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: **Monitoring, Tagging, Feeding Habits, and Restoration of Killer Whales in Prince William Sound/Kenai Fjords in FY 2007**

Printed Name of PI: Craig O. Matkin

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. 070742 Date Received: _____

FY07 INVITATION
PROPOSAL SUMMARY PAGE

Project Title: Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales in Prince William Sound/Kenai Fjords in 2007

Project Period: FY 2007

Proposer(s): Craig Matkin

Study Location: Prince William Sound/ Kenai Fjords

Abstract: The proposed project is an amendment to the previously funded project that addresses lingering effects of the *Exxon Valdez* oil spill by continuation of the monitoring of AB pod and the AT1 population killer whale populations in Prince William Sound. These groups of whales suffered serious losses at the time of the spill and have not recovered at projected rates. This proposal seeks to extend the scope of work to include an innovative satellite tagging program to examine habitat preference and to aid in a more extensive examination of feeding habits using observational and chemical techniques. Results will allow us to more closely examine the potential for restoration. The project will more clearly delineate the role of killer whales in the nearshore ecosystem and possible effects on the restoration recovery of harbor seals and sea otters. Community based initiatives such as Youth Area Watch and educational programs for tour boat operators educational programs will continue to be integrated into the work to help foster restoration improving public understanding and reducing harassment of the whales

FUNDING:

EVOS Funding Allocated for FY 07 in PJ 050742 = $24.K
EVOS Funding Additional Request for FY 07 in PJ 070742 = $99.4.K

TOTAL FY 07 ALLOCATON REQUEST = $123.4K

Non-EVOS Funds to be used: FY07 $60.K

Date: 23 July 2006

Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales in Prince William Sound/Kenai Fjords in 2007

(Submitted under the BAA)

I. NEED FOR THE PROJECT

A. Statement of Problem

The proposed project is an amendment to the previously funded project that addresses lingering effects of the *Exxon Valdez* oil spill by continuation of the monitoring of AB pod and the AT1 population killer whale populations in Prince William Sound. It seeks to extend the scope of work to include an innovative satellite tagging program that will be used to examine habitat preference and to aide in a more extensive examination of feeding habits using observational and chemical techniques. Results will allow us to more closely examine the potential for restoration for the not recovered AB pod and the depleted AT1 population.

On March 31, 1989 AB pod was observed in oil sheens and six of the 36 pod members were missing. A total of 14 whales were lost from resident AB pod in the two years following the *Exxon Valdez* oil spill and there was no recruitment into the pod during those years. Since that time the social structure within AB pod has shown signs of deterioration. Maternal groups have traveled independently or with other pods, and pod members have not consistently traveled with closest relatives. Although 4 calves were recruited during the period 1992-1994, there were 5 additional mortalities in 1994. There has been a net increase of four individuals since 1995. In 2003 and 2004 the AB25 sub-pod was not completely photographed, so we estimate that the pod contains 26 individuals. We are concerned the AB25 sub-pod may be fragmenting. They are no longer traveling with the remainder or AB pod nor are they traveling with AJ pod which had been the case for many years following the spill. The rate of mortality observed in AB pod after the oil spill far exceeds that recorded for 10 other resident pods observed in southern Alaska over the past 19 years or for 19 pods in British Columbia over the past 26 years (Matkin et al 1999, Matkin et al 2003). Although it appears the AB17 and AB10 sub-pods are slowly recovering, population modeling indicates recovery of these sub-pods will not be complete until 2015 due to the loss of females and juveniles and their reproductive potential at the time of the spill. The fate of the AB25 sub-pod is unclear, even 15 years after the spill. Since recovery has not occurred as was originally predicted, we cannot be assured that it will occur at all and restoration possibilities should be considered

Nine whales from the transient AT1 group have not been observed since 1989. Two additional AT1 whales have not been sighted for seven years. Another member of this group stranded and died on a beach near Cordova, Alaska in July 2000 and another stranded and died in 2001 on Hinchinbrook Island. Another AT1 whale stranded and died on Latouche Island in spring 2003. From genetic and photographic data from beached whales, five of these fourteen missing AT1 group whales are known to be dead. Although transient killer whale social structure is not fully understood, we are confident that the other missing AT1 whales also are dead. Statistical analysis backs up this supposition and indicates that they have either died or permanently emigrated from the area. Since there is no record of these whales in adjacent regions and they appear to have a limited range, it is almost certain that the missing AT1 whales are dead.

Twenty two years of systematic data collected under public and private funding have been placed in a specially designed GIS database currently housed at the NGOS offices in Homer and at Alaska Sea Life Center, Seward, Alaska. The database contains nearly 1000 records of encounters with killer whales in and near Prince William Sound and Kenai Fjords, Alaska. Analyses have determined large-scale differences in spatial distribution patterns between resident and transient whales over time (Scheel et al. 2001).

Without more accurate information on killer whale range, habitat preferences, feeding locations and prey species on a pod by pod basis we cannot judge possible restoration strategies. In this project we will use satellite tagging technology recently developed by the ASLC and NGOS to look at movements of specific groups primarily the AT1 transients and AB pod. Tags will allow relocation of these pods or groups and permit additional encounter time for obtaining feeding data from observation and biopsy. In addition we will monitor longer term movements remotely using locations downloaded daily from the Argos satellite system and to determine use of habitat by these whales. Whale locations will be plotting locations up to three times daily.

Feeding habits data will be collected during our long-term follows of killer whales. Resident killer whales are primarily salmon feeders (at least during the spring, summer and fall) and transient killer whales eat solely marine mammals including harbor seals, Dall's porpoise, harbor porpoise, and Steller sea lions (Saulitis et al 2000). Although we have observed only harassment of sea otters and sea otters do not appear to be declining in the region, transient killer whales could potentially switch to this prey as has been postulated as the reason for the sea otter decline in the Central Aleutians (Estes et al 1998). Observations of feeding behavior will be coupled with contaminant/ stable isotopes/lipid fatty-acid analysis as an aid in determination of killer whale feeding habits. Preliminary chemical analysis indicates different feeding preferences for different pods and lineages in the region. The DDT/PCB ratios and ppDDT/Total DDT ratios from biopsy samples indicate whales are not leaving the northern Gulf of Alaska to feed and are dependent on a prey concentrations in the northern Gulf of Alaska.

The AB pod of killer whales was injured by the EVOS. Although it initially had shown signs of recovery from 1991 to 1993, mortalities in 1994/95 reduced the number of surviving AB pod whales to a low of 22. Since 1995 there has been a net gain of four individuals; however, recovery to pre-spill numbers is not expected until at least 2015, provided there are no additional atypical mortalities. This recovery is far slower than was originally expected for two reasons: 1) there were additional unexpected mortalities, likely due to breakdown in social structure and loss of important females 2) there was a disproportionate loss of females (adults and juveniles) at the time of the spill which reduced the reproductive potential and future reproductive potential of the pod. We are concerned that the AB25 sub-pod is fragmenting due to spill induced changes in social structure and their split with the other AB subpods.

The AT1 group is now recognized as depleted under the Marine Mammal Protection Act. The results of the Integral Consulting review suggest is be considered as damaged by the spill and not recovering It appears that 14 of the original 22 members of AT1 group of transient killer whales have apparently died since 1989 (Saulitis et al 2005) and there has been no recruitment within the group. Recovery for this group seems doubtful at this time. This project will continue to monitor the status of AB pod and the AT1 group and use innovative tagging and analytical techniques to examine restoration and recovery possibilities for these whales.

B. Relevance to 1994 Restoration Plan Goals and Scientific Priorities

The final report from our long-term evaluation details the status of AB pod and the AT1 transient group (Matkin et al 2003). The status of AB pod is considered "not recovered" at this

time and the actual number of whales in the pod is uncertain since all members of the AB25 sub-pod have not been photo-documented in recent years. This sub-pod no longer swims with AB pod, this fragmentation and change in social structure are likely a long term effect of losses of females sustained at the time of the spill. AB pod now contains approximately 26 whales, but numbered 36 whales before the spill and was a unified pod. The AT1 transient group has also failed to recover from the 9 mortalities suffered following the spill. This project continues monitoring the lingering oil spill effects and assesses recovery of AB pod and AT1 group killer whales following the *Exxon Valdez* oil spill and will result in a journal publication on this material as well examine restoration possibilities for killer whales.

This amendment to our current project will use satellite tagging studies will help determine locations of important killer whale feeding habitat and examine restoration possibilities via protection of important habitat or enhancement/protection of fish and marine mammal populations. The amended project will closely examine feeding habits of killer whales using observational and chemical techniques and examine the potential effect of predation on the near shore ecosystem and on relevant prey species. Data from this project will be suitable for use in future modeling projects. Harbor seals are currently known to be a major prey item for the AT1 transient killer whales, and we are concerned that sea otters could also become an important prey. Recent evidence from stomach contents that indicates AT1 whales are preying on sea otters to some extent. Also, resident killer whales, including AB pod, are important near-shore predators on salmon. Previous work (Saulitis et al 2000) has indicated specific species may be important: detailed food habits studies will more clearly delineate species of salmon involved and examine the restoration potential of producing/protecting particular salmon species.

An important part of the restoration plan is the long term monitoring of non-recovering and not-recovered resources. An annual killer whale database of spanning 22 years now exists with an associated spatial database in GIS format. Details of all encounters as well as behavioral data in a spatial context are readily available. This is linked to our photographic identification database that includes identifications of all individuals from each frame of film for every encounter logged in the GIS system.

Restoration also has a strong community involvement aspect to foster understanding and reduce harassment of these whales. We are part of the Youth Area Watch program which provides the opportunity for young students to accompany us during our research. In addition, we provide research results and educational briefings to tour boat operators in both Seward and Whittier on a regular basis. We maintain a monitoring program that examines tour boat interactions with killer whales and seeks to reduce harassment of specific groups including the AT1 transients. We collaborate with the environmental monitoring program at Chenega village and exchange information on a regular basis.

PROJECT DESIGN

A. Objectives

1. To provide photographic population monitoring of resident killer whale pods, including the non-recovered AB pod in order to determine status. Also monitor the depleted AT1 transient group which has lost over half its members since the spill.

2. To use remotely attached satellite tags to aid in long term follows for feeding habits studies and to allow remote tracking and relocation of both AB pod and AT1 transients to detail habitat use. Suggest restoration alternatives from feeding habit and habitat use data.

3. Examine seasonal feeding habits, particularly of AB pod and other resident type pods to determine specifics and timing and predation using observational methods based on collection of fish scales from kill sites and using stable isotope and lipid/fatty acid analysis to corroborate and/or extend field observations. To examine possible restoration through enhancement of particular salmon prey species

4. To complete journal papers on resident killer whale population dynamics and on the assessment of long-term effects of the *Exxon Valdez* oil spill on AB pod and AT1 population.

5. To provide data for assessment of the role of transient and resident killer whales in the near-shore ecosystem; to monitor any changes in feeding habits in this area based on previously published dietary information (Saulitis et al 2000).

6. To continue to work with local groups (Youth Area Watch, tour boat operators/industry) in providing community involvement with our work and promote restoration through education and reduction in harassment.

B. Procedural and Scientific Methods

Our work depends on accurate photo-identification of each individual in each pod/group that regularly uses the Sound, particularly AB pod and the AT1 population. It is important that researchers maximize the time actually spent with resident killer whales (particularly AB pod and other resident whales) to insure thorough identification of all individuals and meet other objectives of this proposal which now amended to include satellite tracking and detailed food habits evaluation.

Methods proposed to obtain photographic data necessary to meet monitoring objectives will be similar to those used by the NGOS in Prince William Sound/Kenai Fjords for the past 22 years. Searches for whales will not be made on random transects, but based on current and historical sighting information. In addition whales will be located by listening for killer whale calls with a directional hydrophone (calls can be heard up to 10 miles away), or by responding to VHF radio calls from other vessels reporting sightings of whales. We have developed network of cooperating vessel owners and tour boat operators that regularly report whale sightings. In addition, requests for recent killer whale sightings will be made routinely on hailing Channel 16 VHF and working channel 77. Finally, we will use satellite tracking positions, when possible, to direct searches for individuals and groups.

A vessel log and chart of the vessel track will kept for each day the research vessels operate. Nobletech software and a laptop computer configured with GPS will automatically record the research vessel track in real time. The elapsed time and distance traveled will be recorded and vessel track plotted. Record will be made of the time and location of all whale sightings and the weather and sea state noted at regular intervals.

The Nobletech system will also be used to record specifics of each encounter with killer whales including the track line during these encounters. This data system will be used in 2004 to log all encounters and summarize effort. Additional attention will be made to relate behavior to

location using a Nobletech data recording system which relates precise geographic location to behavioral events. The new data collection system will be based on killer whale encounter data sheets developed in 1995 and specifically tailored to GIS data entry. Data recorded will include date, time, duration, and location of the encounter. Rolls of film exposed and the estimated number of whales photographed will also be recorded. A chart of the whales' track line during the encounter will be completed and the distance traveled by the vessel with the whales will be calculated by the Nobletech system on a daily basis. The new system will make it much simpler to link general behavior of the whales (i.e. feeding, resting, traveling, socializing, milling) to location and time.

Photographs for individual identification will be taken of the port side of each whale showing details of the dorsal fin and gray saddle patch. Photographs will be taken at no less than 1/1000 sec using Fuji Neopan 1600, a high speed black and white film. A Nikon F-100 auto focus camera with internal motor drive and a 300 mm f4.5 auto focus lens will be used. When whales are encountered, researchers will systematically move from one subgroup (or individual) to the next keeping track of the whales photographed. If possible, individual whales will be photographed several times during each encounter to insure an adequate identification photograph. Whales will be followed until all whales are photographed or until weather and/or darkness make photography impractical.

All photographic negatives will be examined under a Wild M5 stereomicroscope at 9.6 powers. Identifiable individuals in each frame will be recorded. When identifications are not certain, they will not be included in the analysis. Unusual wounds or other injuries will be noted. Photographic negatives will be analyzed using a photographic database that spans 22 years. Identities of each whale that appears in every frame of usable film will be recorded and stored in VAX computer system. Final analysis and assessment will follow Matkin et al. (1994).

Recently we have accomplished the first successful remote attachments of satellite transmitters to killer whales using a crossbow arrangement and small barbed tag that attaches to the dorsal fin of the whale. The prototype position-only satellite transmitter that we are proposing to deploy is approximately 3.8 cm in diameter in a half dome shape, with a maximum height of 2.2 cm. The transmitting antenna will be approximately 1.5 mm in diameter and 17 cm long sticking out of the center of the half dome. On the flat side, opposite the point of the antenna protrusion will be one or two barbed attachment post that will be 5 cm long and 0.6 cm in diameter. Attachments will be made from distances of approximately 6-8 meters using either a Pneudart rifle or by crossbow (e.g. Barnett Wildcat 170 pound bow or similar). Uplink schedules are set prior to tagging and data received through the Argos satellite system. We have had attachment times of up to 2 months in other regions (Antarctica and western Alaska). Reaction to application of the tags is slight and scarring after the tag drops off appears minimal. As part of this project we will attempt to place 9 tags on different whales primarily on the AB pod and AT1 group. We will access positions from the field on a daily basis to find individuals, in addition to compiling a long term record of movements.

Field observations of feeding will be made and prey parts collected when possible. Scales are retrieved from fish predations events and read for species and age at the Pacific Biological Station in Nanaimo, British Columbia, where a scale laboratory has been established and certified for over 20 years. If mammal prey species cannot be identified visually, then genetic analysis will be conducted if bits of prey remains are collected. The University of British Columbia, Department of Zoology genetics laboratory maintains a reference collection of genetic markers for each marine mammal species and will conduct species identification analysis.

Contaminant, lipid/fatty acid analysis and stable isotope analysis will be conducted from biopsies obtained from individual whales using collection procedures described in Matkin et al

(2003). Genetic analysis conducted at the University of British Columbia using mtDNA haplotypes and nuclear DNA micro satellites will be used as necessary to identify the population of new groups or individuals (see Data Management and Quality Assurance attached to this proposal). Lipid/fatty acid analysis and OC contaminants analysis will be conducted on the blubber samples using the procedures detailed in Herman et al (2005) and in the Data Management and Quality Assurance statement. Stable isotopes will be determined from epidermis tissue from biopsy samples using standard procedures (Herman et al 2005). All analysis will be conducted by the Environmental Contaminant Laboratory, Northwest Fisheries Science Center (NWFSC), Seattle,WA. Although the NWFSC maintains a large reference library of values for contaminants/fatty acids and stable isotopes for potential prey species of killer whales, it will be necessary to augment their collection with samples from our regions, as values may change appreciably between areas. Collection of potential prey for analysis (including all species of salmon and marine mammals as available) will be a part of this project.

The primary research platform will be a 34' diesel inboard powered vessel capable of 18 knots that can sleep 3-4 individuals (R.V. *Natoa)*. With sleeping accommodations and large fuel capacity, the R.V. *Natoa* can remain in the field for extended periods. This vessel will operate a total of 32 days under funding from this project (and an additional 25 days from the Alaska Sea Life Center funding), with days selected to maximize encounters with resident whales (AB pod) and the AT1 group during the early season (April/May) the late season (Aug/Sept) in order to compare food habits during the different periods.

C. Data Analysis and Statistical Methods

Because photographic and observational data are being made in the same format as during the past 22 field seasons and using the techniques now standardized for studying killer whales, the data will be comparable with other data collected around the North Pacific. Since we identify every individual in each pod of resident killer whales, and pod membership only changes through death or calf production, we can accurately assess changes in pods/population.

The report for the monitoring segment will include a summary of all field effort including that funded outside of this DPD, and will include a summary of the pods and individuals encountered and a status report on AB pod and the AT1 group. Changes within AB pod will be examined with consideration for the age and sex structure of the pod and maternal groups within the pod and related to the population model now under development. Trends in transient killer whale sighting rates and demographics will also be presented.

Feeding data will be summarized and field observations and data from scales (species and age) will be summarized and compared by area and by pod. In conjunction with the NWFSC we have used contaminant/fatty acid/stable isotope analysis to describe aspects of killer whale predation in other areas (Herman et al 2005, Krahn et al 2006, see Data Management and Quality Assurance). Analysis and publication for this project will follow the model presented in these papers. We will also compare chemical markers indicative of diet between pods and from different times of year (late winter/spring and late summer/fall). We will take into account that chemical markers usually indicate prey from approximately two months prior to the sample in temporal comparisons. Genetic analysis, when appropriate, will be conducted using the methods detailed in Matkin et al (2003) and will include mtDNA and nuclear DNA analysis. Track lines from whales tagged with satellite tracking devices will be presented and analyzed in GIS format. Tracks will be examined for patterns in movements, and in relation to topography, to known migratory pathways of prey and to areas of potential prey abundance.

Frame by frame input of identification data from exposed film into VAX and IBM PC computer systems will occur and identifications tabulated by pod and by individual. Copies of killer whale encounter data and vessel logs will be stored at the Alaska Sea Life Center and this data will be archived in the GIS database for potential future analysis. Frame by frame identification data will also be made available on disk. Copies of the GIS program and data base will be available by request to NGOS.

PC (Windows) compatible computers owned by NGOS will be used to analyze field data. The various long-term databases will be housed at NGOS offices and the Alaska Sea Life Center, although copies will be made available to other management agencies on request.

D. Description of Study Area

This project is part of an ongoing killer whale research in Prince William Sound and the Kenai Fjords region, Alaska (Matkin et al 2005). The overall study area stretches from the Nuka Bay, outer Kenai Peninsula region to Cordova on the eastern edge of Prince William Sound. However, the funding specifically requested in this proposal will be used primarily in Southwestern Prince William Sound where likelihood of encountering the focal whales is most likely. We cannot predict the specific locations where encounters will occur.

E. Coordination and Collaboration with Other Efforts

The monitoring of killer whales and analysis of current data is part of a long-term program to investigate killer whale recovery, monitor populations and examine the interactions of killer whales with other species. Although Craig Matkin is the sole P.I. on this project, he will work closely with collaborators Russ Andrews at the Alaska Sea Life Center, who has designed the satellite tags and with Dave Herman and Peggy Krahn at the Northwest Fisheries Science Center, who conduct diet and contaminant analysis, to complete the project. As possible it will be integrated with near shore studies that focus on sea otters and with the oceanographic studies of the Alaska Coastal Current. We will work as collaborators/consultants for work on humpback whale impact on herring studies (Jeep Rice, P.I.) should they be funded.

We have a record of community involvement and plan to continue work with the Youth Area Watch Program. In FY2007 this project will rely on approximately $60,000 in project funds that will extend field time and salary time from a complementary project at the Alaska Sea Life Center and up to $18,000 in additional analytical time provided by the NMFS, NWFSC, Environmental Contaminant Laboratory. Support from various foundations completes the overall program. In addition we are supported and work cooperatively with the NMFS regional office (Kaja Brix) to provide observation and education of the tour boat fleet in the Prince William Sound/Kenai Fjords region. As a non-profit research institution familiar with private funding sources and cooperative programs, NGOS can work with the Trustee Council to maximize return for current and future funding.

III. SCHEDULE

A. Project Milestones

Objective 1. Complete analysis and submit paper on population dynamics of southern Alaska resident killer whales January 2007

Objective 2. To prepare and launch field collection of data, including identification photos, prey samples and observations, biopsy samples and satellite tag attachments. Field work will begin in April 2007 and end by October 2007.

Objective 3. Conduct analysis on prey samples, biopsy samples, and plot results of tagging efforts. Completion date February 2008

Objective 4. Write Final report to be submitted April 2008.

Objective 5. Submit paper on long term effects of the *Exxon Valdez* oil spill and AB pod and the AT1 transient group. April 2008

B. Measurable Project Tasks

FY07, 1st quarter (October 1, 2006-December 31, 2006)
October: Project funding approved by Trustee Council. Preparation and submission of paper "Population dynamics of southern Alaska resident killer whales"
FY07, 2nd quarter (January1, 2007-March 30, 2007)
Preparation of field work, preparation of satellite tags and other equipment
FY07, 3rd quarter (April 1, 2007-June 30, 2007)
Field work in Prince William Sound. Photo identification, biopsy sampling, satellite tagging, food studies
FY07, 4th quarter (July 1, 2007-September 30, 2007)
Field work in Prince William Sound. Photo identification, biopsy sampling, satellite tagging, predation studies
FY08, 1st quarter (October 1, 2007-December 31, 2007)
Analysis of photographs from fieldwork. Workup satellite tag data in GIS format and update databases. Lipid/fatty acid, contaminant, stable isotope and genetic analysis.
FY08, 2nd quarter (January 1, 2008-March 31, 2008)
January 23-27 Annual Marine Science Symposium Finish analysis of photographs from fieldwork and workup satellite tag data in GIS format and update databases. Lipid/fatty acid, contaminant, stable isotope and genetic analysis completion.
FY08, 3rd quarter (April 1, 2008-June 30, 2008)
April 30 Submit final report. This will consist of a draft manuscript
for publication to the Trustee Council Office. Prepare paper on long-term effects of EVOS on killer whales

C. Completion Date

Annual report will be submitted by September 30 each year. Final report to be submitted by late April 2008.

IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge

There is great public concern and interest for killer whales in Prince William Sound and in Kenai Fjords. The expanding tourboat industry depends on a healthy killer whale population to attract and satisfy visitors and residents and the research and its results enrich the experience of visitors and residents. We have been closely involved with tourboat and recreational operators and residents by exchanging sighting information on a daily basis and providing updated catalogues of individual whales to enhance enjoyment of whale observation (Contact Dan McDonald, Kenai Fjords Tours, Seward Alaska and Tom Tougas, Renown Tours, Seward, Alaska). We have provided and continue to provide workshops detailing the biology of Alaskan whales. We are involved in the Youth Area Watch program, taking young students out to participate in our research (Contact Shu Salasky, Glacier School District). Publication of an updated identification catalogue that includes details of our research results and viewing guidelines has further sparked interest in these whales. Killer whales now draw thousands of visitors to the region each year.

We continue to collect observations and stories from native residents and others that will provide background for interpretation of our findings and place the work in a historical and cultural perspective. Some of these legends and stories are used to place our research in a broader context in our publication: "Killer Whales of Southern Alaska" (Matkin et al 1999).

B. Resource Management Applications:

This study builds on a long-term database that gives us the ability to track the changes in killer whale populations in this region. Currently, resident killer whales are increasing in number except for the oil spill damaged AB pod, while the AT1 transients are in serious decline. This study will continue to examine these changes and hopefully help better explain and interpret them. The AT1 transients are listed as depleted under the Marine Mammal Protection Act. Killer whales are an important resource for the tour industry as well as a cultural resource for native and non-native cultures and tourboat and other human interaction should be managed effectively. We are currently working with the National Marine Fisheries Service, Regional Management Office, Juneau, Alaska (Contact:Kaja Brix) in providing data on vessel and whale interactions and assisting in formulation of management guidelines. Contaminant data from killer whales aids in monitoring of toxic chemicals that are moving into Alaskan waters from other regions (primarily southeast Asia) and can be an aide in promoting management of those chemicals on a worldwide basis. Data we collect on killer whale habitat use and important prey species could provide possibilities for management strategies that will encourage the recovery of the oil spill damaged killer whale groups.

PUBLICATIONS AND REPORTS:

Annual/Final reports will be filed as scheduled. Published papers will include (1) a paper modeling the population dynamics of the southern Alaska resident killer whale population and (2) a paper detailing the immediate and long-term effects of the *Exxon Valdez* oil spill on AB pod and the AT1 population.

PROFESSIONAL CONFERENCES:

Papers developed using data collected under this contract will be presented at various meetings and conferences, including the annual Alaska Marine Science Symposium in Anchorage in January 2008 ,and the Society of Marine Mammalogy Conference in December 2007 in Cape Town, South Africa. Support to attend these two conferences is requested in this proposal.

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Experience

Currently: Director, North Gulf Oceanic Society, a non-profit research and education organization
Adjunct faculty, University of Alaska, Anchorage, Lower Penninsula Campus

Mr. Matkin has conducted research on marine mammals in southern Alaska since 1977. He completed work on harbor seals and Steller sea lions and their interactions with fisheries in 1978-79. He initiated photo-identification work of killer whales and humpback whales in Prince William Sound in 1977. Since 1982 he has been employed by the North Gulf Oceanic Society and has worked under numerous contracts from the National Marine Mammal Laboratory, NMFS; the U.S. Fish and Wildlife Service; the Sea Grant Marine Advisory Program; Alaska Council on Science and Technology, U.S. Marine Mammal Commission Hubbs Sea World Research Institute, the *Exxon Valdez* Trustee Council and the Alaska Sea Life Center. He has directed the NGOS long-term photo-identification project examining killer whale population dynamics in southern Alaska since 1984. He has conducted population/distribution/genetics research on humpback whales in Prince William Sound and western Alaska. He has specialized in biopsy sampling of various cetaceans including killer whales, humpback whales, and sperm whales. He directed work contracted by the Exxon Valdez Oil Spill Trustee Council and National Marine Fisheries Service assessing the impacts of the *Exxon Valdez* Oil Spill on killer whales for the past 12 years (1989-2001) and currently supervises a killer whale research program that extends from southeastern Alaska to the Eastern Aleutians. He has examined environmental contaminant levels in killer whales and humpback whales in Alaskan waters using biopsy sampling techniques. Currently he is a member of the Alaska Scientific Review Group, advising the National Marine Fisheries Service on the status of marine mammal stocks in Alaska.

Mr. Matkin has extensive experience in the operation and maintenance of commercial fishing and research vessels and has operated commercial vessels in southern Alaska since 1978. He has owned and operated a salmon and herring purse seine vessel since 1984. His commercial fishing experience includes Dungeness crab and Tanner crab pot fishing, salmon seining and gillnetting, herring seining, and roe-on-kelp impoundment.

Selected Publications

Matkin, CO. and E. Saulitis. 1994. Killer whale (*Orcinus orca)*: Biology and Management in Alaska. U.S. Marine Mammal Commission, Washington D.C. 80pp. Contract T75135023.

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Matkin C.O., Matkin D.R., Ellis G.M., Saulitis E, and D. McSweeney. 1997. Movements of Resident Killer-Whales between Southeastern and Prince-William-Sound, Alaska
Marine Mammal Science: 13(3) Pp. 469-475 .

Matkin, C.O., G. Ellis, , E Saulitis, L. Barrett-Lennard and D. Matkin. 1999. *Killer Whales of Southern Alaska.* North Gulf Oceanic Society, Homer, Alaska

Matkin, C.O., G. Ellis, P. Olesiuk and E. Saulitis. 1999. Association patterns and inferred genealogies of resident killer whales, Orcinus orca, in Prince William Sound, Alaska. Fisheries Bulletin

Saulitis, E.L., C.O. Matkin, L. Barrett-Lennard, K. Heise and G. Ellis. 2000. Foraging strategies of sympatric killer whale (*Orcinus orca*) populations in Prince William Sound, Alaska Marine Mammal Science, 16(1)94-109**.**

Scheel, D. C. O. Matkin, and E. Saulitis 2001. Distribution of killer whale pods in Prince William Sound, Alaska over a 13 year period 1984-1996. Marine Mammal Science. 17(3).

Ylitalo**,** G.M., C.O. Matkin, J. Buzitis, M. M. Krahn, L. L. Jones, T. Rowles, and J. Stein. 2001. Influence of Life-History Parameters on Organochlorine Concentrations in Free-Ranging Killer Whales (*Orcinus orca*) from Prince William Sound, Alaska.. The Science of the Total Environment 281:183-203.

Saulitis, E., C. O. Matkin and F.H. Fay. 2005. Vocal repertoire and acoustic behavior of the isolated AT1 killer whale subpopulation in Southern Alaskaa. Can J Zool **83**: 1015-1029.

Matkin, C. O., E. Saulitis, D. Maldini, J. Maniscalco and L. Mazzuca. 2005. Steller sea lion predation by killer whales in Kenai Fjords/Prince William Sound, Alaska. Pages 212-226 *in* T. R. Loughlin, S. K. Atkinson and D. G. Calkins, eds. Synopsis of research on Steller sea lions: 2001-2005. Alaska SeaLife Center's Steller Sea Lion Research Program, Seward, Alaska. 344 pp.

Herman, D.P., D.G. Burrows, P.R. Wade, J.W. Durban, C.O. Matkin, R.G. LeDuc, L.G. Barrett-Lennard, and M.M. Krahn. 2005. Feeding ecology of eastern North Pacific killer whales Orcinus orca from fatty acid, stable isotope, and organochlorine analyses of blubber biopsies. Mar Ecol. Prog. Ser.302:275-291

Krahn, Margaret M., David P. Herman, Craig O. Matkin, John W. Durban, Lance Barrett-Lennard, Douglas G. Burrows, Marilyn E. Dahlheim, Nancy Black, Richard G. LeDuc and Paul R. Wade In Press. Use of chemical tracers in assessing the diet and foraging regions of eastern North Pacific killer whales. Marine Environmental Research

Collaborators:

Lance Barrett-Lennard Vancouver Public Aquarium, Vancouver, B.C. Canada
Russ Andrews, Alaska Sea Life Center
John Durban, National Marine Mammal Laboratory
Dave Herman, Northwest Fisheries Science Center
Peggy Krahn, Northwest Fisheries Science Center
Graeme Ellis Pacific Biological Station, Nanaimo, B.C. Canada
Peter Olesiuk Pacific Biological Station, Nanaimo, B.C. Canada
Eva Saulitis, North Gulf Oceanic Society, Homer, Alaska
David Sheel Alaska Pacific University, Anchorage, Alaska
Jan Straley, University of Alaska Southeast, Sitka, Alaska
Paul Wade National Marine Mammal Laboratory, Seattle, WA
Harald Yurk University of British Columbia, Vancouver, B.C. Canada

Budget Justification

Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales in Prince William Sound/Kenai Fjords in 2007

$24.K Current for FY 07 in PJ 050742
$99.4K Additional Request for FY 07 in PJ 070742

Revised Total Request for FY 07 = $123.4K

Personnel: $34.K
Craig Matkin is the P.I., the operator of the vessel, and field biologist and will be leader for the duration of the project. Time is included for final report and work on publications. Eva Saulitis is a field biologist/data analyst and will be integral to completion of field and analytical aspects of the project. A spatial analyst/statistician will be needed to assemble and analyze tagging and feeding data and initiate a paper detailing these results
Allocated: $11.7K; Additional request: $22.3K

Travel: $.7K
Travel by Craig Matkin to Anchorage to attend and present results at annual science meetings in January 2008
Allocated: $.7K; Additional request: $0.K

Contractual: $31.K
The initial vessel contract (34' R.V. *Natoa*, diesel inboard 12 days @475/day) did not include tagging, long term observation of feeding habits, or sampling for chemical analysis of food habits. An additional 20 field days is requested for the additional work
Allocated: $5.7K Additional request: $25.3K

Commodities: $37.2K
Monies to cover additional communication (includes phone use in office and on boat and internet connections, satellite phone, etc), and additional food and fuel due to additional field time and increased fuel prices. Additional film and processing will be needed for increased field effort (used in photoidentification of individual killer whales). The new project will use 10 satellite tags and satellite tagging equipment including crossbows.
Allocated: $2.K; Additional request: $35.2.K

Equipment: $0.0K
Allocated: $0.0K; Additional request: $0.0K

Indirect: $10.6K
Used to maintain both field and office equipment and purchase replace components, use and maintenance of office space, pay for bookkeeping and support services, publishing costs, copying, and shipping costs.
Allocated: $2.K; Additional requested: $8.K

Data Management and Quality Assurance Control Statement

1. Many of our samples will consist of photographs that identify each individual whale (pods and groups) that we encounter. These photographs are part of a continuous photographic database collected since 1984 and housed at the Pacific Biological Station in Nanaimo, B. C. with a reference collection of individuals maintained at the North Gulf Oceanic Society offices in Homer, Alaska Photographs are compared to those in the database to determine identities of individuals and changes in structure in pods and groups. We will also collect samples (using biopsy techniques) of skin and blubber. Genetic identifications will be made in the case of new or unidentified groups, however the primary use of skin and blubber biopsy samples will be for contaminant/lipid fatty acid/stable isotope analysis in an effort to more closely examine feeding habits. The number of samples we collect by biopsy will be determined by which animals we encounter, which we cannot predict in advance, however budget limitations will allow processing of no more than 30 samples. We will primarily sample AB pod and the AT1 group, however, other pods will be sampled as possible to determine differences in diet between pods and populations.

2. Photographs that show fin shape and unique nicks and scratches will be sufficient to determine individual identities of whales. Genetic data that develops mtDNA and nuclear DNA typing will be sufficient to determine population affiliations of new whales. Contaminant/lipid-fatty acid/stable isotope analysis that can be completed in the manner described in Herman et al (2005) will be sufficient when coupled with field observations and identification of prey through observation, reading of scales taken from fish prey, and genetic identification of species from bits of unidentified marine mammal prey.

3. (a) Meta-lite data form is submitted separately and attached to the end of the proposal

   (b) Our photographic and contaminant/lipid-fatty acid/stable isotope analysis will provide species specific/population specific data for a specific taxa (killer whales) while genetic samples will provide taxonomic sampling that will define population affinities of individuals.

4. Not applicable

5. Photographs will be collected using high-resolution black and white film, but voucher digital scans of each individual will be placed on computers at the North Gulf Oceanic Society and Alaska Sea Life Center. Biopsy samples will be collected using a pneumatic rifle and custom-designed biopsy darts. A small dart is fired from a specially outfitted rifle powered by air pressure from a .22 caliber blank cartridge. The setup is similar to that used to deliver tranquilizing drugs to terrestrial mammals in wildlife research. A lightweight plastic and aluminum dart (approx. 10cm long by 1.2cm dia.) is fitted with a beveled tubular sterile stainless steel tip that took a small core of skin and blubber (approximately 1.6cm long and 0.5cm dia.). The sterilized dart is fired from a range of 16-20m. The dart strikes the animal in the upper back, excises a small tissue sample, bounces clear of the whale, and floats with sample contained until retrieved with long handled net.

From the biopsy samples, the epidermis, which is heavily pigmented, is separated aseptically from the other layers with a scalpel soon after retrieval. The dermal sample, the source of DNA, is stored at about 4 deg C. in a sterile 1 ml cryovial containing 1. ml of an autoclaved solution of 20% DMSO and 80% sodium chloride saturated with double distilled water. The dermis and hypodermis is made up primarily of collagen and lipid, respectively, and is frozen at -20C in autoclaved, solvent-washed vials for contaminant analysis. Contaminant/lipid-fatty acid/stable isotope analysis is conducted by the National Marine Fisheries Service, Northwest Fisheries Science Center, Environmental Contaminant Laboratory in Seattle and is described in detail below. Skin samples not used in analysis are stored in -70 C freezers at the University of British Columbia, Genetics Department and the blubber samples are exhausted in the analytical procedure.

6. Fatty acid concentrations will be determined for killer whale samples as follows: (1) extraction of approximately 0.5 to 1.0 g of tissue (mixed with sodium and magnesium sulfates to remove water) by accelerated solvent extraction (ASE) using 50 ml methylene chloride at 100°C and 2000 psi; (2) partitioning of the extract into 3 fractions [approximately 46% for OC analysis, 46% for total lipid by the standard gravimetric method and 8% for fatty acid and lipid class (Iatroscan) analyses]; (3) derivatization of the fatty acid fraction to fatty acid methyl esters (FAMEs) using 3% sulfuric acid in methanol; (4) extraction of the FAMEs into iso-octane; (5) drying the extract over a bed of sodium sulfate; and (6) separation and analysis of the FAME extracts on a DB-23 capillary column using quadrupole gas chromatography/mass spectrometry (GC/MS) operated in the selected ion monitoring (SIM) mode. In most cases, the molecular ion will be chosen for quantitation, and a confirmation ion was also monitored. Fatty acids C11:1 (as triglyceride) and C13:1 will serve as surrogate recovery standards added to each sample prior to the ASE solvent extraction and transesterification steps, respectively. A method blank and a 1 g sample of National Institute Standards and Technology NIST fish tissue homogenate standard reference material (SRM 1946) will be analyzed with each set of 14 field samples as part of a performance-based quality assurance program.

Blubber samples will be analyzed for OC (contaminant) concentrations using the following: (1) extraction of approximately 1g blubber tissue using the same ASE procedure outline above for fatty acids; (2) clean-up of the entire methylene chloride extract on a single stacked silica gel/alumina column; (3) separation of OCs from the bulk lipid and other biogenic material by high-performance size exclusion liquid chromatography (HPSEC); and (4) analysis on a low-resolution quadrupole GC/MS system equipped with a 60 m DB-5 GC capillary column. The instrument was calibrated using a set of 10 multi-level calibration standards of known concentrations. Following this procedure, a total of 40 PCB congeners and 24 chlorinated pesticides will be determined in the samples.. Total lipid in killer whale blubber samples will be measured by either a gravimetric procedure or a more sensitive TLC/FID method (biopsy samples). Individual lipid classes (triglycerides, wax esters/sterol esters, free fatty acids, phospholipids, and sterols) will be measured by the TLC/FID method, and their concentrations summed to obtain values for total lipid.

Killer whale epidermal samples will be prepared for stable isotope analysis by (1) freeze-drying the skin overnight in a Virtis Freezemobile 12XL freeze-drier; (2) pulverizing the freeze-dried material to a powder in a micro ball mill; (3) transferring the powder into a 5 cm diameter glass filter paper folded into a cone, folded shut, and then placing the capsule into a 33 ml ASE cell; (4) extracting lipid using 2 cell volumes of

dichloromethane at 25°C and 500 psi; (5) removing lipid-free skin from the extraction cell and drying at room temperature in a hood for 10 min; and (6) loading 0.4 to 0.6 mg dried powder into tin cups and combusting in a Costech elemental analyzer attached to a Thermo-Finnigan Delta Plus Isotope Ratio Mass Spectrometer. The values were calibrated against internal laboratory standards (aspartic acid and ^{15}N-enriched histidine), which were analyzed after every 10 samples. Unenriched histidine wasalso analyzed after every 25 samples as a control material to determine set-to-set reproducibility. For quality control, all standards and the reference material must have standard deviations $\leq$0.3‰ for $\delta^{15}N$ and $\leq$0.2‰ for $\delta^{13}C$ Stable isotope ratios are expressed in δ notation as per mil (‰) by the following expression:

$$\delta Z = [(R_{sample}/R_{standard}) - 1] \times 1000$$

(1)where Z is ^{15}N or ^{13}C and R_{sample} is the ratio $^{15}N/^{14}N$ or $^{13}C/^{12}C$ for the tissue sample. $R_{standard}$ is the ratio $^{15}N/^{14}N$ or $^{13}C/^{12}C$ of the corresponding standard, atmospheric air and Pee Dee Belemite limestone respectively. The statistical significance of the killer whale grouping differences will be calculated using the Tukey-Kramer honestly significant difference (HSD) test at $\alpha = 0.05$. Diets will be estimated from field data and literature for comparisons with data profiles generated by chemical analysis.

7. Quality control and statistical tests associated with diet analysis are provided in 6.

Metalite, Metadata File

Identification_Information:
Citation:
Citation_Information:
Originator: Craig Matkin
Publication_Date: 20060720
Title: Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales in Prince William Sound/Kenai Fjords 2007
Geospatial_Data_Presentation_Form: atlas
Description:
Abstract: : The proposed project is an amendment to the previously funded project that addresses lingering effects of the Exxon Valdez oil spill by continuation of the monitoring of AB pod and the AT1 population killer whale populations in Prince William Sound. These groups of whales suffered serious losses at the time of the spill and have not recovered at projected rates. This proposal seeks to extend the scope of work to include an innovative satellite tagging program to examine habitat preference and to aid in a more extensive examination of feeding habits using observational and chemical techniques. Results will allow us to more closely examine the potential for restoration. The project will more clearly delineate the role of killer whales in the nearshore ecosystem and possible effects on the restoration recovery of harbor seals and sea otters. Community based initiatives such as Youth Area Watch and educational programs for tour boat operators educational programs will continue to be integrated into the work to help foster restoration improving public understanding and reducing harassment of the whales
Purpose: To evaluate restoration potential for AB pod and AT1 group
Time_Period_of_Content:

Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20061101
Ending_Date: 20080301
Currentness_Reference:
Status:
Progress: Planned
Maintenance_and_Update_Frequency:
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: 150
East_Bounding_Coordinate: 145
North_Bounding_Coordinate: 61
South_Bounding_Coordinate: 59
Keywords:
Theme:
Theme_Keyword_Thesaurus:
Theme_Keyword: animal science
Theme_Keyword: ciencia de los animales
Theme_Keyword: aquatic habitat
Theme_Keyword: hábitat acuático
Theme_Keyword: environmental effects
Theme_Keyword: efectos ambientales
Theme_Keyword: GIS
Theme_Keyword: SIG
Theme_Keyword: SIG
Theme_Keyword: oil spill
Theme_Keyword: derrame de petróleo
Theme_Keyword: Wildlife
Theme_Keyword: vida silvestre
Theme_Keyword: vida selvagem
Theme_Keyword: zoology
Theme_Keyword: zoología
Place:
Place_Keyword_Thesaurus: Prince William Sound, Kenai Fjords, Alaska
Place_Keyword: Gulf of Alaska
Temporal:
Temporal_Keyword_Thesaurus:
Temporal_Keyword: 2007
Access_Constraints: By permission of North Gulf Oceanic Society of Exxon Valdez Oil Spill Trustee Council
Use_Constraints: To be determined
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Point
Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:

Contact_Person: Craig Matkin
Contact_Organization: North Gulf Oceanic Society
Contact_Address:
Address_Type: Mailing and Physical Address
Address:
3040 Main St.
Suite B1
City: Homer
State_or_Province: Alaska
Postal_Code: 99603
Country: USA
Contact_Voice_Telephone: 907 235-6295
Contact_Facsimile_Telephone: same
Contact_Electronic_Mail_Address: comatkin@xyz.net
Distribution_Liability:
Metadata_Reference_Information:
Metadata_Date: 20060720
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Craig Matkin
Contact_Organization: North Gulf Oceanic Society
Contact_Address:
Address_Type: Mailing and Physical Address
Address:
3040 Main Street
Suite B1
City: Homer
State_or_Province: Alaska
Postal_Code: 99603
Country: USA
Contact_Voice_Telephone: 907 235-6590
Contact_Facsimile_Telephone: same
Contact_Electronic_Mail_Address: comatkin@xyz.net
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998

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

Budget Category:	Authorized FY 2006	Proposed FY 2007
Personnel	$8.7	$34.0
Travel	$2.2	$0.7
Contractual	$5.7	$31.0
Commodities	$2.0	$37.2
Equipment	$0.0	$0.0
Subtotal	$18.6	$102.9
Indirect	$1.9	$10.3
Non-Agency Total	$20.5	$113.2
Trustee Agency GA (9%)	$1.8	$10.2
Project Total	$22.3	$123.4
Previous award PJ 050742		$24.0
Total additional request		$99.4
	Dollar amounts are shown in thousands of dollars.	
FTE		0.6
Other Resources	$47.0	$60.0

Comments: ***Travel in the amount of $3,000 was removed during the proposal review processes for the South Africa trip. This resulted in a G&A reduction in the amount of $600.***

This is a major amendment to the final year (FY07) of our three year monitoring effort.

In addition to the funds requested from the EVOS Trustee Council, the ASLC will provide $60,000 in funding for associated projects, which will contribute additional field and analysis time to this project. The Northwest Fisheries Science Center, Environmental Contaminant Lab will provide up to 15,000 in additional analytical services.

All permanant equipment will be provided by NGOS through grants from foundations and maintenance provided through NGOS indirect monies

NOTE: $23,764 has already been allocated for monitoring in FY2007, an additional $103,036 is requested in this proposal. In this budget "Currently funded " items are marked and new items are denoted "NEW"

FY07

Revised: 12 August 06

Project Number: 070742
Project Title: Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales
Name: North Gulf Oceanic Society

FORM

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

Personnel Costs:				Months	Monthly		Proposed
	Name	Position Description		Budgeted	Costs	Overtime	FY 2007
	Craig Matkin	P.I., Field Biologist (Currently funded)		2.0	4950.0		9.9
	Eva Saulitis	Field Biologist, Data (Currently funded)		0.5	3500.0		1.8
							0.0
	Craig Matkin	P.I., Field Biologist - Additional		3.0	5100.0		15.3
	Eva Saulitis	Field Biologist, Data - Additional		2.0	3500.0		7.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
		Subtotal		7.5	17050.0	0.0	
						Personnel Total	$34.0

Travel Costs:			Ticket	Round	Total	Daily	Proposed
	Description		Price	Trips	Days	Per Diem	FY 2007
							0.0
							0.0
	Annual Anchorage Science Meeting	(Currently funded)	250.0	1	3	150.0	0.7
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
							0.0
						Travel Total	$0.7

FY07

Project Number: 070742
Project Title: Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales
Name: North Gulf Oceanic Society

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Revised: 12 August 06

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

Contractual Costs:	Proposed
Description	FY 2007
Vessel Contract (34' R.V. Natoa, deiisel inboard) 12 days @ 475/day (Currently funded)	5.7
Vessel Contract (34' R.V. Natoa, deiisel inboard) 20 days @ 475/day - Additional	9.5
Contaminant/Lipid-fatty acid/stable isotope analysis (12 units @ 1000 apiece) Additional	12.0
GIS analysis (1 month) - Additional	3.8
Contractual Total	$31.0

Commodities Costs:	Proposed
Description	FY 2007
Misc tagging equipment - Additional	2.0
10 satellite tags @2800 apiece - Additional	28.0
Field Communication (Currently funded)	0.2
Field Food ($30/day for 12 days) (Currently funded)	0.4
Fuel ($90/day for 12 days) (Currently funded)	1.1
Film, Photo processing (Currently funded)	0.4
Communication, Tracking, Shipping, and Misc Equip - Additional	0.6
Field Food ($35/day for 20 days) - Additional	0.7
Fuel ($150/day for 20 days) - Additional	3.0
Film, Photo processing - Additional	0.8
Commodities Total	$37.2

FY07

Revised: 12 August 06

Project Number: 070742
Project Title: Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales
Name: North Gulf Oceanic Society

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

- Additional Equipment Purchases:	Number of Units	Unit Price	Proposed FY 2007
Description			
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R. **- Additional Equipment Total**			$0.0

Existing Equipment Usage:	Number of Units	
Description		

FY07

Project Number: 070742
Project Title: Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales
Name: North Gulf Oceanic Society

F O R M

Revised: 12 August 06