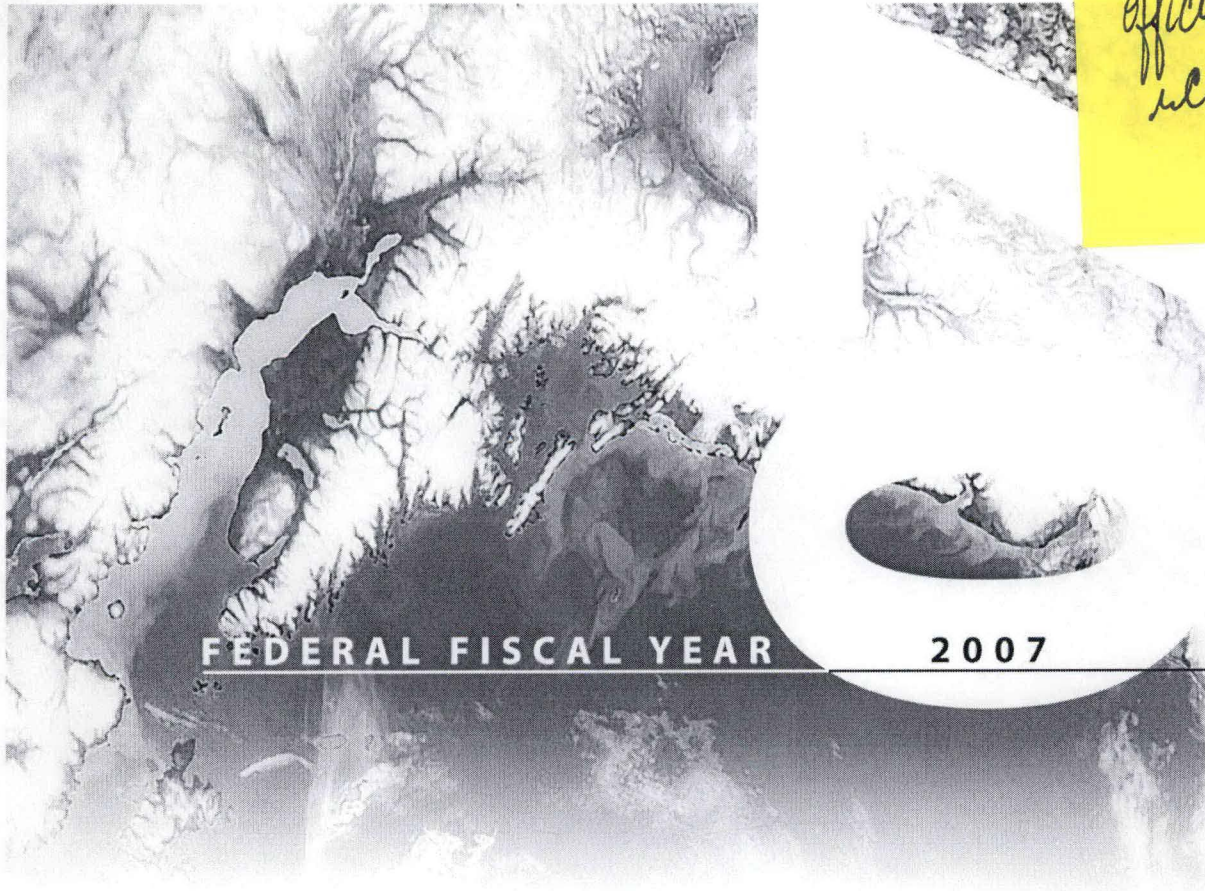


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EXXON VALDEZ OIL SPILL TRUSTEE COUNCIL



INVITATION FOR
PROPOSALS

Issued June 1, 2006



Exxon Valdez Oil Spill Trustee Council
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Anchorage, AK 99501-2340
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Exxon Valdez Oil Spill Trustee Council

Implementation of the *Exxon Valdez* Oil Spill Restoration Plan

**FY 2007
Invitation for Proposals**

Exxon Valdez Oil Spill Trustee Council
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June 1, 2006

***The FY07 Invitation was issued in an electronic format
on the Trustee Council's website at (URL)
This paper copy of the Invitation has been prepared to provide
documentation for the permanent files***

Statement of Non-Discrimination

The Trustee Council conducts all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood or disability. The Council administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975 and Title IX of the Education Amendments of 1972. If you believe you have been discriminated against in any program, activity or facility, or if you desire further information, please write to EVOS Trustee Council, 441 West 5th Avenue, Suite 500, Anchorage, Alaska 99501-2340, or O E O U S Department of the Interior, Washington, D C 20240.

For information on alternative formats for this and other publications, contact the department ADA coordinator at (voice) 907-465-4120 or (telecommunication device for the deaf) 1-800-478-3648.

Eligibility Criteria

Individuals, private industry, government agencies and other interested parties, regardless of nationality or institutional affiliation, are entitled to submit a proposal in response to this Invitation. All proposals will be evaluated based on the same criteria regardless of the source of the proposal.

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I. Schedule

The schedule for the receipt, review and approval of FY07 proposals is shown below.

Schedule and Milestones in 2006 for the FY07 Invitation

Jun 01	Invitation for Proposals issued
Aug 04.....	FY07 Proposals Due
Sept 1	Peer review complete
Sept 18	Draft Work Plan released; 30-day public comment period begins
Nov 1.....	Trustee Council meeting to approve successful projects
Nov 3.....	Contacts for successful projects notified

Meetings will be announced on the *Exxon Valdez* Oil Spill Trustee Council office website, www.evostc.state.ak.us.

II. Background and Purpose

In 1989, the *T/V Exxon Valdez* spilled 11 million gallons of crude oil into Prince William Sound (PWS). In 1991, the U.S. District Court approved a civil settlement that required Exxon to pay the United States and the State of Alaska \$900 million to restore the resources injured by the spill and the reduced or lost services, or human uses, the resources provide. A **Trustee Council** (Council) of three federal and three state members administers the restoration fund to restore the resources and services injured by the spill.

A **Restoration Plan** was adopted by the Council in 1994 that provides long-term guidance for restoring the resources and services injured by the oil spill. It contains policies for making restoration decisions and describes how restoration activities will be implemented. An update of the **Injured Resources and Services list** occurred in 2002.

The Council sets restoration priorities and annually determines what projects will be funded. Restoration projects are solicited through this Invitation for Proposals (Invitation). The Invitation is open to individuals, private industry, government agencies and other interested parties interested in submitting proposals for restoration work identified in the Invitation.

Proposal formats are comparable with previous years to provide consistency, and the Council encourages individuals and entities possessing expertise in specific species and *Exxon Valdez* Oil Spill (EVOS) research to solicit funding.

A. Funding, Duration and Scope

Funding The Council established an Investment Fund and adopted an endowment approach for management of the fund. This approach establishes annual spending limits thus ensuring the fund's value over time. Yearly spending includes the annual

work plan, continuing multi-year projects and administrative costs, including the science and data management, public information and project management. Under the FY07 Invitation, the Council is not placing a direct cap on the amount of money available for projects. However, projects must reflect reasonable and prudent cost analysis, and budgets should be precise and accurate. Cost effectiveness will be an important consideration for the Council as the members deliberate over project funding.

Duration Under the Council's **Interim Guidance Document** (IGD), the Council will consider funding single year projects. However, the Council understands that single year funding may hinder success of projects that require multiple years to complete. Therefore, applicants should include project and budget information that reflect the true time commitment necessary to complete their work. The Council will consider funding multi-year projects in their deliberations, but reassess funding priorities on an annual basis. Regardless of project length, all applicants must achieve an outcome and product within the requested award period, including data analysis and submission of quarterly reports, a draft final report and a peer-reviewed, final report of research results.

Scope For the categories outlined within this Invitation, the Council is seeking completed proposals using the instructions provided in **Section VII, Instructions for Submitting a Proposal**. *However, the Council will consider all restoration ideas.* If you have a restoration suggestion that does not fall specifically within one of the Invitation categories, or if you are unable to implement the idea yourself, please provide as much project information as possible to the Council, so they can determine the best way to implement the work, if warranted. If you do not wish to submit a complete proposal package but would like to present your ideas to the Council, please use the **Project Summary** page provided in **Section VII** as a guide or format for your submission.

B Projects Continuing from Prior Fiscal Years

The projects below currently receive funding for FY07 from previous multi-year awards

- | | |
|--------|---|
| 050742 | Monitoring of Killer Whales in PWS/Kenai Fjords in 2005-2007 |
| 050743 | Connecting Coastwalk Linking Shoreline Mapping with
Community-based Monitoring |
| 050749 | Harbor Seal Monitoring in Southern Kenai Peninsula Fjords |
| 050763 | Long-term Monitoring of Anthropogenic Hydrocarbons in EVOS
Region |
| 050765 | Management Applications Improving Preseason Forecasts of Kenai
River sockeye Salmon Runs |
| 050769 | Temporal Stability of Fatty Acids used to Discriminate Pacific
Herring in Alaska |

Principal investigators (PIs) already receiving funding from the Council who have already been authorized to continue their projects in the fiscal year of this Invitation need not submit a proposal package To be considered for an amendment or an extension, an annual report must be current and available at the EVOS Council office. Amendments or extensions to existing proposals must be submitted to the Science Director, and include a reference to their previously funded project. All amendments will receive full review by the Science Director and the Executive Director. Recommendations for additional funding will be made to the Council for a final decision.

III Introduction to the FY07 Invitation for Proposals

In 2006, the Council recognized that a tremendous amount of work had been accomplished over 15 years of research, monitoring and specific activities directed at addressing the restoration and rehabilitation goals of the 1994 Restoration Plan. However, the Council determined that results of previous efforts needed synthesis in order to better understand the effects of lingering oil and to evaluate the status of injured resources and services. They decided to realign priorities and restorative activities, placing focus on critical work required to reach closure in areas of restoration related to lingering oil and injured resources. The Council's priorities are outlined in the IGD.

Research opportunities for 2006 were directed towards synthesis projects relevant to the status of unrecovered injured resources and services, as well as towards understanding why some resources had not recovered, were still recovering or whose recovery status was unknown. The outcome of these prioritized synthesis studies and a finalized 2006 update of the Injured Resources and Services list will provide the Council with comprehensive information that they can use to fully meet the goals outlined in the 1994 Restoration Plan.

Many of the synthesis projects from 2006 are ongoing, however, pending results do not preclude the release of the FY07 Invitation. This year, proposals are being sought in the following categories:

- 1) Lingering Oil Distribution, Processes and Remediation
- 2) Injured Resources and Services Evaluation and Restoration

Specific requests under each category are outlined below and are based upon previous Council-sponsored research, as well as on Integral Consulting's draft **Assessment of Lingering Oil and Resource Injuries from the Exxon Valdez Oil Spill** and recommendations of the Lingering Oil Committee. Information on the status of Council funded studies is available on the EVOS Council website as it becomes available, or you can contact the Council office directly for more information at (907)278-8012. The Council does not wish to duplicate efforts and encourages the use of existing materials and collaboration with other ongoing efforts. Proposals should explicitly state how the project could lead to the *restoration* of injured resources.

IV Project Invitation by Category

A Lingering Oil Distribution, Processes and Remediation

Sixteen years after the spill, lingering oil continues to persist in intertidal zones of the shorelines impacted by EVOS. **Sediments** are currently classified as “**recovering**” due to the presence of diminishing but persistent oil residues. The presence of surface and subsurface oil continues to compromise wilderness areas and recreational activities, expose and potentially harm living organisms, and offend visitors and residents, especially those who engage in subsistence activities along still-oiled shorelines.

Not all oiled shorelines have been surveyed to establish the complete extent and degree of remaining oil. Sediments containing lingering oil are generally located in the intertidal portion of the shoreline which typically consists of exposed and sheltered rocky shores composed of bedrock, very large boulders (>50 cm diameter), boulder-cobble, or wave-cut platform, and coarse-textured beaches and exposed tidal flats comprising gravel, sand, and mixed gravel/sand.

The current **restoration recovery objective** will be met when there are no significant residues of *Exxon Valdez* oil on shorelines (both intertidal and subtidal) in the oil spill area. Declining oil residues and diminishing toxicity are indications that recovery is underway.

The **restoration strategy** for sediment is to monitor concentrations of hydrocarbons in sediment and measure indices of petroleum exposure in living resources. Further removal or reduction of residual oil should occur if treatment is cost-effective and less harmful than leaving the oil in place.

Distribution

Since 1989, no systematic long-term effort has been in place to consistently survey and document oil remaining on EVOS impacted shorelines. Isolated studies estimate that 11 – 35 acres of intertidal beaches have remnant lingering oil. However, one of the assumptions underlying the estimates is that nearly all of the remaining oil is located in beaches that were heavily or moderately oiled in 1989. Yet, because some nearshore organisms inhabiting less oiled areas of Western PWS are still being exposed to oil, it is possible that organisms are being exposed to sources of oil that have not been recently identified.

Studies conducted since 2001 have focused primarily on beaches that received large quantities of oil in 1989. All EVOS impacted shorelines should be reevaluated in order to ascertain the distribution and remaining amounts of lingering oil.

The Council seeks proposals that map distribution and assess patterns of lingering oil remaining in PWS. 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. Proposals could seek to relate oil distribution to migratory patterns of injured resources, or develop models which relate distribution to accessibility and potential bioavailability. The Council requests mapping incorporate geospatial technologies that will allow for web-based visualization of areas with lingering oil.

Processes

Questions remain about the geomorphology and geochemistry of the beaches on which lingering oil deposits are found. The physical and chemical processes in beaches with remaining oil need to be defined, as these processes will determine the potential success of any further attempts at remediation. In combination with the lingering oil distribution information, risk assessments can be conducted for resources inhabiting EVOS oiled shorelines. The dispersion of oil in these beaches relative to local fauna will also determine how accessible the oil is to organisms and help define exposure pathways. Therefore, it is important to gain better understanding of the fine-scale processes occurring in the beaches that still harbor significant quantities of oil.

The Council seeks proposals to investigate the physical and chemical processes that influence the lingering oil remaining in PWS. The Council encourages proposals that identify exposure pathways that pose a risk to biological resources and remediation endpoints needed to protect these resources.

Remediation

The Council is interested in current technologies that may be used for in-place treatment of lingering oil and associated habitat restoration. In 2005, the Council funded an Evaluation of Oil Remediation Technologies for Lingering Oil from the Exxon Valdez Oil Spill in Prince William Sound, Alaska. In their final report, Michel et al. (2006) determined that two remediation strategies—natural attenuation and bioremediation—were feasible alternatives for removing lingering oil. However, this report was the result of a scoping effort to determine if any viable remediation methods were possible, not an application of the suggested remedies.

The Council is interested in proposals that determine if remediation for specific, oiled shoreline segments would protect or restore injured resources or human services. They also seek proposals that will remove, reduce, or manage lingering oil in compliance with the State laws governing the characterization, removal, cleanup, and closure of oil contaminated soils (18 AAC 75), and water quality (18 AAC 70). Proposals for remediation should be based on the extent and degree of shoreline oiling, and the risk of exposure to a resource. Projects should include information such as exposure pathways, cleanup endpoints, cost benefit, and ultimately protection of injured resources and services.

B Injured Resources and Services Evaluation and Restoration

As of 2002, 18 resources and human services were classified as not recovering or recovering (Table 1)

Table 1 Current Status of Injured Resources and Services¹

Resource	Recovered	Recovering	Not Recovered	Recovery Unknown
Archaeological Resources	X			
Bald Eagles	X			
Black Oystercatchers	X			
Common Murres	X			
Pink salmon	X			
River Otters	X			
Sockeye Salmon	X			
Clams		X		
Commercial Fishing		X		
Designated Wilderness		X		
Intertidal Communities		X		
Killer Whales		X		
Marbled Murrelets		X		
Mussels		X		
Passive Use		X		
Recreation and Tourism		X		
Sea otters		X		
Sediments		X		
Subsistence		X		
Harbor Seals			X	
Harlequin Ducks			X	
Pigeon Guillemot			X	
Pacific Herring			X	
Common Loon			X	
Cormorants (3 species)			X	
Dolly Varden				X
Kittlitz's Murrelet				X
Rockfish				X
Subtidal Communities				X
Cutthroat Trout				X

In general, the Council seeks proposals that measure the exposure to and effects of recovering or not recovered resources to lingering oil. Additionally, the Council is interested in the recovery process of resources that may not be currently exposed to lingering oil but are still not recovered. Finally, the

¹ From the 2002 Update on Injured Resources and Services. In 2005, the Council funded Integral Consulting to provide a comprehensive independent evaluation of the status of injured resources and service. The results from this project are pending, but using the final report as guidance, the Council will provide an updated list of injured resources and services in late 2006.

Council is interested in funding work that directly addresses restoration of human services which are still not considered recovered

Designated Wilderness Areas

Wilderness areas are classified as “**recovering**” due to the presence of diminishing but persistent lingering oil. Lingering oil in the intertidal shoreline is the portion of wilderness areas that continues to be of concern.

The **recovery objective** for wilderness areas states that oil should no longer be encountered in these areas, and the public should perceive them to be recovered from the spill.

The Council seeks proposals that map the location of lingering oil remaining in wilderness areas impacted by Exxon Valdez oil and removes, reduces, or manages lingering oil in compliance with the State of Alaska’s regulations for the characterization, removal, cleanup, and closure of oil contaminated soils (18 AAC 75)

Harlequin Ducks

Harlequin ducks were **classified as “not recovering”** in the 2002 assessment of resource recovery status.

The **recovery objective** for harlequin ducks is a return of breeding- and nonbreeding-season demographics to prespill levels. Additionally, biochemical indicators of hydrocarbon exposure in harlequins in oiled areas of PWS should be similar to those in harlequins in unoiled areas.

Harlequin ducks may still be exposed to and affected by oil in certain areas of PWS. However, several factors make it difficult to assess the true impact of continuing oil exposure to harlequins. For example, population densities in oiled and unoiled areas of the Sound were similar in 2004, but the proportion of females to males remains lower in oiled areas. Moreover, population trends in the western portion of the sound are not increasing, and elevated biochemical responses (CYP 1A induction) indicative of oil exposure continued in birds wintering in oiled areas as late as March 2005.

To rectify these discrepancies and formulate an appropriate restoration strategy for harlequin ducks, it is necessary to have a thorough understanding of both the sources and distribution of lingering oil and the foraging behavior of harlequin ducks that facilitates their continuous exposure to oil. Evidence suggests that over time, exposure of harlequin ducks to Exxon Valdez oil has led to individual losses and suppression of population recovery. However, despite the vast amount of data collected through Council-funded studies, a synthesis of these data has not culminated in a model that can both quantitatively evaluate acute and chronic population-level effects of lingering oil on harlequin duck populations and identify

factors (including oil) that could be constraining population recovery of harlequin ducks today

The Council seeks projects that synthesize existing data to characterize the condition and natural recovery of this resource. For example, the Council would be interested in a population model that could make quantitative/predictive conclusions about long-term population demographics and the influence of *Exxon Valdez* oil on harlequin ducks. The Council also seeks proposals for harlequin ducks that incorporate annual population surveys and the measurement of other stressors (e.g., climatic shift, predator-prey relationships), foraging behavior and/or other parameters that may be affecting harlequin duck recovery.

Intertidal Communities

The intertidal community in PWS was classified as “recovering” in the 2002 assessment of resource recovery status.

The **recovery objective** established by the Council seeks to reestablish important species (such as *Fucus*) at sheltered rocky sites. After taking into account geographic differences, community composition and organism abundance on oiled and unoled shorelines should no longer be apparent. Additionally, the intertidal and nearshore habitats should provide adequate, uncontaminated food supplies for top predators.

The intertidal zone was the recipient of 40 to 45% of the 11 million gallons of *Exxon Valdez* oil released during the spill. Habitats within this area included a variety of substrates harboring multiple types of infaunal species. Although some of these areas were not consistently monitored over the 17 years since the spill, evidence suggests that some parts of the intertidal benthic community may still be experiencing effects of residual oil exposure. The Council funded a 2004 study, **Ecological Effects to Benthic Infauna from Lingering Oil 15 Years after the Exxon Valdez Oil Spill**, to examine the effects of lingering oil on benthic communities in nearshore environments. Specific toxicity tests suggest that some species of invertebrates in and around remaining oil deposits could still be exposed to toxic concentrations of oil. However, ecological implications were difficult to derive from the study due to confounding natural factors.

In order to determine if lingering oil is still impacting intertidal communities, the Council seeks proposals that include an ecological risk assessment of the invertebrate infaunal community. Projects should aid in the Council’s determination of future restoration strategies, including monitoring or physical removal of the oil. Additionally, these studies should evaluate the exposure and effects of oil on deep-burrowing invertebrates, because much of the unweathered, more toxic lingering oil remains below the low water line.

Pacific Herring

The Trustee Council classified Pacific herring in 2002 as a “**not-recovered**” resource based on population trends that became evident 4 years after the spill

The **recovery objective** for Pacific herring in PWS identifies the population as recovered when the next highly successful year class is recruited into the population and when other indicators of population health are within normal bounds in PWS

Herring are an important component of the Sound ecosystem, both ecologically and commercially. Herring were initially impacted by the oil spill, and the Council has continued to classify them as a non-recovering injured resource. Pacific herring are an essential part of the marine food web in the Sound and provide food for birds, marine mammals and invertebrates. Moreover, herring have been fished commercially for food, bait, sac-roe and spawn-on-kelp. The fishery in the Sound collapsed in 1993, four years after the spill, and since then a consistent fishery has not been sustainable. Because herring are a forage fish for many other species, it is speculated that the decline of herring has also had deleterious effects on other animals that depend on them for food.

The Council appreciates the dire situation of PWS herring and the ecological and human impact caused by their decline. Therefore, the Council has committed to develop a long-term Herring Restoration Plan and implement enhancement activities with the ultimate goal of assisting herring recovery in the Sound. A restoration planning effort will begin in the summer of 2006. The planning process will include stakeholders, community members and scientists. The Restoration Plan will define critical decision pathways needed to make progress in herring recovery and provide a structure for evaluating and assessing decisions and actions as the recovery effort progresses.

In conjunction with the Restoration Plan, the Council seeks projects that will facilitate the development, implementation and advancement of herring restoration activities. Appendix A provides examples of the types of projects that will be considered by the Council under this category. (Note: Herring are not specifically mentioned again in this Invitation, as categories for herring proposals have been developed in Appendix A)

Seabirds

In 2002, seven seabird species were classified as “**recovery unknown**” or “**not recovered**”

- Pigeon guillemot
- Marbled murrelet
- Double-crested cormorant
- Pelagic cormorant
- Red-faced cormorant
- Common loon

- Kittlitz's murrelet

The **recovery objectives** stated in the 2002 recovery plan update calls for stable or increasing populations of seabirds in the spill areas

The Council seeks projects that conduct annual population surveys, and synthesize existing data to characterize the condition and natural recovery of seabird resources

Sea Otters

In 2002, the Trustee Council concluded that “[s]ea otter recovery is underway for much of the spill-affected area, with the exception of subpopulations at the most heavily oiled bays in western PWS. For this reason, sea otters are **classified as “recovering”**

The **recovery objective** for sea otters states that sea otter populations in oiled areas return to their pre-spill levels and distribution. Additionally, biochemical indicators of hydrocarbon exposure in otters in the oiled areas must be similar to those of otters in unoiled areas.

In 2004, the total number of sea otter found throughout PWS was approximately 10,000, populations appear relatively stable. In oiled areas of western PWS there has been significant increases in sea otter abundance, indicating progress toward recovery, although patterns of mortality remain different compared to pre-spill. Further, subpopulations in and around Knight Island remain at numbers less than half of their 1989 abundance and continue to decline. Full recovery of this subpopulation may be constrained due to demographic lag, or it may continue to suffer from residual oil effects, continuous oil exposure or other factors such as hunting or predation.

The Council supports continued monitoring of sea otter populations and seeks proposals that conduct annual population surveys and synthesize existing data to characterize the condition and natural recovery of the western population. The Council also seeks proposals that further the understanding of factors affecting western PWS and particularly the northern Knight Island population of sea otters.

Other Injured Resources

The Council recognizes that several resources remain on the Injured Resources and Services list (Table 1), but have not been addressed by individual sub-category in this Invitation. Specific requests for several resources are included in the Monitoring/ Population Modeling section below (e.g., killer whales and harbor seals). The Council will consider proposals for all injured resources, but encourage the applicant to specifically address restoration applicability in their request.

C Human Services

Human Services injured by the spill are considered to be recovering until the resources on which they depend are fully recovered. Until now, the focus for projects requested under the Invitation process has been directed primarily at injured resources. However, the Council believes that the human population can not be separated from the ecosystem and the components that comprise human use. To fully address injured human services, it is necessary to first understand the current influence that lingering oil, previous contamination and lack of resource recovery has on resumption of activities, such as subsistence use and recreation.

Commercial fishing, passive use, recreation, tourism (including sport fishing) and subsistence are services that were reduced or lost because of the spill. The primary way that human services can recover in the spill area is by restoring the natural resources on which these services depend. Restoration strategies could include promoting recovery of the service through such means as increasing the availability, reliability or quality of the dependant resource. For some resources, this may take the form of increasing availability of the resource through improved resource management or providing replacement resources. Strategies for recreation and tourism and subsistence also include removing or reducing residual oil if treatment is cost effective and less harmful than leaving the oil in place.

The Council seeks proposals that directly or indirectly restore human services. As previously noted, human services are inextricably linked to natural resources. Projects which propose to evaluate or reestablish human services must be linked to injured resources and should be beneficial at the community scale. *Proposals in which only individuals personally benefit will not be considered.*

The following examples illustrate the types of projects the Council is interesting in pursuing. This is not an exhaustive list and proposals submitted within this category could include, but are not limited to these specific projects. They are presented here to generate ideas and as a guide for perspective applicants.

Human Services Project Examples

- 1) Clam populations injured by high pressure, hot water during the initial phase of spill response have not recovered in some areas, and this lag is expected to continue, such that clam populations may not see full recovery for many years. A project could propose to seed young clams on oiled-but-treated beaches to reestablish productive clam communities. This activity would directly address restoration of clams for subsistence use in areas that currently have small/no clam populations.
- 2) Food safety of some subsistence resources, such as bivalves (e.g., clams) is a concern in many communities within the spill zone. Many consumers continue to perceive clams and other shellfish as unsafe to eat. The threat of paralytic shellfish poisoning (PSP) discourages many people from harvesting these species and PSP is directly perceived to be associated

with *Exxon Valdez* oil in several communities. A proposal to address food safety and subsistence use could include outreach and education about PSP in communities at risk. Moreover, testing of clams and other shellfish would alleviate concern by reducing possible risk to the consumer.

- 3) Local involvement in resource stewardship and restoration of injured resources provides immediate benefits to the community and the environment. Full recovery of resources and services in PWS can only occur when there is a commitment to sustainable management of natural resources in the future. Projects in which community involvement is an integral part of the program enhance human services by encouraging participation in and responsibility for restoration activities.

Commercial Fishing

Commercial fishing is classified as “**recovering**”

The **recovery objective** states that commercial fishing will have recovered when commercially important fish species have recovered, and the opportunities to catch these species are not lost or reduced because of the effects of the spill.

The Council seeks proposals for management options to reduce pre-mature harvest of depleted or declining species and allow stocks to return to allowable harvest levels. *Proposals should address management of fisheries as a whole, proposals that will personally benefit individuals will not be considered.*

Passive Use

Currently passive use of the spill area is considered to be “**recovering**”, but not recovered, because recovery of injured resources is still incomplete.

The **restoration objective** for passive use states that the public perception aesthetic and intrinsic values associated with the spill areas should no longer be diminished by the spill.

Passive uses are the services provided by natural resources to people who do not visit, contact, or otherwise use the resources. Examples of passive uses injured by EVOS include the appreciation of aesthetic natural areas and wilderness and the pleasure of knowing natural resources exist at a given level of quality. No data on passive use values or perception in the spill area exists prior to EVOS. However, the contingent valuation study estimated damages to passive use values from EVOS and provides a baseline for comparison to perceptions following the spill. The efficacy of efforts to inform the public about the status of natural resources following the spill and the effects this information had on public perception were not studied after EVOS.

The Council seeks projects that continue to communicate the progress being made toward recovery of resources and survey public perceptions regarding the return of natural values of the spill area

The success of efforts directed towards communicating to the public the results of restoration results remains unknown. It is possible that the continuing publicity on presence of lingering oil in intertidal sediments, the failure of the herring fishery, and continuing need for restoration projects will contribute to public perceptions that PWS resources continue to be injured.

Recreation and Tourism

Recreation and tourism are currently classified as “**recovering**” because related natural resources have not yet recovered, and recreational use of beaches containing lingering oil remained impaired. Among those species considered important to recreation and tourism but not recovered in 2002 were killer whales (AB pod), harbor seals, sea otters, harlequin ducks, and seabirds including common loons, cormorants, Kittlitz’s murrelets, marbled murrelets, and pigeon guillemots. Remaining oil in areas accessible to recreational users and tourists affect aesthetic perception, linking satisfactory recreation and tourism experiences to the restoration of perceptions of the spill area as wilderness.

The **recovery objective** for recreation states that this service will have recovered when the fish and wildlife resources on which they depend have recovered and recreational use of oiled beaches is no longer impaired.

Therefore, the Council seeks projects that survey effects of lingering oil on recreational uses

Recovery of recreation services also requires that recreational use of oiled beaches is no longer impaired. Some users are still aware of and displeased by lingering oil on beaches. Perceived impairment to beaches by lingering oil concerns the Council. By polling Alaska recreational users and tourists these perceptions, could be more directly quantified.

Subsistence Use

Subsistence use is currently listed as a “**recovering**” service contingent on the recovery of important subsistence species and confidence of subsistence users that the resources are safe to eat.

Restoration objectives for subsistence use include returning injured resources used for subsistence to prespill levels and restoring the user’s confidence in safety of subsistence foods.

Restoration strategies for subsistence use include restoring injured resources, removing residual oil, protecting subsistence from further degradation, and monitoring subsistence food safety

The presence of lingering oil on some beaches in the oil spill area has been well documented, and some studies indicate that the oil is persisting in the environment longer than anticipated, and remaining toxic much longer than expected. The impacts of lingering oil to subsistence food safety continue to limit the harvesting activities of subsistence users in the region. Confidence in the safety of eating intertidal resources remains low due to the presence of residual oil in traditional harvest areas.

The Council seeks projects that provide subsistence users with meaningful data and analysis regarding the impact of lingering oil to subsistence resources, and the safety of consuming traditional foods gathered in the oil spill area

It has been over a decade since the last study of subsistence food safety in the oil spill area. Additionally, little geospatial information exists showing the relationship between areas with lingering oil and areas used for subsistence or subsistence areas avoided due to perceived unsafe conditions. Information on subsistence use patterns, lingering oil locations, and subsistence food safety needs to be consolidated, and effectively communicated to subsistence users.

V Considerations Applicable to Project Proposals

The 1994 Restoration Plan includes restoration policies, appropriate actions, and goals, objectives, and strategies specific to each of the injured sediment resources, biological resources, and human services previously listed. All restoration project proposals must include methods and employ project designs consistent with the 1994 Restoration Plan. Proposals are encouraged to consider and include, if possible, the following elements in their proposals for injured resources and services:

A Population Monitoring/Modeling

In some instances, new research on specific resources may not aid in resolving questions regarding continuing injury. Nonetheless, long-term evaluation of injured species should occur to determine when populations in oiled and unoled areas can be declared recovered, or until it is determined that further remediation or enhancement activities are warranted.

Monitoring is also important for resources whose recovery status is currently difficult to assess. For example, recovery status for intertidal communities is challenging because monitoring in both oiled and unoled areas has not been conducted consistently in these areas since the spill. Thus, monitoring of some resources in this habitat type should continue at an intensity necessary to track changes over time and among areas. Given that

most of the restoration goals for injured resources require a measurable comparison, monitoring is consistent with the 1994 Restoration Plan

Many exogenous stressors influence population dynamics of injured resources, and to implement effective long-term restoration strategies it is necessary to understand factors currently constraining recovery of these species. Population models may provide insight on the demographics of species that may be experiencing continuing effects of oil or whose recovery may be constrained by stressors other than or in addition to lingering oil. Proposals for population models of injured species would be considered if they provide quantitative analysis of population demographics in relation to the EVOS oil spill and restoration and recovery of individuals, populations, communities or species.

B Integration

The Council will consider proposals for groups of interrelated injured resources or services. Proposals that group resources and services should include the rationale and benefits of grouping injured resources or services into a single integrated project. Integrated projects are encouraged to involve aspects of multiple categories. For example, multi-species data sets from common areas (e.g., Knight Island) could be integrated with studies conducted on physical processes of lingering oil. Combining studies could provide economies of scale for logistics, chemical analyses and data analyses.

C Data Management and Synthesis

The Council will consider proposals that facilitate recovery, utilization and/or enhancement of long-term data series within the oil spill affected areas. Information should assist the Council in identifying appropriate restoration projects and determining recovery for injured resources or service.

D Community Participation and Revitalization

The Council encourages proposals in any invited category that involve communities whose services have been impacted as a result of an injured resource. Authors of proposals are encouraged to engage local communities in the design of proposals and the conduct of projects. The Council is also interested in local community based proposals that would address community revitalization restoration objectives. Further information regarding community involvement is available in Section XI.

VI Instructions for Non-Trustee Council Proposals

If you represent a private organization, a non-profit group or a university from a state other than Alaska, you should submit your proposal through the Broad Agency Announcement (BAA) process, as well as to the Trustee Council. In most instances, requirements of state and federal law preclude Council funds from being awarded directly to such organizations. Rather, a competitive solicitation process is required. This solicitation can occur before the Council approves funding for a project through a BAA issued by the National Oceanic and Atmospheric Administration (NOAA). Using the BAA approach, if the Council approves funding for your project, you can begin contract negotiations with NOAA without the further competitive solicitation that is required if you do not apply through the BAA.

As part of this invitation, NOAA is issuing a BAA on behalf of the Council, and is requesting proposals for any of the topics identified in this invitation. To submit your proposal through the BAA process, submit an electronic copy, as well as one paper copy, of your proposal to NOAA at the address below by **5 00 p m Pacific Daylight (Seattle) time on Friday, August 4, 2006**. This is in addition to the copies of the proposal that must be submitted to the Council. Include the words "submitted under the BAA" as part of your project's title. Faxed proposals will not be accepted.

More information is contained in the Broad Agency Announcement itself (BAA# AB133F-06-RP-0166), available from NOAA.

- Ms. Sharon Kent
- NOAA, WASC, Acquisition Management Division, WC31
- 7600 Sand Point Way NE
- Seattle, WA 98115-6349
- Telephone (207) 526-6035
- Fax (207) 526-6025
- Sharon.S.Kent@noaa.gov

Proposals submitted to NOAA under the BAA will be evaluated by the Trustee Council at the same time as other proposals submitted to the Council.

VII Instructions for Submitting a Proposal

What to Submit

One paper copy and one electronic copy of the proposal package must be submitted. Proposals will not be accepted by fax. Submit proposals via e-mail or portable media (Windows platform) to

Kimberly Trust, Interim Science Director
Exxon Valdez Oil Spill Trustee Council
441 West 5th Avenue, Suite 500
Anchorage, AK 99501-2340
science_director@evostc.state.ak.us
907-278-8012 phone
1-800-478-7745 (within Alaska) / 1-800-283-7745 (outside Alaska)

E-versions of the narrative sections of the proposal must be composed using Microsoft Word 2002 (XP) or lower or WordPerfect 9 x or lower, with figures and tables embedded. E-versions of each budget must be composed in Microsoft Excel. Please submit Word or WordPerfect documents in one file and Excel documents in a separate file, labeling them as follows

- Surname of lead PI_FY07_Proposal (e.g., Smith_FY07_Proposal)
- Surname of lead PI_FY07_Budget (e.g., Smith_FY07_Budget)

Non-Trustee Agency organization proposals should be submitted to

Ms Sharon Kent
NOAA, WASC, Acquisition Management Division, WC31
7600 Sand Point Way NE
Seattle, WA 98115-6349
Tel (207) 526-6035 | Fax (207) 526-6025
[Sharon S Kent@noaa.gov](mailto:Sharon.S.Kent@noaa.gov)

Proposal Format Specifications

- paper-clipped (not stapled) but otherwise unbound and one-sided
- Times Roman, 12-point
- one-inch margins on all sides
- page numbers
- footer including proposal title and name of lead PI
- summary page must be a standalone page
- extraneous cover sheets (i.e., often included with applications from universities) are allowed, but must not be integrated into the proposal package

*Download the FY07 Invitation and Instructions at
<http://www.evostc.state.ak.us/Proposals/forms.htm>*

FY07 Invitation Proposal Application Materials

Submit the following materials

- Signature Form
- Proposal Summary Page
- Project Plan (including references and literature cited)
- Resumes
- Budget Justification
- Budget Forms
- Data Management and QA/QC Statement, including MetaLite metadata file (visit www.evostc.state.ak.us/Policies/data.htm for more information on MetaLite)

Signature Form

A signed form indicating willingness to abide by the Trustee Council's data and report requirements must be submitted with each proposal

Proposal Summary Page (one page maximum)

The summary page includes project title, project period, proposer(s) name, affiliation, email address for all principal investigators (PIs), study location, key words, a project abstract (a summary of the proposed work in 150 words or less), the amount of EVOS funding requested (*including nine percent general administration*), and the amount of non-EVOS funds also contributing to the proposal

Project Plan (15 pages maximum)

The project plan must completely describe the work to be performed, including a statement of the problem the proposal is designed to address, project objectives, procedural and statistical methods, description of study area, coordination with other efforts, schedule, responsiveness to key Trustee Council strategies, and expected publications, reports and conference participation **The project plan is limited to 15 consecutively numbered pages formatted as described** The page limit includes figures and tables. References and literature cited should be attached to the project plan, but do not fall within the 15-page limit. The project plan should include a footnote with the proposal title and lead PI's name.

Resumes (two pages maximum per PI)

The resumes of all PIs and other senior personnel involved in the proposal must be provided, and must include

- 1 A list of professional and academic credentials, mailing address, and other contact information, including e-mail addresses

- 2 A list of up to five of your most recent publications most closely related to the proposed project and up to five other significant publications Do not include additional lists of publications, lectures, etc
- 3 A list of all persons, including their organizational affiliations, in alphabetical order with whom you have collaborated on a project or publication within the last four years If there have been no collaborators, this should be indicated as well

Budget Justification (two pages maximum)

For each budget category (personnel, travel, contractual, commodities and equipment), list the total amount requested and explain the basis for the request in terms of specific project objectives and activities Funds from non-EVOS sources, including in-kind contributions, must also be described In addition, if you are employed by a government agency that has a legislative mandate for the type of work you propose to do, you must explain why the proposed costs are not being covered by your agency's budget If you are employed by a non-Trustee agency, you must include an explanation of how the indirect costs were calculated

Detailed Budget Form

Submit a budget form outlining expenditures estimated to be necessary for implementing the objectives described in your proposal This form will be reviewed in conjunction with the budget justification You may be asked to respond to budget review questions or to revise your budgets to address budgetary concerns

Data Management and Quality Assurance/Quality Control (QA/QC) Statement (three pages maximum)

Any project involving collecting or processing data, conducting surveys, taking environmental measurements and/or modeling must provide a statement describing the data management and quality assurance/control processes that will be used to ensure the integrity of the data Data types should be matched to project objectives The statement must present the information listed below and reference the specific page and paragraph number of the research plan containing the information If a particular item does not apply to the proposed research, please say so If you are employed by an entity that has published its QA/QC procedures, please cite where the information may be obtained in lieu of a statement

- 1 Describe the study design, including sample type(s) and location requirements, all statistical analyses that were or will be used to estimate the types and numbers of physical samples required or equivalent information for studies using survey and interview techniques Include a description of the metadata essential to interpretation of the results of your work (see item 3 below)

- 2 Discuss criteria for determining acceptable data quality in terms of the activities to be performed or hypotheses to be tested
- 3 Discuss the characteristics of the data that your project will produce
 - (a) Metadata about your project which meets the minimum requirements dictated by the Federal Geographic Data Committee (FGDC) must be provided. Freeware for creating minimally compliant FGDC metadata record can be downloaded from <http://edcintl1.cr.usgs.gov/metalite>. MetaLite requires 26 fields to be registered before an FGDC-compliant metadata record is created. You must submit a copy of the MetaLite file with your proposal. In addition to minimal FGDC metadata requirements, proposers must submit more extensive metadata descriptor requirements for project data which have a quantitative characteristic (see (b) below).
 - (b) Quantitative datasets can be grouped into three basic categories: physical measurements, species-specific measurements and taxonomic sampling. If your proposal would collect quantitative data, you must categorize, with justification, your data by one of the following types—physical measurements, species-specific measurements or taxonomic sampling—and then you should produce a list of fields associated with your quantitative dataset.
- 4 Define each algorithm to be used for converting signals from sensors to observations. Examples of algorithms of interest would be the conversion of pressure to depth and the conversion of integrated voltages to biomass at depth. When conversion algorithms are lengthy (i.e., computer programs) substitute a source location, such as an ftp site, for the full text. In the case of proprietary conversion algorithms, identify the proprietor and describe how the accuracy of conversion is verified under calibration (see item 7 below).
- 5 Describe the procedures for the handling and custody of samples, including sample collection, identification, preservation, transportation and storage.
- 6 Describe procedures you will use to calibrate and evaluate all analytical instrumentation, as well as each of the analysis methods you will use during the project.

- 7 Discuss your procedures for data reduction and reporting, including a description of all statistical methods with reference to any statistical software to be used to make inferences and conclusions. Discuss any computer models to be designed or used, and include associated verification and validation techniques.

VIII FY07 Invitation Narrative Forms for Proposals**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 _____

Printed Name of PI _____

Signature of PI _____

Date _____

Printed Name of co-PI _____

Signature of co-PI _____

Date _____

Printed Name of co-PI _____

Signature of co-PI _____

Date _____

* 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**
(to be filled in by proposer)

Project Title Maximum 80 characters

Project Period Federal fiscal year (Oct 1 - Sept 30) for which funding is requested

Proposer(s) Name, affiliation and contact information (include e-mail address) for each proposer

Study Location General area in which field work will be conducted, e g , Prince William Sound, Kodiak, Kenai Peninsula

Abstract A brief (150 words or less) summary of the project Include what question(s) the project will address, what products the project will produce, and where and when the work will be done The abstract may be edited for clarity, brevity, and readability by Trustee Council staff

Funding

EVOS Funding Requested FY07 \$ (must include 9%GA)

TOTAL

Non-EVOS Funds to be used FY07 \$

TOTAL

Date Date proposal prepared

(NOT TO EXCEED ONE PAGE)

Download the FY07 Invitation and Instructions at
<http://www.evostc.state.ak.us/Proposals/forms.htm>

PROJECT PLAN

A project plan must comprise the following sections in **15 pages or less**

- Need for the project
- Project design
- Schedule
- Responsiveness to key Trustee Council strategies
- Publications and Reports

Instructions and explanations for each section are detailed below. Please include information specific to your project under the appropriate headings.

NEED FOR THE PROJECT

Statement of Problem

Identify the problem the project is designed to address. Describe the background and history of the problem. Include a scientific literature review that covers the most significant previous work history related to the project.

Relevance to 1994 Restoration Plan Goals and Scientific Priorities

Discuss how the project will evaluate the hypotheses or questions posed in the Invitation. Describe the results you expect to achieve during the project, the benefits of success as they relate to the category under which the proposal was submitted, and the potential recipients of these benefits. Discuss the utility of the research proposed for addressing the objectives described in the invitation. Describe how this project addresses restoration of services or resources.

PROJECT DESIGN

Objectives

List the objectives of the proposed project, the hypotheses being tested if it is a research project, and briefly state why the intended project is important.

Procedural and Scientific Methods

For each objective listed in A above, identify the specific methods that will be used to meet the objective. In describing the methodologies for collection and analysis, identify measurements to be made and the anticipated precision and accuracy of each measurement and describe the sampling equipment in a manner that permits an assessment of the anticipated raw-data quality.

If applicable, discuss alternative methodologies considered and explain why the proposed methods were chosen. In addition, projects that will involve the lethal collection of birds

or mammals must comply with the **Policy on Collections**, which is available on the EVOSTC website

Data Analysis and Statistical Methods

Describe the process for analyzing data. Discuss the means by which the measurements to be taken could be compared with historical observations or with regions that are thought to have similar ecosystems. Describe the statistical power of the proposed sampling program for detecting a significant change in numbers. To the extent that the variation to be expected in the response variable(s) is known or can be approximated, proposals should demonstrate that the sample sizes and sampling times (for dynamic processes) are of sufficient power or robustness to adequately test the hypotheses. For environmental measurements, what is the measurement error associated with the devices and approaches to be used?

Description of Study Area

Where will the project be undertaken? Describe the study area, including if applicable decimal-coded latitude and longitude readings of sampling locations or the bounding coordinates of the sampling region (e.g., 60 8233, -147 1029, 60 4739, -147 7309 for the north, east, south and west bounding coordinates). The formula for converting from degree minute seconds to decimal degrees is: degrees + (minutes/60) + (seconds/3600) so $121^{\circ}8'6'' = 121 + (8/60) + (6/3600) = 121.135$

Coordination and Collaboration with Other Efforts

Indicate how your proposed project relates to, complements or includes collaborative efforts with other proposed or existing projects funded by the Trustee Council. Describe any coordination that has taken or will take place (with other Council funded projects, ongoing agency operations, activities funded by other marine research entities, etc.) and what form the coordination will take (shared field sites, research platforms, sample collection, data management, equipment purchases, etc.). If the proposed project requires or includes collaboration with other agencies, organizations or scientists to accomplish the work, such arrangements should be fully explained and the names of agency or organization representatives involved in the project should be provided. If your proposal is in conflict with another project, note this and explain why.

SCHEDULE**Project Milestones**

For each project objective, specify when critical project tasks will be completed. Reviewers will use this information along with annual project reports to assess whether PIs are meeting objectives and are eligible for continued funding. Please format your information as follows:

Objective 1 Develop sediment-core chronologies in lake-productivity indicators
To be met by September 2007

- Objective 2 Compare sediment data corresponding to the past few decades to salmon population statistics
To be met by December 2007
- Objective 3 Reconstruct time-series of lake productivity, input of marine-derived nutrients, and salmon escapement
To be met by April 2007

Measurable Project Tasks

Specify, by each quarter of each fiscal year, when critical project tasks will be completed. This information will be the basis for the quarterly project progress reports that are submitted to the Trustee Council Office. Please format your schedule as follows:

FY07, 1st quarter (October 1, 2006-December 31, 2006)

October Project funding approved by Trustee Council

FY07, 3rd quarter (April 1, 2007-June 30, 2007)

April 30 Core Upper Russian Lake

May 30 Core Delight Lake

FY07, 4th quarter (July 1, 2007-September 30, 2007)

September 1 Core Hidden Lake

FY07, 1st quarter (October 1, 2007-December 31, 2007)

December 15 Finish lab analyses of all three lakes

FY07, 2nd quarter (January 1, 2008-March 31, 2008)

January 23-27 Annual Marine Science Symposium

FY07, 3rd quarter (April 1, 2008-June 30, 2008)

April 15 Submit final report. This will consist of a draft manuscript for publication to the Trustee Council Office.

RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES**Community Involvement and Traditional Ecological Knowledge (TEK)**

Every successful proposal is required to develop a community involvement plan that specifies how relevant coastal communities, concerned commercial and sport fishers and subsistence harvesters, local science interests such as public schools and university operations, will be informed and engaged in the project. The degree to which the activities of each proposed project allow involvement with local communities and incorporation of local knowledge will vary, but some kind of interaction with communities is required. Reviewers will give additional consideration to proposals that demonstrate meaningful community involvement and/or make use of traditional ecological knowledge (TEK). Use this section to address the following questions, if

applicable how will affected communities be informed about the project and be given an opportunity to provide their input? How will research findings and other project information be communicated to local communities? To what extent will local hire be used for the acquisition of such things as vessels, technicians and equipment? To what extent will traditional and local knowledge be incorporated into the project? Do not simply provide a statement that a proposal is expected to benefit a community without demonstrating that one or more representatives of the community have been contacted prior to proposal submission and have agreed to work with the proposers in developing the community involvement components of the proposal. Community contacts should be identified in this section.

If you would like assistance in developing a community involvement or traditional knowledge component for your proposal, contact the Trustee Council Office. Please note that in December 1996 the Trustee Council adopted protocols for including traditional knowledge in EVOS projects. See *Protocols for Including Indigenous Knowledge in the EVOS Restoration Process* available at <http://www.evostc.ak.us/pdf/admin/protc.pdf>

Resource Management Applications

Reviewers will be given additional consideration for proposals that have resource management applications. The development of tools, technologies and information that can help resource managers and regulators improve management of marine resources and address problems that may arise from human activities are a critical part of this invitation. Use this section to describe how your proposal might result in knowledge or products that would contribute to meeting this goal. Do not simply provide a statement that a proposal is expected to have resource management applications without demonstrating that one or more representatives of a resource management agency have been contacted prior to proposal submission and have agreed to work with the proposers in developing the resource management components of the proposal. Resource management agency contacts should be identified in this section.

PUBLICATIONS AND REPORTS

If you are requesting funding for publication of project results in a peer-reviewed journal, provide the subject/title of each manuscript, the name of the peer-reviewed journal(s) to which you plan to submit it and when the manuscript will be submitted. The Trustee Council expects publication of project results in peer-reviewed journals as soon as scientifically appropriate and logistically possible. The Council has adopted a policy regarding an acknowledgment and disclaimer to be used in publishing results of projects it has supported. For more information, see the **Procedures for the Preparation and Distribution of Reports** on the EVOSTC website.

In addition to publications, annual reports are required on multi-year projects by September 1 of each fiscal year for which funding is received. In addition, PIs may be required to provide an oral briefing of their findings to the Trustee Council. PIs must revise all final reports to respond to peer review comments, if any, revision of annual

reports is not required. Publications discussed above may satisfy a portion of the report requirements. For more information, see the **Procedures for the Preparation and Distribution of Reports** on the EVOSTC website.

IX FY07 Invitation Budget Instructions for Proposals

Introduction

Budgets will be reviewed for consistency with proposal objectives and for adherence to the budget instructions that follow. Proposers may be asked to respond to budget review questions, or to revise their budgets to address budgetary concerns. General costs may be submitted until final project negotiations are complete. The scope of the proposal may be modified during negotiations to include more than a single resource or service if applicable.

Budget Instructions

A budget form detailing the amount of funding requested from the Trustee Council for each federal fiscal year must be submitted as part of the proposal package. The form is in addition to the budget justification that is also required as part of the proposal package.

There are two sets of budget forms, you will use only the set that applies to you. One is used for proposals submitted through Trustee agencies, a separate set is for those submitted through non-Trustee organizations.

Blank forms (Excel format) are available on the EVOSTC website at **www.evostc.state.ak.us/Proposals/Downloadables/FY07_Budget_Forms.xls**

For assistance completing budget forms, please contact the EVOSTC **Administrative Manager** via e-mail or telephone at (907) 278-8012.

Notes on Completing Budget Forms

- **Fiscal Year** The Council awards funds on the federal fiscal year (Oct 1-Sept 30). Your budget must address all fiscal years for which funds are requested.
- **Project Number** The EVOSTC office assigns numbers to proposals.
- **Rules for Numbers** Show costs in thousands of dollars (e.g., show \$86,423 as \$86.4). When the number "5" follows the digit to be rounded, round to the higher amount (e.g., round \$26,752 to \$26.8).
- **Indirect Costs** Indirect costs are costs incurred for common or joint purposes that cannot be specifically identified with a particular project. Examples of indirect costs are lease costs, copying, phones, faxes, internet access, equipment maintenance, vehicle leasing, training, payroll and

*Download the FY07 Invitation and Instructions at
<http://www.evostc.state.ak.us/Proposals/forms.htm>*

personnel functions, clerical support, administrative supervision, accounting, auditing and mail and messenger services. These items should be budgeted for separately only if they are incurred because of a specific project and documentation of the expense is maintained.

- **Trustee agencies (Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, Alaska Department of Natural Resources, National Oceanic and Atmospheric Administration, US Forest Service and US Department of the Interior)** should cover these costs through the Trustee Council's general administration (GA) formula. The GA rate is 9% of each project's total direct costs.
- **Non-Trustee organizations** should cover these costs through their indirect cost rate. These rates will be reviewed on a project-by-project basis. However, proposers affiliated with the University of Alaska must use the indirect rate agreed to by the University for Trustee Council-funded projects. The agreement provides for an indirect cost rate of 25 percent of total direct costs (TDC). TDC includes all direct costs except (1) equipment for which ownership resides with the University and (2) subcontract costs in excess of \$25,000. Regarding subcontracts, the indirect rate is 25 percent of the first \$25,000 of each subcontract, plus 5 percent of each subcontract's costs in excess of \$25,000 and less than \$250,000, plus 2 percent of each subcontract's costs in excess of \$250,000.
- **Direct Costs** Direct costs are costs specifically identified with a particular project. Examples of direct costs are compensation of employees for the time spent executing the project, acquisition of materials or equipment for purposes outlined in the research plan, project-specific travel and contractual services specified in the research plan. For most projects, the following direct costs should be included:
 - **NEPA (National Environmental Policy Act) Compliance** All projects funded by the Trustee Council must comply with NEPA. Due to their research nature, most projects receive a categorical exclusion (CE) from NEPA. However, for a few projects, an environmental assessment (EA) may be required. If a project will likely require an EA, include the costs for preparing it in the project budget.
 - **Workshop Attendance** All principal investigators are required to attend the annual Marine Science Symposium. Unless you reside in Anchorage, include funds in your budget for travel and per diem for the PI (and co-PI, if appropriate) to attend this workshop.

- **Community Involvement Activities** Include a minimum of one trip per fiscal year for the PI or his/her representative to exchange information with the local communities
- **Report Writing** For Synthesis Projects a draft final report is due April 1, 2007 and a final report is due July 1, 2007. In addition, PIs may be required to provide an oral briefing of their findings to the Trustee Council. Final reports are required upon project completion. Identify in the description field on the appropriate budget forms any funds that have been included for report writing and preparation. See the Procedures for the Preparation and Distribution of Reports on the EVOSTC website
- **Manuscript Preparation and Publication** The Trustee Council may contribute a maximum of \$1,000 in page costs per project and 1.5 months of personnel time per manuscript toward publication of study results in the peer reviewed literature. Specify in your research plan the subject/title of each manuscript, the name of the peer reviewed journal(s) to which you plan to submit it, and when the manuscript will be submitted

Budget Form Explanations

Download budget forms from

http://www.evostc.state.ak.us/Policies/Downloadables/FY07_Budget_Forms.xls

Trustee Agency Form
Multi-Trustee Agency Summary
Form 2A

Use this form if multiple Trustee agencies are cooperating on a project. If only one Trustee agency is involved, this form is not required.

How to Complete the Form

- 1 *Proposed Funding (FY07 TOTAL)* - No input required. All the information is linked to the individual agency forms.
- 2 *Proposed Trustee Agency Totals* - Total requested by each agency. These fields are not linked and the information must be entered manually.
- 3 *Project Identification Field* - Enter the project number (if known), title and lead agency.
- 4 *Date Prepared* - Enter the date this budget was prepared.

**Trustee Agency Form
Summary, page 1 of 4
Form 3A**

This form summarizes the proposed expenditures contained on the Trustee Agency Detail forms

How to Complete the Form

- 1 *Proposed Funding (FY07, TOTAL)* - No input required All the information is linked to the Detail forms
- 2 *Cost-share Funds* - Enter the amount of funds from other sources that the project leverages and any agency contribution
- 3 *Project Identification Field* - Enter the project number (if known), title and your agency
- 4 *Data Prepared* - Enter the date this budget was prepared

**Trustee Agency Form, page 2 of 4
Personnel & Travel Detail
Form 3B**

"Personnel" means compensation of employees, including benefits, for the time and effort devoted to the execution of the project "Travel" means the cost of transportation by public conveyance and per diem All travel must be budgeted at round-trip economy rates

How to Complete the Form

- 1 *Name* - Enter the first initial and last name of each person budgeted
- 2 *Position Description* - Enter the position title
- 3 *GS/Range/Step* - Enter the appropriate general schedule (GS) and step or range and step
- 4 *Months Budgeted* - Enter the number of months for each position
- 5 *Monthly Costs* - Enter the monthly sum of salary and benefits for each position
- 6 *Overtime* - Enter the estimated overtime cost for each position, if any
- 7 *Personnel Sum* - The form automatically calculates
(Months Budgeted x Monthly Costs) + Overtime
- 8 *Travel Description* - Include name of traveler, destination and trip purpose
- 9 *Ticket Price* - Enter the round trip economy-rate ticket price
- 10 *Round Trips* - Enter the number of round trips
- 11 *Total Days* - Enter the total number of days in travel status
- 12 *Daily Per Diem* - Enter the daily per diem rate
- 13 *Travel Sum* - The form automatically calculates
(Ticket Price x Round Trips) + (Total Days x Daily Per Diem)
- 14 *Project Identification Field* - Enter the project number, title and your agency

Trustee Agency Form, page 3 of 4
Contractual & Commodities Detail
Form 3B

“Contractual” covers such items as vessel charters, equipment rental or lease, professional services, communications and printing “Commodities” are expendable supplies with an estimated life of less than one year and a unit value of less than \$1,000

How to Complete the Form

- 1 *Contractual Description* - List the items or services to be purchased. If a significant portion of the project will be performed under contract, and the likely contractor is known, the Non-Trustee Organization forms are also required.
- 2 *Contractual Sum* - Enter the proposed contractual cost.
- 3 *Commodities Description* - List the items to be purchased.
- 4 *Commodities Sum* - Enter the proposed commodities cost.
- 5 *Project Identification Field* - Enter the project number, title and your agency.

Trustee Agency Form, page 4 of 4
Equipment Detail
Form 3B

“Equipment” means non-expendable items having an estimated life of more than one year and a unit value greater than \$1,000. Equipment previously purchased by the Trustee Council should be used to the maximum extent possible. Before requesting funds for new equipment, contact your Trustee Agency project manager to determine if suitable equipment is already available. Equipment items with an original per unit cost of \$5,000 or more belong to the acquiring Trustee agency on behalf of the Council. At the end of the project, the Council’s Executive Director shall determine if such equipment shall be used for another Council project or if the item shall remain with the acquiring agency. For more information, download the [Financial Procedures](#) from the EVOSTC website.

How to Complete the Form

- 1 *New Equipment Description* - List the equipment and how the cost estimate was obtained.
- 2 *Number of Units* - Enter the number of units to be purchased.
- 3 *Unit Price* - Enter the unit price.
- 4 *Equipment Sum* - The form automatically calculates Number of Units x Unit Price.
- 5 *Existing Equipment Description* - Describe existing equipment which will be used.
- 6 *Number of Units* - Enter the number of existing units which will be used.
- 7 *Inventory Agency* - Enter the agency which currently has the equipment on inventory.
- 8 *Project Identification Field* - Enter the project number, title and your agency.

Non-Trustee Organization Form, page 1 of 4

Summary Form 4A

This form summarizes the proposed expenditures contained on the Non-Trustee Organization Detail forms

How to Complete the Form

- 1 *Proposed Funding (FY07, TOTAL)* - No input required All the information is linked to the Detail forms
- 2 *Indirect* - Enter the proposed indirect project cost
- 3 *Trustee Agency GA* - No input required, the form automatically calculates Project Total x .09 (Each project is administered by one of the Trustee agencies, the approved administrative fee is 9% of total project cost)
- 4 *Cost-share Funds* - Enter the amount of funds from other sources that the project leverages and any organization contribution
- 5 *Project Identification Field* - Enter the title and your organization and proposer's (PI) name
- 6 *Date Prepared* - Enter the date this budget was prepared

Non-Trustee Organization Form, page 2 of 4

Personnel & Travel Detail Form 4B

"Personnel" means the compensation of employees, including benefits, for the time and effort devoted to the project and includes tuition for students "Travel" means the cost of transportation by public conveyance and per diem All travel must be budgeted at round-trip economy rates

How to Complete the Form

- 1 *Name* - Enter the first initial and last name of each person budgeted
- 2 *Position Description* - Enter the position title
- 3 *Months Budgeted* - Enter the number of months for each position
- 4 *Monthly Costs* - Enter the monthly sum of salary and benefits for each position
- 5 *Overtime* - Enter the estimated overtime cost for each position, if any
- 6 *Personnel Sum* - The form automatically calculates (Months Budgeted x Monthly Costs) + Overtime
- 7 *Travel Description* - Include name of traveler, destination and trip purpose
- 8 *Ticket Price* - Enter the round trip economy-rate ticket price
- 9 *Round Trips* - Enter the number of round trips
- 10 *Total Days* - Enter the total number of days in travel status
- 11 *Daily Per Diem* - Enter the daily per diem rate
- 12 *Travel Sum* - The form automatically calculates (Ticket Price x Round Trips) + (Total Days x Daily Per Diem)
- 13 *Project Identification Field* - Enter project number, title and your organization

Non-Trustee Organization Form, page 3 of 4
Contractual & Commodities Detail
Form 4B

“Contractual” covers such items as vessel charters, equipment rental or lease, professional services, communications and printing “Commodities” are expendable supplies with an estimated life of less than one year and a unit value of less than \$1,000

How to Complete the Form

- 1 *Contractual Description* - List the items or services to be purchased
- 2 *Contractual Sum* - Enter the proposed contractual cost
- 3 *Commodities Description* - List the items to be purchased
- 4 *Commodities Sum* - Enter the proposed commodities cost
- 5 *Project Identification Field* - Enter project number, title and your organization

Non-Trustee Organization Form, page 4 of 4
Equipment Detail
Form 4B

“Equipment” means non-expendable items having an estimated life of more than one year and a unit value greater than \$1,000 Equipment previously purchased by the Trustee Council should be used to the maximum extent possible Before requesting funds for new equipment, contact the project manager at your administering Trustee agency to determine if suitable equipment is already available All equipment purchased remains the property of the Trustee agency until the end of the project, at which time the agency may, under certain circumstances, transfer the equipment title to the contractor If the original per unit cost of the equipment was \$5,000 or more, the Council’s Executive Director has the authority to direct that the equipment be transferred to another Council-funded project, rather than remaining with the Trustee agency or being transferred to a contractor

How to Complete the Form

- 1 *New Equipment Description* - List the equipment and how the cost estimate was obtained
- 2 *Number of Units* - Enter the number of units to be purchased
- 3 *Unit Price* - Enter the unit price
- 4 *Equipment Sum* - No input necessary The form automatically calculates Number of Units x Unit Price
- 5 *Existing Equipment Description* - Describe existing equipment which will be used
- 6 *Number of Units* - Enter the number of existing units which will be used
- 7 *Project Identification Field* - Enter project number, title and your organization

X How Proposals are Reviewed

Policy and Legal Review

To be eligible for funding, proposals must be designed to analyze, evaluate, suggest restoration, replace, enhance or acquire the equivalent of natural resources injured as a result of the oil spill or the reduced or lost services provided by such resources. Trustee Council staff will review each proposal for completeness and for adherence to the requirements of this invitation before forwarding them on for technical and programmatic review.

Technical Review

Proposals will be evaluated on the following technical aspects that are essential to all projects:

- **Responsiveness to this Invitation (10%)** Evaluation of whether or not proposals respond to this invitation
- **Project Design/Conceptual Soundness (40%)** Evaluation of applicant's understanding of the problem, project's feasibility and the soundness of the technical approach/project design
- **Project Management (25%)** Evaluation of capabilities, experience and past performance of the proposer(s) and key personnel
- **Cost Effectiveness of the Proposal (15%)** The justification and allocation of the budget in terms of the work to be performed will be evaluated. Unreasonably high or low project costs will be considered.
- **Collaboration/Coordination Efforts (10%)** Because of the multitude of resources and services in Prince William Sound and the inter-relatedness of many of these resources and services, coordination/collaboration partnerships are highly encouraged.

Programmatic Review

Proposals and their technical reviews will be examined by appropriate review panels for both scientific rigor (criteria listed above) and programmatic suitability. The programmatic criteria emphasize the following:

- **Responsiveness of the proposal to the invitation (10%)**
- **Consistency with Restoration Plan (20%)** Evaluation of the extent to which the proposal is consistent with the 1994 Restoration Plan (20%)
- **Achievement of Restoration Objective (20%)** Evaluation of how well this proposal will achieve and/or contribute to the restoration goals identified for a given injured resource. Does the project fill an identified "gap"? The Council's restoration objectives and the current status of injury, are available at www.evostc.state.ak.us/pdf/inupdate02.pdf

- **Use of Local Knowledge (15%)** Degree to which the proposed activities have considered or are able to capitalize on or involve those with local knowledge or traditional ecological knowledge appropriate to the proposed activities
- **Applications (25%)** Degree to which proposed activities are likely to result in resource or environmental management applications
- **Project Management Experience and Qualifications of Personnel (10%)** Organization and management of the project, and the project's principal investigator(s) and other personnel in terms of related experience and qualifications

Budget Review

Trustee Council staff will examine each proposal's budget for consistency with its proposed objectives and for adherence to the budget instructions contained in this invitation. You may be asked to respond to budget review questions or to revise your budget to address budgetary concerns. General cost may be submitted until final negotiations. The scope of the proposal may be modified during negotiations to include more than a single resource or service if applicable.

Public Advisory Committee Review

Proposals will be reviewed by the Public Advisory Committee (PAC), a group representing a cross section of interests affected by the oil spill.

Public Comment and Funding Decision

The Trustee Council's Executive Director will develop a funding recommendation based on the reviews by the STAC and PAC. This recommendation will be circulated for public comment as the *FY07 Draft Work Plan*. The Council will then decide which proposals will be funded. Unanimous agreement of all six Council members is required to fund a proposal. **Please note** that the Trustee Council is not legally bound to abide by recommendations of peer reviewers, science advisors, the PAC or the Executive Director.

Public Comment and Funding Decision

The Trustee Council's Executive Director will develop a funding recommendation based on the reviews described above. The recommendation will be circulated for public comment as the *FY07 Draft Work Plan*. The Council will then decide which proposals will be funded. Unanimous agreement of all six Council members is required to fund a proposal. **Note** that the Trustee Council is not legally bound to abide by recommendations of peer reviewers, science advisors, PAC or the Executive Director.

XI Community Involvement Information

All proposals in all program areas are expected to declare the extent to which local communities are involved or have been contacted. All successful proposals will be required to develop a community involvement plan that puts the investigators in contact with the relevant communities and specifies how the community will receive the results of the project. Even if there are no obvious synergies to be derived from contacting the city, borough, tribal or other government entity or community council, it is prudent to let them know you may be working, staging or launching in the area. Proposals that have made appropriate community contacts may be rated higher by the STAC than those without.

Advice and other contact information may be obtained from Cherrí Womac, Community Involvement Coordinator for the Trustee Council, Cherrí_Womac@evostc.state.ak.us, or by telephone at 907-278-8012.

Community involvement contact information The following contact information is intended to be used by applicants to find initial contacts in the communities.

Akhiok Tribal Council

Mitch Simeonoff
President
PO Box 5072
Akiok, AK 99615
(907) 836-2313

Chenegra IRA Council

Larry Evanoff President
PO Box 8079
Chenegra Bay, AK 99574-
8079
(907) 573-5132

**Chignik Lake Village
Council**

Virginia Aleck President
PO Box 18
Chignik Lake, AK 99548
(907) 845-2212

**Chignik Bay Village
Council**

Debbie Carlson
P O Box 50
Chignik, AK
99564
(907) 749-2445

**Chignik Lagoon Village
Council**

Angela Gregorio
Administrator
P O Box 9
Chignik Lagoon, AK
99565
(907) 840-2281

City of Cordova

Scott Hahn
City Manager
PO Box 1210
Cordova, AK 99574
(907) 424-6200

City of Homer

Walt Wrede
City Manager
491 E Pioneer Ave
Homer, AK 99603
(907) 235-8121
clerk@xyz.net

City of Kodiak

Linda Freed
City Manager
710 Mill Bay Rd
Kodiak, AK 99615
(907) 486-8640
lfreed@city.kodiak.ak.us

City of Seldovia

John Frohrip
City Manager
PO Drawer B
Seldovia, AK 99663
(907) 234-7643

City of Seward

Richard Gifford
Assistant City Manager
PO Box 167
Seward, AK 99664
(907) 224-4005
rgifford@cityofseward.net

City of Soldotna

Thomas Boedeker
City Manager
177 N Birch St
Soldotna, AK 99669
(907) 262-9107
boedeker@ci.soldotna.ak.us

City of Valdez

David Dengel
City Manager
PO Box 307
Valdez, AK 99686
(907) 835-4313

ddengel@ci.valdez.ak.us

**City of Whittier/Port &
Harbor Commission**

Dean Rand
Representative
PO Box 608
Whittier, AK 99693
(907) 472-2337
dean@discoveryvoyages.com

**Karluk IRA Tribal
Council**

Alicia Reft
President
PO Box 22
Karluk, AK 99608
(907) 241-2218

Kodiak Island Borough

Pat Carlson
Manager
710 Mill Bay Rd
Kodiak, AK 99615
(907) 486-9363
mfo@kib.co.kodiak.ak.us

**Larsen Bay Tribal
Council**

Jack Wick
President
PO Box 35
Larsen Bay, AK 99624-
0035
(907) 847-2207

Nanwalek IRA Council

Emilie Swenning
First Chief
PO Box 8012
Nanwalek, AK 99603
(907) 281-2274

**Native Village of
Afognak**

Roger Malutin
PO Box 968
Kodiak, AK 99605
(907) 486-6357

Native Village of Eyak

Bruce Cam
Executive Director
PO Box 1388
Cordova, AK 99574-1388
(907) 424-7738
bruce@nveyak.org

**Native Village of Port
Lions**

Denise May
President
PO Box 69
Port Lions, AK 99550
(907) 454-2234

**Native Village of
Tatitlek**

Gary Kompkoff
President
PO Box 171
Tatitlek, AK 99677
(907) 325-2311

**Old Harbor Tribal
Council**

Al Cratty, Jr
PO Box 62
Old Harbor, AK 99643
(907) 286-2215

Ouzinkie Tribal Council

Daniel Ellenak
PO Box 130
Ouzinkie, AK 99644
(907) 680-2257

**Port Graham
Traditional Council**

Patrick Norman
Chief
PO Box 5510
Port Graham, AK 99603
(907) 284-2227

Qutekcak Native Tribe

Connie Pavloff
Administrator
P O Box 1467
Seward, AK 99664
(907) 224-3118

Seldovia Village Tribe

Crystal Collier Executive
Director
PO Drawer L
Seldovia, AK 99663
(907) 234-7898

Valdez Native Tribe

Charlie Hughey
Natural Resources
Manager
PO Box 1108
Valdez, AK 99686
(907) 835-4951
vntevos@cvinternet.net

**Woody Island Tribal
Council**

Andy Teuber, Jr
PO Box 9009
Kodiak, AK 99615
(907) 486-282

**Native Village of
Perryville**

Gerald Kosbruk, President
PO Box 89
Perryville, AK 99648
(907) 853-2203
nvofperry@starband.net

XII Appendix A

Categories and Examples of Herring Projects Being Solicited by the Trustee Council for the FY07 Invitation for Proposals

Project Categories For Herring Proposals

As a guide, the Council suggests that proposals for herring restoration activities apply to one or more of the categories listed below

- 1 Planning
- 2 Mapping and Geospatial Analysis
- 3 Modeling
- 4 Predation
- 5 Disease
- 6 Oceanographic Characteristics (e g , Zooplankton, Temperature)
- 7 Marking Studies
- 8 Intervention

Examples of Project Descriptions

The following project descriptions are examples of the types of information the Council is seeking regarding herring restoration. It is not, however, an exhaustive list, and the Council will consider ideas not explicitly mentioned below. However, the Council is specifically seeking the information that is outlined in the following examples, and encourages proposals be developed to address these projects

Planning

Synthesize National and International Efforts Currently Directed at Herring Restoration

Identify and evaluate national and international efforts related to herring (and similar species) enhancement, restoration and recovery. The product from this effort should be a report presented to the Trustee Council and the Herring Restoration planning team that outlines the types of herring enhancement and restoration work being done in other locales. It should include a discussion about the feasibility of conducting these activities in Alaska and a cost/benefit analysis where possible.

Mapping and Geospatial Analysis

Synthesis and Use of Available Herring Data Through Geospatial Analysis

A clear understanding of the spatial and temporal relationships of past herring spawn and other herring data is necessary to understand how restoration activities might affect current and future populations. This project would synthesize herring aerial survey data, habitat information and other herring-related data and produce a web-based product that would allow users access to maps and resource information via an interactive visual format (e g , using GIS).

Shorezone Mapping

Of the 5500 km of coastline in PWS, 1600 km have been shorezone mapped. Current mapping efforts have concentrated on the west side of PWS and these areas are not the most important regarding herring or oil remediation issues. Approximately 3900 km still need to be mapped, these remaining areas include places important for herring spawn, possible herring release locations and future oil remediation and tracking areas.

Modeling**Biological Model of Herring Life Stages Integration and Evaluation**

The continued decline of herring in PWS is probably linked to more than one life stage and is due to multiple causes. In order to understand these complex interactions, it is necessary to enhance the existing herring ecosystem model. In this project a biologically-focused, statistical model that includes multiple life stages will be created, and it will include information such as food resources, disease information, predation, climate change, and habitat. These variables will be related through functions such as mortality, growth, recruitment and energetics.

The resultant model can be used to simulate and evaluate any herring population enhancement efforts. For example, it will be able to simulate predator/prey interactions that may be restricting recruitment, or simulate and evaluate the effects of pollution and disease on the population. This tool will allow managers to see the impact of past, current and future effects of fishing, conservation efforts and population restoration efforts on the herring population.

Circulation and Larval Drift Models Update and Validation

The current circulation/larval drift model of Prince William Sound needs to be updated and completed. The general circulation model that can be used to predict larval drift will be validated by comparison of model predictions and actual ground-truthing of predicted trajectories. This model is important in understanding the movement patterns of various herring life stages throughout the Sound and will be instrumental in facilitating herring intervention activities.

Predation**Predation on Juvenile Herring in Prince William Sound**

Predation on herring has been cited as one of the possible causes for the lack of recovery in PWS, yet juvenile herring is an important food resource for other EVOS injured species, including marbled murrelets, pigeon guillemots, cormorants and loons. This project will provide information on the amount of juvenile herring being consumed by their chief predators which will be an important variable in any herring survival model.

Modeling Marine Mammal and Seabird Predation on Herring

Predation is likely contributing to the suppression of herring populations in PWS and marine mammals and seabirds are major predators on these fish. Any restoration effort must understand whether or not increased herring production will merely result in more predators rather than more herring. Fisheries management models currently use broad and

highly uncertain estimates of natural mortality. Predation is the major source of mortality, even if underlying causes are disease or starvation. Understanding the predation process is critical in improving management models such as the age-structured assessment model.

Disease

Disease Impact on Early Life-Stage Survival and Population Growth of Pacific Herring

Numerous potentially lethal pathogens are present in PWS herring but their impact on survival and reproductive success is unknown. Through experimental studies with herring of known disease history, the mortality associated with each pathogen can be determined. Management decisions require information relating to the production and survival of each year class of herring, so if disease(s) is responsible for significant mortality at any life-stage it will impact subsequent year-class size and limit population growth.

Role of Disease in Limiting Recruitment of Pacific Herring in Prince William Sound

Disease among adult Pacific herring has played a significant role in the decline of herring in PWS and failure of population recovery. It is necessary to study early life stages (ages 1-2) and combine this information with ongoing disease information collected as part of the adult epidemiology studies conducted as regular management by the Alaska Department of Fish and Game. Moreover, a 'reference' area, (where herring populations are stable) should also be established (e.g., Sitka) where similar information is collected for comparison with PWS stocks.

Oceanographic Characteristics

Oceanographic Monitoring

Any effort to restore or enhance herring production will require understanding of the factors affecting recruitment success. Oceanographic parameters, including, but not limited to temperature, salinity, and zooplankton production may influence herring recruitment and population dynamics. Comparisons of these constituents, for example among different bays will give insight into the relationship between herring survival and water circulation. Answers to these types of questions are necessary for many enhancement activities, such as egg transportation or larval dispersal.

Zooplankton Abundance and Herring Prey Study

Food may be a limiting factor for juvenile herring. To understand this relationship a project would need to describe the local/seasonal forage base for herring and its relationship to fish survival/abundance. It would be necessary to document any relative food/prey/predator changes that may have occurred over the past 20 years and relate those changes to herring abundances and recent shifts in zooplankton species and abundance. For enhancement activities, it would be necessary to identify herring rearing areas that are not food limited.

Marking Studies**Use of Otolith Analysis as a Marker for Population Studies**

Current research is being done on the unique chemical components of herring otoliths that can reveal the location of herring at the time of egg, larval and juvenile life stages. Artificial mass marking of herring otoliths may also be possible with the use of certain benign chemicals or the manipulation of water temperatures. Analysis of herring otoliths for trace elements has great potential for identifying natal and rearing habitat of larval and juvenile herring, and may prove to be a crucial tool for identifying environmental factors modulating recruitment. While promising, the reliability of this method needs to be quantitatively assessed so that future studies based on it may be interpreted with confidence.

After a validation study confirms the reliability of this technique, a pilot project on the success rate of mass marking PWS herring via the otolith will provide an important tool for tracking success of herring enhancement and allow for the development of performance measures for enhancement experimentation. Mass marking should allow further refined tracking of all PWS herring life stages necessary to determine any limiting factors for this species.

Intervention**Protect PWS Herring Eggs from Predation**

Individual adult herring spawn thousands of eggs nearshore on the natural bottom substrate, such as dock pilings, rocks, kelp, and sea grass beds. Protection from predation may be a simple and effective way to increase herring roe survival to the larval stage, and so greatly increase the relative abundance of juvenile and/or adult herring. A project should be developed that will test methods to protect herring spawn from predation and conduct research on the effectiveness of predator exclusion devices.

Pilot Projects for Testing Restoration and Re-Colonization Concepts and Techniques for PWS Herring

- a) Design, construct and operate a small specialized vessel (approximately 45x20) designed to provide the necessary environment for the hatching of herring eggs and rearing the resulting larvae to a size of approximately 30mm.
- b) Test moving eggs from an original spawning site to a site where a more suitable habitat that has been determined to provide enhanced juvenile rearing and survival will be tested.
- c) Monitor juveniles in the selected nursery areas as they advance from age 0 to age 1, the first overwinter phase. Data collection and insight into the age 0 fall physical condition of the herring and comparison with the following spring condition of the same herring cohort will provide data necessary to develop a condition index.

Development of Technology to Support Restoration and Protocols of Herring in Prince William Sound Use of *in vitro* Studies to Optimize and Validate Active Restoration Activities

- a) Conduct *in vitro* studies needed for refining and validating proposed restoration/enhancement activities
- b) Conduct preliminary investigations on the role of calcium receptors on immune system function under varying environmental conditions to investigate effects of salinity and temperature on immune activity

Experimental Nursery Bay

Develop the concept of a natural experimental bay. The establishment of an experimental bay in PWS will allow evaluation and validation of 1) herring ecosystem models, 2) the interplay and dynamics of fish condition and stress to predator/prey relations and disease, 3) intervention/enhancement efforts, 4) fill in research gaps in early life history critical to understanding the recruitment process.