19.11.02 (11of12)

Project Title: Analysis of genomic stress response in sea otters (Enhydra lutris) after the *Exxon Valdez* oil spill for evidence of on-going injury and cause of limited population recovery

Project Number:	02657
Restoration Category:	Research and Monitoring
Proposers:	F. Charles Mohr, Jeffrey L. Stott, and Brenda E. Ballachey
Lead Trustee Agency:	DOI--U.S.G.S.
Cooperating Agencies:	
Alaska SeaLife Center:	No
Project Duration:	1st year, 1-year project
Cost FY 02:	$43,500
Cost FY 03:	$0
Geographic Area:	Western Prince William Sound
Injured Resource/Service:	Sea otter

ABSTRACT

Sea otters in the most heavily oiled areas of western PWS have not shown recovery from the *Exxon Valdez* oil spill, based on low abundance relative to estimated prespill population size , poor survival rates, and elevated levels of cytochrome P450 1A (CYP1A), a biomarker of hydrocarbon exposure. In summer 2001, as part of project 01423, we will capture sea otters in oiled and unoiled areas of PWS for assessment of CYP1A levels. Herein we describe a complementary effort to project 01423, in which we propose to apply novel, highly sensitive molecular techniques for the measurement of health status, toxicant exposure and metabolic processes in the sea otters. Specifically, we will characterize and compare the genomic stress response in peripheral blood mononuclear cells, by examining the differential expression of a suite of key genes that are indicators of immunological, cellular, and metabolic responses to stress. The results of this study will enhance our understanding of the status of recovery of sea otters in western PWS, and physiological factors that may be involved in constraining recovery.

INTRODUCTION

Sea otters *(Enhydra lutris)* residing in the most heavily oiled areas of western Prince William Sound (WPWS) have not yet occurred from the *1989 Exxon Valdez* oil spill (EVOS), based on several lines of evidence from studies conducted as part of the NVP project (/025) and the continuing sea otter research (project /423). This conclusion is based on a lack of population growth, through summer 2000, in the area of northern Knight island (Bodkin et al. In press, Dean et al. 2001), and evidence of relatively poor survival rates of sea otters from the oiled area (Bodkin et al. In press, Monson et al. 2000). Exposure to residual oil in the area continues, based on elevated levels of cytochrome P450 1A (CYP1A), a biomarker of exposure to aromatic hydrocarbons, in sea otters from the heavily oiled area (Ballachey et al. 2000b). Recovery of sea otters from the spill will not be complete until the population returns to its pre-spill abundance, and there is no indication of continuing effects of oil exposure.

To assess the role of residual EVOS oil in limiting sea otter recovery, we propose to measure both exposure to and effects of the hydrocarbons on the sea otters. To accomplish this, we will utilize new molecular techniques that simultaneously detect, at the level of the gene, an array of immunological, cellular stress response, and metabolic parameters that are coupled to toxicological interactions. These physiological processes are activated in response to changes in the animal's environment, and together are referred to as *genomic stress responses* (Ray 1998). Concurrent measurement of multiple responses by means of measuring gene expression has a marked advantage, as it allows for greater analysis of the health status of the sea otters and a detailed examination of interactions between toxicant exposure, metabolism, and the otters' response to injury, and provides insight into mechanisms constraining full recovery of the sea otters in WPWS.

NEED FOR THE PROJECT

A. Statement of Problem

Even though it has been over decade since the *Exxon Valdez* oil spill, residual petroleum oil from the spill is still exerting a biological effect on sea otters residing in the affected portion of western Prince William Sound. The major evidence for this is that, as late as 1998, the induction of CYP1A was higher in the peripheral blood mononuclear cells (PBMC) of sea otters sampled from oiled areas of PWS than in animals sampled from an adjacent unoiled area (Ballachey et al. 2000a,b). This observation is coupled with additional evidence that a small number of sea otters from oiled areas have a higher concentration of an enzyme (GGT, gamma glutamyltransferase) that is released from liver cells into the circulation in response to organ injury, compared to animals sampled from unoiled areas (Ballachey et al. 2000a).

An important question to address is whether the slow recovery of sea otter populations to pre-spill abundance is limited by the persistence of petroleum oil products in the environment or by other factors. In free-ranging animals, this question is best answered through a biomarker approach that not only documents evidence of continued *exposure* to petroleum oil, *e.g.*, CYP1A induction, but also shows evidence of the *effect* of residual oil on the animal's overall health and

viability. This can be achieved by a molecular approach that simultaneously detects, at the level of the gene, an array of immunological, cellular stress response, and metabolic parameters that are coupled to toxicological interactions. Together these physiological processes that are activated in response to changes in the animal's environment are referred to as *genomic stress responses* (Ray 1998). Traditionally, assays that measure individual stress responses have been used. New molecular techniques that can measure multiple host responses concurrently by means of measuring gene expression have a marked advantage over the traditional methods. This allows for not only greater analysis of the health status of an animal but also enables a more detailed examination of interactions between toxicant exposure, metabolism, and the host's response to injury.

B. Rationale/Link to Restoration

The rationale for monitoring the effects of ongoing exposure to petroleum oil on the induction of metabolizing pathways for xenobiotic chemicals and on cellular stress responses is based on the reactions of an organism to the exposure of a foreign chemical. Monitoring the health effects of chemical exposure by evaluating the immunological responses is justified on the basis that the host defense system is an early responder to a variety of environmental stresses, including those that are chemically induced. The immune system responds to foreign antigens such as xenobiotic chemicals by manifesting immunosuppressive and hypersensitivity reactions. Aromatic hydrocarbons present in petroleum oil are known to be immunotoxic. Because of the dynamic nature of the immune system and its responsiveness to physiological and environmental stressors, the immune system can function as a biomarker of *exposure*, *e.g.*, reduction in lymphocyte population from immunotoxic chemicals, *effect*, *e.g.*, inhibition of mitogen-stimulated proliferation, changes in cytokine expression, and *susceptibility*, *e.g.*, changing immune profile, including the major histocompatibility complex, of the individual animals (Council 1987).

In this project our *objective* is to use novel, highly sensitive molecular techniques to monitor immunological health and cellular/metabolic stress responses in sea otters at northern Knight and Naked Islands, areas where there is known residual petroleum oil from the EVOS (Babcock et al. 1996; Hayes and Michel 1999). Comparisons will be made with a control group of animals from Montague Island, an adjacent unoiled area. Our *rationale* for this proposed objective is that the data generated from these comparisons will be useful to any future effort monitoring the effects of the EVOS on the recovery of the sea otter from heavily oiled regions of PWS. In addition to providing monitoring information, the data may also provide clues as to why there is only limited population recovery of sea otters in the most heavily oiled regions of WPWS. Our *approach* is to measure genomic stress responses from genetic material isolated from PBMC using Real-Time polymerase chain reaction (R-T PCR) (Schena, Shalon et al. 1995; Chee, Yang et al. 1996). This powerful technique can detect and quantitate specific genes, even if there are only a few copies present in the sample. Also, multiple genes can be detected from one sample. Therefore, from one sample of blood it is possible to assess many potential physiological changes that occur as an animal reacts to its environment. Blood samples are easily obtained with minimal invasiveness, and peripheral blood provides a window in which the activity of the immune system and other physiological processes can be measured.

Our research team has extensive experience in studying the immune system of the southern sea otter (*Enhydra lutris nereis*) due to our involvement in an ongoing health assessment program of free-ranging California sea otters. This program is a collaboration between government agencies (California Fish & Game) and academia (UCDavis). The overall goal of this program is to determine the reasons behind the decline in the southern sea otter population. We have developed a panel of immunological tests and reagents specifically for sea otters and are monitoring the immunological profiles of individual free-ranging animals to establish baseline data for the southern sea otter and its population. Concurrently, we are studying in a controlled laboratory setting the systemic and immunological effects of chronic low level petroleum oil exposure in American mink (*Mustela vison*), an animal model for sea otters. We are also initiating a plan to introduce two novel molecular technologies— genomic microarray analysis (Schena, Shalon et al. 1995; Chee, Yang et al. 1996) and real-time polymerase chain reaction (R-T PCR) (Higuchi, Dollinger et al. 1992; Higuchi, Fockler et al. 1993)—to increase the sensitivity of detection of changes in host responses. With these methodologies we will be able to measure alterations in the expression of chemical mediators that are central to the immune system, as well as cellular homeostasis and xenobiotic chemical metabolism. All of the techniques that we will use to meet our objectives for this proposal are in use by our research group. Our research team is comprised of veterinary pathologists and marine mammal immunologists. We are in an excellent position to address our objectives in this proposal.

This proposal focuses on one specific aim that will help us meet our objective: to characterize and to compare the genomic stress response in peripheral blood mononuclear cells (PBMC) in free-ranging sea otters from oiled and unoiled areas of PWS.

The *strategy* will be to use previously collected data on differential gene expression in oil-exposed mink and a selection of genes we know to be important in immunological, cellular stress, and metabolic responses to quantitate differences in genomic stress response activity between oiled and unoiled sea otters from PWS. We have used gene microarray analysis with a commercially available human microarray (UniGEM™ microarrays, Incyte Genomics, Palo Alto, CA) to screen for differential genomic activity between the oil-exposed and control mink. This technique identified 10 genes that are differentially expressed between the two groups (J. Schwartz, B. Aldridge, J. Stott and C. Mohr, unpublished data). We have also identified a select group of genes to be important in mediating immune reactions and cellular stress responses. The genes selected encode the following products: interferon-γ , IL-1 to measure $T_{Helper1}$ lymphocyte activity; IL-4, IL-10 to measure $T_{Helper2}$ activity; IL-6, IL-18, Tumor necrosis factor-α to measure activity of innate immunity (inflammation). IL-2 receptor γ-chain message will be measured as a indicator of T-lymphocyte activation. Also, we will measure the transcriptional activity of genes that encode for proteins important in toxicological biotransformation and metabolism and in cellular stress reactions. They will include genes for CYP1A, metallothionine (a marker for heavy metal exposure), heat shock protein (HSP)-90 (a marker for cellular stress responses), and superoxide dismutase (a marker for oxidative injury). We will design sea otter specific complimentary DNA (cDNA) primers to the entire collection of identified genes and perform the R-T PCR procedure on samples of PBMC.

This assessment of differential gene expression will reveal patterns of expression within and between groups of animals from oiled and unoiled areas. We expect that the patterns of

expression will give us clues to the effects of petroleum oil pollution on host defense systems in sea otters. For example, immunosuppressive compounds found in petroleum oil will potentially alter the pattern of cytokine expression or molecular machinery important in mediating cellular activation. These compounds also will initiate cellular stress and metabolic responses which will be detected by this sensitive technique. The detection of changes in genomic activity from a variety of physiological systems may identify factors influencing the slow recovery of the sea otter population in oiled regions of WPWS. In addition, from the sea otters in the unoiled area, we will obtain a baseline of "normal" genomic values that can be used to assess responses to further environmental changes, ranging from catastrophic pollution events such as the 1989 spill, to more subtle alterations induced by increasing anthropogenic impacts upon the nearshore ecosystem.

C. Location

The blood samples will be collected in western PWS, in the vicinity of Knight, naked and Montague islands. Laboratory procedures for isolation of RNA and real-time PCR will be done at the University of California, Davis.

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

This project will coordinate closely with the sea otter component of Project 02423, *Patterns and Processes of Population Change in Selected Nearshore Vertebrate Predators*. For community involvement and incorporation of traditional ecological knowledge, we will integrate with and rely on those activities conducted as part of Project 02423.

PROJECT DESIGN

A. Objectives

1. To characterize and to compare the genomic stress response in peripheral blood mononuclear cells (PBMC) in free-ranging sea otters from oiled and unoiled areas of PWS.

B. Methods

Animals. Twenty sea otters will be used for this proposal, including 10 animals from an oiled area (northern Knight and Naked Islands) and 10 animals from an unoiled area (Montague Island). These are the same areas that were the focus of sea otter studies in the Nearshore Vertebrate Predator project (/025), and in the continuing sea otter project, *Patterns and Processes of Population Change in Selected Nearshore Vertebrate Predators* (/423). Sea otters will be captured and bled in July 2001, as part of a 01423 activities, under the supervision of Brenda Ballachey and James Bodkin, PI's for project 01423. Permits for the capture and bleeding of these animals are held by these investigators.

Blood collection. Blood (approx. 35 ml) is collected by venipuncture into Vacutainer (Becton Dickinson) collection tubes containing sodium citrate and Ficoll Hypaque for isolation of mononuclear cells (PBMC) by centrifugation. Isolated cells are cryopreserved (Truax, Powell et al. 1990) and frozen in cryovials in liquid nitrogen. Frozen cells are shipped to the Laboratory of Marine Mammal Immunology at the University of California, Davis.

RNA isolation. mRNA will be isolated from frozen PBMC using silica-based gel membranes combined with microspin technology (Qiagen, Santa Clarita, CA). The integrity of the mRNA isolated by this technique will be checked by performing reverse transcription PCR using sea otter primers developed in our laboratory. The isolated mRNA will be stored at -70° C prior to shipping for microarray analysis or performing Real-Time PCR.

Real-time PCR. Real-time PCR is a new and promising method for quantifying RNA and DNA by measuring PCR product accumulation through a dual-labeled fluorogenic TaqMan probe (Applied Biosystems, Foster City, CA). The TaqMan assay is an improvement on other conventional quantitative PCR-based methods that have been proposed in the past few years. These latter methods are mainly based on the use of end-point dilution analysis or in the co-amplification of a competitive internal standard and need parallel reactions of competitor dilutions with target DNA and time-consuming post-amplification steps. The TaqMan assay is fast, simple and has the power to detect as few as 5-10 copies of a specific gene. Multiple genes can be measured from the same sample. It is a reliable alternative to conventional systems and has already been used successfully in many different species, including cats, horses, and bovines, to study the immune response to a variety of infectious agents. We will isolate mRNA from animals in each group and use a facility located at the School of Veterinary Medicine at UCDavis (The Taqman Service, Dept. of Population Medicine and Epidemiology) to perform the assays. This facility that has the equipment and technical expertise to help with these measurements.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

Contract with the University of California, Davis, for sample analyses, data analyses, and preparation of manuscript and final report.

SCHEDULE

A. Measurable Project Tasks for FY 02

July 2001:	Capture and blood sampling of sea otters, Project 01423.
Oct. 2001-Sept. 2002:	Laboratory assays at University of California, Davis.

B. Project Milestones and Endpoints

Oct. 2001-Sept. 2002:	Laboratory assays at UCDavis. Data analyses, manuscript preparation.
April 15, 2003:	Report submission - April 15, 2003.

C. Completion Date

This is a one year project; work will be completed in FY2002 and a final report submitted by April 15, 2003.

PUBLICATIONS AND REPORTS

We will provide a final report to the EVOSTC office by April 15, 2003. We anticipate a manuscript on the results to be submitted to a scientific journal in the year 2002.

PROFESSIONAL CONFERENCES

None planned for FY2002.

NORMAL AGENCY MANAGEMENT

The work proposed here is not part of normal agency management and is related specifically to research addressing oil spill restoration concerns. No similar work has been conducted, is currently being conducted, or is planned using agency funds.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

The blood samples to be utilized as part of this project will be collected during the summer of 2001, as part of sea otter capture activities conducted for Project 01423, Processes of Population Change in Selected Nearshore Vertebrate Predators. Results obtained in this study will be integrated with other data collected on these sea otters to understand all factors contributing to recovery status of the population.

EXPLANATION OF CHANGES IN CONTINUING PROJECTS

This is a new project proposal; however it integrated with and utilizes data and samples obtained in projects /025 and /423.

PRINCIPLE INVESTIGATORS

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INVESTIGATOR QUALIFICATIONS

Dr. F. Charles Mohr is a principal investigator on this proposal. He is an associate professor in the department of Veterinary Pathology, Microbiology and Immunology at the School of Veterinary Medicine, University of California, Davis. He holds a D.V.M. Degree from the Ohio State University and Ph.D. From Cornell University. Dr. Mohr is also a diplomate of the American College of Veterinary Pathologists. His expertise is in environmental pathology and toxicology, especially petroleum oil pollution. He will be responsible for overseeing the progress on the proposal including analysis of data and writing the final report. Dr. Mohr will work with all personnel involved in the project to insure its completion.

Dr. Jeffrey L. Stott is a principal investigator on this proposal. He is a professor in the department of Veterinary Pathology, Microbiology and Immunology at the School of Veterinary Medicine, University of California, Davis. He holds a Ph.D. from the University of California, Davis. Dr. Stott is the director of the Laboratory of Marine Mammal Immunology located at the university. A portion of the work described in this proposal will be performed in this laboratory. Dr. Stott is an expert in marine mammal immunology. Along with Dr. Mohr he will be responsible for overseeing the progress on the proposal.

Dr. Brenda Ballachey, B.S., M.S. 1980 Colorado State University, Ph.D. 1985 Oregon State University, is a Research Physiologist at the USGS-Alaska Biological Science Center. She was Project Leader for sea otter NRDA studies from 1990 through 1996, and has been involved in all aspects of post-spill research on sea otters. She is currently a co-principal investigator for the Project 01423, *Patterns and Processes of Population Change in Selected Nearshore Vertebrate Predators*, and is currently a PI on Project 01534, *Comparison of Cytochrome P450 1A Induction in Blood and Liver Cells of Sea Otters*, examining effects of residual oil on health and recovery of sea otters. She will be involved in sample collection, processing, data compilation and analysis, and preparation of the final report for this project.

Dr. Julie A. Schwartz is a co-investigator for this proposal. She is currently a postgraduate researcher in the department of Veterinary Pathology, Microbiology and Immunology at the School of Veterinary Medicine, University of California, Davis. Dr. Schwartz holds a D.V.M. from Michigan State University and is completing her Ph.D at the University of California. Her dissertation research is on the systemic effects of low concentrations of petroleum oil in American mink, a model for sea otters, with emphasis on the immune system. Dr. Schwartz is also a diplomate of the American College of Veterinary Pathologists. Her field of interest is in marine mammal pathology and immunology. She will be directly involved in all aspect of completing the specific aim of this proposal. Along Dr. Mohr she will be responsible for assembling and analyzing the data generated from this project and writing the final report.

Brian M. Aldridge is a co-investigator for this proposal. He is currently a research fellow in the department of Veterinary Pathology, Microbiology and Immunology at the School of Veterinary Medicine, University of California, Davis. He works extensively with Dr. Stott in the Laboratory of Marine Mammal Immunology. Dr. Aldridge holds a BVSc from the University of Liverpool, Great Britain and a Ph. D. From the University of Wisconsin-Madison. His expertise in

molecular biology and immunology will be required to complete the molecular aspects of this proposal.

Dr. Paul Snyder is a co-investigator for this proposal. He is an Associate Professor of Pathology and Immunotoxicology and Director of the Clinical Immunology Laboratory of the Department of Veterinary Pathobiology, Purdue University. He is also a Diplomate of the American College of Veterinary Pathologists. His research interests are in the area of mechanism-based studies on the pathology and immunology of xenobiotics on biological systems. He was a PI on the Nearshore Vertebrate Predator project (/025) and is currently a PI on Project 01534, *Comparison of Cytochrome P450 1A Induction in Blood and Liver Cells of Sea Otters*.

LITERATURE CITED

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2001 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002	LONG RANGE FUNDING REQUIREMENTS					
Personnel		$3.5						
Travel		$0.0						
Contractual		$36.9						
Commodities		$0.0						
Equipment		$0.0						
Subtotal	$0.0	$40.4			Estimated FY 2003	Estimated FY 2004		
General Administration		$3.1						
Project Total	$0.0	$43.5			$0.0	$0.0		
Full-time Equivalents (FTE)		0.0						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

No costs are included for NEPA compliance, technical review session attendance, restoration workshop attendance, professional conferences, or community involvement.

All equipment needed to complete the project is available at the University of California Davis. No new equipment purchases are included.

FY02

Prepared: 13 April 2001

Project Number: 02657
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Agency: DOI

FORM 3A
TRUSTEE
AGENCY
SUMMARY

2001 EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 200[illegible] - September 30, 2002

Personnel Costs:		GS/Range/ Step	Months Budgeted	Monthly Costs	Overtime	Proposed FY 2002
Name	Position Description					
B. Ballachey	Research Physiologist	GS 12 / 04	0.5	7.0		3.5
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		0.5	7.0	0.0	
					Personnel Total	$3.5

Travel Costs:	Ticket Price	Round Trips	Total Days	Daily Per Diem	Proposed FY 2002
Description					
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

FY02

Prepared: 13 April 2001

Project Number:
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Agency: DOI

FORM 3B
Personnel
& Travel
DETAIL

Contractual Costs:		Proposed FY 2002
Description		
4A Linkage		36.9
When a non-trustee organization is used, the form 4A is required.	**Contractual Total**	$36.9

Commodities Costs:		Proposed FY 2002
Description		
	Commodities Total	$0.0

FY02

Prepared: 13 April 2001

Project Number:
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Agency: DOI

FORM 3B
Contractual & Commodities DETAIL

2001 EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 200[illegible] - September 30, 2002

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2002
			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 Equipment Total**	$0.0

Existing Equipment Usage: Description	Number of Units	Inventory Agency

FY02

Project Number:
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Agency: DOI

FORM 3B
Equipment
DETAIL

Prepared: 13 April 2001

2001 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

Budget Category:	Authorized FY 2000	Proposed FY 2002						
Personnel		$15.2						
Travel		$0.0						
Contractual		$0.0						
Commodities		$18.8						
Equipment		$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal	$0.0	$34.0			Estimated FY 2003	Estimated FY 2004		
Indirect		$2.9						
Project Total	$0.0	$36.9			$0.0	$0.0		
Full-time Equivalents (FTE)		0.3						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

University of California Davis policy is to charge overhead on subcontracts from agenices at a rate which matches overhead costs to the agency. $2,900 is included for UCD overhead expenses.

FY02

'Prepared: 13 April 2001

Project Number:
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Name: University of California, Davis

FORM 4A
Non-Trustee
SUMMARY

2001 EXXON VALDEZ TRUS COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2002
	Julie Schwartz	Research Associate	4.0	3.8		15.2
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	4.0	3.8	0.0	
					Personnel Total	$15.2

Travel Costs:		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2002
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
					Travel Total	$0.0

FY02

Prepared: 13 April 2001

Project Number:
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Name: University of California, Davis

FORM 4B
Personnel
& Travel
DETAIL

2001 EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 200[illegible] - September 30, 2002

Contractual Costs:				Proposed FY 2002
Description				
			Contractual Total	$0.0
Commodities Costs:				Proposed FY 2002
Description				
Sea otter gene library and primer development				
Blood tubes and PBMC isolation (30x $20)			$ 600	0.6
RNA Isolation and RT procedure		(2x $15each)	$ 30	0.0
cDNA RACE library kit		$495	$ 495	0.5
PCR	$5 each (15genes, 10 reaction per gene)	2x$750	$ 1,500	1.5
Gel extraction	$2 x15(5' and 3'ends)	2x$60	$ 120	0.1
cloning	(30) at $10/clone	2x$300	$ 600	0.6
primers	15 genes x 4 primers/gene	$1,200	$ 1,200	1.2
sequencing	15 genes, assume 30 positives forward and reverse, 5'and 3' $14 ea (120sequences)	2x$1680	$ 3,360	3.4
Real time PCR expenses (20 animals)				
RNA Isolation and RT procedure, 20 x $15 each			$ 300	0.3
Taqman plates	100 plates @ $7 ea		$ 700	0.7
Taqman primers and probes, $275 x16			$ 4,400	4.4
ABI 7700 PRISM Sequence Detection System Recharge, 10 runs @ $22 per run			$ 220	0.2
Taqman Service consultation fee, $65 per for hour 30 hours			$ 1,950	2.0
Miscellaneous: plastics, tips, gloves			$ 1,000	1.0
Chemicals			$ 300	0.3
Chemical waste disposal			$ 500	0.5
Publication costs			$ 1,000	1.0
Sample shipping			$ 500	0.5
			Commodities Total	$18.8

FY02

Prepared: 13 April 2001

Project Number:
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Name: University of California, Davis

FORM 4B
Contractual & Commodities DETAIL

New Equipment Purchases:		Number of Units	Unit Price	Proposed FY 2002
Description				
				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 Equipment Total**	$0.0

Existing Equipment Usage:	Number of Units	
Description		

FY02

'Prepared: 13 April 2001

Project Number:
Project Title: Analysis of genomic stress response in sea otters after the Exxon Valdez oil spill for evidence of on-going injury and cause of limited population recovery
Name: University of California, Davis

FORM 4B
Equipment
DETAIL

PREPARATION AND PUBLICATION OF RESULTS FROM SEA AND NVPP AVIAN PREDATION STUDIES

Project Number:	02659
Restoration category:	Research
Proposer:	Prince William Sound Science Center
Lead Trustee Agency:	NOAA
Cooperating Agencies:	
Alaska SeaLife Center:	No
Duration:	1 year
Cost FY02:	$29.7K
Geographic Area:	Prince William Sound
Injured Resource/Service:	Pacific herring, Mussels, Intertidal communities

ABSTRACT

Two studies on avian predation have been important components of the Sound Ecosystem Assessment Study (SEA; EVOS Project 320Q) and the Nearshore Vertebrate Predator Project (NVPP; EVOS Project 025). Field work for the first study, Avian Predation on Herring Spawn, was conducted during 1994 and 1995 for SEA. Field work for a second study, Avian Predation on Blue Mussels (*Mytilus trossulus*) was conducted in 1996 and 1997 as part of NVPP. Final reports for both projects were submitted, reviewed, and accepted by the Exxon Valdez Oil Spill Trustee Council. One publication on avian consumption of herring spawn is currently *in press* in *Fisheries Oceanography*. The proposed work will prepare the remaining information from these two studies for publication. Two manuscripts will be prepared based on the work from the Avian Predation on Herring Spawn study. One manuscript will be prepared based on the work from the Avian Predation on Blue Mussels study. The three manuscripts will be submitted to peer-reviewed journals for publication.

INTRODUCTION

Pacific herring (*Clupea pallasi*) has been identified as a resourced injured by the Exxon Valdez oil spill. The Sound Ecosystem Assessment (SEA) Project tested a series of hypotheses to understand herring production. The Avian Predation on Herring Spawn component of SEA was designed to provide critical information to test SEA's natal hypotheses #2: that recruitment success of Pacific herring populations in Prince William Sound is related to physical processes and predation during early life stages. Since completion of the final report of Avian Predation on Herring Spawn (Bishop and Green 1999), one paper has been submitted, revised, and accepted for publication in *Fisheries Oceanography*. This paper estimates herring spawn intake for the major avian predators (Bishop and Green *in press*). Information from this project on avian composition, timing, distribution, and foraging patterns in herring spawn areas would provide the basis for two additional publications.

The Nearshore Vertebrate Predator Project (NVPP) was designed to investigate the effects of oiling on the nearshore ecosystem in Prince William Sound. One important hypothesis of this study is that prey availability of resources such blue mussels (*Mytilus trossulus*) may be limiting the recovery of sea otters (*Enhydra lutris*) and harlequin ducks (*Histrionicus histrionicus*). Our study was designed to determine the effect of avian co-predators. We posed a series of hypotheses and then examined the abundance of avian mussel predators, investigated the relationship between their abundance and mussel densities, and estimated mussel consumption by these co-predators. Results from our study were reported in the final report (Bishop et al. 1998). There is an opportunity to use the information from this project to provide the basis for one publication.

NEED FOR THE PROJECT

A. Statement of Problem

Breeding and migration of avian predators in Prince William Sound coincide spatially and temporally with herring spawn deposition and incubation. There is little information available in the scientific literature on the ecological importance of herring spawn in the life cycle of birds. Similarly, little is known about the relationship between blue mussel populations and their avian predators.

B. Rationale/Link to Restoration

This project provides critical information on the impacts of avian predators on Pacific herring and blue mussels in Prince William Sound.

C. Location

The study will be carried out in Cordova.

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

Both the SEA project and the NVPP were developed based on local, traditional, and scientific knowledge. Both programs address meaningful community issues.

PROJECT DESIGN

A. Objectives

1. Revise the SEA Avian Predation on Herring Spawn final report into two manuscripts for publication in peer-reviewed journals.

2. Revise the NVPP Avian Predation on Blue Mussels final report into one manuscript for publication in a peer-reviewed journal.

B. Methods

Three manuscripts will be prepared and each submitted to a peer-reviewed journal. Dr. Mary Anne Bishop, the Principal Investigator for both projects, will be the lead author on all 3 manuscripts. The first manuscript will assess the timing, abundance, and distribution of avian herring spawn predators in relation to herring spawn. This manuscript will be submitted to *Condor*. A second manuscript will examine the effects of tide cycles on avian foraging patterns in response to the availability of herring spawn. This manuscript will be submitted to *Waterbirds* or *Canadian Field Naturalist*. Second author on both of these manuscripts will be S.P. Green (deceased).

A third manuscript will examine the relationship between densities of blue mussels and bird species commonly found in intertidal regions. Second and third authors for the third manuscript will be P. Myers and C. O'Clair. This manuscript will be submitted to *Wilson Bulletin* or the *Journal of Field Ornithology*.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

The Principal Investigator of the two avian predation projects will conduct this project. The Principal Investigator is a scientist at the Prince William Sound Science Center. For the manuscript on blue mussels, Bishop will work closely with coauthors P. Myers, a biologist at Cordova Ranger District, USDA Forest Service, and with C. O'Clair, a research scientist at NOAA's Auke Bay Laboratory.

SCHEDULE

A. Measurable Project Tasks for FY 02

October 1-November 30:	Prepare and submit first manuscript
November 30-January 30:	Prepare and submit second manuscript
February 1-April 1:	Prepare and submit third manuscript
April 1-September 1:	Prepare any needed revisions, or resubmit

B. Project Milestones and Endpoints

April 1: Three manuscripts completed and submitted to journals
September 1: Complete revisions

C. Completion Date

All of the project objectives will be completed upon publication of the three manuscripts.

PUBLICATIONS AND REPORTS

Avian response to Pacific herring spawn. Submit to *Condor*, November 30, 2001
Effects of tide cycles on avian foraging in Pacific herring spawn. Submit to *Waterbirds* or *Canadian Field Naturalist*, January 30, 2002.
Seabird abundance in relation to blue mussels. Submit to *Wilson Bulletin* or the *Journal of Field Ornithology,* April 1, 2002.

PROFESSIONAL CONFERENCES

No conferences are anticipated under this project.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

Information from this project will be used by US Fish and Wildlife Service and the USDA Forest Service to monitor spring use of intertidal areas by birds and to assess the relative importance of Montague Island for future protection and conservation measures.

PRINCIPAL INVESTIGATOR

Mary Anne Bishop, Ph.D.
Prince William Sound Science Center
P.O. Box 705, Cordova, AK 99574
tel: (907) 424-5800, *fax*: (907) 424-5820
e-mail: mbishop@pwssc.gen.ak.us

Responsibilities: Dr. Bishop will be responsible for preparing and writing each manuscript, and making any needed revisions. Bishop was the PI on both the Avian Predation on Herring Spawn study and the Avian Predation on Blue Mussels study. In addition, Bishop has been the PI on several other research projects on the Copper River Delta and in Prince William Sound. From 1990-1999, Dr. Bishop worked in Cordova Alaska as the research avian ecologist for the Pacific Northwest Research Station, U.S. Forest Service both as an employee and through a cooperative agreement between the Center for Streamside Studies, University of Washington (1994-1997). Since June 1999 she has worked as a research scientist at the Prince William Sound Science Center. She has published 25 papers, including 10 peer-reviewed manuscripts.

C.V. for Bishop is attached.

OTHER KEY PERSONNEL

A statistician will be contracted to assist with any needed data analyses, and to review all previous analyses.

LITERATURE CITED

Bishop, M.A. and S.P. Green. in press. *Predation on Pacific herring (Clupea pallasi) spawn by birds in Prince William Sound, Alaska.* Fisheries Oceanography

Bishop, M.A., and S.P. Green. 1999. *Sound Ecosystem Assessment (SEA): Avian predation on herring spawn in Prince William Sound.* Exxon Valdez Oil Spill Restoration Project final report (Restoration Project 96320-Q). Copper River Delta Institute, Cordova, Alaska and Center for Streamside Studies, University of Washington. 78pp.

Bishop, M.A., P. Meyers, and S.P. Green. 1998. *Mechanisms of impact and potential recovery of nearshore vertebrate predators: avian predation on blue mussels component.* Appendix B in Exxon Valdez Oil Spill Restoration Project Annual Report (Restoration Project 97025). Pacific Northwest Research Station, US Forest Service and Center for Streamside Studies, University of Washington, Seattle, WA.

Curriculum Vitae

MARY ANNE BISHOP,
Certified Wildlife Biologist

Prince William Sound Science Center
P.O. Box 705
Cordova, Alaska 99574

Phone: 907-424-5800
Fax: 907-424-5820
Email: mbishop@pwssc.gen.ak.us

EDUCATION

Ph.D. Wildlife Ecology, Department of Wildlife and Range Sciences, University of Florida, Gainesville, 1988.

M.S. Wildlife and Fisheries Sciences, Department of Wildlife and Fisheries Sciences, Texas A & M University, College Station, 1984.

B.B.A. Real Estate and Urban Land Economics, School of Business, University of Wisconsin-Madison, 1974.

PROFESSIONAL EXPERIENCE

6/99-present Research Ecologist, Prince William Sound Science Center, PO Box 705, Cordova, Alaska

3/97-5/99 Research Wildlife Biologist, Pacific Northwest Research Station, U.S. Forest Service, Cordova, Alaska.

4/94-3/97 Research Wildlife Biologist, Center for Streamside Studies and Dept. Fisheries, University of Washington, assigned to Copper River Delta Institute, U.S. Forest Service, Cordova, Alaska.

5/92-4/93 Acting Manager, Copper River Delta Institute, Pacific Northwest Research Station, U.S. Forest Service, Cordova, Alaska.

4/90-4/94 Research Wildlife Biologist, Copper River Delta Institute, Pacific Northwest Research Station, U.S. Forest Service, Cordova, Alaska.

11/88-present Principal Investigator, Tibet Black-necked Crane Project, International Crane Foundation, Baraboo, Wisconsin (job location: Tibet, People's Republic of China).

7/89-4/90 Wildlife Biologist, Forestry and Range Sciences Laboratory, Pacific Northwest Research Station, U.S. Forest Service, LaGrande, Oregon.

9/88-6/89 Biological Technician, Malacology Lab, Florida Museum of Natural History, Gainesville, Florida.

8/88-11/89 Course Coordinator, Department of Wildlife and Range Sciences, University of Florida, Gainesville, Florida

8/83-8/88 Project Biologist, Department of Wildlife and Range Sciences, University of Florida, Gainesville, Florida.

11/80-12/82 Biological Consultant to Whooping Crane Project, Research Department, National Audubon Society, Tavernier, Florida (job location: Rockport, Texas).

INTERNATIONAL EXPERIENCE

12/99-present Principal Investigator, Tibet Black-necked Crane Project, in cooperation with Tibet Autonomous Region, Forestry Department, Lhasa, Tibet, PR China.

2/95-1/96 Principal Investigator, Tibet Black-necked Crane Project, in cooperation with Tibet Autonomous Region, Agriculture Bureau, Lhasa, Tibet, PR China.

11/89-12/93 Principal Investigator, Tibet Black-necked Crane Project, in cooperation with Tibet Plateau Institute of Biology, Lhasa, Tibet, PR China.

2/89 Visiting Researcher, Royal Society for the Protection of Nature, Bhutan.

1/89-2/89 Visiting Scientist, Bombay Natural History Society, Bombay, India.

6/87 Visiting Researcher, Northwest Plateau Institute of Biology, Academia Sinica, Xining, Qinghai, PR China.

1972 Undergraduate course work. Universidad Catolica de Chile, Santiago, Chile.

HONORS AND AWARDS

2000 U.S. Forest Service 1999 Taking Wing Award, Public Awareness & Community Involvement Category. Awarded for "Copper River Delta Symposium, Where the River Rests."

1998 U.S. Forest Service 1997 Taking Wing Award, Investigations Category. Awarded for "Spring migration stopovers of Western Sandpipers on the Pacific Flyway."

1994 U.S. Forest Service 1993 Taking Wing Award, Investigations Category. Awarded for "Spring Migration Ecology of Western Sandpipers on the West Coast of North America."

1994 Tibet Autonomous Region, PR China, Development of Science and Technology in Tibet Award, Second Place. "Black-necked Crane Winter Numbers and Habitats."

1993 Research Fellow, Wildlife Conservation Society (formerly Wildlife Conservation International, New York Zoological Society). Awarded for "Conservation of the endangered Black-necked Crane in Tibet Autonomous Region of China."

1993 Chief's Seminar Series 1993. One of five seminars selected for presentation to USDA Forest Service Washington Office. Seminar title, "The Copper River Delta Shorebird Festival."

1993 Certificate of Merit with $2,500 cash award, U.S. Forest Service. For excellent performance as Acting Manager of the Copper River Delta Institute.

1992 Monograph Publication Award of The Wildlife Society for "A conservation strategy for the Northern Spotted Owl," Interagency Scientific Committee (Team Member).

1991 Group Achievement Award of The Wildlife Society. For participation as Team Member on Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl.

1990 Certificate of Merit with $500 cash award, U.S. Forest Service. For participation as Team Member on Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl.

1982 Rob and Bessie Welder Wildlife Fellow, Sinton, Texas while MS candidate at Texas A & M University.

PUBLICATIONS

Bishop, M.A. and S.P. Green. in press. *Predation on Pacific herring (Clupea pallasi) spawn by birds in Prince William Sound, Alaska.* Fisheries Oceanography.

Bishop, M.A. in press. *Great possessions: Leopold's good oak. in* R.L. Knight and S. Reidel, eds. Aldo Leopold and the Ecological Conscience. Oxford University Press .

Bishop, M.A., J. Harris, and Z. Canjue. in press. *Agricultural management zones for Bar-headed Geese and Black-necked Cranes in Tibet.* Proc. Tibet Biodiversity Workshop.

Bishop, M.A., P. Meyers, and P.F. McNeley. 2000. *A method to estimate shorebird numbers on the Copper River Delta, Alaska.* Journal Field Ornithology 71(4):627-637.

Li, F. and M.A. Bishop. 1999. *Ecology and conservation of Black-necked Cranes (Grus nigricollis).*Pages 2533-2543 *in* N.J. Adams, R.H. Slotow, eds. Proc. XXII International Ornithological Congress, Durban, South Africa. Johannesburg: Birdlife South Africa (S42.3. on CD)

Butler, R.W., T.D. Williams, M.A. Bishop, and N. Warnock. 1999. *A reply to Hedenstrom and Weber.* Auk 116(2):563-564.

Bishop, M.A. and N. Warnock. 1998. *Migration of Western Sandpipers: links between their Alaskan stopover areas and breeding grounds.* Wilson Bulletin 110(4):457-462.

Warnock, N. and M.A. Bishop. 1998. *Spring stopover ecology of migrant Western Sandpipers.* Condor 100(3): 456-467.

Bishop, M.A. 1998. *Great possessions: Leopold's good oak.* Wildlife Society Bulletin 26(4):732-740.

Bishop, M.A., Z. Canjue, Y. Song, J. Harkness, and B. Gu. 1998. *Winter habitat use by Black-necked Cranes Grus nigricollis in Tibet.* Wildfowl 49:228-241.

Bishop, M.A., Y. Song, Z. Canjue, and B. Gu 1997. 1997. *Bar-headed Geese Anser indicus wintering in south-central Tibet.* Wildfowl 48:118-126.

Butler, R.W., T.D. Williams, N. Warnock, and M.A. Bishop. 1997. *Wind assistance: a requirement for migration of shorebirds?* Auk 114(3):456-466.

Johnson, O.W., N. Warnock, M.A. Bishop, A.J. Bennett, P.M. Johnson, and R.J. Kienholz. 1997. *Migration by radio-tagged Pacific Golden-Plovers from Hawaii to Alaska and their subsequent survival.* Auk 114(3):521-524.

Bishop, M.A. 1996. *Black-necked Crane Species Account.* Pages 184-193 *in* C.D. Meine and G.W. Archibald, eds. The cranes: status survey and conservation action plan. IUCN, Gland, Switzerland, and Cambridge, UK.

Bishop, M.A. 1996. *Black-necked Crane.* Pages 284-285 *in* D.Ellis, G.F. Gee, C.M. Mirande, eds. Cranes: their biology, husbandry and conservation. Nat. Bio. Serv., Wash. DC & Int. Crane Found., Baraboo, WI.

Iverson, G.C., S.E. Warnock, R.W. Butler, M.A. Bishop, N. Warnock. 1996. *Spring migration of Western Sandpipers along the Pacific coast of North America: a telemetry study.* Condor 98:10-21.

Bishop, M.A. 1994. *People and black-necked cranes of the Tibetan Plateau.* Pages 19-22 *in* H. Whitaker and C. Schimmel, eds. Proc. Second Annual International Crane Symposium. People, Water andWildlife: Human Population Impacts on Cranes. National Audubon Society, Boulder, CO.

Bishop, M.A. 1993. *The black-necked crane winter count 1991-1992.* Journal of Ecological Society of India. 6:55-64.

Bishop, M.A. 1992. *Land use status and trends of potential whooping crane release sites in central Florida.* Pages 131-144 *in* D. Wood, ed. Proc. 1988 Crane Workshop. Florida Game Fresh Water Fish Commission, Tallahassee.

McMillen, J.L., S.A. Nesbitt, M.A. Bishop, A.J. Bennett, L.A. Bennett. 1992. *An evaluation of three areas for potential populations of whooping cranes in Eastern North America.* Pages 285-294 *in* D. Wood, ed. Proc. 1988 Crane Workshop. Florida Fresh Water Fish Commission, Tallahassee.

Dwyer, N., J. Harkness, M.A. Bishop, Z. Yaozhung. 1992. *Black-necked cranes nesting in the Tibet Autonomous Region, P.R. China.* North American Crane Workshop 6:75-80.

Bishop, M.A., K.M. Portier, and M.W. Collopy. 1991. *Sampling methods for aerial censuses of nesting Florida sandhill cranes in central Florida.* Pages 235-239 *in* J. Harris, ed. Proc. 1987 International Crane Workshop. International Crane Foundation, Baraboo, Wisconsin.

Bishop, M.A. 1991. *Trapping cranes with alpha-chloralose (an oral tranquilizer).* Pages 247-256 *in* J. Harris, ed. Proc. 1987 International Crane Workshop. International Crane Foundation, Baraboo, Wisconsin.

Bishop, M.A., and M.W. Collopy. 1987. *Productivity of Florida sandhill cranes on three sites in central Florida.* Pages 257-263 *in* J.C. Lewis, ed. Proc. 1985 Crane Workshop. Platte River Whooping Crane Habitat Maintenance Trust and U.S. Fish and Wildlife Service, Grand Island, Nebraska.

Bishop, M.A., H.E. Hunt, and R.D. Slack. 1987. *Activity patterns of whooping cranes wintering on Aransas National Wildlife Refuge.* Pages 167-171 *in* J.C. Lewis, ed. Proc. 1985 Crane Workshop. Platte River Whooping Crane Habitat Maintenance Trust & U.S. Fish and Wildlife Service, Grand Island, NE.

Bishop, M.A. and D.R. Blankinship. 1982. *Dynamics of subadult flocks of whooping cranes at Aransas National Wildlife Refuge, Texas 1978-1981.* Pages 180-189 *in* J.C. Lewis, ed. Proc. 1981 Crane Workshop. National Audubon Society, Tavernier, Florida.

RECENT TECHNICAL REPORTS

Bishop, M.A. 2001. *Black-necked crane and Bar-headed Geese surveys in Tibet, December 26, 2000-January 3, 2001.* Rept. to Tibet Dept. Forestry. International Crane Foundation, Baraboo, Wisconsin. 3pp.

Bishop, M.A. 1999. *Status of seabird colonies in Northeast Prince William Sound.* Exxon Valdez Oil Spill Restoration Project final report. Prince William Sound Science Center, Cordova, Alaska. 15pp.

Bishop, M.A. 1999. *Black-necked crane survey in Tibet, December 12-23, 1999.* Rept. to Tibet Dept. Forestry. International Crane Foundation, Baraboo, Wisconsin. 5pp.

Bishop, M.A., and S.P. Green. 1999. *Sound Ecosystem Assessment (SEA): Avian predation on herring spawn in Prince William Sound.* Exxon Valdez Oil Spill Restoration Project final report (Restoration Project 96320-Q). Copper River Delta Institute, Cordova, Alaska and Center for Streamside Studies, University of Washington. 78pp.

Bishop, M.A., P. Meyers, and S.P. Green. 1998. *Mechanisms of impact and potential recovery of nearshore vertebrate predators: avian predation on blue mussels component.* Appendix B *in* Exxon Valdez Oil Spill Restoration Project Annual Report (Restoration Project 97025). Pacific Northwest Research Station, US Forest Service and Center for Streamside Studies, University of Washington, Seattle, WA.

Bishop, M.A. 1997. *Natural Resource Indicators for the Copper River Delta and Basin: Fish, Large Mammals, Waterfowl, and Timber.* Copper River Watershed Project final report. Pacific Northwest Research Station, US Forest Service, Cordova, Alaska. 51pp.

Bishop, M.A., B.K. Lance, S.P. Green, J. Mason, and E. Lance. 1997. *Results of avian and marine mammal surveys in the nearshore waters of northeast Orca Inlet.* Copper River Delta Institute, US Forest Service, Cordova, Alaska. 60pp.

Bishop, M.A., and F. Li. 1996. Report on investigations of Black-necked Cranes (Grus nigricollis) wintering in southcentral Tibet: effects of farming practies on diet and food availability. Final rept. to US State Dept. International Crane Foundation, Baraboo, Wisconsin. 10pp.

Marks, D. and M.A. Bishop. 1996. *Status of the marbled murrelet along the proposed Shepard Point Road Corridor.* Copper River Delta Institute, US Forest Service, Cordova, Alaska. 16pp.

Lance, E.W., M.A. Bishop, and J. Mason. 1996. *Songbirds detected during breeding surveys along the proposed Shepard Point Road corridor.* Copper River Delta Institute US Forest Service, Cordova, Alaska. 14pp.

Lance, B., R. Mathis, and M.A. Bishop. 1996. *Results of Northern Goshawk surveys along the proposed Shepard Point Road corridor.* Copper River Delta Institute, US Forest Service, Cordova, Alaska. 9pp.

Bishop, M.A. 1996. *Report on investigations of status, distribution, and winter habitat use by Black-necked Cranes in southcentral Tibet.* Final rept. to US State Dept. International Crane Foundation, Baraboo, Wisconsin 42pp.

Bishop, M.A. and N. Warnock. 1995. *Conservation of Western Sandpipers along the Pacific flyway.* Year-end report. June 1995. Report for National Fish and Wildlife Foundation, Washington, DC. 12pp.

Fairall, R. and M.A. Bishop. 1994. *A review of avian use of northeast Orca Inlet.* Appendix F, pp 1-46 *in* Shepard Point Road: Draft environmental assessment. Report to: Dept. Transportation, State of Alaska. Copper River Delta Institute, US Forest Service, Cordova, Alaska

POPULAR SCIENCE ARTICLES

Warnock, N., and M.A. Bishop. 1998. *Northwest passages.* Natural History Magazine. 107(4):50-53. (based on western sandpiper telemetry study)

Warnock, N., S. Warnock, and M.A. Bishop. 1997. *Marvels of migration: the northward flight of the Western Sandpiper.* Tideline 17(2): 1-3. (Newspaper published quarterly by San Francisco Bay National Wildlife Refuge.)

Bishop, M.A. 1991. *A new tune to an ancient harmony.* International Crane Foundation Bugle 17(4) 3-4. (based on field work in Tibet).

Bishop, M.A.1989. *First winter count for Black-necked Cranes.* International Crane Foundation Bugle 15(2)4-6.

Jacobson, S.K. and M.A. Bishop. 1989. *Second annual meeting of the Society for Conservation Biology, held in Davis, California 14-20 August 1988.* Environmental Conservation 15(2): 375-377.

PROFESSIONAL SOCIETIES

American Ornithologist's Union (since 1982)
Cooper Ornithological Society (since 1996)
North American Crane Working Group (since 1988)
Society for Conservation Biology (since 1988)
The Wildlife Society (since 1994)
Wilson Ornithological Society (since 1980)

TEAM MEMBERSHIPS

Science Review Panel, Platte River Whooping Crane Maintenance Trust (since 1999)
United States Shorebird Conservation Plan, Research and Monitoring Working Group (since 1998)
Scientific Advisory Board, Western Hemisphere Shorebird Reserve Network (since 1998)
Alaska Shorebird Working Group (since 1996)
Crane Specialist Group, IUCN Species Survival Commission (since 1995)
Sound Ecosystem Assessment (SEA) Research Program, sponsored by Exxon Valdez Oil Spill Trustee Council (since 1994)

OFFICES CURRENTLY HELD

Vice President, Prince William Sound Audubon Society (since 1999)
Board of Directors, Copper River Watershed Project (since 1998)
Board of Directors, North American Crane Working Group (since 1991)

SERVICE

Leadership

Co-Chair Scientific Program and Local Arrangements, Copper River Delta Conference, Cordova Alaska (May 1999).
Chair, Fifth Alaska Bird Conference and Workshop, Cordova, Alaska (May 1994).
International Coordinator, Black-necked Crane Winter Count in China and Bhutan (1988-1993).
Co-Chair, Critical Forest Habitats and Long-term Planning in Greater Prince William Sound Workshop, Cordova, Alaska (November 1992).
Co-Chair, Fifth North American Crane Workshop, Kissimmee Prairie, Florida (February 1988).
Member, Chugach National Forest Leadership Team (July 1992 - July 1993).
Member, Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl, (January-April 1990).

Editorship

Referee: Conservation Biology, Journal of Wildlife Management, Wildlife Society Bulletin, Wilson Bulletin, Journal of Field Ornithology, North American Crane Workshop.
Associate Editor: Proceedings of Sixth North American Crane Workshop.

FY 02 EXXON VALDEZ TRU: COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002
Personnel		$0.0
Travel		$0.0
Contractual		$27.8
Commodities		$0.0
Equipment		$0.0
Subtotal		$27.8
General Administration		$1.9
Project Total	$0.0	$29.7
Full-time Equivalents (FTE)		3.0
Other Resources		

LONG RANGE FUNDING REQUIREMENTS					
	Estimated FY 2003	Estimated FY 2004	Estimated FY 2005		
	$0.0	$0.0	$0.0		

Dollar amounts are shown in thousands of dollars.

Comments:

FY 02

Prepared:

Project Number: 02659
Project Title: Preparation and publication of results from SEA and NVPP avian predation studies
Agency: NOAA

FORM 3A
TRUSTEE
AGENCY
SUMMARY

FY 02 EXXON VALDEZ TRU COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Budget Category:	Authorized FY 2001	Proposed FY 2002						
Personnel		$19.2						
Travel		$0.0						
Contractual		$2.6						
Commodities		$0.0						
Equipment		$0.0	LONG RANGE FUNDING REQUIREMENTS					
Subtotal		$21.8		Estimated FY 2003	Estimated FY 2004	Estimated FY 2005		
Indirect		$6.0						
Project Total	$0.0	$27.8		$0.0				
Full-time Equivalents (FTE)		3.0						
	Dollar amounts are shown in thousands of dollars.							
Other Resources								

Comments:

FY 02

Prepared:

Project Number:
Project Title: Preparation and publication of results from SEA and NVPP avian predation studies
Name: Prince William Sound Science Center
Agency: NOAA

FORM 4A
Non-Trustee
SUMMARY

FY 02 EXXON VALDEZ TRU COUNCIL PROJECT BUDGET

October 1, 200 - September 30, 2002

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2002
	M.A. Bishop	Principal Investigator	3.0	6.4		19.2
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	3.0	6.4	0.0	
					Personnel Total	$19.2

Travel Costs:		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 2002
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
					Travel Total	$0.0

FY 02

Prepared:

Project Number:
Project Title: Preparation and publication of results from SEA and NVPP avian predation studies
Name: Prince William Sound Science Center
Agency: NOAA

FORM 4B
Personnel
& Travel
DETAIL

FY 02 EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

Contractual Costs:	Proposed FY 2002
Description	
network costs (based on $100./mo x staff months)	0.3
phone/fax/and copying charges	0.2
consultant (statistician) (24h@$25/h)	0.6
page charges (3 @ $500/ea)	1.5
Contractual Total	$2.6

Commodities Costs:	Proposed FY 2001
Description	
Commodities Total	$0.0

FY 02

Prepared:

Project Number:
Project Title: Preparation and publication of results from SEA and NVPP avian predation studies
Name: Prince William Sound Science Center
Agency: NOAA

FORM 4B
Contractual & Commodities DETAIL

FY 02 EXXON VALDEZ TRU : COUNCIL PROJECT BUDGET

October 1, 2001 - September 30, 2002

New Equipment Purchases:	Number of Units	Unit Price	Proposed FY 2002
Description			
			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 Equipment Total**	$0.0

Existing Equipment Usage:	Number of Units	
Description		

FY 02

Project Number:
Project Title: Preparation and publication of results from SEA and NVPP avian predation studies
Name: Prince William Sound Science Center
Agency: NOAA

FORM 4B
Equipment
DETAIL

Prepared:

Project Title: Natural Life Restoration by Manulipitation

Project Number: 02662

Restoration Category: Restoration Manulipitation

Proposer: Rusher's Services.

Lead Trustee Agency:
Cooperating Agencies:

Alaska SeaLife Center: No

Duration: FY02 federal fiscal years--October 1st to September 30th. 1st year.

Cost FY 02:

Cost FY 03:

Geographic Area: Prince William Sound.

Injured Resources/Services: Subtidal Communities, Clams, Intertidal Communities, Subsistence, Commercial fishing.

ABSTRACT

The use of a bait would be placed in pits of beaches and sensitive areas where weathered oil may remain. By quality control testing of the bate you could tell if weathered oil is in the process of degrading by the movement of worms in the beach. It will also idintify the toxicity of weathered oil This would be a tool for communities to know if resources and services are continuing to be injured by the spill now and well into the future. This bait manulipitation of worms could excellerate the degraderation of oil.

INTRODUCTION

The proposed proposal will tell if weathered oil on beaches or sensitive areas is still contrubiting to the injury of resources and services.

This proposed project is not a continuation of previous funded projects by the trustee council. Past project work on this project has been totally funded by Rusher's Services. (1989, 1990, 1991) In 1989 work to stop oil water emultion from penatrating beach in 1990, 1991 to recover oil that was leaching from beach and tests of worm life and movement.

ATTACHMENT A

Work planed for FY 02 is to place a bait on beach at State Marine Park, LaTouche Island.

The bait will tell if weathered oil that is more toxic than fresh oil is still degrading from beaches or sensitive areas and if it can be acelerated by worm movement.

Start date will be October 1, 2001 and proposed completion date September30, 2002.

Proposal would be linked to other projects such as community based monitoring programs, Innovative tools and strategies to improve monitoring,Subsistance, Nearshore Ecosystems, and monitor the toxic effects of oil.

NEED FOR THE PROJECT

A. Statement of Problem

The project will address the problem of weathered oil degratition from beaches of sensitive areas and the toxicity of the weathered oil. This project was reviewed for three year by council.

The injured resources and services the project is designed to help restore our subtidal communities, subsistence, commercial fishing, clams, intertidal areas.

B. Rationale/Link to Restoration

This project should be done bedause the information would tell is weathered oil is still contributing to the injury of resources and services and if degradition of weathered oil can be accelerated by worm movement.

This project will tell first if weathered oil is leaching from beach, secont tell if toxicity of weathered oil may still be contributing to injury. The project will produce information well into the future. This will also tell if past restoration activities have been successful and if restoration activities can be accelerated.

C. Location

State Marine Park, LaTouche Island. Horseshoe Bay.

The project benefits will be realized by local villages, any subsistence users, commercial fishing, recreational users.

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

Chenega Bay.

The community was informed about the project on April 6, 2001. They were asked if they would like to be part of the project and if not, if they would support the project.

ATTACHMENT B: Letter to the community.

The information knowledge will be a comference in non technical languate at the local community. If the community is involved with the project, they will know on a month to month basis about the project.

Local vessels, technicions and locally available resources will be used if the community would like to be involved.

The traditional and local knowledge of the community will be used to find out where the communities may think oil from beach or sensitive areas would be leaching out.

As principle investigator, Jerry Rusher has also asked the opinion of the community if they feel the project is needed.

PROJECT DESIGN

A. Objectives

1. Determine if degradiation of weathered oil can be accelerated from beaches or sensitive areas by worm manipulation.
2. Determine the toxicity of weathered oil
3. Determine what resources and services in that area may still be injured by the spill.
4. Determine if the bate would be a tool for the community to use well into the future to accelerate the degradiation of weathered oil.
5. Determine if more work needs to be done to address weathered oil remaining on beaches.

B. Methods

The researh and monitoring porject would test the bait sample for the weathered oil content, that analytical lab data would tell if weathered oil is degrading and the toricity of that oil and if worm movement can accelerate degrading of weathered oil.

Research then would be done to tell what resources and services in that area would be injured by remaining oil.

A field report of work in placement, time frame, in place, chain of custody to lab, lab analytical date, report if weathered oil is degrading and local community involvement about what resources and services may be injured.

Sites: Horseshoe Bay, Chenega Bay area.

Proposal will demonstrate sample sizes, sampling time, for dynamic processes and have sufficient power to adaquately test the hypotheses. The proposed methodologies be will be:

ATTACHMENT C

The statistical power of the proposed sampling program for detecting a significant change in numbers is past fresh oil information, to weathered oil information and to current weathered oil information numbers and how high in sample. Past information of worm movement at site.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

Chugiach Regional Resources Commission help with communication with spill area residents and publications.

The Chenega Bay, will be involved in vessel charters and one person for field work.

SCHEDULE

A. Measurable Project Tasks for FY02 (October 1, 2001 - September 30, 2002)

Project Start:	Oct. 1, 01	Place bate 3
	Nov 1, 01	Pull & replace bait 2
	Dec 1, 01	Pull & replace bait 3 and test
Dec 31: Quarterly report.		
	Jan. 1, 02	Pull & replace bait 2 and test
	Jan. 14-23	Attend annual restoration workshop
	Feb. 1, 02	Pull & replace bait 3 and test
		Logistics arranged and contracts
	Mar. 1, 02	Pull & replace bait 2 and test
March 31: Quarterly report		
	Apr. 1-10	Consult with subsistence harvesters
	Apr. 1, 02	Pull & replace bait 3 and test
April 13: Submit annual report		
	May 1, 02	Pull & replace bait 2 and test
	June 1, 02	Pull & replace bait 3 and test
		Consult experts
June 30: Quarterly report		
	July 1, 02	Pull & replace bait 2 and test
	Aug. 1, 02	Pull for closeout of project 5 and test

Sept. 15: Submit manuscripts

Sept. 30: Final quarterly report and closeout of project

B. Project Milestones and Endpoints

The milestone for determination of weathered oil degraditation. Oct. 1, 01 to Aug. 1, 02. End of project is Sept. 30, 02.

The milestone for toxicity testing Nov. 1, 01 to Aug. 1, 02. End of project is Sept. 30, 02.

The milestone for determining of resources and services injured determine if the bait would be used well in to the future and to see if more work needs to be donw will be from Nov. 1, 01 to Sept. 15, 02

C. Completion Date.

Completion date Sept. 30, 02. Project objectives and final reports will be completed Sept 30, 02.

PUBLICATIONS AND REPORTS

The manuscripts for publication in FY 02 will be provided to trustee council Sept. 30, 02. The three communities involved will also be provided with the manuscripts.
The National Environmental Technology Corporation University of Pittsburg Applied Research Center will be provided with a namuscript. (NETAC)
ATTACHMENT D: is part of (NETAC) communication. Last information to them Feb. 28, 2000.

PROFESSIONAL CONFERENCES

Planned conferences are allual restoration workshop and conference and the community of Chenega Bay, a presentation of project to decide if project was beneficial to resources and services.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project would be a benefit to many trustee council projects and to many communities to help monitor water and ecosystem well into the future.
The efforts to obtain funds would be three years of research information all funded by Rusher's Services will be part of this proposal.

PROPOSED PRINCIPAL INVESTIGATOR

Name: Jerry Dale Rusher
Affilication: Owner
Mailing Address: Rusher's Services
HC 33 Box 2866
Wasilla, AK. 99564
Phone: 907-376-9275
Fax: 907-373-7719
E-mail: enviro75@hotmail.com

PRINCIPAL INVESTIGATOR

Jerry Dale Rusher, Environmental affairs in Alaska 31 years. 28 of those years working with environmental and remote site projects from private, State, Federal and nonprofit. A partical Company Bio of projects managed from start to finish is page 1 & 2 of ATTACHMENT E.

OTHER KEY PERSONNEL

Toni Utt in accounting for 25 years, payrolls and quarterly reports is page 3 of ATTACHMENT E.

David Ion: 25 years of electronic data management. 7 years of computer and web design and management is page 4 of ATTACHMENT E.

Budget Category:	Authorized FY 01	Proposed FY 02						
Personnel		18,152.0						
Travel		9,505.0						
Contractual		47,193.5						
Commodities		1,829.0						
Equipment			LONG RANGE FUNDING REQUIREMENTS					
Subtotal		76,979.0	Estimated FY 03					
Indirect		19,243.8						
Project Total								
Full-time Equivalents (FTE)								
	Dollar amounts are shown in thousands of dollars.							
Other Funds		22,000.0						

Comments: Indirect rate is at 25%of direct total cost and subcontract at 5% in excess of $25,000. each $25,000
NEPA compliance should fall under trustee council (EA) plan (EC) This project past screening 92, 93, & 94
Annual restoration workshop attendence will be one PI & one PI/CO.
The reports writing, publication will be furnished to communities involved
Source of other funds is from past research total funded by Rusher's Services.
The requirement of past information is part of this proposal only if funded

FY 02

Prepared: April 11, 2001

Project Number: 02662
Project Title: Natural Life Restoration by Manulipitation
Name: Rusher's Services

FORM 4A
Non-Trustee
SUMMARY

Personnel Costs:				Months	Monthly		Proposed
	Name	Position Description		Budgeted	Costs	Overtime	FY 02
	T. Utt	Accounting & Quarterly Reports		12	300.0		3,600.0
	D. Ion	Computer & Electronic Reports		11	280.0		3,080.0
	J. Rusher	Principal Investigator		12	732.0		8,784.0
	Unknown	Village Field Help		12	224.0		2,688.0
			Subtotal				
						Personnel Total	18,152.0

Travel Costs:		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 02
	J. Rusher Airfair to Community	600.0	12	12	35.0	7,620.0
	D. Ion Airfair to Community	600.0	3	3	35.0	1,905.0
					Travel Total	9,505.0

FY 02

Prepared: April 11, 2001

Project Number:
Project Title: Natural Life Restoration by Manulipitation
Name: Rusher's Services

FORM 4B
Personnel
& Travel
DETAIL

Contractual Costs:	Proposed FY 02
Description	
Community Vessel Charters; 3 Communities	3,233.3
Professional Services; Lab Testing; Chain of Custody Services & Transportation sample to Lab	41,806.0
Communications; Phone; Fax; Community site to Field site	1,166.2
Printing Report Documents	988.0
Contractual Total	47,193.5

Commodities Costs:			Proposed FY 02
Description			
E-75 Bait Pack	45	19.0 each	171.0
Bait Case	1	150.0 each	150.0
Protective Gloves & Eye Gear	8		158.0
Lease Sample Storage 2.50 per Sample per month 45 Samples 12 Months			1,350.0
Commodities Total			1,829.0

FY 02

Prepared: April 11, 2001

Project Number:
Project Title: Natural Life Restoration by Manulipitation
Name: Rusher's Services

FORM 4B
Contractual & Commodities
DETAIL

New Equipment Purchases:		Number of Units	Unit Price	Proposed FY 02
Description				
	NA			
Indicate replacement equipment purchases with an R.			**New Equipment Total**	

Existing Equipment Usage:	Number of Units	
Description		
NA		

FY 02

Prepared: April 11, 2001

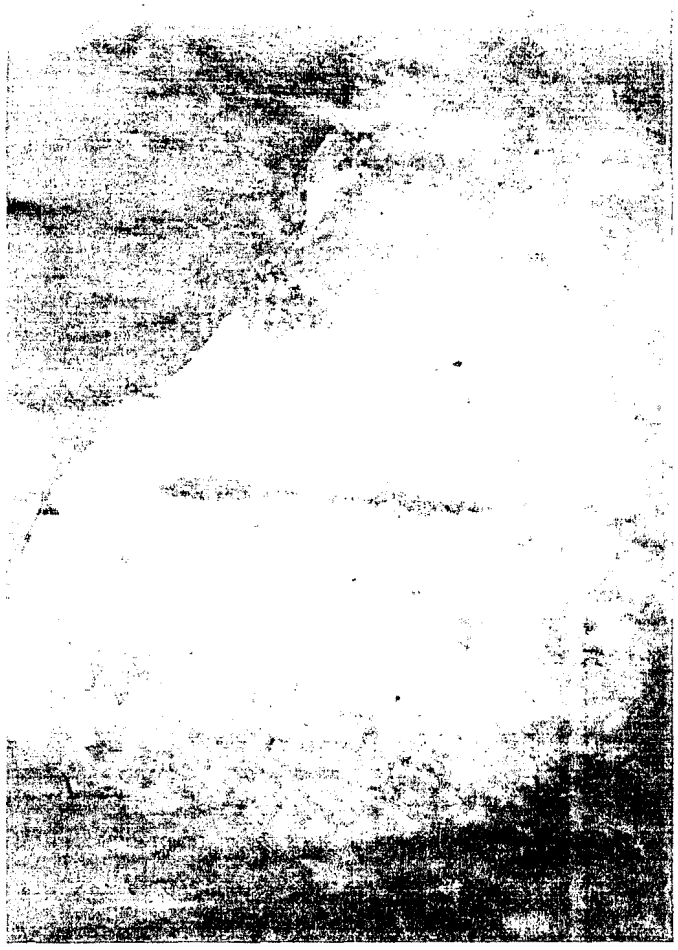
Project Number:
Project Title: Natural Life Restoration by Manulipitation
Name: Rusher's Services

FORM 4B
Equipment
DETAIL

ATTACHMENT A

Jan.13/1990 LaTouche Island (S) 5

Jan.13/1990 LaTouche Island (S) 5



Microscope at/50 by ALASKA ASSAY

Microscope at/50 by ALASKA ASSAY

ATTACHMENT B

Rusher's Services
Environmental Response
"Working with Industry to Protect Our Environment"
www.One-Service.com/enviro75/
enviro75@hotmail.com

HC 33 Box 2866
Wasilla, Alaska 99654

Office 907-376-9275
Fax 907-373-7719

April 6, 2001

Larry Evanoff, President
Chenega IRA Council
P.O. Box 8079
Chenega Bay, Alaska 99574

Dear Mr.Evanoff

This letter is in reference to Exxon Valdez Oil Spill Trustee Council Restoration Proposals for Federal fiscal year 2002
Rusher's Services would appreciate the opportunity to work with Chenega IRA Council through the FY 2002 Federal fiscal year 2002 starting October 1, 2001
Rusher's Services would appreciate a meeting to inform the community of the project and receive information from your community.
Reference to information from your community:
1. If your community feels there is a need for the project.
2. If your community would have an interest in doing part of the project or a major part of the project.
3. If your community would have an interest, we could decide what part of the project you would like to do.
4. If your community has an interest in the project but not to be part. Would the council support this project?
The Proposals are due April 13, 2001.
I hope we can work together to help your community with water quality monitoring concerns about oil remaining in intertidal, shallow subtidal and shorelines reference to leaching from shorelines.
Proposal is to use the "Watchdog Tool" on surface or pits of beaches and sensitive areas where oil may be leaching out. Product would be a tool for communities to know if resources and services are continuing to be injured by the spill. This would be a tool that would tell if weathered oil in sediments are still leaching and a tool to be used well into the future.
Page 3 is introduction to the "Watchdog Tool"
Page 4 is Website information.
Thank you for your time.
Sincerely,

Jerry Dale Rusher - Environmental Affairs

ATTACHMENT C

CT&E Environmental Services Inc.

QUOTE 5355

Required Parameters	Matrix	Method(s)	A Code	# of Samples	Price per Sample	Total Price Per Analysis
DRO/RRO	Sediment	AK 102/103	XF.102/3.7	36	$135.00	$4,860.00
Toxicity Characteristics	Sediment	SW 1311	SW1311___7	36	$1,632.00	$58,752.00

Project Total **$61,612.00**

CT&E Project Manager: **Rhonda Strucher**

All work will be performed in ALASKA.

- Samples received within 3 days of holding time will be extracted on a RUSH basis and will be charged a 25% expedited extraction fee.
- Prices are subject to increase based on a reduction in the scope of work.

ATTACHMENT D

National Environmental Technology Applications Corporation
UNIVERSITY OF PITTSBURGH APPLIED RESEARCH CENTER
615 William Pitt Way • Pittsburgh, PA 15238
Facsimile (412) 826-3360
(412) 826-5511

NETAC

February 19, 1993

Mr. Jerry Rusher
Rusher's Service
HC 33
P.O.Box 2866
Wasilla, AK 99687
U.S.A.

Subject: *Request for Oil Spill Response Bioremediation Product Information Update*

Dear Mr. Rusher:

Over the past two years your company has provided technical information regarding your oil spill response bioremediation product(s) to the National Environmental Technology Applications Corporation (NETAC). From this information, NETAC developed a database of product data. We would now greatly appreciate your assistance in updating our records regarding your company and any bioremediation product(s) you currently market.

The product information which NETAC has in its files may have been provided in response to one of the U.S. Environmental Protection Agency's *Commerce Business Daily* notices seeking products for use in Alaska; in the development of protocols by the Bioremediation Action Committee's Oil Spill Protocol Development Panel; or through some previous contact with your company. The information in NETAC's database will be available to government agencies and the spill response community for reference in spill response support. For this information to remain useful and effective, it needs to be updated periodically.

NETAC would like to include your company's latest corporate and most recent technical product information in this update. To participate, we request that you, or another knowledgeable colleague, complete the enclosed questionnaire and return it along with any other publicly available information using the enclosed mailing label. Should you have more than one oil spill response product, please feel free to duplicate this form and send along the literature for these other product(s) as well. Your response by March 19, 1993 would be appreciated.

We look forward to receiving information about your product(s). Please note that additional information is gladly accepted at any time. Should you have any questions or need any assistance in completing these forms, please feel free to call Ms. Jessica Paffenbarger, Business Development Representative, or me at (412) 826-5511.

Sincerely,

A. Thomas Merski

A. Thomas Merski
Regulatory Analyst

ATM:tmw
Enclosure
310-3004-000

ATTACHMENT E

Rusher's Services

Company Biography
Project Development
Usage & Application History

Project Development ...

Nine (9) years of research and use has lead to the 24 hour per day ~ 365 day per year environmental "Watchdog Tool". (Multi-use. See references below...)

Usage and application history of "Environmental 75" :

1. **Exxon Valdez** Oil Spill.
2. **Huntington Beach** Oil Spill.
3. **Nye Frontier Ford** ~ Wasilla, Alaska.
4. **Tony Chevrolet / Geo** ~ Wasilla, Alaska.
5. **Alaska D.O.T.** ~ Wasilla Lake Swimming Area outfall and Lucille Lake outfall.
6. **Chugiach Alaska Corporation** ~ LUP 12-90-01 ~ State of Alaska ~ 43 U.S.C. H Section 1601-71.
7. **Matanuska Valley Emergency Services.**
8. **United States Coast Guard R&D Center Groton** 06340-6096 No. 4100.
9. **Superfund Project ~ Stop & Shop Texaco** ~ 6-91-X-5025 80.57.
10. **VRCA Envirinmental Services** ~ Purdhoe Bay ~ Natchio Inc. 11-91-IV.1003 ~ F-BNO 10146583-4-22-91
11. **Petroleum Spill** 92-221-099-2 Solidification.
12. **Spartan Services UST Facility** ~ ID No. 0-002413 ~ Spill No. 93-2-2-00120-01.
13. **Alyeska Marine Terminal Port of Valdez Ballast Water Treatment** ~ 11-21-91-33 U.S.C. 31251-PL.1004.
14. **Spill Clean Up** D-002/003 No. 93-2-2-1-2861.
15. **Oils Spill 1-120-1** ~ Stored Oil Drums ~ Spill No. 93-2-2-120-1.
16. **Oil Spill Response Center** ~ Technology Division for the Exxon Valdez Oil Spill ~ Data Base Response 7-17-90 LET COOE C-2.
17. **Department of Military Affairs** ~ Division of Emergency Services ~ Alcantra Tank Removal ~ No. 94-2-2-01-221-01.
18. **Anchorage International Airport Signature Inc.** ~ Fuel Spill onto waterway.
19. **Exxon Valdez Oil Spill Trustee Council Document** ~ ID No. 920601063 Restoration : Shoreline Worm Life Monitoring.
20. **Department of the Air Force** ~ 13th Space Warning Squadron ~ Clear.

ASAK ~ Power Plant P.O. 621BM0077 VNO.FSC 430 ZA007.
21. **Spill Denali Highway** ~ NRO. file No. 190.02.007 ~ NOV : NO. 92330112001.

22. **Others :**
MEA ~ Palmer, Alaska
Alaska State Troopers
Rutter Brothers Inc.
Quality Auto Supply of Alaska Inc.
Happy Hooker Towing
D.J. Excavating
Homesteader's Lumber & Hardware
Burkshore Marina
Wasilla Services
Wasilla Aggregate
Craig Taylor Equipment
Shee-Shi Inc.

"The list goes on..."

Rusher's Services
Environmental Response
'IC 33 Box 2866 ~ Wasilla, Alaska 99654
)ffice (907) 376-9275 ~ Fax (907) 373-7719
Website : http://www.One-Service.com/enviro75/
E-Mail : enviro75@hotmail.com

Mission Statement : Working with Industry to Protect Our Environment.

GRANT ADMINISTRATION
PROJECT MANAGER

Moonrise Enterprises
Toni Utt

HC30 Box 5446 ♦ Wasilla, AK 99654
Phone (907)376-9275 ♦ Fax (907)373-7119 ♦ Home Phone (907)376-5718 ♦ Email toniutt@mtaonline.net

QUALIFICATIONS

I have worked in the accounting field for 25 years. I have worked for Certified Public Accountant firms, construction companies, and my own bookkeeping/tax service.

I have been a member of the Matanuska Susitna Borough Library Board since the mid-'90's and have been the Secretary of said Board for the past 4 years.

I have been the Secretary for the Knik Community & Economic Development Corporation since 1996.

I was the Secretary for the Knik Dog Mushers Association when they applied and received a State of Alaska Trail Grant in 1998.

WORK HISTORY

Owner, Moonrise Enterprises ***1997- 2001***
Responsible for all aspects of business handling 40 payroll accounts, 400+ tax clients, and 20 bookkeeping clients. Am familiar with deadlines and financial tracking.

AP/Payroll Clerk, E&E Construction, Inc. ***1982- 1997***
I was responsible for the payroll and accounts payable for a construction firm building projects such as the Fort Greely Test Support Complex, Knik Goose Bay Elementary School, Fingerlake School, Palmer Job Corps, etc.

Payroll Clerk, Hermon Brothers Construction ***1977- 1982***
Payroll clerk for a union construction company with projects such as the Sterling Hwy, Knik Goose Bay Road, Valdez School, Palmer Pioneer Home, and Pittman Road.

Payroll Clerk, Duane Jones, CPA ***1975- 1977***
My main job title was Payroll Clerk, but I also did reception, accounting and tax preparation as required.

EDUCATION

- High School Diploma, Wasilla High School, 1975

INTERESTS & ACTIVITIES

- Library Board
- Community Development

David Lee Ion
P.O. Box 940271
Houston, Ak. 99694
Work phone 907-892-7082
Message phone 907-892-7082

OBJECTIVE

Seeking unique opportunity to work in computers and electronic media.

SUMMARY OF QUALIFICATIONS

- Thirty five years as a professional musician.
- Twenty years as a studio electronics technician and sound producer.
- Worked in computers before IBM, Mac and Commodore were on open market.

RELEVANT SKILLS AND ACCOMPLISHMENTS

- Web Tutor.
- Own and operate two domain web sites. (UNIX)
- Proficient with Perl and JavaScript program modifications.
- Webmaster for numerous sites worldwide. (UNIX SERVERS)
- Plan and implement merchandising techniques for all of the above.
- Proficient in daily server skills and maintenance.
- Neat and Clean. Precise in layout and documentation techniques.
- Mechanical, Electronic and Scientific inclined.

Project Title: "Watchdog Tool" a sampling and monitoring tool.

Project Number: 02663

Restoration Category: Monitoring

Proposer: Rusher's Services.

Lead Trustee Agency:
Cooperating Agencies:

Alaska SeaLife Center: No

Duration: FY02 federal fiscal years--October 1st to September 30th. 1st year.

Cost FY 02:

Cost FY 03:

Geographic Area: Prince William Sound.

Injured Resources/Services: Subtidal Communities, Clams, Intertidal Communities, Subsistence, Commercial fishing.

ABSTRACT

The use of a sampling tool called the 'Watchdog tool' would be placed on surface or pits of beaches and sensitive areas where weathered oil may be leaching out. By quality control testing of the 'Watchdog Tool' you could tell if weathered oil is leaching out or coming in from subtidal areas. It will also idintify the toxicity of weathered oil This would be a tool for communities to know if resources and services are continuing to be injured by the spill now and well into the future.

INTRODUCTION

The proposed proposal will tell if weathered oil on beaches or sensitive areas is still contrubiting to the injury of resources and services.

This proposed project is not a continuation of previous funded projects by the trustee council. Past project work on this project has been totally funded by Rusher's Services. (1989, 1990, 1991) In 1989 work to stop oil water emultion from penatrating beach in 1990, 1991 to recover oil that was leaching from beach.

ATTACHMENT A

Work planed for FY 02 is to place a "Watchdog Tool" on beach at State Marine Park, LaTouche Island, Windy Bay Port Graham area, Tatitlek Council to choose area.

The "Watchdog Tool" will tell if weathered oil that is more toxic than fresh oil is still leaching from beaches or sensitive areas.

Start date will be October 1, 2001 and proposed completion date September30, 2002.

Proposal would be linked to other projects such as community based monitoring programs, Innovative tools and strategies to improve monitoring,Subsistance, Nearshore Ecosystems, and monitor the toxic effects of oil.

NEED FOR THE PROJECT

A. Statement of Problem

The project will address the problem of weathered oil leaching from beaches of sensitive areas and the toxicity of the weathered oil

The injured resources and services the project is designed to help restore our subtidal communities, subsistence, commercial fishing, clams, intertidal areas.

B. Rationale/Link to Restoration

This project should be done bedause the information would tell is weathered oil is still contributing to the injury of resources and services.

This project will tell first if weathered oil is leaching from beach, secont tell if toxicity of weathered oil may still be contributing to injury. The project will produce information well into the future. This will also tell if past restoration activities have been successful.

C. Location

State Marine Park, LaTouche Island. Horseshoe Bay. Windy Bay Port Graham area. Tatitlek, their council will pick the area.

The project benefits will be realized by local villages, any subsistence users, commercial fishing, recreational users.

COMMUNITY INVOLVEMENT AND TRADITIONAL KNOWLEDGE

Chenega Bay; Port Graham; Tatitlek.

The three communities were informed about the project on April 6, 2001. They were asked if they would like to be part of the project and if not, if they would support the project. We will work with all three.

ATTACHMENT B: Letters to the communities.

The information knowledge will be a comference in non technical languate at each local community requesting that information. If the community is involved with the project, they will know on a month to month basis about the project.

Local vessels, technicions and locally available resources will be used if the community would like to be involved.

The traditional and local knowledge of the communities will be used to find out where the communities may think oil from beach or sensitive areas would be leaching out.

As principle investigator, Jerry Rusher has also asked the opinion of the communities if they feel the project is needed.

PROJECT DESIGN

A. Objectives

1. Determine if weathered oil is still leaching from beaches or sensitive areas.
2. Determine the toxicity of weathered oil
3. Determine what resources and services in that area may still be injured by the spill.
4. Determine if the "Watchdog Tool" would be a tool for the community to use well into the future.
5. Determine if more work needs to be done to address weathered oil remaining on beaches.

B. Methods

The researh and monitoring porject would test the "Watchdog Tool" sample for the weathered oil content, that analytical lab data would tell if weathered oil is still leaching and the toricity of that oil.

Research then would be done to tell what resources and services in that area would be injured by remaining oil leaching out.

A field report of work in placement, time frame, in place, chain of custody to lab, lab analytical date, report if weathered oil is still leaching and local community involvement about what resources and services may be injured.

Sites: Windy Bay, Port Graham area; Horseshoe Bay, Chenega Bay area; Tatitlek area Council will pick area.

Proposal will demonstrate sample sizes, sampling time, for dynamic processes and have sufficient power to adaquately test the hypotheses. The proposed methodologies be will be:

ATTACHMENT C

The statistical power of the proposed sampling program for detecting a significant change in numbers is past fresh oil information, to weathered oil information and to current weathered oil information numbers and how high in sample.

C. Cooperating Agencies, Contracts, and Other Agency Assistance

Chugiach Regional Resources Commission help with communication with spill area residents and publications.

The Chenega Bay, Port Graham and Tatitlek will be involved in vessel charters and one person for field work.

SCHEDULE

A. Measurable Project Tasks for FY02 (October 1, 2001 - September 30, 2002)

Project Start:	Oct. 1, 01	Place Watchdog Tool (WT)
	Nov 1, 01	Pull & replace WT & test
	Dec 1, 01	Pull & replace WT & test
Dec 31: Quarterly report.		
	Jan. 1, 02	Pull & replace WT & test
	Jan. 14-23	Attend annual restoration workshop
	Feb. 1, 02	Pull & replace WT & test
		Logistics arranged and contracts
	Mar. 1, 02	Pull & replace WT & test
March 31: Quarterly report		
	Apr. 1-10	Consult with subsistence harvesters
	Apr. 1, 02	Pull & replace WT & test
April 13: Submit annual report		
	May 1, 02	Pull & replace WT & test
	June 1, 02	Pull & replace WT & test
		Consult experts
June 30: Quarterly report		
	July 1, 02	Pull & replace WT & test
	Aug. 1, 02	Pull for closeout of project and test

Sept. 15: Submit manuscripts

Sept. 30: Final quarterly report and closeout of project

B. Project Milestones and Endpoints

The milestone for determination of weathered oil leaching. Oct. 1, 01 to Aug. 1, 02. End of project is Sept. 30, 02.

The milestone for toxicity testing Nov. 1, 01 to Aug. 1, 02. End of project is Sept. 30, 02.

The milestone for determining of resources and services injured determine if the Watchdog Tool would be used well in to the future and to see if more work needs to be donw will be from Nov. 1, 01 to Sept. 15, 02

C. Completion Date.

Completion date Sept. 30, 02. Project objectives and final reports will be completed Sept 30, 02.

PUBLICATIONS AND REPORTS

The manuscripts for publication in FY 02 will be provided to trustee council Sept. 30, 02. The three communities involved will also be provided with the manuscripts.
The National Environmental Technology Corporation University of Pittsburg Applied Research Center will be provided with a namuscript. (NETAC)
ATTACHMENT D: is part of (NETAC) communication. Last information to them Feb. 28, 2000.

PROFESSIONAL CONFERENCES

Planned conferences are allual restoration workshop and conference and the three communities; Port Graham, Chenega Bay, Tatitlek Council, a presentation of project to decide if project was beneficial to resources and services.

COORDINATION AND INTEGRATION OF RESTORATION EFFORT

This project would be a benefit to many trustee council projects and to many communities to help monitor water and ecosystem well into the future.
The efforts to obtain funds would be three years of research information all funded by Rusher's Services will be part of this proposal.

PROPOSED PRINCIPAL INVESTIGATOR

Name: Jerry Dale Rusher
Affilication: Owner
Mailing Address: Rusher's Services
HC 33 Box 2866
Wasilla, AK. 99564
Phone: 907-376-9275
Fax: 907-373-7719
E-mail: enviro75@hotmail.com

PRINCIPAL INVESTIGATOR

Jerry Dale Rusher, Environmental affairs in Alaska 31 years. 28 of those years working with environmental and remote site projects from private, State, Federal and nonprofit. A partical Company Bio of projects managed from start to finish is page 1 & 2 of ATTACHMENT E.

OTHER KEY PERSONNEL

Toni Utt in accounting for 25 years, payrolls and quarterly reports is page 3 of ATTACHMENT E.

David Ion: 25 years of electronic data management. 7 years of computer and web design and management is page 4 of ATTACHMENT E.

Budget Category:	Authorized FY 01	Proposed FY 02						
Personnel		23,528.0						
Travel		9,505.0						
Contractual		98,300.8						
Commodities		2,520.0						
Equipment			LONG RANGE FUNDING REQUIREMENTS					
Subtotal		132,674.4	Estimated FY 03					
Indirect		36,349.2						
Project Total								
Full-time Equivalents (FTE)								
	Dollar amounts are shown in thousands of dollars.							
Other Funds		50,000.0						

Comments: Indirect rate is at 25%of direct total cost and subcontract at 5% in excess of $25,000. each $25,000
NEPA compliance should fall under trustee council (EA) plan (EC)
Annual restoration workshop attendence will be one PI & one PI/CO.
The reports writing, publication will be furnished to communities involved
Source of other funds is from past research total funded by Rusher's Services.
The requirement of past information is part of this proposal only if funded

FY 02

Prepared: April 11, 2001

Project Number: 02663
Project Title: Watchdog Tool; A sampling & monitoring tool
Name: Rusher's Services

FORM 4A
Non-Trustee
SUMMARY

Personnel Costs:				Months	Monthly		Proposed
	Name	Position Description		Budgeted	Costs	Overtime	FY 02
	T. Utt	Accounting & Quarterly Reports		12	300.0		3,600.0
	D. Ion	Computer & Electronic Reports		11	280.0		3,080.0
	J. Rusher	Principal Investigator		12	732.0		8,784.0
	Unknown	Village Field Help		12	224.0		2,688.0
	Unknown	Village Field Help		12	224.0		2,688.0
	Unknown	Village Field Help		12	224.0		2,688.0
			Subtotal				
						Personnel Total	23,528.0

Travel Costs:		Ticket	Round	Total	Daily	Proposed
	Description	Price	Trips	Days	Per Diem	FY 02
	J. Rusher Airfair to Community	600.0	12	12	35.0	7,620.0
	D. Ion Airfair to Community	600.0	3	3	35.0	1,905.0
					Travel Total	9,505.0

FY 02

Prepared: April 11, 2001

Project Number:
Project Title: Watchdog Tool; A Sampling & Monitoring Tool
Name: Rusher's Services

FORM 4B
Personnel
& Travel
DETAIL

Contractual Costs:	Proposed FY 02
Description	
Community Vessel Charters; 3 Communities	9,700.0
Professional Services; Lab Testing; Chain of Custody Services & Transportation sample to Lab	83,612.0
Communications; Phone; Fax; Community site to Field site	3,500.8
Printing Report Documents	1,488.0
Contractual Total	98,300.8

Commodities Costs:			Proposed FY 02
Description			
Watchdog Tool Sampling & Monitoring Tool	30	21.0 each	630.0
Beach Anchor Kit for Watchdog Tool	30	12.0 each	360.0
Sample Case for Samples	3	150.0 each	450.0
Protective Gloves & Eye Gear	8		158.0
Lease Sample Storage 2.50 per Sample per month 36 Samples 12 Months			1,080.0
Commodities Total			2,520.0

FY 02

Prepared: April 11, 2001

Project Number:
Project Title: Watchdog Tool; A Sampling & Monitoring tool
Name: Rusher's Services

FORM 4B
Contractual & Commodities
DETAIL

New Equipment Purchases:	Number of Units	Unit Price	Proposed FY 02
Description			
NA			
Indicate replacement equipment purchases with an R.		**New Equipment Total**	

Existing Equipment Usage:	Number of Units	
Description		
NA		

FY 02

Prepared: April 11, 2001

Project Number:
Project Title: Watchdog Tool; a Sampling & Monitoring Tool
Name: Rusher's Services

FORM 4B
Equipment
DETAIL

ATTACHMENT A

Rusher's Services

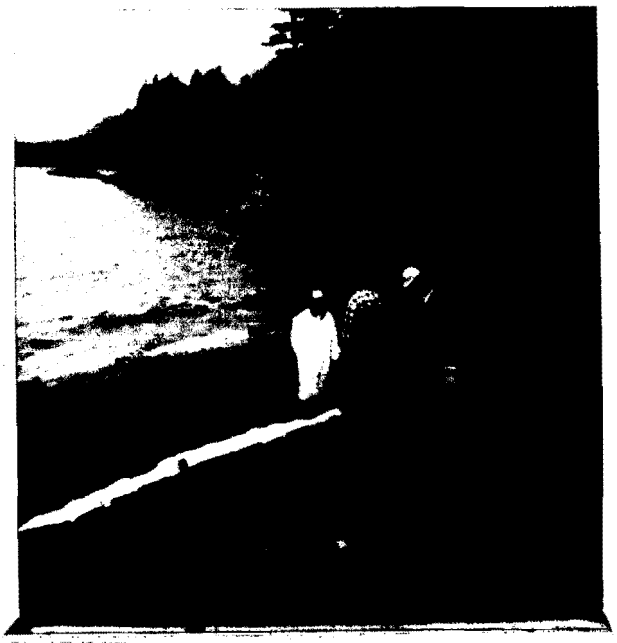
Rusher's Environmental 75
Oil Spill Clean-up

Valdez 907-835-5915

JERRY RUSHER - Owner
HC 33 BOX 2866
WASILLA, ALASKA 99687

OFFICE 373-0350
BEEPER 376-1970

Test site Horseshoe Bay, LaTouche Island, AK with A.D.E.C. personnell Mike Lucky (Shoreline Treatment Coordinator) and Bob Hull (Field Operations Supervisor, Shoreline Treatment) on hand to monitor our proposal- June 16, 1989-using Rusher's Environmental "75" Oil-Spill Clean-Up in deployment bags at shoreline.



RUSHER'S SERVICES
HC 33 Box 2866
Wasilla, AK 99687
Office (907) 373-0350
Message (907) 376-9275
Beeper (907) 376-1970
Home (907) 376-5104
VALDEZ:
Office (907) 835-5915
Message (907) 835-2410

Rusher's Services

Rusher's Environmental 75
Oil Spill Clean-up

Oil Recovery Rate Per Pound

Sample of crude oil from "Jannie N" April 21'1989 Valdez Oil Spill was used for the determination of unit weight.
Analysis from Gilfilian Engineering , Inc.resulted in a value of 61.7 pounds per cubic foot. This equates to 8.25 pounds per gallon.

Test Site 1 (25 ten pound deployment bags)

Date	Original Wight	Dry Weight	Recovered Weight	Gallons
6/22/1989	1-10#	22#	12#	1.45gal.
	1-10#	17#	7#	.84gal.
	1-10#	22#	12#	1.45gal.
	1-10#	20#	10#	1.21gal.
6/21/1989	Commander Portor			
	1-10# sent to R.&D.C. Groton, CT.			.97gal.
	1-10# Sent to R.&D.C. Groton, CT.			.84gal.
6/24/1989	1-10#	17#	7#	.84gal.
	1-10#	20#	10#	1.21gal.
	1-10#	20#	10#	1.21gal.
	1-10#	18#	8#	.97gal.
	1-10#	18#	8#	.97gal.
11/17/1989	1-10#	17#	7#	.84gal.
	1-10#	18#	8#	.97gal.
	1-10#	18#	8#	.97gal.
	1-10# Mat-Su Test Lab, Inc.			1.21gal.
	1-10# Mat-Su Test Lab, Inc.			.97gal.
	1-10#	22#	12#	1.45gal.
	1-10#	20#	10#	1.21gal.
	1-10#	16½#	6½#	.79gal.
	1-10#	17#	7#	.84gal.
	1-10#	20#	10#	1.21gal.
	1-10#	17#	7#	.84gal.
	1-10#	20#	10#	1.21gal.
	1-10#	16½#	6½#	.79gal.
	1-10#	18#	8#	.97gal.
Total	25-10#	467#	217#	26.23gal.

Crude OIL Recovered 26.23gal.

ATTACHMENT B

Rusher's Services
Environmental Response
"Working with Industry to Protect Our Environment"
www.One-Service.com/enviro75/
enviro75@hotmail.com

HC 33 Box 2866
Wasilla, Alaska 99654

Office 907-376-9275
Fax 907-373-7719

April 6, 2001

Larry Evanoff, President
Chenega IRA Council
P.O. Box 8079
Chenega Bay, Alaska 99574

Dear Mr.Evanoff

This letter is in reference to Exxon Valdez Oil Spill Trustee Council Restoration Proposals for Federal fiscal year 2002
Rusher's Services would appreciate the opportunity to work with Chenega IRA Council through the FY 2002 Federal fiscal year 2002 starting October 1, 2001
Rusher's Services would appreciate a meeting to inform the community of the project and receive information from your community.
Reference to information from your community:
1. If your community feels there is a need for the project.
2. If your community would have an interest in doing part of the project or a major part of the project.
3. If your community would have an interest, we could decide what part of the project you would like to do.
4. If your community has an interest in the project but not to be part. Would the council support this project?

The Proposals are due April 13, 2001.
I hope we can work together to help your community with water quality monitoring concerns about oil remaining in intertidal, shallow subtidal and shorelines reference to leaching from shorelines.
Proposal is to use the "Watchdog Tool" on surface or pits of beaches and sensitive areas where oil may be leaching out. Product would be a tool for communities to know if resources and services are continuing to be injured by the spill. This would be a tool that would tell if weathered oil in sediments are still leaching and a tool to be used well into the future.
Page 3 is introduction to the "Watchdog Tool"
Page 4 is Website information.
Thank you for your time.
Sincerely,

Jerry Dale Rusher - Environmental Affairs

Rusher's Services
Environmental Response
"Working with Industry to Protect Our Environment"
www.One-Service.com/enviro75/
enviro75@hotmail.com

HC 33 Box 2866
Wasilla, Alaska 99654

Office 907-376-9275
Fax 907-373-7719

April 6, 2001

Gary Komkoff, President
Tatitlek IRA Council
P.O. Box 171
Tatitlek, Alaska 99677

Dear Mr. Komkoff

This letter is in reference to Exxon Valdez Oil Spill Trustee Council Restoration Proposals for Federal fiscal year 2002
Rusher's Services would appreciate the opportunity to work with Tatitlek IRA Council through the FY 2002 Federal fiscal year 2002 starting October 1, 2001
Rusher's Services would appreciate a meeting to inform the community of the project and receive information from your community.
Reference to information from your community:
1. If your community feels there is a need for the project.
2. If your community would have an interest in doing part of the project or a major part of the project.
3. If your community would have an interest, we could decide what part of the project you would like to do.
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Proposal is to use the "Watchdog Tool" on surface or pits of beaches and sensitive areas where oil may be leaching out. Product would be a tool for communities to know if resources and services are continuing to be injured by the spill. This would be a tool that would tell if weathered oil in sediments are still leaching and a tool to be used well into the future.
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Thank you for your time.
Sincerely

Jerry Dale Rusher ~ Environmental Affairs

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www.One-Service.com/enviro75/
enviro75@hotmail.com

HC 33 Box 2866
Wasilla, Alaska 99654

Office 907-376-9275
Fax 907-373-7719

April 6, 2001

Elenore McMullen, First Chief
Port Graham Tribal Council
P.O. Box 5510
Port Graham, Alaska 99603

Dear Ms. McMullen,

This letter is in reference to Exxon Valdez Oil Spill Trustee Council Restoration Proposals for Federal fiscal year 2002
Rusher's Services would appreciate the opportunity to work with Port Graham Tribal Council through the FY 2002 Federal fiscal year 2002 starting October 1, 2001
Rusher's Services would appreciate a meeting to inform the community of the project and receive information from your community.
Reference to information from your community:
1. If your community feels there is a need for the project.
2. If your community would have an interest in doing part of the project or a major part of the project.
3. If your community would have an interest, we could decide what part of the project you would like to do.
4. If your community has an interest in the project but not to be part. Would the council support this project?
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Proposal is to use the "Watchdog Tool" on surface or pits of beaches and sensitive areas where oil may be leaching out. Product would be a tool for communities to know if resources and services are continuing to be injured by the spill. This would be a tool that would tell if weathered oil in sediments are still leaching and a tool to be used well into the future.
Page 3 is introduction to the "Watchdog Tool"
Page 4 is Website information.
Thank you for your time.
Sincerely

Jerry Dale Rusher ~ Environmental Affairs

ATTACHMENT C

CT&E Environmental Services Inc.

QUOTE 5355

Required Parameters	Matrix	Method(s)	A Code	# of Samples	Price per Sample	Total Price Per Analysis
DRO/RRO	Sediment	AK 102/103	XF.102/3.7	36	$135.00	$4,860.00
Toxicity Characteristics	Sediment	SW 1311	SW1311___7	36	$1,632.00	$58,752.00

Project Total **$61,612.00**

CT&E Project Manager: **Rhonda Strucher**

All work will be performed in ALASKA.

- Samples received within 3 days of holding time will be extracted on a RUSH basis and will be charged a 25% expedited extraction fee.
- Prices are subject to increase based on a reduction in the scope of work.

ATTACHMENT D

National Environmental Technology Applications Corporation
UNIVERSITY OF PITTSBURGH APPLIED RESEARCH CENTER
615 William Pitt Way • Pittsburgh, PA 15238
Facsimile (412) 826-3360
(412) 826-5511

NETAC

February 19, 1993

Mr. Jerry Rusher
Rusher's Service
HC 33
P.O.Box 2866
Wasilla, AK 99687
U.S.A.

Subject: *Request for Oil Spill Response Bioremediation Product Information Update*

Dear Mr. Rusher:

Over the past two years your company has provided technical information regarding your oil spill response bioremediation product(s) to the National Environmental Technology Applications Corporation (NETAC). From this information, NETAC developed a database of product data. We would now greatly appreciate your assistance in updating our records regarding your company and any bioremediation product(s) you currently market.

The product information which NETAC has in its files may have been provided in response to one of the U.S. Environmental Protection Agency's *Commerce Business Daily* notices seeking products for use in Alaska; in the development of protocols by the Bioremediation Action Committee's Oil Spill Protocol Development Panel; or through some previous contact with your company. The information in NETAC's database will be available to government agencies and the spill response community for reference in spill response support. For this information to remain useful and effective, it needs to be updated periodically.

NETAC would like to include your company's latest corporate and most recent technical product information in this update. To participate, we request that you, or another knowledgeable colleague, complete the enclosed questionnaire and return it along with any other publicly available information using the enclosed mailing label. Should you have more than one oil spill response product, please feel free to duplicate this form and send along the literature for these other product(s) as well. Your response by March 19, 1993 would be appreciated.

We look forward to receiving information about your product(s). Please note that additional information is gladly accepted at any time. Should you have any questions or need any assistance in completing these forms, please feel free to call Ms. Jessica Paffenbarger, Business Development Representative, or me at (412) 826-5511.

Sincerely,

A. Thomas Merski

A. Thomas Merski
Regulatory Analyst

ATM:tmw
Enclosure
310-3004-000

ATTACHMENT E

Rusher's Services

Company Biography
Project Development
Usage & Application History

Project Development ...

Nine (9) years of research and use has lead to the 24 hour per day ~ 365 day per year environmental "Watchdog Tool". (Multi-use. See references below...)

Usage and application history of "Environmental 75" :

1. **Exxon Valdez** Oil Spill.
2. **Huntington Beach** Oil Spill.
3. **Nye Frontier Ford** ~ Wasilla, Alaska.
4. **Tony Chevrolet / Geo** ~ Wasilla, Alaska.
5. **Alaska D.O.T.** ~ Wasilla Lake Swimming Area outfall and Lucille Lake outfall.
6. **Chugiach Alaska Corporation** ~ LUP 12-90-01 ~ State of Alaska ~ 43 U.S.C. H Section 1601-71.
7. **Matanuska Valley Emergency Services.**
8. **United States Coast Guard R&D Center Groton** 06340-6096 No. 4100.
9. **Superfund Project ~ Stop & Shop Texaco** ~ 6-91-X-5025 80.57.
10. **VRCA Envirinmental Services** ~ Purdhoe Bay ~ Natchio Inc. 11-91-IV.1003 ~ F-BNO 10146583-4-22-91.
11. **Petroleum Spill** 92-221-099-2 Solidification.
12. **Spartan Services UST Facility** ~ ID No. 0-002413 ~ Spill No. 93-2-2-00120-01.
13. **Alyeska Marine Terminal Port of Valdez Ballast Water Treatment** ~ 11-21-91-33 U.S.C. 31251-PL.1004.
14. **Spill Clean Up** D-002/003 No. 93-2-2-1-2861.
15. **Oils Spill 1-120-1** ~ Stored Oil Drums ~ Spill No. 93-2-2-120-1.
16. **Oil Spill Response Center** ~ Technology Division for the Exxon Valdez Oil Spill ~ Data Base Response 7-17-90 LET COOE C-2.
17. **Department of Military Affairs** ~ Division of Emergency Services ~ Alcantra Tank Removal ~ No. 94-2-2-01-221-01.
18. **Anchorage International Airport Signature Inc.** ~ Fuel Spill onto waterway.
19. **Exxon Valdez Oil Spill Trustee Council Document** ~ ID No. 920601063 Restoration : Shoreline Worm Life Monitoring.
20. **Department of the Air Force** ~ 13th Space Warning Squadron ~ Clear.

ASAK ~ Power Plant P.O. 621BM0077 VNO.FSC 430 ZA007.
21. **Spill Denali Highway** ~ NRO. file No. 190.02.007 ~ NOV : NO. 92330112001.

22. **Others :**
MEA ~ Palmer, Alaska
Alaska State Troopers
Rutter Brothers Inc.
Quality Auto Supply of Alaska Inc.
Happy Hooker Towing
D.J. Excavating
Homesteader's Lumber & Hardware
Burkshore Marina
Wasilla Services
Wasilla Aggregate
Craig Taylor Equipment
Shee-Shi Inc.

"The list goes on..."

Rusher's Services
Environmental Response
'HC 33 Box 2866 ~ Wasilla, Alaska 99654
)ffice (907) 376-9275 ~ Fax (907) 373-7719
Website : http://www.One-Service.com/enviro75/
E-Mail : enviro75@hotmail.com

Mission Statement : Working with Industry to Protect Our Environment.

GRANT ADMINISTRATION
PROJECT MANAGER

Moonrise Enterprises
Toni Utt

HC30 Box 5446 ♦ Wasilla, AK 99654
Phone (907)376-9275 ♦ Fax (907)373-7119 ♦ Home Phone (907)376-5718 ♦ Email toniutt@mtaonline.net

QUALIFICATIONS

I have worked in the accounting field for 25 years. I have worked for Certified Public Accountant firms, construction companies, and my own bookkeeping/tax service.

I have been a member of the Matanuska Susitna Borough Library Board since the mid-'90's and have been the Secretary of said Board for the past 4 years.

I have been the Secretary for the Knik Community & Economic Development Corporation since 1996.

I was the Secretary for the Knik Dog Mushers Association when they applied and received a State of Alaska Trail Grant in 1998.

WORK HISTORY

Owner, Moonrise Enterprises ***1997- 2001***
Responsible for all aspects of business handling 40 payroll accounts, 400+ tax clients, and 20 bookkeeping clients. Am familiar with deadlines and financial tracking.

AP/Payroll Clerk, E&E Construction, Inc. ***1982- 1997***
I was responsible for the payroll and accounts payable for a construction firm building projects such as the Fort Greely Test Support Complex, Knik Goose Bay Elementary School, Fingerlake School, Palmer Job Corps, etc.

Payroll Clerk, Hermon Brothers Construction ***1977- 1982***
Payroll clerk for a union construction company with projects such as the Sterling Hwy, Knik Goose Bay Road, Valdez School, Palmer Pioneer Home, and Pittman Road.

Payroll Clerk, Duane Jones, CPA ***1975- 1977***
My main job title was Payroll Clerk, but I also did reception, accounting and tax preparation as required.

EDUCATION

- High School Diploma, Wasilla High School, 1975

INTERESTS & ACTIVITIES

- Library Board
- Community Development

David Lee Ion
P.O. Box 940271
Houston, Ak. 99694
Work phone 907-892-7082
Message phone 907-892-7082

OBJECTIVE

Seeking unique opportunity to work in computers and electronic media.

SUMMARY OF QUALIFICATIONS

- Thirty five years as a professional musician.
- Twenty years as a studio electronics technician and sound producer.
- Worked in computers before IBM, Mac and Commodore were on open market.

RELEVANT SKILLS AND ACCOMPLISHMENTS

- Web Tutor.
- Own and operate two domain web sites. (UNIX)
- Proficient with Perl and JavaScript program modifications.
- Webmaster for numerous sites worldwide. (UNIX SERVERS)
- Plan and implement merchandising techniques for all of the above.
- Proficient in daily server skills and maintenance.
- Neat and Clean. Precise in layout and documentation techniques.
- Mechanical, Electronic and Scientific inclined.