

Trustee Council Use Only

Project No: _____

Date Received: _____

GEM PROPOSAL SUMMARY PAGE

(To be filled in by proposer)

Project Title: Long-Term Monitoring of Anthropogenic Hydrocarbons in the *Exxon Valdez* Oil Spill Region

Project Period: FY 05 – FY 07

Proposer(s): Jeffrey Short Lisa Ka'aihue
Auke Bay Laboratory Prince William Sound Regional
Alaska Fisheries Science Center Citizens' Advisory Council
National Marine Fisheries Service

Study Location: Prince William Sound, Kodiak, Kenai Peninsula

Abstract:

This proposal seeks support to expand the Long Term Environmental Monitoring (LTEMP) of the Prince William Sound Regional Citizens' Advisory Council (PWSRAC) in a manner that will make it substantially more powerful in its ability to detect environmental changes induced by petroleum contamination, and possibly other contaminants that have recently been identified as potential insults to the region. This expansion is designed to address the needs of both the PWSRCAC and the GEM programs, in part by combining resources of both organizations. The proposed design incorporates and integrates the existing NOAA and LTEMP monitoring datasets, and proposes a modest enlargement of effort to monitor at a substantially larger spatial scale. Most of the expansion is intended to implement a random-sampling based design that is currently being developed under an FY2004 Trustee Council funded project (Trustee Project 040724: Short - FY04 - Monitoring Exxon Valdez Oil).

| | | | | |
|----------|----------------------------|-------|----------|-----------------|
| Funding: | EVOS Funding Requested: | FY 05 | \$ 58.9K | |
| | (must include 9%G&A) | FY 06 | \$ 58.9K | |
| | | FY 07 | \$ 58.9K | TOTAL: \$176.6K |
| | Non-EVOS Funds to be Used: | FY 05 | \$ 111K | |
| | | FY 06 | \$ 111K | |
| | | FY 07 | \$ 111K | TOTAL:\$333K |

Date: April 14, 2004

I. NEED FOR THE PROJECT

A. Statement of Problem

Environmental monitoring provides a means of detecting and reacting to pollution in advance of irreversible ecosystem harm that may result from long-term discharges. Petroleum pollution counts as a major concern within the region of interest to the GEM program, because the program evolved from a major petroleum pollution event (the *Exxon Valdez* oil spill (EVOS)), and because continued chronic and catastrophic inputs remain the most likely pollution inputs for the foreseeable future. Human development in the region is likely to increase, especially given the opening of the road connecting Anchorage with Whittier, and the fact that petroleum-contaminated wastewater is the second largest pollution discharge produced by humans (after sewage; NAS 1985). An on-going monitoring program will be necessary to determine when lingering oil from the EVOS is no longer of concern, as well as whether future petroleum releases become concerns.

Concerns regarding potential adverse effects of hydrocarbon pollution in Prince William Sound (PWS) intensified during the late 1970s with the opening of the Alyeska Marine Oil Terminal in Port Valdez. These concerns prompted the first regional monitoring program for potential hydrocarbon pollutants along the proposed oil tanker corridor in PWS, which lasted from 1977 through 1981 (Karinen et al. 1993), sponsored by the National Oceanic and Atmospheric Administration (NOAA). Some of the monitoring stations of this program were re-sampled days before oil from the 1989 EVOS impacted beaches in PWS, and this sampling continued through 1991 (Short and Babcock 1996). A similar on-going monitoring program sponsored by the Prince William Sound Regional Citizens' Advisory Council (PWSRCAC) began in 1993 and included stations inside and outside PWS along the Kenai Peninsula and the Kodiak archipelago. This program, known as the Long-Term Environmental Monitoring Program (LTEMP), includes several stations that were heavily impacted by the EVOS, and now has the longest continuous record of repeated sampling on a semi-annual basis for the region.

This proposal seeks support to expand the LTEMP program of the PWSRCAC in a manner that will make it substantially more powerful in its ability to detect environmental changes induced by petroleum contamination, and possibly other contaminants that have recently been identified as potential insults to the region. This expansion is designed to address the needs of both the PWSRCAC and the GEM programs, in part by combining resources of both organizations. The proposed design incorporates and integrates the existing NOAA and LTEMP monitoring datasets, and proposes a modest enlargement of effort to monitor at a substantially larger spatial scale. Most of the expansion is intended to implement a random-sampling based design that is currently being developed under an FY2004 Trustee Council funded project (Trustee Project 040724: Short - FY04 - Monitoring Exxon Valdez Oil). ***The total annual cost of this proposal is \$169.9K, of which \$94K will be furnished by the PWSRCAC, and \$17K by NOAA.*** The PWSRCAC-funded portion of this project will cover all costs associated

with sample collection and report review. The funding sought from GEM will only cover costs for the chemical and data analysis of collected samples.

B. Relevance to GEM Program Goals and Scientific Priorities

This project will directly address the GEM goal of detecting long-term changes induced by human development on near-shore habitats at spatial scales on the order of ~100 km, and of providing context for understanding the results of biological monitoring performed by other projects. Although human development pressure on more temperate coastlines is intense, the trajectory of development along the northern Gulf of Alaska coastline (including PWS) is less certain, owing to the more inhospitable climate. Nonetheless, increased road access to PWS suggests that some additional human habitation of shorelines is inevitable. Such habitation is always attended by two characteristic environmental signatures of human occupancy, sewage and hydrocarbons. In addition, industrial tourism is likely to expand, and brings risks of accidental bunker fuel releases from cruise ship accidents, which though certain to be smaller than the EVOS, could still be substantial. By monitoring hydrocarbons on a broad spatial scale and consistently through time, this project will not only detect impacts from large-scale oil spills and more diffuse, chronic fuel discharges, but it will also serve as a proxy measure for human development pressure on the nearshore environment.

II. PROJECT DESIGN

A. Objectives

(1). The primary objective of LTEMP is to take standardized measurements of hydrocarbon background measures in the EVOS region as long as oil flows through the pipeline.

Additional objectives of the proposed project are:

(2). Monitor the persistence of lingering oil from the Exxon Valdez oil spill.

(3). Monitor long-term trends in anthropogenic hydrocarbons over a wide area in the nearshore marine ecosystem of western PWS.

B. Procedural and Scientific Methods

This monitoring program will consist of two parts: a small expansion of the current LTEMP program, and a random-sampling component focused on the islands of western PWS. The current LTEMP program involves sampling intertidal mussels (*Mytilus trossulus*) in winter and in summer at 10 stations, two of which are inside Port Valdez, five within the remainder of PWS, two along the Kenai Peninsula and one in the northern Kodiak Island complex. Subtidal sediments are also sampled at the Port Valdez stations, as well as an additional mussel sample event there in the fall.

The LTEMP sampling scheme would be retained, and one additional station added at Constantine Harbor on the eastern margin of Hinchinbrook Entrance, which is one of the NOAA stations sampled during 1977-1981 and 1989-1991. Both mussels and intertidal sediments would be sampled at this station during the summer LTEMP sampling. This new station will serve primarily as a reference station for the randomized sampling component. Intertidal sediments at Constantine Harbor display a well-defined and quantitatively constant signature of petrogenic hydrocarbons that originate from petroleum source rocks eroding into the Gulf of Alaska from outcrops to the east (Short and Babcock 1996, Short et al. 2004). Total PAH concentrations at Constantine Harbor average nearly 600 ng/g dry sediment wt., and did not change significantly from 1977 through 1991 (Short and Babcock 1996).

The random-sampling component of this program will involve annual sampling of intertidal sediments and mussels at ~20 stations selected within the Naked-Knight-Southwest Islands complex. This region was the most heavily impacted by the EVOS, but is also the most remote from population centers. Monitoring this region will simultaneously track the persistence of lingering oil from the EVOS, and serve as a large-scale monitoring "station" reflecting human development pressure over a long time scale. The exact number of stations and frequency of sampling must await the results of the monitoring design study currently under way (Trustee Project 040724: Short - FY04 - Monitoring Exxon Valdez Oil), but it is anticipated that some fairly small number of stations, periodically sampled at random would, over time, lead to a sensitive measure of temporal trends that is representative of a broad area. These trends will also be linked to the fixed-station sampling of the current LTEMP program, which has advantages for tracking temporal changes but cannot be extrapolated regionally.

Sampling for both the fixed- and random-station components would follow the current LTEMP protocols, as would the chemical analysis procedures and data analysis. The random-sampling component would be executed as an extension of the LTEMP summer sampling event, using the same platforms (which currently include aircraft and marine vessel components). By adopting the LTEMP protocols, the data would be strictly comparable, and these protocols reflect the current state of the science (Payne et al. 2003).

The basic sampling approach for this program is consistent with the National Oceanographic and Atmospheric Administration's (NOAA) National Mussel Watch Project where native populations of sedentary organisms are utilized as bioindicators of chemical contamination, and nearby sediments are used to evaluate trends in contamination in the marine environment.

Bivalves such as the blue mussel filter large volumes of water, and numerous studies have indicated that they can accumulate hydrocarbons to a level several orders of magnitude above the water column concentrations. Long term studies of mussel tissue at selected sites can provide information concerning the trends of hydrocarbon contamination at those sites. Bioaccumulation of hydrocarbons in mussels is a dynamic process as mussels eliminate the contaminants from their body tissues both in response to

cleaner conditions and through the release of gametes during spawning. For this reason, repeated sampling is helpful in determining trends in contamination, as each sampling event provides information on contamination levels that exist at that point in time

Sediment analyses are intended to provide information concerning the potential accumulation of hydrocarbons in the inter- and subtidal environments. For this program, recently-deposited sediments (top 2 centimeters [cm]) are examined to determine hydrocarbon content.

The analytical approach includes the use of compound-specific measurements for organic parameters such as polycyclic aromatic hydrocarbons (PAH) and aliphatic hydrocarbons (AHC, including the unresolved complex mixture, or UCM). These parameters are used to assess hydrocarbon concentrations in both tissue (PAH and AHC) and sediment (PAH and AHC).

Analytical strategy is summarized in Table 1.

Analytical methods include tissue sample collection in the intertidal area which is analyzed for PAH and AHC. At the fixed-station LTEMP sites, mussel samples designated for hydrocarbon analysis are collected by hand from the mid-intertidal zone of each station. One site marker is located and then samples are taken from optimally selected (nonrandom) patches of mussels stratified within 3 horizontal segments (10m) along the transect path. Replicate mussel samples are analyzed for PAH and AHC. At the random sampling sites, one sample consisting of 30 individual mussels will be collected from each site. Sampling variances associated with the replicated fixed-sampling sites will be assumed to be applicable to the results from the random sampling sites.

Sediment samples are analyzed for the following parameters: PAH, AHC, PGS, and TOC. A modified Van Veen grab is used to collect each replicate. Field and equipment rinsate blanks are analyzed for PAH and AHC. Sediment samples are collected in triplicate at the two Port Valdez fixed-station LTEMP sites, but only single samples will be collected from the random sampling sites. As with mussels, variances from the two LTEMP sites will be used for interpreting data from the single samples of intertidal sediments at the randomly selected sites.

All samples are analyzed at NOAA's Auke Bay Laboratory in Juneau, Alaska.

Navigation and station location include the use of nautical and topographic charts, radar, and a global positioning system (GPS). Locally chartered vessels and aircraft are used for all field surveys.

The project includes a comprehensive quality assurance, quality control (QA/QC) program that encompasses all aspects of the project, from initial sample collection through laboratory analysis and data analysis to reporting.

Table 1. LTEMP Analytical Strategy.

| Parameter | Description | Matrix | Relevance |
|--|--|---|--|
| Polycyclic aromatic hydrocarbons (PAH) | 2 to 6-ring polycyclic aromatic hydrocarbon compounds; includes homologous series of aromatic hydrocarbons consisting of unsubstituted (parent) compounds, such as naphthalene, and substituted compounds, which are similar structures with alkyl side chains that replace hydrogen ions, such as C ₁ -naphthalene | Mussel tissue, sediment, and water (blanks) | Useful for determining hydrocarbon contamination and the relative contribution of petrogenic, pyrogenic, and diagenic sources; useful in source identification and determination of weathering rates |
| Aliphatic hydrocarbons (AHC) | Fully saturated normal alkanes (paraffins) and branched alkanes, n-C ₁₀ to n-C ₃₄ ; includes the isoprenoid compounds pristane (C ₁₉) and phytane (C ₂₀) that are often the most abundant isoprenoids in petroleum hydrocarbons | Mussel tissue, sediment and water (blanks) | Useful for determining hydrocarbon contamination and the relative contribution of petrogenic and biogenic sources; useful in determination of weathering rates and rates of oil degradation |
| Unresolved complex mixture (UCM) | A mixture of hydrocarbons of undefined structure that are not separated by gas chromatographic techniques; represented by the total resolved plus unresolved area minus the total area of all peaks that have been integrated; a characteristic of some fresh oils and most weathered oils | Mussel tissue, sediment and water (blanks) | Useful for determining hydrocarbon contamination and the relative contribution of petrogenic, pyrogenic, and diagenic sources; useful in source identification and determination of weathering rates |
| Particle Grain Size (PGS) | Percent sand, silt, and clay | Sediment | Assessment of particle size distribution in sediments; potentially used to standardize organic parameters such as PAH and AHC |
| Total Organic Carbon (TOC) | Organic carbon | Sediment | Assessment of organic carbon load in sediment; potentially used to standardize organic parameters (PAH and AHC) |
| Total Resolved Aliphatic Hydrocarbon (TRAHC) | A mixture of hydrocarbons defined and undefined by gas chromatographic techniques that represents the total resolved and unresolved area of the GC run. Includes the AHC analyte list, UCM, and other compounds (e.g., plant waxes and lipids) | Mussel tissue | Provides additional information concerning biogenic (biologically sourced) component of the hydrocarbons that may be present in the mussel tissue |

C. Data Analysis and Statistical Methods

The statistical analysis of project results will follow the recommendations made by Trustee Project 040724 (Short - FY04 - Monitoring Exxon Valdez Oil). These recommendations will determine the exact sampling protocol followed as well.

The major sources of any hydrocarbons detected in samples will be inferred by comparison with hydrocarbon signatures of the dominant sources in the region. Major known sources include: (1) the "regional background", consisting of hydrocarbon source rock eroded from terrestrial outcrops east of PWS and swept into the Sound by the Alaska Coastal Current (Short et al. 2004); (2) lingering oil from the Exxon Valdez oil spill (Short and Heintz 1997, Short et al. 2004); combustion products (Page et al. 1999); and other recent, small fuel spills (Page et al. 2002). Potential mixtures that may consist of composites of these sources will be assessed using the general statistical approach of Aitchison (1986) for the analysis of composition data, where hydrocarbon composites will be evaluated as perturbations of the regional background or the Exxon Valdez composition. Results from this powerful new approach to hydrocarbon source fingerprinting will be compared with those of more traditional approaches that rely primarily on selected diagnostic hydrocarbon ratios. Where helpful, samples will be analyzed for hopane and sterane biomarkers (at no additional cost) to provide additional data on implied hydrocarbon sources.

D. Description of Study Area

The study area includes all of PWS, and the northern Gulf of Alaska west of PWS to the Kodiak archipelago. The locations of the current LTEMP stations are presented in Table 2.

E. Coordination and Collaboration with Other Efforts

This proposal seeks to establish a partnership including GEM, the PWSRCAC and NOAA to perform long term monitoring in PWS on a consistent and stable basis. Each of these organizations will contribute significant resources to insure the success of this program. The largest contribution will come from the PWSRCAC, sample collection, preparation of the annual reports, and coordination of the peer review of the annual reports.

The GEM program would furnish the second largest portion of project funds, which would be directed to the Auke Bay Laboratory to cover expenses associated with the hydrocarbon and other analyses of samples collected for this project.

The Auke Bay Laboratory will donate all costs associated with the analysis of field and lab blanks (only analyses of environmental samples are included in the budget request), as well as professional services relating to the analysis and interpretation of the data generated, and report preparation.

Table 2. Station Location and Sampling Information

| Station Location | Station Designation | Station Type | Decimally-coded latitude and longitude readings from winter 2000 survey | |
|-------------------------|---------------------|--------------------|---|-----------|
| | | | Latitude | Longitude |
| Aialik Bay | AIB-B | Intertidal Mussel | 59.88 | 149.66 |
| Alyeska Marine Terminal | AMT-B | Intertidal Mussel | 61.09 | 146.41 |
| | AMT-S | Subtidal Sediment | 61.09 | 146.39 |
| Disk Island | DII-B | Intertidal Mussel | 60.50 | 147.66 |
| Gold Creek | GOC-B | Intertidal Mussel | 61.12 | 146.50 |
| | GOC-S | Subtidal Sediment | 61.12 | 146.49 |
| Knowles Head | KNH-B | Intertidal Mussels | 60.69 | 146.59 |
| Sheep Bay | SHB-B | Intertidal Mussels | 60.65 | 145.99 |
| Shuyak Harbor | SHH-B | Intertidal Mussels | 58.50 | 152.63 |
| Sleepy Bay | SLB-B | Intertidal Mussels | 60.07 | 147.83 |
| Windy Bay | WIB-B | Intertidal Mussels | 59.22 | 151.52 |
| Zaikof Bay | ZAB-B | Intertidal Mussels | 60.27 | 147.09 |

III. SCHEDULE

A. Project Milestones

- Objective 1. Take standardized measurements of hydrocarbon background measures in the EVOS region.
To be met by September of each funded project year
- Objective 2. Monitor the persistence of lingering oil from the Exxon Valdez oil spill.
To be met by September of each funded project year
- Objective 3. Monitor long-term trends in anthropogenic hydrocarbons over a wide area in nearshore marine ecosystem of western PWS.
To be met by September of each funded project year

B. Measurable Project Tasks

(Schedule for first funded year; subsequent years will follow a similar schedule)

FY 05, 1st quarter (October 1, 2004-December 31, 2004)

October: Project funding approved by the Trustee Council

October: Fall sampling at the two Port Valdez fixed-program sites

FY 05, 2nd quarter (January 1, 2005-March 31, 2005)

January 12 – 16 (tentative): Annual GEM Workshop

March: Field sampling at the ten fixed-program sites

FY 05, 3rd quarter (April 1, 2005-June 30, 2005)

April 15: Field Survey Report

May 15: Laboratory Analysis and QA/QC

May 30: Laboratory Reporting

FY 05, 4th quarter (July 1, 2005 – September 30, 2005)

July 31: Data Validation and Management

July: Field Sampling at the ten fixed-program sites, the ~20 random-program sites, and Constantine Harbor site

July 31: Field Survey Report

August: Laboratory Analysis and QA/QC

August: Laboratory Reporting

FY06, 1st Quarter (October 1, 2005 – December 31, 2005)

December 15: Data analysis

FY06, 2nd Quarter (January 1, 2006 – March 31, 2006)

(dates not yet known) Annual GEM Workshop

March: Field sampling at the ten fixed-program sites

FY06, 3rd Quarter (April 1, 2006 – June 30, 2006)

April 15: Submit final report to Trustee Council. (Submissions to the peer-reviewed scientific literature will be encouraged when appropriate, probably after the third year of data collection.)

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

The results produced by this project will be communicated to interested members of communities within the oil spill region primarily through their representation on the board of the PWSRCAC. The PWSRCAC board includes members from most of these communities, as well as the Boroughs of Kenai Peninsula and of Kodiak Island, the Kodiak Village Mayors Association, Chugach Alaska Corporation, and the Cordova District Fisheries United, among other groups. Results of this project will be presented to the PWSRCAC at least annually.

B. Resource Management Applications

This project will also provide data useful to the Alaska Department of Environmental Conservation for enforcement of Alaska State Water Quality Standards in Prince William Sound. In particular, the hydrocarbon results will permit evaluation of whether the marine waters in the vicinity of lingering oil from the Exxon Valdez oil spill are impaired.

V. PUBLICATIONS AND REPORTS

One report will be prepared annually that will summarize and interpret results, and integrate them with previous monitoring efforts. More comprehensive reports will be prepared at intervals of a few years as noteworthy trends become evident, and these will be submitted publication in the peer-reviewed scientific literature.

VI. PROFESSIONAL CONFERENCES

Annual results will be presented at the GEM workshop and to the board of the PWSRCAC. Results that merit publication in peer-reviewed scientific journals will be presented at professional conferences such as the Society of Environmental Toxicology and Chemistry when appropriate.

Literature Cited:

Aitchison, J. 1986. The statistical analysis of compositional data. Chapman and Hall, London.

Karinen, J.F., M.M. Babcock, D.W. Brown, W.D. MacLeod, Jr., L.S. Ramos, and J.W. Short. 1993. Hydrocarbons in intertidal sediments and mussels from Prince William Sound, Alaska, 1977-1980: Characterization and probable sources.

United States Department of Commerce, National Oceanic and Atmospheric Administration Technical Memorandum NMFS-AFSC-9. 69 p.

- National Research Council (NRC). 1985. Oil in the sea: inputs, fates and effects. National Academy Press, Washington, D.C.
- Page, D. S., Boehm, P. D., Douglas, G. S., Bence, A. E., Burns, W. A., Mankiewicz, P. J. 1999. Pyrogenic polycyclic aromatic hydrocarbons in sediments record past human activity: A case study in Prince William Sound, Alaska. *Marine Pollution Bulletin* 38:247-260
- Page, D. S., Bence, A. E., Burns, W. A., Boehm, P. D., Brown, J. W., Douglas, G. S. 2002. A holistic approach to hydrocarbon source allocation in the subtidal sediments of Prince William Sound embayments. *Journal of Environmental Forensics* 3:331-340.
- Payne, J. R., Driskel, W. B., Short, J. W. 2003. Prince William Sound Regional Citizens' Advisory Council, Long-Term Environmental Monitoring Program, 2002-2003 LTEMP Monitoring Report, PWSRCAC Contract 951.03.1. Prince William Sound Regional Citizens' Advisory Council, Anchorage, Alaska, 107 pp.
- Short, J.W. and M.M. Babcock. 1996. Prespill and postspill concentrations of hydrocarbons in mussels and sediments in Prince William Sound. Pages 149-166 in Rice, S. D., R. B. Spies, D. A. Wolfe, and B. A. Wright (eds). Proceedings of the *Exxon Valdez* Oil Spill Symposium. American Fisheries Society Symposium 18. American Fisheries Society, Bethesda, Maryland.
- Short, J. W., Kolak, J. J., Payne, J. R., Van Kooten, G. K. 2004. Geochemical Investigation of Hydrocarbon Fate and Transport in the Northern Gulf of Alaska Fluvio-Marine Environment. Final report for restoration project 00599, submitted to the Exxon Valdez Trustee Council, Anchorage, Alaska, 45 pp.
- Short, J. W. and R. A. Heintz. 1997. Identification of *Exxon Valdez* oil in sediments and tissues from Prince William Sound and the Northwestern Gulf of Alaska based on PAH weathering. *Environmental Science and Technology* 31: 2375-2384.

Statement of Qualifications:

Mr. Short's primary area of responsibility will be to supervise the analyses of hydrocarbons, lipids, moisture, particle grains sizes, and total organic carbon in all of the samples collected, and to insure that the QA criteria for these analyses are met. He will also participate in data analysis, and report preparation. Mr. Short holds a Master of Science degree in physical chemistry from the University of California at Santa Cruz (1982), and has worked on oil pollution research for nearly 25 years, beginning in 1972, and is a Ph.D. candidate in fisheries biology at the University of Alaska. Mr. Short

created the hydrocarbon analysis facility at the Auke Bay Laboratory, in response to the *Exxon Valdez* oil spill, and his facility has consistently met the highest applicable quality assurance standards. It was selected as one of only two labs that qualified to analyze samples for the DOJ Natural Resource Damage Assessment of the *Exxon Valdez* oil spill, after rigorously demonstrating interlaboratory comparability with the other lab selected (GERG). Mr. Short is a leading authority on the fate, persistence and effects of the oil spilled from the *T/V Exxon Valdez*, as well as on the nature of alternative sources of hydrocarbons in the spill region.

Ms. Ka'aihue is the Environmental Program Manager for the Prince William Sound Regional Citizens' Advisory Council (PWSRCAC). In coordination with the Scientific Advisory Committee of the PWSRCAC, Ms. Ka'aihue has managed LTEMP for nine years. She will manage the contracts associated with sampling, data interpretation, and reporting. She will also coordinate rigorous peer reviews of LTEMP annual reports. Ms. Ka'aihue manages other projects in support of the PWSRCAC Environmental Monitoring Program including research associated with the use of chemical dispersants on oil spills. Ms. Ka'aihue holds a B.S. in Political Science from the University of Oregon. Prior to joining the PWSRCAC, she was a Subsistence Resource Specialist with the Alaska Department of Fish and Game. As a subsistence specialist, Ms. Ka'aihue conducted extensive subsistence surveys related to the *Exxon Valdez* oil spill in many of the spill impacted communities and co-authored technical reports.



Regional Citizens' Advisory Council / "Citizens promoting environmentally safe operation of the Alyeska terminal and associated tankers."

In Anchorage: 3709 Spenard Road / Anchorage, Alaska 99503 / (907) 277-7222 / FAX (907) 277-4523
In Valdez: P.O. Box 3089 / 339 Hazelet Avenue / Valdez, Alaska 99686 / (907) 835-5957 / FAX (907) 835-5926

April 12, 2004

MEMBERS

Alaska State
Chamber of
Commerce

Alaska Wilderness
Recreation & Tourism
Association

Chugach Alaska
Corporation

City of Cordova

City of Homer

City of Kodiak

City of Seldovia

City of Seward

City of Valdez

City of Whittier

Community of
Chenega Bay

Community of
Tatitlek

Cordova District
Fishermen United

Kenai Peninsula
Borough

Kodiak Island
Borough

Kodiak Village Mayors
Association

Oil Spill Region
Environmental
Coalition

Prince William Sound
Aquaculture
Corporation

Mr. Jeff Short
Research Chemist
Auke Bay Laboratory, National Marine Fisheries Service
N.O.A.A.
11035 Glacier Highway
Juneau, Alaska

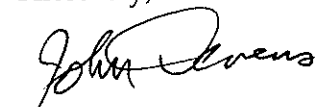
Dear Mr. Short:

The Prince William Sound Regional Citizens' Advisory Council (PWSRCAC) is an independent non-profit corporation formed after the 1989 *Exxon Valdez* oil spill to promote environmentally safe operation of the Valdez Marine Terminal and associated tankers. Our work is guided by the Oil Pollution Act of 1990 as sponsored by Governor Frank Murkowski while in the Senate, and our contract with Alyeska Pipeline Service Company. Our 18 member organizations are communities in the region affected by the Valdez spill, as well as commercial fishing, aquaculture, Native, recreation, tourism and environmental groups.

This letter confirms the intent of the PWSRCAC regarding the proposal in response to the Gulf Ecosystem Monitoring FY2005 Invitation for Proposals. It is the intent of PWSRCAC to participate in the research as outlined in the proposal in collaboration with Auke Bay Laboratory, contingent upon the Board of Directors review and approval of the PWSRCAC budget. The PWSRCAC annual budget is scheduled for approval in May of each year.

We believe that this proposal provides an excellent opportunity to meet the goals of GEM, the PWSRCAC and Auke Bay Laboratory, by building upon our own Long-Term Environmental Monitoring Program.

Sincerely,


John S. Devens, Ph.D.
Executive Director

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Budget Category: | Proposed FY 05 | Proposed FY 06 | Proposed FY 07 | TOTAL PROPOSED |
|---|---------------------------|---------------------------|---------------------------|---------------------------|
| Personnel | \$8.0 | \$8.0 | \$8.0 | \$24.0 |
| Travel | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Contractual | \$34.0 | \$34.0 | \$34.0 | \$102.0 |
| Commodities | \$12.0 | \$12.0 | \$12.0 | \$36.0 |
| Equipment | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Subtotal | \$54.0 | \$54.0 | \$54.0 | \$162.0 |
| General Administration (9% of Subtotal) | \$4.9 | \$4.9 | \$4.9 | \$14.6 |
| Project Total | \$58.9 | \$58.9 | \$58.9 | \$176.6 |

Cost-share Funds:

The total annual cost of this proposal is \$169.9K, of which \$94K will be furnished by the PWSRCAC. The PWSRCAC-funded portion of this project will cover all costs associated with sample collection and the NOAA part will cover the sample analysis costs.
NOAA contributions: Principle investigator: Jeff Short 1 months salary @ \$13K, Marie Larsen .5 month @ 4K for a total of \$17K.

**FY 05-
07**

Date Prepared:

Project Number: 050763
Project Title: Evaluation of Oil Remaining in the Intertidal from the Exxon Valdez Oil Spill
Agency: NOAA

FORM 3A
TRUSTEE
AGENCY
SUMMARY

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Personnel Costs: | | GS/Range/ Step | Months Budgeted | Monthly Costs | Overtime | Personnel Sum |
|------------------|-------------|------------------------|--------------------|------------------|-------------------|---|
| Name | Description | | | | | |
| Marie Larsen | Chemist | GS/11 | 1.0 | | | 8.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 |
| Subtotal | | | 1.0 | 0.0 | 0.0 | \$8.0 |
| | | Personnel Total | | | | |
| Travel Costs: | | Ticket Price | Round Trips | Total Days | Daily Per Diem | Travel Sum |
| Description | | | | | | |
| | | | | | | 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 |

**FORM 3B
Personnel
& Travel
DETAIL**

Project Number: 050763
Project Title: Evaluation of Oil Remaining in the Intertidal
from the Exxon Valdez Oil Spill
Agency: NOAA

FY 05

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| | | |
|---|--|--------------------------|
| Contractual Costs: | | Contract Sum |
| Description | | 34.0 |
| Temporary Labor (NOAA) chemical laboratory analysis | | |
| if a component of the project will be performed under contract, the 4A and 4B forms are required. | | |
| Commodities Costs: | | Contractual Total |
| Description | | Commodity Sum |
| Laboratory supplies and chemicals | | 12.0 |
| Commodities Total | | \$12.0 |

Project Number: 050763
 Project Title: Evaluation of Oil Remaining in the Intertidal from the Exxon Valdez Oil Spill
 Agency: NOAA

FORM 3B
 Contractual &
 Commodities
 DETAIL

FY 05

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| New Equipment Purchases: | Number of Units | Unit Price | Equipment Sum |
|--|----------------------------|-----------------------------|--|
| Description | | | 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 |
| New Equipment Total | | | \$0.0 |
| Existing Equipment Usage: | Number of Units | Inventory Agency | |
| Description | | | |
| NOAAA Auke Bay Laboratory GCMS/HPLC | | | |

FY 05

Project Number: 050763
Project Title:
Agency:

FORM 3B
Equipment
DETAIL

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| Personnel Costs: | | GS/Range/ Step | Months Budgeted | Monthly Costs | Overtime | Personnel Sum |
|------------------------|-------------|-------------------|--------------------|------------------|-------------------|--|
| Name | Description | | | | | |
| Marie Larsen | Chemist | GS/11 | 1.0 | | | 8.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 |
| Subtotal | | | 1.0 | 0.0 | 0.0 | \$8.0 |
| Personnel Total | | | | | | |
| Travel Costs: | | Ticket Price | Round Trips | Total Days | Daily Per Diem | Travel Sum |
| Description | | | | | | |
| | | | | | | 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 |
| Travel Total | | | | | | \$0.0 |

FORM 3B
Personnel
& Travel
DETAIL

Project Number: 050763
Project Title:
Agency:

FY 06

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| | | |
|--|--|------------------|
| Contractual Costs: | | Contract Sum |
| Description | | 34.0 |
| Temporary Labor (NOAA) chemical laboratory analysis | | |
| Contractual Total | | \$34.0 |
| If a component of the project will be performed under contract, the 4A and 4B forms are required. | | |
| Commodities Costs: | | Commodity Sum |
| Description | | 12.0 |
| Laboratory supplies and chemicals | | |
| Commodities Total | | \$12.0 |

| | |
|---------------------|---|
| <p>FY 06</p> | <p>Project Number: Project Title: Agency:</p> |
|---------------------|---|

FORM 3B
Contractual &
Commodities
DETAIL

EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07

| New Equipment Purchases: | | | |
|----------------------------|-----------------|------------|---------------|
| Description | Number of Units | Unit Price | Equipment Sum |
| | | | 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 |
| New Equipment Total | | | \$0.0 |

| Existing Equipment Usage: | |
|--|------------------|
| Description | Inventory Agency |
| NOAAA Auke Bay Laboratory GCMS/HPLC | |

FORM 3B
Equipment
DETAIL

Project Number:
Project Title:
Agency:

FY 06

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 05 - FY 07**

| | | |
|--|--|---------------|
| Contractual Costs: | | Contract Sum |
| Description | | 34.0 |
| Temporary Labor (NOAA) chemical laboratory analysis | | |
| Contractual Total | | \$34.0 |
| Commodities Costs: | | Commodity Sum |
| Description | | 12.0 |
| Laboratory supplies and chemicals | | |
| Commodities Total | | \$12.0 |

FORM 3B
Contractual &
Commodities
DETAIL

Project Number:
Project Title:
Agency:

FY 07

**EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL
 DETAILED BUDGET FORM FY 05 - FY 07**

| New Equipment Purchases: | Number of Units | Unit Price | Equipment Sum |
|---|------------------------|------------------------|---|
| Description | | | 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 |
| New Equipment Total | | | \$0.0 |
| Existing Equipment Usage: | | Number of Units | Inventory Agency |
| Description NOAAA Auke Bay Laboratory GCMS/HPLC | | | |

FORM 3B
 Equipment
 DETAIL

Project Number:
 Project Title:
 Agency:

FY 07

Budget Justification

Project Title: Long term monitoring of anthropogenic hydrocarbons in the Exxon Valdez oil spill region

FY 05 – \$58.9K including GA

Personnel:

Marie Larsen, Senior GC-MS chemist; Her job is to run the GC-MS analyses for this project, and quality assure the results. 1 month in time to run the samples and the quality assurance samples that travel with the unknown samples. Calculate the concentrations of 63 analytes.

Jeff Short, Senior Research Chemist will interpret the analyses and be responsible for the final report product. No charge to this project.

Travel:

none.

Request: **(total requested)**

Contractual:

34 K for soft fund contract technician labor to process the samples. The quantity of samples will require several months of processing, homogenizing, extracting, purification, concentrating throw volume reduction, cleaning, etc associated with the analyses.

Requested: **(total requested)**

Commodities:

.
12 K; mostly solvents and GC column replacement.

Request: **(total requested)**

Equipment:

None- GC-MS will be used, computers used. No charge.

Request: **\$54K (net of G&A)**

FY 06 – \$58.9K including GA

Personnel:

Marie Larsen, Senior GC-MS chemist; Her job is to run the GC-MS analyses for this project, and quality assure the results. 1 month in time to run the samples and the quality assurance samples that travel with the unknown samples. Calculate the concentrations of 63 analytes.

Jeff Short, Senior Research Chemist will interpret the analyses and be responsible for the final report product. No charge to this project.

Travel:

none.

Request: **(total requested)**

Contractual:

34 K for soft fund contract technician labor to process the samples. The quantity of samples will require several months of processing, homogenizing, extracting, purification, concentrating throw volume reduction, cleaning, etc associated with the analyses.

Requested: **(total requested)**

Commodities:

12 K; mostly solvents and GC column replacement.

Request: **(total requested)**

Equipment:

None- GC-MS will be used, computers used. No charge.

Request: **\$54K (net of G&A)**

FY 07 – \$54K (net of G&A)

Personnel:

Marie Larsen, Senior GC-MS chemist; Her job is to run the GC-MS analyses for this project, and quality assure the results. 1 month in time to run the samples and the quality assurance samples that travel with the unknown samples. Calculate the concentrations of 63 analytes.

Jeff Short, Senior Research Chemist will interpret the analyses and be responsible for the final report product. No charge to this project.

Travel:

none.

Request: **(total requested)**

Contractual:

34 K for soft fund contract technician labor to process the samples. The quantity of samples will require several months of processing, homogenizing, extracting, purification, concentrating throw volume reduction, cleaning, etc associated with the analyses.

Requested: **(total requested)**

Commodities:

12 K; mostly solvents and GC column replacement.

Request: **(total requested)**

Equipment:

None- GC-MS will be used, computers used. No charge.

Request: **\$54K (net of G&A)**