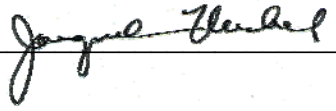
PROPOSAL SIGNATURE FORM

THIS FORM MUST BE SIGNED BY THE PROPOSED PRINCIPAL INVESTIGATOR AND SUBMITTED ALONG WITH THE PROPOSAL. If the proposal has more than one investigator, this form must be signed by at least one of the investigators, and that investigator will ensure that Trustee Council requirements are followed. Proposals will not be reviewed until this signed form is received by the Trustee Council Office.

By submission of this proposal, I agree to abide by the Trustee Council's data policy (*Trustee Council Data Policy**, adopted July 9, 2002) and reporting requirements *(Procedures for the Preparation and Distribution of Reports***, adopted July 9, 2002).

PROJECT TITLE: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska (in response to BAA No. AB133F-06-RP-0166).

Printed Name of PI: Jacqueline Michel

Signature of PI:  Date 9 February 2007

Revised

Printed Name of PI: Jeffrey Short

Signature of PI: _____ Date 31 July 2006

Printed Name of co-PI: Gail Irvine

Signature of co-PI: _____ Date 31 July 2006

* **www.evostc.state.ak.us/Policies/data.htm**

** **www.evostc.state.ak.us/Policies/Downloadables/reportguidelines.pdf**

Trustee Council Use Only Project No._____ Date Received: _____

FY07 INVITATION
PROPOSAL SUMMARY PAGE
(in response to BAA No. AB133F-06-RP-0166)

Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska

Project Period: FY 07 - 08

Proposer(s): Dr. Jacqueline Michel, Research Planning, Inc. (RPI); Dr. Jeffrey Short, Auke Bay Laboratory, NMFS; and Dr. Gail Irvine, USGS

Study Location: Prince William Sound and the Gulf of Alaska (Kenai Peninsula and Kodiak Strait)

Abstract: The proposed study is to develop and implement a statistically rigorous field study and spatial modeling analysis to produce maps showing the probability of lingering oil in areas of Prince William Sound and the Gulf of Alaska that were affected by the *Exxon Valdez* oil spill. We will also estimate the area and volume of oiled sediments in these areas as of 2007. Sediment samples will be analyzed to fingerprint the source of the oil residues, characterize them as to the degree of weathering and risk to exposed biota, and determine treatability using bioremediation. The results will provide key data for use in developing more detailed remediation plans and priority areas for remediation. The probability maps will allow researchers to identify locations where oil persists with much greater precision, leading to more sensitive studies of the long-term effects of the lingering oil on biota in the spill-impact regions.

Funding: (Includes 9% G&A)

EVOS Funding Requested:

FY07 = $ 1,465.5

FY08 = $ 128.6

TOTAL = $1,594.1

Non-EVOS Funds to be used: FY07 = $.00

TOTAL = 1,594.1

Date: Revised: 9 February 2007

PROJECT PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

Oil from the 1989 *Exxon Valdez* oil spill (EVOS) has persisted along shorelines to this day, as both surface and subsurface oil residues. Surface and subsurface oil may be causing on-going exposure and potential harm to living organisms, wilderness areas, recreational activities, and subsistence users in Prince William Sound (PWS) and the Gulf of Alaska (GOA). Short et al. (2004) developed and implemented a study approach whereby they estimated 11 hectares of remaining lingering oil in PWS. Most of the subsurface oil was in the middle intertidal zone where it may be more bioavailable (Short et al. 2006). The sampling design used by Short et al. (2004) was based mostly on beaches that were described as moderately or heavily oiled in 1990 to 1993, thus may not have included the full range of potential areas. The sampling results were statistically extrapolated to estimate the total area of remaining oil but not the geographical locations where the oil may occur. Short et al. (in prep) also estimated that the oiled surface area of beaches has not changed significantly since 2001, indicating that the rate of decline has slowed significantly. Spatial information on the distribution of lingering oil in the spill impact areas is needed to determine the need for active restoration to speed recovery of sediment resources and associated resources, to assess potential impacts to subsistence users, and to assess the impact of lingering oil on the recovery rates of injured resources.

It is important to note that many ongoing and planned projects will benefit from our proposed work. Having maps showing the probability of lingering oil along the shoreline will provide a much needed and better basis for the design of studies to assess the potential effects of lingering oil on resources, both natural and socio-economic. Our spatial data products will provide the ability to query the data used to generate the probability maps, so researchers will also have access to more detailed historical oiling information, to the extent it is available. The probability maps will allow researchers to identify locations where oil persists with much greater precision, leading to more sensitive studies of the long-term effects of the lingering oil on biota. At least as important, residents and visitors of the spill-affected region will be much better able to identify beaches where oil likely remains, and avoid them if desired.

B. Relevance to the RFP

This proposal has direct relevance to the RFP, which stated… “The Council seeks proposals that map distribution and assess patterns of lingering oil….. For example, a project would be considered if it located and mapped remaining lingering oil in the spill area and produced a quantitative estimate of that remaining oil.” Our objective is to generate maps showing areas of lingering oil by degree of probability. It is important to note that we do not propose to physically survey all potential shoreline segments to determine whether or not lingering oil is present. Instead, we propose to conduct a rigorous, statistically based sampling plan to allow us to predict, with a high degree of confidence, the likelihood of lingering oil on each shoreline segment in the entire oil-impact area, including the Gulf of Alaska. It has been repeatedly

pointed out to us by land managers and researchers working in the GOA that this area has not been adequately included in previous assessments of lingering oil. We propose to spend an appropriate level of effort in the GOA to address this inadequacy.

II. PROJECT DESIGN

A. Objectives

The objectives of the project are:

1. Develop maps showing the probability of lingering oil from the *Exxon Valdez* oil spill in Prince William Sound and the Gulf of Alaska as of 2007 based on a statistically rigorous field sampling program;
2. Estimate the area and volume of oiled sediments from the *Exxon Valdez* oil spill in Prince William Sound and the Gulf of Alaska as of 2007; and
3. Estimate the volume of oil from the *Exxon Valdez* oil spill remaining in Prince William Sound and the Gulf of Alaska

B. Procedural and Scientific Methods

Maps of the location and amounts of lingering oiled sediments and EVOS oil will be generated using a spatial probability model based on a statistically rigorous field sampling program, proceeding along the following five tasks.

Task 1. Construct a preliminary probability model from existing information. This model has three objectives: (1) to determine whether geomorphologic features can be found that are associated with lingering oil; (2) to identify locations where oil is most likely to be found; and (3) to determine the likely maximum extent of oil that would qualify for remediation efforts. This preliminary probability model will be based primarily on comparison of the extent of maximum oiling observed during the comprehensive shoreline cleanup assessment team (SCAT) surveys of the entire spill zone in 1989 and 1990-1991 SCAT data on subsurface oil, with physical shoreline characteristics such as exposure, aspect, and geomorphology (as mapped in 2000 by NOAA using the Environmental Sensitivity Index (ESI) shoreline categories and other data). Locations of subsurface oil identified during surveys in 2001-2004 will be added to this map, and the results examined statistically for significant associations. Most of this oil location data will be obtained from records acquired during the 2001, 2003, and 2005 surveys of oil in PWS conducted by the Auke Bay Laboratory (ABL) (Short et al. 2004, 2006, in prep.).

Task 2. Design a statistically rigorous sampling plan to collect additional field data necessary to refine the preliminary probability model. The sampling plan will address between-beach and within-beach sampling strategies, incorporate criteria regarding minimum patch size and oil weathering state. The design of this sampling plan will be sufficiently flexible that it can be readily refined as data are acquired from other sources, including oiled locations that might be identified by the public. This sampling plan will focus on areas from the preliminary model both with good estimated precision (for validation of the approach), and with poor estimated precision

(for improvement of estimation).

Task 3. Conduct the field sampling in PWS and the northern GOA. The field survey objectives are to: (1) provide a statistically rigorous data set for extending and refining the preliminary probability model; (2) gather ancillary data for estimating the volume and surface area of the subsurface oiled sediments more accurately and precisely; and (3) gather additional data on the geomorphologic characteristics associated with lingering oil, including patch sizes and oil weathering states, to refine the probability model to improve prediction of oil volumes and surface areas as well as location at a smaller spatial scale.

Beaches that are selected for sampling during FY07 will be examined for surface and subsurface oil using methods adapted from Short et al. (2004). Rather than a fixed alongshore length selected for sampling, the number of sampling units at a location will be determined primarily by consistency of oiling history and physical characteristic attributes. The surface of selected shorelines will be carefully examined for visual evidence of oil, and pits dug to 0.5 m depth (when possible) will be excavated in search of subsurface oil, detected from visual and olfactory cues. At each sampled shoreline segment, the fundamental sampling unit will be a 12.5 m alongshore length partitioned into 3 contiguous rectangles (hereafter denoted as "blocks") bounded by tidal elevation beginning at +0.8 m above mean lower low tide and extending to +3.8 m. This tidal interval is where most of oil the remains within PWS (Short et al. 2006) and presumably in the GOA as well. The average slope of beaches within PWS is ~0.15, and at such beaches two 0.25 m^2 quadrats will be randomly located within each block, resulting in a sampling proportion of 0.6% of the beach surface area. At this sampling density, the probability of detecting an oil patch of 25 m^2 is about 50%, and the detection probability increases rapidly with patch size. Almost 90% of the remaining oil in PWS is in patches of 25 m^2 or greater (J. Short, unpublished data). The number of sampled quadrats would be adjusted for beaches having substantially different slopes to maintain (approximately) this detection probability.

Each 0.25 m^2 quadrat will be sampled by excavating a pit to a depth of 0.5 m where possible. The sediment grain size and visible oil will be described using standard terms. Each pit will be photographed with a photographic scale. A sketch will be made of each segment showing the geomorphology of the beach relative to the distribution of surface and subsurface oil, if present. Photographs of the segment will be taken and located on the field sketch. All field measurements and observations will be recorded in special data entry forms created for this project using rugged field computers.

Up to 100 sediment samples will be collected for chemical analysis, including n-alkanes, polynuclear aromatic hydrocarbons (PAH), and biomarkers. These data will be used to fingerprint the source of the residual oil and to characterize the oil residues as to their degree of weathering and treatability using bioremediation methods. The 2007 results will also be compared with the 2001 results to estimate the current rate of weathering. It is estimated that about half of the sediment samples will be collected in PWS and half in the GOA. The oil residues in PWS have been better characterized by Short et al. (2001, 2004, 2006, in prep) compared to the limited sampling and analysis by Irvine et al. (1991).

There will be three survey teams, two in PWS and one in the GOA. Each team will be led by an experienced coastal geologist, the Field Party Chief, who will be responsible for setting up the sampling blocks and making the field observations on sediment grain size, degree of oiling with depth, and geomorphologic characteristics of the beach that may be correlated with the presence/absence of lingering oil. The Field Assistant will help set up the sampling blocks and manage the work of the field technicians excavating the pits. In PWS, there will be three field technicians on each team; there will be four field technicians on the GOA team because of the larger sediments.

To assure consistency among field teams and with previous field surveys, the Field Party Chief for the previous surveys (Mandy Lindeberg, Auke Bay Laboratory) will provide both pre-field and field training support. In PWS, she will lead both teams in the first survey, assuring that both teams consistently implement all methods. She will then check each team working separately. For the GOA team, she will lead the team on the first survey and check them working independently on the second survey.

Task 4. Construct a refined probabilistic model of the spatial extent of lingering oil. The results of the field sampling effort described above would then be used to refine the preliminary probabilistic model of the spatial extent of lingering oil in PWS. At minimum, the additional data collected will be used to refine the parameters of the existing preliminary model. New predictive factors might be identified in the course of field sampling that would recommend inclusion in the refined model.

Task 5. Prepare a draft report that presents the study methods, study results as maps of the probability-based likelihood of the distribution of lingering oil, tables of the estimated amount of lingering oil per shoreline segment, and discussion of the results. Figure 1 shows a very preliminary analysis using readily available datasets for the probability of subsurface oil in Prince William Sound (northern Knight Island) and is an example of the type of probability maps we expect to generate. The digital data, including all collected and generated data, will be delivered in a common format and projection to support distribution of the results to multiple users in risk assessment, prioritization for remediation, and correlation with resource studies. We will prepare a final report in response to peer review comments. We will present the study results at a meeting or workshop as requested by the Trustee Council, and to communities within the spill-affected region at their request.

C. Data Analysis and Statistical Methods

The overall approach proposed involves constructing a probability model that assigns likelihood of oil presence to beaches having defined and readily accessible attributes. Examples of candidate attributes include oiling history, such as the intensity of initial oiling in 1989 and the presence of subsurface oil from 1990 – 1992, and physical characteristics, such as beach aspect, exposure, and geomorphology. These attributes will be compared statistically with beaches where oil is known to remain, and significant associations between attributes and oiling will provide the foundation of a preliminary probability model.

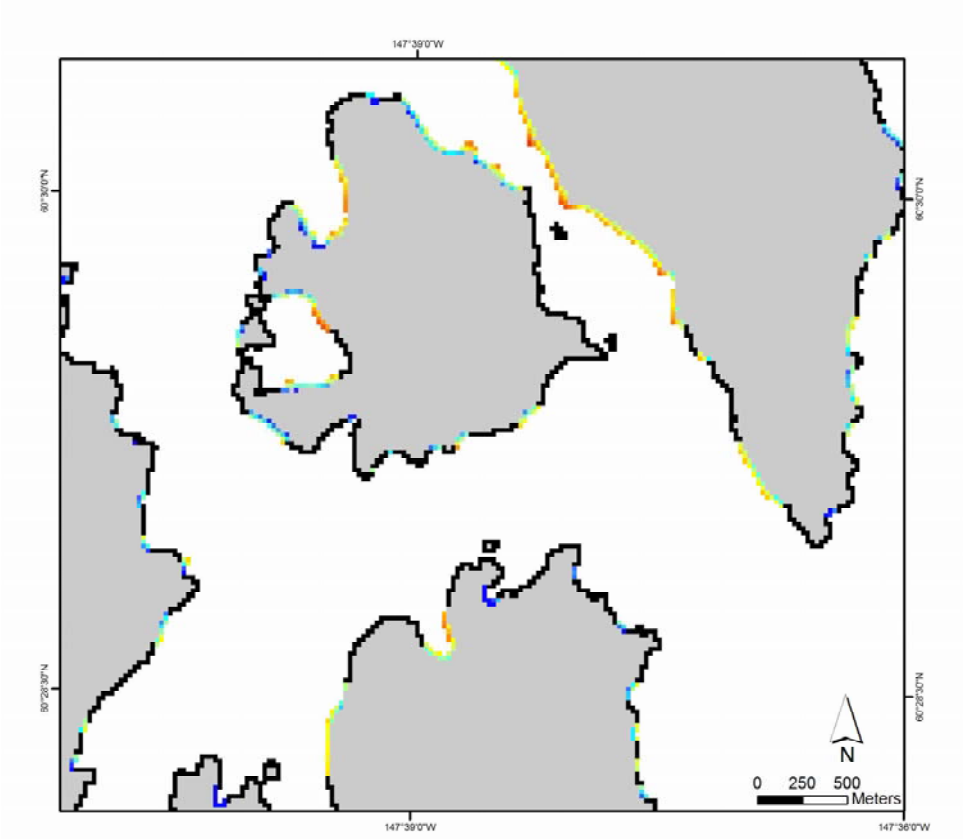


FIGURE 1. Example probability map using readily available datasets for PWS at a 25 m raster grid. Reds and oranges indicate higher probability of subsurface oiling and greens and blues represent lower probability.

The challenge to development of a useful probability model will be to efficiently limit the scope of its applicability. According to results of the first shoreline cleanup assessment team (SCAT) survey of the spill-affected region, 560 km of shoreline was either heavily, moderately, or lightly oiled within PWS, and another ~200 km was more patchily oiled in the Kenai Peninsula-Kodiak Island Archipelago region (Owens, 1991). Shorelines that were classified as very lightly oiled, defined as less than 10% cover, are unlikely to have been sufficiently oiled to have oil penetrate into subsurface sediments and will therefore be excluded from consideration for sampling. Subsurface oil can only occur on shorelines containing porous substrates, which constitute roughly 28% of these shorelines within PWS (Owens, 1991), so the sampling universe is on the order of 157 km there, and less than 56 km outside PWS. Hence, we expect that about 210 km of shoreline length will have been sufficiently oiled initially and are porous for subsurface oil to possibly be found there. We take this ~210 km of shoreline as defining the scope of applicability (and hence sampling universe) of the probability model to be developed.

Information from several sources may help to develop a preliminary probability model of the oil distribution. About half the 210 km of potentially subsurface-oiled shoreline was included within the sampling universe of studies that searched for subsurface oil during 2001 and later. The results of these studies in combination with the associated geomorphologic conditions

characterize about 10 km, or ~5% of the sampling universe. Records of the initial SCAT surveys conducted during 1989 may contain more detailed information regarding oiling intensity that may be compared with oil persistence confirmed during the 2001 and later studies. Also, SCAT surveys conducted during 1990 – 1992 included efforts to locate subsurface oil, and shorelines where it was found are more likely to still be oiled now. Unfortunately, the utility of these data are limited by the fact that the search effort was haphazard and confined mainly to the upper half of the intertidal, so failure to find oil during these surveys is not a reliable indicator of its absence. Finally, communities will be invited to identify locations where subsurface oil is known to persist. The probability model we propose is designed to incorporate as much as possible useful information from all these sources.

To make full use of the different kinds of information provided by the surveys in 1989, 1990-1992, 2001, 2003, and 2005 for predicting presence of subsurface oil in quantities requiring remediation, a detailed model of the initial distribution, penetration, and persistence of spilled oil will be needed. This model will be composed of spatial and temporal components and will be fitted to the data of the surveys by statistical methods including, but not limited to, Bayesian techniques. In broad outline, the oiled shoreline will be idealized as a linear series of 12.5m segments, approximately the finest spatial resolution available for some of the information. Each segment has associated with it various known attributes which may influence the subsurface oil distribution and persistence. The first component of the spilled oil model will be the initial oil distribution model that details the amount or volume of oil in each of the segments shortly after the spill. The second component will describe the probabilities that the initially deposited surface oil in each segment penetrates subsurface sediments and persists to the sampling dates of the various surveys. These persistence probabilities will be modeled as functions of the segment attributes. The third and last component comprises the sampling models for the various surveys, which relate the surviving amount of subsurface oil in each segment to the observations made in sampled segments.

Although the parameter values of the component models are unknown, they can be estimated because the likelihood of the survey observations can be computed for any guess of the parameter values. We will find plausible parameter values for the spilled oil model using the various survey observations. Bayesian estimation using the Markov chain Monte Carlo method will be evaluated as an approach for such a spatial model (e.g., Diggle, Ribeiro, and Christensen, 2003). If Bayesian estimation is used, the prediction of persistent subsurface oil would include a posterior distribution for each segment and thereby the precision of estimation. Future sampling for updating the spilled oil model would focus on (1) segments for which the amount of oil is high or low and precision is good (for validation of the approach) and (2) segments where the amount of oil is estimated with poor precision (for improvement of estimation).

The field sampling effort proposed is enough to examine about 15 km of shoreline for oil, or about 6.6% of our estimated size for the sampling universe. Combined with the beaches already sampled during 2001 and later, the total proportion of the sampling universe examined will exceed 10%. At this proportion of sampling, we expect our probability estimates to be usefully precise, enabling efficient prioritization of shorelines for remediation effort, and useful estimates of volumes of oil and of oiled sediments throughout the entire spill-affected region.

Extrapolations from the probability model of oil occurrence to oil and oiled-sediment volumes will follow methods described in Short et al. (2004) and Michel et al. (2006).

D. Description of Project Area

The project area will include the shorelines in western PWS, the Kenai Peninsula, the Alaska Peninsula, and Kodiak Island.

E. Coordination and Collaboration with Other Efforts

This proposed study will be conducted in close coordination and collaboration among the three co-PIs and their agencies. We have collaborated as a team during proposal development and budgeting of the different tasks and responsibilities within tasks. The proposed work will be closely coordinated among the team. Dr. Jacqueline Michel will be responsible for all reporting requirements and overall project management. Research Planning, Inc. (RPI) will take the lead on the spatial model development, statistical design, field data collection and analysis, data quality, field logistics, and contractor hiring and management. Dr. Miles Hayes will be the Field Party Chief for two of the five surveys in PWS, and he will be an important contributor to the assessment of the geomorphologic factors contributing to the persistence of subsurface oil on beaches. Key RPI contractors include: Jerry Pella, retired NOAA statistician who played a key role in the design and analysis of the 2001 surveys; and Dr. Dan Mann, University of Alaska geologist who conducted extensive SCAT surveys in 1989 and 1990 and has been working in the GOA on lingering oil studies with Gail Irvine, USGS. He will be the Field Party Chief for the surveys in the GOA.

Three researchers at the NOAA Auke Bay Laboratory will be closely involved in this work. Dr. Jeffrey Short will provide senior scientist oversight of all tasks and be actively involved in all aspects of study design, implementation, data analysis, and report production. Mandy Lindeberg will provide training of field teams to provide consistency among teams and with past surveys. Jacek Maselko will provide statistical support. NOAA will obtain the necessary permits for conducting the field surveys in PWS by the teams. NOAA will also analyze the sediment samples.

Dr. Gail Irvine, USGS, will be actively involved in work in the GOA. Her work will include permitting field activities in the GOA, study design, collection of SCAT data on oiling history, field work, data analysis, and report production.

F. References Cited

Diggle, P. J., Ribeiro, P. J. Jr., and O. F. Christensen. 2003. An introduction to model-based geostatistics, pp. 43-86 In J. Moller (Ed.) Spatial statistics and computational methods. Lecture Notes in Statistics Vol. 173, Springer-Verlag, New York, 202 pp.

Irvine, G.V., Mann, D.H., Short, J.W. 1999. Multi-year persistence of oil mousse on high energy beaches distant from the *Exxon Valdez* spill origin. Marine Pollution Bull. 38: 572-584.

Michel, J., Z. Nixon, and L. Cotsapas. 2006. Evaluation of Oil Remediation Technologies for Lingering Oil from the *Exxon Valdez* Oil Spill in Prince William Sound, Alaska. Restoration Project 050778, Final Report, Exxon Valdez Trustee Council, Anchorage, AK, 47 pp + app.

Owens, E. H. 1991. Shoreline conditions following the *Exxon Valdez* spill as of fall 1990. Proceedings, Fourteenth Arctic and Marine Oilspill Technical Program, Environment Canada, Ottawa, Canada.

Short, J.W., M.R. Lindeberg, P.M. Harris, J.M. Maselko, J.J. Pella, and S.D. Rice. 2004. Estimate of oil persisting on the beaches of Prince William Sound 12 years after the *Exxon Valdez* oil spill. Environmental Science and Technology. 38(1): 19-25.

Short, J.W., J.M. Maselko, M.R. Lindeberg, P.M. Harris, and S.D. Rice. 2006. Vertical distribution and probability of encountering intertidal *Exxon Valdez* oil on shorelines of three embayments within Prince William Sound, Alaska. Environmental Science and Technology (in press).

Short, J.W., G.V. Irvine[2], D.H. Mann, J.M. Maselko, J.J. Pella, M.R. Lindeberg, J.R. Payne, W.B. Driskell, and S.D. Rice. In preparation. Slightly weathered *Exxon Valdez* oil persists in Gulf of Alaska beach sediments after 16 years.

III. SCHEDULE

A. Project Milestones

February 2007	Contract Awarded
February 2007-March 2008	Quarterly Reports Due
April 2007	Sampling Plan Developed
May-August 2007	Field Sampling
September 2007	Annual Report Due
January 2008	Draft Report Due
March, 2008	Final Report Due

B. Measurable Project Tasks

FY 07, 2nd quarter (January 1, 2007-March 30, 2007)

Task 1. Develop the preliminary probability model

Task 2. Design a statistically rigorous sampling plan

FY 07, 3rd quarter (April 1, 2007-June 30, 2007)

Task 2. Design a statistically rigorous sampling plan
To be completed by 30 April 2007

Task 3. Conduct field sampling

FY 07, 4th quarter (July 1, 2007-September 30, 2007)

Task 3. Conduct field sampling
To be completed by 31 August 2007

Task 4. Develop refined probability model

FY 08, 1st quarter (October 1, 2007-December 31, 2007)

Task 4. Develop refined probability model
To be completed by 15 December 2007

FY 08, 2nd quarter (January 1, 2008-March 30, 2008)

Task 5. Produce draft and final reports
To be completed by 30 March 2008

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

1. How will affected communities be informed about the project and be given an opportunity to provide their input?

We will contact environmental coordinators in these communities for their input regarding locations of persistent subsurface oil. Also, as major landowners in the region, Native communities will be informed about the project through the permitting process.

2. How will research findings and other project information be communicated to local communities?

We will produce fact sheets and other summary materials that will be made available to local communities and environmental coordinators, the Oil Spill Recovery Institute in Cordova, and the Pratt Museum in Homer. We will rely on guidance from the EVOS Trustee Council on the best methods for distribution of these materials, as part of their overall outreach program on lingering oil and associated impacts. We will consider giving a presentation tour during fall or winter at communities and villages in the spill-affected regions that request it.

3. To what extent will local hire be used for the acquisition of such things as vessels, technicians, and equipment?

We will locally hire vessels to support the field sampling surveys. We will hire as many of the field technicians as possible from local communities in each region. We will need to hire six technicians in PWS and four technicians in the GOA.

4. To what extent will traditional and local knowledge be incorporated into the project?

The probability model will include the ability to utilize local knowledge about where lingering oil has been observed. We will solicit this local knowledge through co-ordination with environmental coordinators in the villages, with the Oil Spill Recovery Institute in the Prince William Sound Science Center in Cordova, the Pratt Museum in Homer, and ecotourism companies operating in the spill-affected region.

B. Resource Management Applications

The study will have valuable resource management applications in that, for the first time, there will be a comprehensive map showing areas where lingering oil is likely to occur, by degrees of probability, throughout the oil spill impact region. These maps will allow resource managers prioritize areas for remediation based on natural resources and socio-economic uses. Researchers monitoring resources that have not recovered will be able to make correlations between areas where lingering oil is likely to occur and recovery patterns for affected resources.

V. PUBLICATIONS AND REPORTS

The study results will be submitted for publication in a peer-reviewed journal. We will consider giving a presentation tour during fall or winter at communities and villages in the spill-affected regions that request it.

JACQUELINE MICHEL, Ph.D.
Geochemist, President of Research Planning, Inc.
1121 Park Street, Columbia, SC 29201
(P) 803-256-7322; (F) 803-254-6445; email: jmichel@researchplanning.com

EDUCATION

Ph.D., Department of Geology, University of South Carolina (USC), Columbia (1980).
M.S., Department of Geology, USC, Columbia (1976).
B.S., Department of Geology, USC, Columbia (1974).

PROFESSIONAL CREDENTIALS

Phi Beta Kappa
First in graduating class (August 1974), USC
Carolina Geological Society
Sigma Xi
Distinguished Alumni Achievement Award, 2002, College of Science and Mathematics, USC
Registered Geologist, South Carolina
Member, Ocean Studies Board, National Academies 2001-present
Chair, NRC Committee on Spills of Emulsified Fuels: Risks and Response (2002)
Chair, NRC Committee on Dispersants Effectiveness and Effects
Member, NRC Committee on Oil in the Sea III (2003)
Member, NRC Committee on Spills of Nonfloating Oils: Risks and Response (1999)
Lifetime Associate, National Academies
Member, Science Advisory Panel to the U.S. Commission on Ocean Policy (2004)
Co-creator of the concept of Environmental Sensitivity Index (ESI) mapping; has mapped many shorelines, including Prince William Sound (1999), Southeast Alaska, Southern Alaska Peninsula, Cook Inlet and Kenai Peninsula, and Bristol Bay
Wrote the Shoreline Assessment Manual for NOAA, which includes SCAT procedures and recommended cleanup methods for all shoreline types
Has responded to hundreds of oil spills, providing recommendations for shoreline cleanup, including manual, mechanical, chemical, *in-situ* burning, and biological technologies.

FIVE RECENT PUBLICATIONS RELATED TO THE LINGERING OIL PROJECT

Michel, J., Z. Nixon, and L. Cotsapas, 2006. Evaluation of oil remediation technologies for lingering oil from the *Exxon Valdez* oil spill in Prince William Sound, Alaska. *Exxon Valdez* Oil Spill Restoration Project Final Report (Restoration Project 050778), National Marine Fisheries Service, NOAA, Juneau, AK, 47 pp. + appendices.

Michel, J., M.O. Hayes, C.D. Getter, and L. Cotsapas, 2005. The Gulf War oil spill twelve years later: Consequences of eco-terrorism. Proc. 2005 International Oil Spill Conference, American Petroleum Institute Publ. No. XX (CD-ROM).

Michel, J. and M.O. Hayes, 1999. Weathering patterns of oil residues eight years after the *Exxon Valdez* oil spill: Marine Pollution Bull., Vol. 38: 855-863.

M.O. Hayes and J. Michel, 1999. Factors determining the long-term persistence of *Exxon Valdez* oil in gravel beaches: Marine Pollution Bull., Vol. 38: 92-101.

Michel, J. and M.O. Hayes, 1996. Evaluation of the condition of Prince William Sound shorelines following the *Exxon Valdez* oil spill and subsequent shoreline treatment: volume II: 1994 geomorphological monitoring survey, July 1994. Prepared for the Hazardous Materials Response and Assessment Division, NOAA, Seattle, Wash., 120 pp. + appendices.

PERSONS WITH WHOM DR. MICHEL HAS COLLABORATED ON A PROJECT OR PUBLICATION WITHIN THE LAST FOUR YEARS:

Al Allen, Spiltec, Inc.
Ann Heyward Walker, Scientific & Environmental Associates, Inc.
Barry Drucker, Minerals Management Service
Brad Benggio, Office of Response & Restoration, NOAA
Jim Turek, Restoration Center, NOAA
Jim Hoff, Damage Assessment Center, NOAA
Bruce Stein, NatureServe
Charlie Henry, Office of Response & Restoration, NOAA
Dan Walker, Ocean Studies Board, National Academies
Dagmar Etkin, Environmental Research Consulting
Dave Andersen, National Park Service
Debbie French, Applied Science Associates, Inc.
Debbie Scholz, Scientific & Environmental Associates, Inc.
DeWitt Braud, Louisiana State University
Don Aurand, Ecosystem Management & Associates, Inc.
Doug Helton, Damage Assessment Center, NOAA
Ed Owens, Polaris Applied Sciences, Inc, (co-author, IOSC paper on ESI mapping in the Arctic)
James Coleman, Louisiana State University
James R. Payne, Payne Environmental Consultants, Inc.
Jay Johnson and Dale Hardin, Applied Marine Sciences, Inc.
Jon Waldron, Blank Rome Law Firm
Keith Michel, Herbert Engineering
Maria de Fatima Guadalupe Meniconi, Petrobras
Mark Curry, Industrial Economics, Inc.
Mark Griswold, Tetra Tech, FW, Inc.
Norman Meade, Damage Assessment Center, NOAA
Peter McGowan, US Fish and Wildlife Service
Richard Greer, Golder Associates, Inc.
Rob Nairn, Baird & Associates, Inc.
Robert Urban, PCCI, Inc.
Trevor Gilbert, Australian Maritime Safety Authority
Vernica Verela, US Fish and Wildlife Service
Mark Ploen, QualiTech Co.
Jeff Short, Auke Bay Lab, NOAA
Al Venosa, USEPA
Brian Wrenn, Washington University
Michel Boufadel, Temple University
Michael Khayata, Office of Pipeline Safety

Jeffrey W. Short

EDUCATION
Ph.D., Fisheries Biology, University of Alaska, 2005
M.S, Physical Chemistry, University of California at Santa Cruz, 1982
B.S., Biochemistry and Philosophy, University of California at Riverside, 1973

Current Position	Research Chemist (since 1983), Auke Bay Laboratory, National Marine Fisheries Service, NOAA, 11305 Glacier Highway, Juneau, Alaska 99801-8626 Tel: 907.789.6065 Fax: 907.789.6094 email: Jeff.Short@noaa.gov
Research Interests	Oil pollution source identification, fate, and effects; Environmental contaminant transport processes; Effects of pristane on marine ecosystem structure
Professional Affiliations	American Chemical Society, American Fisheries Society, Society of Environmental Toxicology and Chemistry, AAAS
Awards	Bronze Medal, U. S. Department of Commerce, "For scientific research and publications describing the long-term, insidious effects of oil pollution on fish embryos at parts per billion levels".
Current Committees	-Alaska Regional Response Team's Science and Technology Committee - Lingering Oil Committee, Exxon Valdez Trustee Council
Reviewer for	- Exxon Valdez Trustee Council - Prince William Sound Regional Citizens' Advisory Council - Cook Inlet Regional Citizens' Advisory Council - National Research Council (USA) - Research Council of Norway - Arctic & Marine Oilspill Program Technical Seminars - Alaska Sea Grant - Environmental Science and Technology - Environmental Toxicology and Chemistry - Marine Environmental Research - National Wildlife Federation - San Francisco Bay Institute

FIVE RECENT PUBLICATIONS RELATED TO THE LINGERING OIL PROJECT

Short, J.W., Maselko, J.M., Lindeberg, M.R., Harris, P.M., Rice, S.D. 2006. Vertical Distribution and Probability of Encountering Intertidal Exxon Valdez Oil on Shorelines of Three Embayments within Prince William Sound, Alaska. Environmental Science & Technology 40(12):3723-3729.

Irvine, G.V., D.H. Mann, and **J.W. Short**. (2006). Persistence of ten-year old *Exxon Valdez* oil on Gulf of Alaska beaches: The importance of boulder armoring. *Marine Pollution Bulletin(in press)*.

Payne, J.R., W.B. Driskell, M.R. Lindeberg, W. Fournier, M.L. Larsen, **J.W. Short**, S.D. Rice, and D. Janka. 2005. Dissolved- and particulate-phase hydrocarbons in interstitial water from Prince William Sound intertidal beaches containing buried oil thirteen years after the Exxon Valdez Oil Spill. 2005 International Oil Spill Conference, American Petroleum Institute.

Short, J. W., Lindeberg, M. R., Harris, P. M., Maselko, J. M., Pella, J. J., and Rice, S. D. 2004. An estimate of oil persisting on beaches of Prince William Sound, 12 years after the *Exxon Valdez* oil spill. Environmental Science and Technology, 38:19-26.

Irvine, G.V., D.H. Mann, **J.W. Short**. 1999. Multi-year persistence of oil mousse on high energy beaches distant from the *Exxon Valdez* spill origin. Marine Pollution Bulletin, 38(7): 572-584.

PERSONS WITH WHOM DR. SHORT HAS COLLABORATED ON A PROJECT OR PUBLICATION WITHIN THE LAST FOUR YEARS:

Brenda Ballachey, Alaska Science Center, USGS
James Bodkin, Alaska Science Center, USGS
Michel Boufadel, Temple University
Ted Cooney, University of Alaska Fairbanks
Roger Green, University of Western Ontario
Lew Haldorson, University of Alaska Fairbanks
Doug Helton, Damage Assessment Center, NOAA
Peter Hodson, Queen's University, Canada
Gail Irvine, Alaska Science Center, USGS
Lisa Ka'aihue, Prince William Sound Regional Citizens' Advisory Council
Gordon Kruse, University of Alaska Fairbanks
Elena Latkovskaya, Sakhalin Institute of Fisheries and Oceanography
Ken Lee, Department of Fisheries and Oceans, Canada
Dan Mann, University of Alaska Fairbanks
Jacqui Michel, Research Planning, Inc.
James R. Payne, Payne Environmental Consultants, Inc.
Pete Peterson, University of North Carolina
Terry Quinn, University of Alaska Fairbanks
Stanley Rice, National Marine Fisheries Service
Thomas Shirley, Texas A&M University
Catherine Sloan, National Marine Fisheries Service
Robert Spies, Applied Marine Science
Robert Ricker, Damage Assessment Center, NOAA
Arnfinn Skadsheim, Rogaland Research, Norway
Katherine Springman, University of California, Davis
Al Venosa, US Environmental Protection Agency
Zhendi Wang, Environment Canada
John Whitney, Damage Assessment Center, NOAA
Brian Wrenn, Washington University

Gail V. Irvine

Research Ecologist
U.S. Geological Survey
Alaska Science Center
1011 E. Tudor Road
Anchorage, AK 99503

Phone: 907-786-3653
FAX: 907-786-3636
E-mail: gail_irvine@usgs.gov

EDUCATION

Ph.D. 1983 University of California, Santa Barbara, Biological Sciences
Emphasis – Aquatic and Population Biology
M.S. 1973 University of Washington, Seattle
Zoology
B.A. 1969 University of California, Santa Barbara
Zoology (Honors)
Attended 1965-66 Alaska Methodist University

PROFESSIONAL POSITIONS

Research Ecologist, U.S. Geological Survey, Alasa Science Center, 1995 – present
Coastal Resources Specialist, National Biological Survey/U.S. Geological Survey, 1993-1995
Coastal Resources Specialist, National Park Service, 1991-1993
Marine Biologist/Fisheries Scientist, Minerals Management Service, 1984-1991
Assistant Research Biologist, Marine Science Institute, University of California, Santa Barbara, 1983

SCIENTIFIC INVOLVEMENT

Editorial Board of Marine Systems Domain, online journal, *TheScientificWorld*, 2001-present
Reviewer, Marine Pollution Bulletin, 2000-2001
Member, Non-indigenous Species Working Group, PWS RCAC

CURRENT MEMBERSHIPS IN PROFESSIONAL SOCIETIES

Ecological Society of America
American Society of Limnology and Oceanography
Western Society of Naturalists
American Geophysical Union

FIVE RECENT PUBLICATIONS RELATED TO THE LINGERING OIL PROJECT

Irvine, G.V., D.H. Mann, and J.W. Short. (2006). Persistence of ten-year old *Exxon Valdez* oil on Gulf of Alaska beaches: The importance of boulder armoring. *Marine Pollution Bulletin(in press)*.

Carls, M.G., M.M. Babcock, P.M. Harris, **G.V. Irvine**, J.A. Cusick, and S.D. Rice. 2001. Persistence of oiling in mussel beds after the *Exxon Valdez* oil spill. Marine Environmental Research 51(2001): 167-190.

Irvine, G.V. 2000. Persistence of spilled oil on shores and its effects on biota. Chapter 126, pp. 267-281, *in* C.R.C. Sheppard, editor. *Seas at the Millenium: An Environmental Evaluation, Volume III, Global Issues and Processes*, Elsevier Science, Ltd., Oxford.

Irvine, G.V., D.H. Mann, J.W. Short. 1999. Multi-year persistence of oil mousse on high energy beaches distant from the *Exxon Valdez* spill origin. Marine Pollution Bulletin, 38(7): 572-584.

Babcock, M.M., **G.V. Irvine**, P.M. Harris, J.A. Cusick, and S.D. Rice. 1996. Persistence of oiling in mussel beds three and four years after the *Exxon Valdez* oil spill. Pages 268-297 *in* S.D. Rice, R.B. Spies, D.A. Wolfe, and B.A. Wright, editors. Proceedings of the *Exxon Valdez* Oil Spill Symposium. American Fisheries Society Symposium 18.

PERSONS WITH WHOM DR. IRVINE HAS COLLABORATED ON A PROJECT OR PUBLICATION WITH OVER THE LAST FOUR YEARS

Scott Carpenter, Dept. of Geosciences, University of Iowa, Iowa City, Iowa
Ginny Eckert, University of Alaska, Southeast, Juneau, Alaska
Sandra Lindstrom, Dept. of Botany, University of British Columbia, Vancouver, B.C., Canada
Dan Mann, Institute of Arctic Biology, University of Alaska, Fairbanks
Anne Pasch, Dept. Biology, University of Alaska, Anchorage
Jeanne Schaaf, Director, Lake Clark-Katmai Studies Center, National Park Service, Anchorage, AK
Jeff Short, Auke Bay Lab, NOAA, Juneau, Alaska
John Southon, Earth System Science Dept., University of California, Irvine, CA
James Taggart, USGS, Alaska Science Center, Juneau, Alaska

BUDGET JUSTIFICATION

Total Request: $1,594.1K (includes $131.6K Trustee Agency G&A on RPI Contract)
Total FY 07 Amount: $1,465.5K
Total FY08 Amount: $128.6K
RPI Total Costs w/o G&A = $1,296.0K (with Trustee G&A = $1,412.6K)
NOAA/USGS Total Costs = $298.1K (includes their Agency G&A)

I. PERSONNEL: $282.8K

RPI personnel = $184.5K; NOAA and USGS Agency personnel = $98.3K

RPI personnel costs in FY07 will be $164.0K and in FY08 will be $20.5K. This work will involve extensive field work by both RPI employees and contract staff. We have developed detailed costs by task. Summaries of the level of effort for each RPI employee is shown below. The levels of effort of contract staff are shown under Section III.

Jacqueline Michel, PI = 75 days
Miles O. Hayes, Senior Coastal Geomorphologist and Field Party Chief = 64 days
Zach Nixon, GIS Specialist = 185 days
Other Field Party Chiefs = 110 days
Field Assistants = 150 days
Contracts Manager = 45 days
Support Staff (graphics and word processing) = 20 days

The total amount requested for NOAA and USGS agency personnel is $60.5K in FY07 and $37.8K in FY08. Of the FY07 amounts, $26.3K will be for contributions from J. Short and J. Maselko (NOAA) towards development of the probability model, $11.3K will be to support M. Lindeberg (NOAA) to insure that field methods comparable with those used for prior studies are used, $10.9K will be to support G. Irvine's (USGS) involvement in model and sampling planning, plus oversight of fieldwork in the Gulf of Alaska, and $12K will support a USGS biological technician to collate historical records of oiling and to support field efforts.

The $37.8K in FY08 will support contributions from J. Short (NOAA) and G. Irvine (USGS) toward preparation of the final deliverables, with some programming support from J. Maselko (NOAA). These funds will also support outreach by J. Short to present results to interested communities within the spill-affected region.

II. TRAVEL: $56.8K

RPI travel = $45.5K; NOAA and USGS Agency travel = $11.3K

RPI travel costs for FY07 will be $42.7K; in FY07 it will be $2.8K. RPI travel costs include airfare for 10 trips by RPI staff from Columbia, SC to Anchorage, AK, eight of which are for survey team members, one for the contracts manager to finalize field logistics, and one for Dr. Michel to present the results at the Alaska Science Symposium. There are costs for two airfares

for travel between Fairbanks and Anchorage by Dr. Mann, one of the field team members. The other survey team members will be hired locally.

Per diem for 97 days is included in the budget to cover hotel and meal expenses for a one-week trip to finalize logistics in April and out-of-town RPI team members during the 2-4 days of poor tides between field surveys and to cover such costs during travel to Anchorage for presentation to the EVOS Trustee Council and at the Alaska Science Symposium.

Ground transportation is included for transport of the field teams to and from the port of departure (Whittier for the six PWS surveys and Homer for the three GOA surveys).

For NOAA/USGS staff, airfare is included for two trips by M. Lindeberg (NOAA) to train field crews on sampling methods, two trips by G. Irvine (USGS) to provide sampling oversight in the Gulf of Alaska, two trips by J. Short (NOAA) to Anchorage to attend the marine science workshop and to collaborate with co-authors, and one trip by J. Short (NOAA) to communities in the spill-affected region for public outreach.

All per diem costs assumes rates of $200/day, which includes all ancillary costs such as ground transportation.

III. CONTRACTUAL: $664.3K

RPI contractural costs = $662.3K; NOAA and USGS Agency contractural costs = $2.0K
FY07: contractural costs - RPI = $655.1K, NOAA/USGS = 0. FY08: RPI = $7.2K, NOAA/USGS = $2K

RPI will contract with individual contractors to fill some of the project positions, as follows:

Statistician = 85 days – Jerry Pella
Field Party Chief for the GOA = 104 days (to include sampling plan, field work, data analysis and report preparation) – Dr. Dan Mann
Field Assistant for the GOA = 70 days – TBA
Field Technicians for the GOA (4) = total of 150 days – TBA
Field Technicians for PWS (6) = total of 426 days – TBA

The budget includes costs to contract for vessel charters for PWS (total of 122 days) and the GOA (total of 48 days) to support the field surveys. Costs are included for eight air charter flights to/from the field, for several trips by NOAA staff to train/visit the field teams and in case of emergencies.

The Agency costs of $2.0K cover page charges for publication of results in the peer-reviewed literature.

IV. COMMODITIES: $65.5K

RPI commodities = $12.0K; NOAA and USGS Agency commodities = $53.5K

RPI commodities costs will be$10K in FY07, and $2K in FY08. The RPI budget includes costs $2,260 for software, computer supplies, and camera supplies, and $2,250 for field supplies needed for each of the three teams (e.g., shovels, picks, special field gear). RPI is providing the rugged field computers at no cost to the project. Printing/mailing/misc. costs of $5,490 are also budgeted.

Most of the Agency amount ($51.5K) is for the hydrocarbon analysis of 100 samples at the Auke Bay Laboratory (NOAA) to verify that oil found during the study is from the *Exxon Valdez*. The budget also includes $2.0K to USGS for field supplies needed for the Gulf of Alaska sampling.

V. EQUIPMENT: $7.2K

RPI equipment costs = $4.8K; NOAA and USGS Agency equipment costs = $2.4

The RPI budget includes FY07 costs for two laser survey instruments ($1,100 each) needed to establish the tide elevations at each beach segment and two laptop computers ($1,300) for date storage and field support.

Agency costs include $2.4K for USGS purchase of one laser survey instrument and one field computer.

VI. INDIRECT COSTS: $402.0K (if the Trustee Agency G&A on RPI contract [$131.5] is included, the total indirect costs = $ 533.5K)

RPI indirect costs = $386.9K; NOAA and USGS Agency indirect costs on their agency activities = $15.1K; Trustee Agency G&A on RPI contract = $116.6K.

In FY07, the indirect costs for RPI will be $348.2K; the Trustee Agency G&A on the RPI contract will be $110.4K. In FY08, the RPI indirect costs will be $38.7K, and the Trustee Agency G&A on the RPI contract will be $ 6.4K.

The RPI component of the budget includes $313,200 for overhead costs and $73,200 profit (6%). Research Planning, Inc.'s overhead rate of 170% is based on its overhead costs less unallowable items shown as a percentage of its direct labor costs. Cost elements in the applicable pool include overhead salaries and fringe, supplies, communication, utilities, maintenance, rent, accounting, and miscellaneous costs. The treatment of these costs is in accord with established accounting practices. Research Planning, Inc. audit reports may be obtained from Stephen Greig – DCAA – North Carolina Branch Office. The address is 415 N. Edgeworth St., Suite A, Greensboro, NC 27401-2163. The phone number is (336) 333-5287.

Following the guidance in FAR 15.404-4 on policies for establishing the fee portion of Government contracts, we provide the following rationale for our proposed profit. The FAR guidelines state that greater profit should be provided under contracts requiring a high degree of professional and managerial skill and to contracts who skills, facilities, and technical assets can be expected to lead to efficient and economical contract performance. The work to be performed

under this contract requires a very high degree of professional and expert skill. The Exxon Valdez Trustee Council expects skilled technical support and RPI provides such skills and expertise. When given specific assignments, we are able to complete them efficiently.

The FAR guidelines also state that indirect costs should be considered in several ways. We work very hard to keep our indirect costs low, thus our indirect costs are below the average for a company our size. This effort to keep overhead rates low should be a consideration. Our indirect rate includes some labor elements that contribute significantly to the overall contract performance, such as close tracking of project costs, preparation of cost estimates for tasks, and maintenance of required training and skills for better performance.

The NOAA/USGS agency indirect costs are calculated from the 9% G&A formula.

VII. OTHER CONTRACTUAL INFORMATION:

RPI has completed the certification in CCR online at https://orca.bpn.gov

DATA MANAGEMENT AND QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) STATEMENT

RPI has extensive experience in collecting field data, building spatial databases, incorporating vector and raster datasets, and processing spatial datasets in support of a variety of different projects. Throughout these processes, we maintain quality control reviews and document this through the use of extensive metadata. With datasets delivered to clients, RPI develops all metadata so that it is fully compliant with the FGDC Content Standard for Digital Geospatial Metadata (CSDGM). Spatial data products comply with ASPRS & US National Map Accuracy Standards, where possible. Responses to each of the requirements for data management and quality assurance called for in the FY 2007 Invitation for Proposals are provided below.

1. Overall Description

The study design and statistical analyses will closely match Short et al. (2004) and are described in detail in Sections II.B on page 2 and II.C on page 4 above. There will be two principal types of data collected: 1) physical field observations; and 2) sediment samples. In both cases, the locations of data collected, both as horizontal coordinates on the sampling grid relative to a latitude/longitude location, and in vertical coordinates on the sampling grid relative to a tidal elevation datum will also be collected.

2. Criteria for Acceptable Data Quality

With regard to the physical observations, the goals of this project require relatively simple categorical data generated from visual and olfactory evidence. It has been repeatedly shown that such evidence is adequate to characterize the presence and relative density of hydrocarbons in sediments, most recently in Short et al. (2004). The sediment samples will serve as part of a quality assurance procedure to determine precision of physical observations after analysis. The requirements of the project for data quality of sample analysis results are well within the standard analytical capabilities of typical instrumentation.

Spatial data collected to record observation and sample locations need to be accurate to within less than 10 cm on the survey grid both horizontally and vertically– well within the accuracy of the laser level and tape measures. The staring coordinate for establishing the survey grid will be generated randomly, and will need to be located in the field to an accuracy of several meters. This distance is within the stated autonomous accuracy of most commercial grade GPS receivers.

3. Metadata and Data Description

Data collected as part of the physical field observations will include date, time, team, segment name, latitude and longitude of the beach segment, segment length, strata name, location name, grid location (column and row), pit location, pit number, pit depth, clean sediment interval, oiled sediment interval, oiling descriptor, grain size of each interval, sample number, and notes. Data describing the analytical results will be delivered in an as yet undetermined format containing, at minimum analytical result and sample ID. Spatial data generated as part of the analysis by extrapolating a statistical probability model will also be delivered in an as yet undetermined

format, containing at minimum the statistical estimate of subsurface oil probability, an estimate of precision of that estimate, and values of variables used to generate the estimate.

All collected field data and subsequently generated spatial data will be described by metadata documents that fully meet the FGDC Content Standard for Digital Geospatial Metadata (CSDGM). As per requirements, an example FGDC-compliant metadata document has been included with this proposal. Actual metadata documents delivered will be generated with appropriate FGDC software as well as custom developed internal routines, and will be much more extensive.

4. Algorithms

No analytical algorithms will be used to generate data from sensor output for this project other than those used internally by the GPS receiver to compute position, and those used by the laser survey instruments to compute distance and elevation.

5. Sample Handling and Custody

Sediment samples will be collected into pre-cleaned glass jars using pre-cleaned utensils. Each sample will be identified by its beach segment, grid, interval, oiling descriptor, date, time, sampler, and notes. Samples will be labelled and frozen in the field at the end of each survey. They will be maintained frozen under chain of custody onboard the survey vessel until the end of each survey period. All samples will then be transferred to a cooler and kept frozen during shipment under chain of custody to the Auke Bay Laboratory in Juneau, Alaska.

6. Calibration and Evaluation of Analytical Instruments and Methods

Prior to commencement of field surveys, the field team leaders will undergo a calibration exercise to assure that the descriptors for physical observations are being applied consistently. All teams have NOAA SCAT Job-Aids with photographs and descriptions for the key terms. We will utilize a 3-tier “collection to delivery” data QA/QC procedure. Customized data collection software will be developed and used on rugged field computers with non-volatile memory. This software will utilize, to the extent possible, forms, pick lists, pull-down menus, and other error-trapping procedures to provide the first level QA/QC in the field. Automated routines, data check in procedures, and multiple device backup on a daily or semi-daily basis while in the field provide the second level QA/QC. Finally, complete data integrity and content reviews are conducted on the assembled data set before subsequent analysis and delivery.

Laser survey instruments will be used to determine tidal elevations for laying out the sampling grids at each segment. All laser units will be inspected prior to and during fieldwork to ensure correct operation. GPS units will be used to record the latitude and longitude; all GPSs will be set to the same datum and units. GPS units will only be operated with the following criteria: An elevational mask will be set to exclude all satellites below 15 degrees above the horizon from position computation. Positional information will not be collected when the Positional Dilution of Precision (PDOP) value is greater than six, indicating relatively poor quality of satellite constellation.

The data management and quality assurance/quality control of the hydrocarbon analyses in use at the NOAA Auke Bay Laboratory have been published and are described in the following document:

Larsen, M., Holland, L., Fremgen, D., Lunasin, J., Wells, M., Short, J. 2003. Standard Operating Procedures for the Analysis of Petroleum Hydrocarbons in Seawater, Marine Sediments, and Marine Faunal Tissue at the Auke Bay Laboratory. Auke Bay Laboratory, Alaska Fisheries Science Center, National Marine Fisheries Service, NOAA, 11305 Glacier Highway, Juneau, Alaska.

This document includes Standard Operating Procedures for chain-of-custody, calculation methods and data storage procedures, in addition to the details of the analytical procedures. Calculation algorithms are either proprietary and part of the analytical hardware, or are available as Excel spreadsheets.

7. Data Reduction and Reporting

Overall data results will be reported in delivered final report and hardcopy map products, as well as digital spatial and tabular data. The specific statistical methods used to construct the subsurface oiling probability model are described in Section II.C, page 6, paragraphs 2 and 3. The exact statistical methodology used to construct the model will depend on the specifics of the data collected and may include linear models, generalized linear models, geostatistical models, or some combination thereof. In turn, the software used will depend upon the statistical methodology. It is likely that, at minimum, the open source software R, as well as WinBUGS for Bayesian inference will be used. This statistical model, once constructed, would be implemented for extrapolation to the entire study area and maps production using ArcGIS. The overall project structure (model-sample-model) will provide inherent estimates of model performance. Also, the anticipated statistical methodology includes built-in estimates of precision.

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Budget Category:	Authorized FY 2006	Proposed FY 2007	Proposed FY 2008	PROPOSED TRUSTEE AGENCY TOTALS TOTAL Proposed			DOI	NOAA
						FY07	$31.4	$1,434.1
						FY08	$12.6	$116.0
Personnel	$0.0	$60.5	$37.8	$98.3				
Travel	$0.0	$3.3	$8.0	$11.3				
Contractual	$0.0	$1,224.8	$72.2	$1,297.0				
Commodities	$0.0	$53.5	$0.0	$53.5				
Equipment	$0.0	$2.4	$0.0	$2.4				
Subtotal	$0.0	$1,344.5	$118.0	$1,462.5				
General Administration	$0.0	$121.0	$10.6	$131.6				
Project Total	$0.0	$1,465.5	$128.6	$1,594.1				
Full-time Equivalents (FTE)	0.0	2.7	0.5					
	Dollar amounts are shown in thousands of dollars.							
Other Resources	$0.0	$0.0				$0.0		

Comments:

FY07 - FY08

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Lead Agency: NOAA - NMFS Auke Bay Lab
Second Trustee Agency: DOI - USGS
Contractor: RPI

PROJECT SUMMARY

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Budget Category:	Authorized FY 2006	Proposed FY 2007	Proposed FY 2008	TOTAL Proposed
Personnel		$37.6	$27.2	$64.8
Travel		$1.8	$8.0	$9.8
Contractual		$1,224.8	$71.2	$1,296.0
Commodities		$51.5	$0.0	$51.5
Equipment		$0.0	$0.0	$0.0
Subtotal	$0.0	$1,315.7	$106.4	$1,422.1
General Administration		$118.4	$9.6	$128.0
Project Total	$0.0	$1,434.1	$116.0	$1,550.1
Full-time Equivalents (FTE)		0.3	0.2	
	Dollar amounts are shown in thousands of dollars.			
Other Resources				

Comments:

FY07 - FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: NOAA - NMFS Auke Bay Lab

FORM 3A
TRUSTEE
AGENCY
SUMMARY

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2007
						0.0
Jeffrey Short	Supervisory Research Chemist	pay-bands	1.6	12.3		19.7
Mandy Lindeberg	Fisheries Biologist	pay-bands	1.4	8.1		11.3
Jacek Maselko	Fisheries Biologist	pay-bands	1.0	6.6		6.6
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		4.0	27.0	0.0	
					Personnel Total	$37.6

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2007
					0.0
Anchorage- Juneau, RT	0.5	1	2	0.2	0.9
Anchorage - Cordova, RT	0.5	1	2	0.2	0.9
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$1.8

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: NOAA - NMFS Auke Bay Lab

FORM 3A
Personnel & Travel
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Contractual Costs:		Proposed
Description		FY 2007
4A Linkage		1,224.8
When a non-trustee organization is used, the form 4A is required.	**Contractual Total**	$1,224.8

Commodities Costs:		Proposed
Description		FY 2007
Sample Chemistry	100 samples @ $500	50.0
Misc. supplies		1.5
	Commodities Total	$51.5

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: NOAA - NMFS Auke Bay Lab

FORM 3A
Contract & Commodoties DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Those purchases associated with replacement equipment should be indicated by placement of an R.

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2007
			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	Inventory
Description	of Units	Agency

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: NOAA - NMFS Auke Bay Lab

FORM 3A
Equipment
Detail

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2008
						0.0
Jeffrey Short	Supervisory Research Chemist	pay-bands	2.0	12.9		25.8
Jacek Maselko	Fisheries Biologist	pay-bands	0.2	6.9		1.4
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		2.2	19.8	0.0	
					Personnel Total	$27.2

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2008
					0.0
Juneau to Anchorage, RT, Marine Science Symposium, collaboration	0.5	2	10	0.2	3.0
					0.0
Juneau to various points (e.g., Chenega, Cordova, Kodiak) outreach	3.0	1	10	0.2	5.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$8.0

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: NOAA - NMFS Auke Bay Lab

FORM 3A
Personnel & Travel
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Contractual Costs:	Proposed
Description	FY 2008
4A Linkage	71.2
Page Charges	1.0
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$72.2

Commodities Costs:	Proposed
Description	FY 2008
Commodities Total	$0.0

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: NOAA - NMFS Auke Bay Lab

FORM 3A
Contract & Commodoties
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2008
			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	Inventory
Description	of Units	Agency

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: NOAA - NMFS Auke Bay Lab

FORM 3A
Equipment
Detail

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Budget Category:	Authorized FY 2006	Proposed FY 2007	Proposed FY 2008	TOTAL Proposed
Personnel		$164.0	$20.5	$184.5
Travel		$42.7	$2.8	$45.5
Contractual		$655.1	$7.2	$662.3
Commodities		$10.0	$2.0	$12.0
Equipment		$4.8	$0.0	$4.8
Subtotal	$0.0	$876.6	$32.5	$909.1
Indirect		$348.2	$38.7	$386.9
Project Total	$0.0	$1,224.8	$71.2	$1,296.0
Full-time Equivalents (FTE)		2.1	0.2	
	Dollar amounts are shown in thousands of dollars.			
Other Resources				

Comments:

FY07 - FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Contractor: RPI

FORM 4B
Non-Trustee
Summary

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2007
	J. Michel	Principal Investigator	2.7	11.9		32.1
	M. Hayes	Coastal Geomorphologist & FPC	2.3	11.9		27.4
	Z. Nixon	GIS Analyst	7.1	4.7		33.4
	T. Freeman	Field Party Chief	4.9	6.0		29.4
	C. Lord	Field Assistant	2.2	4.5		9.9
	H. Hinkeldey	Field Assistant	2.2	4.5		9.9
	K. Beckham	Field Assistant	2.2	3.0		6.6
	J. Moore	Contracts Manager	1.7	7.7		13.1
	J. Holmes	Graphics	0.3	6.1		1.8
	W. Early	Word Processing	0.1	3.6		0.4
						0.0
						0.0
		Subtotal	25.7	63.9	0.0	
					Personnel Total	$164.0

Travel Costs:			Ticket	Round	Total	Daily	Proposed
	Description		Price	Trips	Days	Per Diem	FY 2007
	Airfare	Fairbanks-Anc	0.5	2			1.0
	Airfare	Cola S.C. - Ak	1.8	10			18.0
	Per diem	Anchorage/Various			92	0.2	18.4
	Ground Transportation - 675 miles @ $.445/mile						0.3
	Ground Transportation to and from field - 100 @ $50/ea						5.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
						Travel Total	$42.7

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Contractor: RPI

FORM 4B
Personnel & Travel
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Contractual Costs:	Proposed
Description	FY 2007
J. Pella - Statistician - 77.50 days @ $600/day	46.5
Dr D. Mann - Field Party Chief for GOA - 99 Days @ $536.54/day	53.1
Field Assistant for GOA - 70 days @ $400/day	28.0
Field Technicians for GOA (4)- 220 days @ $200/day	44.0
Field Technicians for PWS (6)- 426 days @ $200/day	85.2
Vessel Charter - PWS - 122 days @ $1,750/day	213.5
Vessel Charter - PWS - 48 days @ $3,750/day	180.0
Air Charter - 8 trips to field @ $600/trip	4.8
Contractual Total	$655.1

Commodities Costs:	Proposed
Description	FY 2007
Field Supplies - shovels, picks, misc. field gear	2.3
Software, computer supplies, camera supplies	2.2
Printing/Reproduction - Reports - all tasks	4.0
Mailing/Shipping/Misc	0.5
Outreach Costs	1.0
Commodities Total	$10.0

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Contractor: RPI

FORM 4B
Contract & Commodoties DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2007
Laser survey instruments	2	1.1	2.2
Laptop Computer	2	1.3	2.6
			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**		$4.8

Existing Equipment Usage:	Number	
Description	of Units	

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Contractor: RPI

FORM 4B
Equipment
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Personnel Costs:			Months	Monthly		Proposed
	Name	Position Description	Budgeted	Costs	Overtime	FY 2008
	J. Michel	Principal Investigator	0.6	11.9		7.1
	M. Hayes	Coastal Geomorphologist & FPC	0.5	11.9		6.0
	Z. Nixon	GIS Analyst	1.1	4.7		5.2
	J. Holmes	Graphics	0.3	6.1		1.8
	W. Early	Word Processing	0.1	3.6		0.4
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	2.6	38.2	0.0	
					Personnel Total	$20.5

Travel Costs:			Ticket	Round	Total	Daily	Proposed
	Description		Price	Trips	Days	Per Diem	FY 2008
							0.0
	Airfare	Cola S.C. - Ak	1.8	1			1.8
	Per diem	Anchorage/Various			5	0.2	1.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
						Travel Total	$2.8

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Contractor: RPI

FORM 4B
Personnel & Travel
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Contractual Costs:	Proposed
Description	FY 2008
J. Pella - Statistician - 7.50 days @ $600/day	4.5
Dr D. Mann - Field Party Chief for GOA - 5 Days @ $536.54/day	2.7
Contractual Total	$7.2

Commodities Costs:	Proposed
Description	FY 2008
Printing/Reproduction - Reports - all tasks	0.5
Mailing/Shipping/Misc	0.5
Outreach Costs	1.0
Commodities Total	$2.0

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Contractor: RPI

FORM 4B
Contract & Commodities DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Those purchases associated with replacement equipment should be indicated by placement of an R.

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2008
			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	
Description	of Units	

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Contractor: RPI

FORM 4B
Contract & Commodities DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET

October 1, 2006 - September 30, 2007

Budget Category:	Authorized FY 2006	Proposed FY 2007	Authorized FY 2008	TOTAL Proposed
Personnel		$22.9	$10.6	$33.5
Travel		$1.5	$0.0	$1.5
Contractual		$0.0	$1.0	$1.0
Commodities		$2.0	$0.0	$2.0
Equipment		$2.4	$0.0	$2.4
Subtotal	$0.0	$28.8	$11.6	$40.4
General Administration		$2.6	$1.0	$3.6
Project Total	$0.0	$31.4	$12.6	$44.0
Full-time Equivalents (FTE)		0.3	0.1	
	Dollar amounts are shown in thousands of dollars.			
Other Resources				

Comments:

FY07 - FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: DOI - USGS

FORM 3B
TRUSTEE
AGENCY
SUMMARY

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2007
						0.0
Gail V. Irvine	Research Ecologist	GS 13/5	1.0	9.9	1.0	10.9
	Biologist	GS9/1	2.6	4.6		12.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		3.6	14.5	1.0	
					Personnel Total	$22.9

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2007
					0.0
Anchorage to Homer, RT	0.3	1	1	0.2	0.5
Kodiak to Anchorage, RT	0.6	1	2	0.2	1.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$1.5

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: DOI - USGS

FORM 3B
Personnel & Travel
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Contractual Costs:	Proposed
Description	FY 2007
4A Linkage	0.0
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$0.0

Commodities Costs:	Proposed
Description	FY 2007
Camera/computer supplies, misc.	1.0
Misc. field supplies	1.0
Commodities Total	$2.0

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: DOI - USGS

FORM 3B
Contract & Commodities DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Those purchases associated with replacement equipment should be indicated by placement of an R.

New Equipment Purchases: Description	Number of Units	Unit Price	Proposed FY 2007
			0.0
Laser level	1		1.1
Laptop computer	1		1.3
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
		New Equipment Total	$2.4

Existing Equipment Usage: Description	Number of Units	Inventory Agency

FY07

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: DOI - USGS

FORM 3B
Equipment
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2008
						0.0
Gail V. Irvine	Research Ecologist	GS 13/5	1.0	10.6		10.6
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		1.0	10.6	0.0	
					Personnel Total	$10.6

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2008
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: DOI - USGS

FORM 3B
Personnel & Travel
DETAIL

Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Contractual Costs:	Proposed
Description	FY 2008
4A Linkage	0.0
Page charges	1.0
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$1.0

Commodities Costs:	Proposed
Description	FY 2008
Commodities Total	$0.0

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: DOI - USGS

FORM 3B
Contract & Commodities
DETAIL

Prep Prepared: August 4, 2006
Format revisions: Aug.12, 2006

2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2008
			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	Inventory
Description	of Units	Agency

FY08

Project Number: 070801
Project Title: Assessment of the Areal Distribution and Amount of Lingering Oil in Prince William Sound and the Gulf of Alaska
Agency: DOI - USGS

FORM 3B
Equipment
DETAIL

Prep Prepared: August 4, 2006
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