoration		
	Agency: ADE8.C		ommodities
			DETAIL
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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

New Equipment Purchases:	Unit Propos
Description of Units	Price FFY 19
	0
	0
	0
	0
	0
	0
	0
	0
	0
	0
Those purchases associated with replacement equipment should be indicated by alacement of an P	rotal ¢0
Evisting Equipment Liegoa:	mbac Invent
Description of	Joits Ager
Hydroacoustic equipment purchased with EVOS funds will be used on the UCI inlet survey	1 ADF
Motors and vessels used for genetic sample collection are from EVOS and General Fund sources.	1 ADF
Electrophoresis laboratory equipment	ADF
Laboratory computer workstations	ADF
	[
Project Number: 96255	FORM 3B
1996 Project Title: Kenaj Sockeye Salmon Restoration	Equipment
	DETAIL
Ayency: Aurao	

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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Budget Category:	Authorized FFY 1995	Proposed FFY 1996						
Personnel		\$168.2						
Travel	·····	\$5.6						
Contractual		\$25.0						
Commodities		\$14.0						
Equipment		\$0.0		LONG I	RANGE FUNDIN	G REQUIREME	NTS	
Subtotal	\$0.0	\$212.8	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
General Administration		\$27.0	FFY 1997	FFY 1998	FFY 1999	FFY 2000	FFY 2001	FFY 2002
Project Total	\$0.0	\$239.8						
		·						
Full-time Equivalents (FTE)		3.8						
			Dollar amoun	ts are shown in	thousands of	dollars.		
Other Resources								

Comments:

	1		FORM 3A
1996		Project Number: 96255 Closeout Project Title: Kenai River Sockeye Salmon Restoration Agency: ADF&G	AGENCY PROJECT DETAIL
Prepared:	1 of 4		7/24/95

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1996 EXXON VALDEZ\*TRUSTEE COUNCIL PROJECT BUDGET October 1, 1995 - September 30, 1996

Pers	onnel Costs:		GS/Range/	Months	Monthly		Proposed
PM	Name	Position Description	Step	Budgeted	Costs	Overtime	FFY 1996
	Davis	FB 1 PCN 1333	14J	6.0	4,726		28.4
	Seagren	AC 111 PCN 1323	10K	3.0	3,628		10.9
	Vacant	FB1	14B	1.0	3,828		3.8
					]		0.0
	Gates	BIOMII PCN 7011	19B	1.0	5,200		5.2
	, v	FBI (2 Positions)	14A	18.0	3,700		66.6
		FWTIII	11B	5.0	3,200	1	16.0
		FWT II (2 positions)	90	10.0	3,100		31.0
e	Moore	FBIII PCN 7021	1'BL	1.0	6,333		6.3
			Subtotal	45.0	33,715	0	
Tho	se costs associated v	with program management should be indicate	ed by placement of an *.		Poi	rsonnel Total	\$168.2
Tra	vel Costs:		Ticket	Round	Total	Daily	Proposed
PM	Description		Price	Trips	Days	Per Diem	FFY 1996
	5 Rt Anchorage to I	Kenai	130	5			0.7
1	Per Diem				10	125	1.3
							0.0
I							0.0
l	1 Round trip Anchorage to Juneau		444	1			0.4
	4 Round trips Anchorage to Kenai		130	4			0.5
2 Round trips Scientific meeting			600	2	10	150	1.2
	10 days per clem at	t i Su/day			10	150	1.5
				1			0.0
			1				0.0
		<sup>°</sup> U i č					0.0
The	L betrioosse staco es	with program macagement should be indicat	ed by placement of en *			Travel Total	\$5.6
1110			co by pracement of an .				
		Decident Numbers, 06255				F	ORM 3B
1006			D			essonnel	
	1990	Project Title: Kenai Sockey	e Salmon Restoration				& Travel
		Agency: ADF&G					DETAIL
		2 of 4					7/24/95

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# 1996 EXXON VALDEZ #RUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

Contractival Costs:	<u> </u>	Proposed
Cunicavian Susie.	······	FFY 1996
Renair of vessels nets acoustic ogar booms winches biofin		4.0
Calibration of acoustic equipment		2.0
		2.0
DNA completion contract		15.0
Communications-phone		1.0
Lab equipment maintenance		0.5
Truck rental		0.5
Photographic developing		2.0
	·	
When a non-trustee organization is used, the form 4A is required.	Contractual Total	\$25.0
Commodities Costs:		Proposed
Description		FFY 1996
Biochemicals		11.0
Miss lab supplies-tubes pinettore plesticware		2.0
Office supplies - cures, proceeds, proceeds		1.0
		•
	Commodities Total	\$14.0
	F	ORM 3B
Project Number: 96255 Closeout		ofractual &
1996 Project Title: Kenaj Sockeve Salmon Restoration		
Agency' ADF&G		ninodities
		DETAIL
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# 1996 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 1995 - September 30, 1996

New Equipment Purchases:	Number	Uni	Proposed
Description	of Units	Price	FFY 1996
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.	New E	uipment Tote	\$0.0
Existing Equipment Usage:		Numbe	Inventory
Description		of Units	Agency
<b>1996</b> Project Number: 96255 Closeout Project Title: Kenai Sockeye Salmon Restoration Agency: ADF&G			FORM 3B Equipment DETAIL
4 of 4		-	7/24/95

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