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: SIGNFICANCE OF WHALE PREDATION ON NATURAL MORTALITY RATE OF PACIFIC HERRING IN PRINCE WILLIAM SOUND

Printed Name of PI: Stanley Rice _____

Signature of PI: _____ Date _____

Printed Name of co-PI: Ron Heintz _____

Signature of co-PI: _____ Date _____

Printed Name of co-PI: John Moran _____

Signature of co-PI: _____Date _____

Note: Straley of UAS and Quinn of UAF will be submitting this proposal with their agency approvals.

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

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

Trustee Council Use Only Project No.070804 Date Received: _____

FY07 INVITATION
PROPOSAL SUMMARY PAGE

Project Title: SIGNFICANCE OF WHALE PREDATION ON NATURAL MORTALITY RATE OF PACIFIC HERRING IN PRINCE WILLIAM SOUND

Project Period: November 2006 to October 2008

Proposers: Stanley Rice, Ron Heintz, and John Moran of Auke Bay Lab, 11305 Glacier Hwy, Juneau, AK 99801: jeep.rice@noaa.gov, (907) 789-6020; ron.heintz@noaa.gov, (907) 789-6058, john.moran@noaa.gov .
Terrance J. Quinn II Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks 11120 Glacier Hwy, Juneau, Alaska 99801, (907) 796-2051, Terry.Quinn@uaf.edu
Janice M. Straley University of Alaska Southeast – Sitka, PO Box 273, Sitka, Alaska 99835, (907)747-7779, Jan.Straley@uas.alaska.edu.
Collaborator: Kate McLaughlin of Sawmill Bay in PWS

Study Location: Prince William Sound, Sitka Sound, and southern Lynn Canal.

Abstract: Pacific herring (*Clupea pallasi*) in Prince William Sound (PWS) have been classified as "not-recovered" by the Exxon Valdez Oil Spill Trustee Council. Predation by marine mammals has been cited as a factor in the failure of this population to rebound. We will assess the significance of humpback whale predation on herring in PWS, particularly in winter. Specifically we will estimate the number of whales foraging in winter, determine when and if there is a prey switch to herring, and how long whales focus on herring as prey. Year one, is stand alone, small in scale with an intense monitoring strategy; year 2 would expand the scale up in area significantly.

These data will be combined in a bioenergetic model to determine numbers of herring consumed (and energy content consumed). Lastly, the estimated numbers of herring consumed would be included in an age-structured model so that the significance of whale predation on herring recovery can be evaluated.

Funding has been approved for FY 07 only; FY 08 is pending

Total Budget Request, Including 9% G&A = $513.5K

Total UAF $55.8K; Total UAS $137.1K; Total ADF&G $210.2K; Total NOAA $303.3K

Total FY 2007 = $197.7K Total FY 2008 = $315.8K

Non-EVOS Funds $ 370K ($185/yr)

Note: Although we are proposing a 2 year project, year one can stand alone.

Date: 28 July, 2006

SIGNFICANCE OF WHALE PREDATION ON NATURAL MORTALITY RATE OF PACIFIC HERRING IN PRINCE WILLIAM SOUND

PREFACE

This is a collaborative proposal among researchers at the Auke Bay Lab (ABL), University of Alaska Fairbanks (UAF), and University of Alaska Southeast (UAS). The universities require signatures at several different levels, so EVOS Trustee Council will receive three submissions of the same proposal from the groups, only with different signature pages. Also, the UAF component of research is exclusively a modeling component and does not involve the handling of fish or whales.

RESEARCH PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

Pacific herring (*Clupea pallasi*) in Prince William Sound (PWS) have been classified as "not-recovered" by the Exxon Valdez Oil Spill Trustee Council. Predation by marine mammals has been cited as a factor in the failure of this population to rebound. This proposal attempts to assess the significance of humpback whale predation on herring mortality rates, particularly in the winter.

In FY 2005, a group of scientific investigators (including Rice and Quinn of this proposal) collaborated to integrate information about the herring population in Prince William Sound and identify factors contributing to its lack of recovery (EVOS TC funded project 050794). One essential component of the synthesis was the continued development of an age-structured assessment model. The group concluded that lingering oil exposure does not play a role in limiting recovery, but disease probably does. In addition, they noted that there were insufficient data to assess the role of predators in limiting recovery, but admitted they could be a significant factor. Therefore, future management and enhancement strategies need evaluations on the significance of predation.

Humpback whales in Alaska are seasonal migrants, spending summers feeding on schooling fish and large zooplankton. Most of these humpback whales winter in the lower latitudes near the Hawaiian Islands where birth and mating takes place (Herman and Antinoja 1977). However, individual humpbacks have been observed in the waters of PWS and northern southeast Alaska during the winter months (McLaughlin in PWS, Rice, Quinn, Straley in Southeast). Observations during winter months in PWS and southeastern Alaska are frequent and associated with known herring schools; however, many of these winter observations are anecdotal and not accompanied with photographic identification. Over-wintering whales have been studied in the winter in Sitka Sound and Seymour Canal. Results of those studies suggest the timing of the winter migration is staggered with some whales leaving earlier for the breeding grounds and some leaving later (Straley 1990, Straley 1994). It is likely that migration patterns in PWS and Lynn Canal would be similar. The migration to Hawaii takes about a month hence whales could be

present on the feeding grounds into early February and still make it to Hawaii for the peak of the breeding season in March (Straley 1990, Straley1994, Gabriele et al. 1996). Whales foraging on aggregated herring in winter are consuming an energy rich prey (Vollenweider 2005). Therefore the whales leaving later in winter could be provisioning themselves for their migration and maximizing their reproductive fitness.

Intensive foraging on aggregated winter herring may represent a significant source of mortality to herring, particularly if herring stocks are depressed, and humpback whales numbers increase. We propose to evaluate this potential by estimating the number of whales foraging in winter, determine when and if there is a prey switch to herring, and how long they focus on herring as prey. These data will be combined in a bioenergetic model to determine numbers of herring consumed (and energy content consumed). Lastly the estimated numbers of herring consumed would be included in an age-structured model so that the significance of this focused foraging event on herring recovery can be evaluated.

Project strategy:
We will assess whale numbers and forage on a restricted scale in year one, and expand the scale of our analysis in year two. The time period of importance begins at the end of summer (August) when whale predation is likely on mixed invertebrates, and probably switches to herring dominance in the early fall, extending into winter through February. The funding cycle with approval after 1 Nov 2006 precludes a large scale study of winter predation on herring in year 1, but does allow intense smaller scale efforts in two locations: Sawmill Bay in PWS, and Lynn Canal in southeast Alaska. Both whale numbers and forage abundance will be assessed at both locations. In year two, Sitka Sound will be added as a reference site, and a larger scale effort will be made in PWS. A year-round study of Lynn Canal predation will continue. Both Lynn Canal and Sitka Sound are logistically easy to study and offer critical comparisons that will contextualize the PWS observations. Herring populations in Sitka Sound and PWS were similar in biomass and synchronous in their recruitment patterns prior to the Exxon Valdez oil spill. The Sitka Sound stock remains robust and supports an important fishery. The Lynn Canal stock is more representative of the PWS stock in its current form. Both PWS and Lynn Canal herring populations are small in size, neither supports a commercial fishery and recovery for both may be limited by humpback whale predation.

In year one: We will assess whale numbers in two restricted locations, Sawmill Bay in PWS and Lynn Canal in northern southeast Alaska. Herring and whales aggregate in both of these locations over winter. Both study sites will be studied intensely, with observations conducted twice monthly. In both locations, we will take advantage of local researchers to maximize observations and minimize costs. Whale numbers will be confirmed with photo ID; and changes in abundance noted. Herring biomass will be estimated with hydroacoustics coupled with and trawl collections to verify acoustic targets and determine age structure and energy content of herring aggregates. Similar surveys conducted for euphausids will allow us to detect when and if whales use alternate prey. Some aerial assessments will be used to determine whale locations and verify that the foraging behavior we examined was representative of the behavior of whales over a broader spatial scale. The whale/prey information will be used to estimate herring consumption rates, and these data will be used in an age-structured model to determine if whales are significant predators. The model integrates population-level information from a variety of

sources, so that the relative importance of factors such as predation, disease, fishing, and environment can be gauged (Marty et al. 2003). Our ability to sample Lynn Canal year- round for both whales and forage will permit a more accurate assessment of whale migration events as well as prey switching.

In year two: The intense observations at Sawmill Bay and Lynn Canal will continue, and similar observations will be added from Sitka Sound. The phasing of whale numbers from summer populations will start earlier than in year one, will be more complete, and the switching to different prey should be better documented. Further, based on the broad scale location of other focal feeding areas in year one, more study in PWS will be focused in year two toward other feeding areas. A better estimate of whale numbers, timing, and focal feeding areas in PWS will be facilitated by the survey efforts in year one.

B. Relevance to Program Goals and Scientific Priorities

The Exxon Valdez Oil Spill Trustee Council classifies Pacific herring as "not recovered" in Prince William Sound. This project specifically addresses two concerns identified by the EVOSTC: "predation on juvenile herring in Prince William Sound" and "modeling marine mammal predation on herring". Previous work in PWS (Norcross and Brown 2001) has shown that winter is a particularly sensitive period for herring because prey resources are scarce. Herring store energy prior to winter to forestall starvation and form tight aggregates, presumably to avoid predation. We hypothesize that these aggregations of energy rich prey form an appealing prey field to humpback whales.

II. PROJECT DESIGN

A. Objectives

1. Enumerate humpback whales
   Year one- - Determine whale numbers and distribution in Sawmill Bay/Chenga Bay and southern Lynn Canal,.
   a. Find locations where whales are foraging and identify their prey
   b. Use photo-identification methods to estimate whale abundance in these locations using twice-monthly, surveys starting in fall 2006.
   c. Locate other feeding focal areas in PWS through cooperative boat surveys and aerial observations

   Year two -- Continue surveys, add enumerate whales in Sitka Sound and PWS
   a. Continue the intense observations at Sawmill Bay/Chenega Bay and Lynn Canal
   b. Add similar set of observations in Sitka Sound
   c. Expand the survey area to include other foraging locations to provide an estimate of the number of whales in PWS.

2. Estimate biomass and energy content of prey for humpback whale
   Year one – Estimate biomass of herring and euphausids in Sawmill/Chenega Bay and Lynn Canal.

a. Estimate biomass before, during, and end of winter to determine if direct impacts of whale foraging can be detected in Lynn Canal

b Identify forage species consumed by whales to determine when and if prey switching occurs in Lynn Canal and Sawmill Bay/Chenega Bay

c Determine size composition, and energy content of prey, using trawl surveys in Sawmill Bay and Lynn Canal

Year two

a. Continue the forage assessments in Sawmill Bay and Lynn Canal
b. Add similar assessments in Sitka Sound.
c. Add similar assessments at other foraging sites in PWS

3 Estimate the percentage of a humpback whale's energy requirements fulfilled by herring using bioenergetic models

a. Energy content will be determined for each forage type, including different age classes of herring.

b. Using prey switching information, estimate the energy consumed by whales.

4. Using herring age structure models, along with whale numbers and foraging information, assess the significance of winter humpback whale predation on each population, for both years.

a. Develop time series of whale abundance for PWS and Sitka from published reports, photo ID information, and mark-recapture methods (as described in Straley et al. 2002).

b. For Lynn Canal, compare whale sightings with the Sitka and PWS catalog to determine if unique whales utilize Lynn Canal. Estimate abundance in 2007 using photo-ID and mark-recapture methods.

c. From objective 3, estimate the winter consumption by humpback whales by herring age-class and year in PWS and Sitka.

d. Modify the age-structured models for PWS and Sitka to subtract winter whale consumption. Compare with results from the models without predation time series.

e. In Lynn Canal, determine what proportion of the herring population is consumed by humpback whales in the winter.

B. Procedural and Scientific Methods

Objective 1. Estimate humpback whale abundance and distribution

We will survey locations where whales are known to forage in winter to establish whale foraging behavior. Surveys will be conducted bi-weekly in small boats, hence we refer to these as the small-boat-surveys. The objective of these surveys will be to determine what whales are eating, when they switch prey, how many whales are in the area and how long they remain there. Prey found in locations where whales are foraging will be collected by an Isaac-Kidd midwater trawl in order to identify species, determine size distributions and estimate energy content. Whales will be photographed in order to determine the number foraging .Comparison of photographs taken on different surveys be used to estimate the amount of time whales spend in a location. The small-boat-surveys will be conducted in Sawmill/Chenega Bay in PWS, Lynn Canal and Sitka

Sound. Lynn Canal and the PWS locations will be sampled in both years, Sitka Sound will only be sampled in year 2. Each of these locations is conveniently located so that survey costs are minimized and local knowledge indicates that whales forage in these locations over winter. .

In year 2 the small-boat-surveys will be expanded to permit estimates of the number of whales foraging in all of PWS. The locations of these surveys and exact methodology will be determined following year 1. Opportunistic surveys conducted from herring stock assessment cruises and our own quarterly trawl surveys (described below under Objective 2) during year 1 will be used to identify other locations in PWS where whales forage. A set of these will be monitored during monthly surveys conducted in year 2 to determine the number of whales foraging and identify their prey. The same methods as those used in our small-boat-surveys will be used to evaluate whale foraging behavior. Estimates of the number of whales observed in these locations based photographic evidence will be compared to numbers reported by opportunistic observers to understand the error associated with opportunistic observations. By pursuing a larger number of locations we can establish a lower limit to the number of whales in PWS. In addition, we can use numbers provided by the opportunistic surveys to estimate a higher number of whales in the Sound. This latter estimate will be guided by our observations of the bias inherent in the opportunistic sightings.

The opportunistic surveys used to estimate the number of whales foraging in PWS are surveys conducted by the Prince William Sound Science Center (PWSSC) and the Alaska Department of Fish and Game. Both of these agencies conduct surveys designed to estimate herring biomass. Therefore these surveys should encounter the majority of the whales in PWS by virtue of the fact that the surveys are targeting herring. To verify that these surveys are covering locations where most whales are foraging, we will have local pilots from Cordova Air record the locations and numbers of whales they observe during regular operations. In Sitka Sound and Lynn Canal we will rely on whale watching tours, local airlines and the Alaska Ferry System to provide information on the whereabouts of whales in our study area.

Time series of humpback whale abundance will be constructed using mark-recapture methods. The first photograph of a particular whale is treated as the “mark”, and subsequent photographs of the same whale are “recaptures”. Both closed and open population models will be examined, along the lines of Straley et al. (2002). By comparing these estimates to those from aerial surveys, it will be ascertained whether aerial surveys miss an appreciable portion of whales and hence would lead to an underestimate of herring consumption by whales

Permitting: All humpback photographic data collected in Alaska is authorized under scientific research permit number 473-1700-00 issued to Janice M. Straley from National Marine Fisheries Service, Office of Protected Resources, WA, DC and with the approval of the Institutional Animal Care and Use Committee (IACUC), University of Alaska Fairbanks. The Alaska Fisheries Science Center (Auke Bay Lab) also has a permit for photographic data collection. No Biopsy samples will be taken in this project.

Objective 2. Estimate prey composition

Quarterly trawl surveys will be conducted to verify the diet information collected during the small-boat-surveys. These surveys are intended to insure that prey samples are collected in sufficient numbers to determine the energy content and size distribution (length and weight) of prey consumed by whales during winter. If we rely entirely on the small-boat-surveys for sample collection we risk not obtaining samples during winter, the most critical period in our study. Therefore we will conduct trawl surveys in PWS , Lynn Canal and in Sitka Sound at the beginning, middle and end of winter. Surveys will only be conducted in Sitka Sound in year 2. An additional survey will be conducted in late summer in each location. The PWS trawl surveys will also include whale observations at locations identified by the opportunistic and chartered aerial surveys, particularly in year 2. In Lynn Canal, hydroacoustic data will be collected because no stock assessments are made for the Lynn Canal herring. Hydroacoustic assessments will follow the method of Sigler and Csepp (2006) and focus on locations where herring are known to aggregate. This latter data set will allow us to determine if whales can locally deplete herring.

Objective 3 Estimate contribution of herring to humpback energy requirements.

Estimates of the relative number and size of forage consumed by whales will be determined from bioenergetic modeling. The daily energy requirement of active whales is estimated as $192M^{0.75}$ (Witteveen et al. 2006) where M is the mass of a whale. Daily consumption rate of prey will be determined as the number of prey that must be consumed to meet daily energy requirement based on the energetic value of the forage we observe whales consuming. Estimates of the energy in forage will be determined monthly for each of the prey items recovered during the bi-weekly surveys. If the bi-weekly surveys cannot provide samples, then we will us samples from the quarterly trawl surveys and interpolate energy content based on our knowledge of the seasonal changes in energy content of forage (Vollenweider 2005). These per capita estimates will be multiplied by the number of whales found to forage in PWS in a given month to estimate the total number of prey items removed by whales. Size distributions of herring consumed will be assumed to be consistent with the size distribution observed in samples collected from locations where whales were foraging.

The energetic content of whale prey will be determined from their proximate composition. Energy content will be calculated using calorific equivalents for lipid and protein 36.43 kJ g^{-1} and 20.10 kJ g^{-1}, l respectively) (Brett 1995). Proximate analysis will be performed following methods outlined in Vollenweider (2005). Briefly, lipids will be extracted from whole fish homogenates using chloroform and methanol and an Dionex Accelerated Solvent Extractor. Lipid content will be determined gravimetrically from the purified extract. Protein content will be determined the total nitrogen content as measured on a Leco FP528 Nitrogen analyzer. Protein is estimated as 6.25 multiplied by the nitrogen content. Estimates of energy in all prey items will be made each month.

Objective 4 Estimate significance of predation

Comparison of the number of herring removed by whales from the different stocks will be compared to estimates of stock size to evaluate the respective impacts of whale predation on

each stock. The total number of herring removed will be estimated as the product of the number of whales in each location and the per capita consumption rate, summed over each of the months

Calendar Year	Nov. - Dec 06	Jan – Mar 07	Apr- Jul 07	Aug – Dec 08	Jan – April 08	May – Jun 08	Jul – Oct 08
Fiscal Year	FY07			FY08			
PWS							

in which we observe whales foraging on herring aggregates. This number will be expressed as a proportion of the total herring population to determine the impact whales have on herring. For the Lynn Canal stock we will be able to adjust the herring stock size estimate downward to reflect potential losses from Steller sea lions that winter in the area (Womble and Sigler 200x).

Table 1. Proposed Sampling Schedule

Small-boat-surveys	X	X		X	X		Analysis and write-up
Aerial[1] and Trawl-survey[2]	1	1		2	2		
Opportunistic Surveys							
PWSSC[2]		2			2		
ADFG	X			X			
Cordova Air	X	X		X	X		
Sitka Sound							
Small-boat-surveys				X	X		Analysis and write-up
Trawl Survey				1	1		
Opportunistic Surveys:							
Allen Marine			X	X		X	
Lynn Canal							
Small-boat Surveys	X	X	X	X	X	X	Analysis and write-up
Trawl Surveys	1	1	1[3]	2[3]	1	1[3]	
Opportunistic Surveys							
Allen Marine			X	X		X	
Tal Air	X	X	X	X	X		

.1. Aerial surveys will be simultaneously with trawl surveys to locate whales.

2. Numbers in survey rows show the number of surveys conducted in each period.

3. Extra trawl surveys provided by NOAA vessel John N. Cobb

C. Data Analysis, Statistical Methods, and Modeling

Data analysis is limited to estimating whale abundance and modeling their bioenergetic requirements. Whale abundance will be determined from photographic data as described in Straley et al (2002). We anticipate that whales will not forage exclusively on a single prey item. The relative abundance of different prey types in their diet will be assumed to be equivalent to the relative abundance of species collected in our mid-water trawls. Trawls will be fished at the same depths whales are observed diving. The energetic content of a unit mass of prey in a particular patch will subsequently be estimated as the mean energy content of the prey in the patch, weighted by their relative abundance. Dividing this mass specific energy content into the energy requirement of a whale (described above) will provide an estimate of the total mass of the patch a whale requires. The contribution of herring to this total mass will be determined from their relative abundance in the sample and the average mass of an individual.

Modeling: Quinn et al. (2001) and Marty et al. (2003) developed an age-structured assessment model for Prince William Sound that included disease information. Thus the model can be used to evaluate the impact of disease on population abundance, recruitment, and survival. ADF&G uses this model in its annual assessments of herring (S. Moffitt, ADF&G, pers. Comm..).

The model contains information about the fisheries on PWS herring, which include purse-seine, gillnet, and pound fisheries in the spring (mainly for roe), and a food and bait fishery in the summer and fall. The model provides an estimation framework to integrate the various sources of information about Pacific herring in Prince William Sound from 1980 – 2006, including age compositions from the purse-seine fishery and spawning surveys, egg production estimates, mile-days of milt from aerial surveys, and hydroacoustic biomass estimates (Quinn et al. 2001, Marty et al. 2003, Hulson et al. 2006, Marty et al. 2006). These observations are compared to comparable model quantities in a least squares setting to obtain parameter estimates of recruitment, natural mortality, abundance, and biomass.

We propose to use this model as the basis of comparing the relative magnitudes of the various factors affecting PWS herring dynamics. Recruitment estimates at age 3 will be related to auxiliary variables related to disease, the environment, spawning stock, and predation. It is a simple matter to use the model as a simulation framework, in which alternative harvest and recruitment scenarios are developed. An example of a question to be addressed would be: If whales did not eat herring, would the population have rebounded more so than what really occurred?

Specifically the model will be used: (1) to determine if predation on adult PWS herring is significantly contributing to its failure to recover, (2) to compare the magnitude of this effect to other known factors such as disease and low recruitment, (3) to investigate whether low recruitment is a function of predation.

D. Description of Study Area

Prince William Sound: To reduce the costs of operating in PWS, our primary study area will focus on the waters of Sawmill Bay/Chenega Bay in year one, where local researchers can be land based with small boats. This area has a known population of humpback whales (humpback whale sighting data have been collected there for three years) and over wintering herring. Quarterly aerial surveys of humpback whales and semiannual herring biomass estimates from the remainder of PWS will supplement the fine-scale data from Chenega Bay. In year two, larger vessels will be used to expand the scale up in PWS.

Sitka Sound: A large robust herring fishery has existed in Sitka Sound for several decades, similar to PWS prior to the oil spill. Recruitment in years prior to the spill of Sitka and PWS herring is correlated (Williams and Quinn 2000), likely due to the influence of broad-based environmental and oceanographic forces. Jan Straley has studied humpback whales year-round since the early 1980s. It is not known whether Sitka Sound whales switch prey sources during the year. Because the Sitka stock is not depleted, comparison of predation effects between Sitka and PWS should be revealing.

Lynn Canal: Our study area will include the waters of southern Lynn Canal, near the Auke Bay Lab. This area has a year-round presence of humpback whale (pers. com. T. Quinn, R. Heintz, and S. Rice) and known concentrations of over wintering herring (Sigler and Csepp 2006). This stock has not been commercially fished since the 1980s, is struggling, and is similar in status to the present PWS stock. Both are suspected of being limited by whale predation. Proximity to the Auke Bay Lab provides for the safe and immediate operation of small vessels, permitting us to survey during the brief periods of good weather occurring in the fall and winter months. Periodically, aerial surveys of PWS and Lynn Canal will extend beyond the study area to locate other areas of winter humpback whale activity.

E. Coordination and Collaboration with Other Efforts

This project will combine the skills and location advantage of researchers from Auke Bay Lab (Rice, Heintz, Moran), Univ. of Alaska Southeast (Straley), Univ. of Alaska Fairbanks (Quinn), and local researchers at Sawmill Bay (McLaughlin). Further, we will coordinate with others, including ADFG in Sitka and Cordova (Moffitt), as well as Dick Thorne of Prince William Sound Science Center. In addition, we will collect sighting information from tour boat operators and pilots. We expect to collaborate with two other EVOSTC proposals evaluating and contrasting herring populations from different regions of Alaska; (1) Are herring (*Clupea pallasi*) energetics in PWS a limiting factor in successful recruitment of juveniles and reproduction investment of adults? (Vollenweider and Heintz of ABL), and (2) a project on Salmon shark predation submitted by Bruce Wright of APIAI and Ron Heintz, NOAA, AFSC

We will build on earlier herring and forage fish studies performed by the Auke Bay Laboratory. We will combine acoustic survey techniques (Sigler and Csepp 2006), used to estimate age structure, biomass with estimates of the energy content of whale prey. We will share our information with Brenda Norcross and her colleagues (UAF), who we understand are submitting four proposals. Their work with juvenile herring may be directly applicable to our modeling, in that recruitment estimates may be a function of predation on juvenile herring.

For this project, Dr. Stanley Rice will provide overall project management and coordination. Co-PI Jan Straley (UAS) will conduct the whale observations for Sitka, and provide IDs for all humpback whale photographs for all three locations, and train researchers at the other locations for photo work. Ron Heintz of ABL will lead the bioenergetics collections and measurements. John Moran of ABL will lead the field efforts in Lynn Canal, and prey assessments/collections. Kate McLaughlin will conduct the on-sight observations and photo work at Sawmill Bay, as well as some collections of herring from skiff operations. John Moran will be the field party chief on quarterly prey assessments conducted by ABL. Dr. Quinn of UAF will lead the modeling efforts.

We will share our information with Brenda Norcross and her colleagues (UAF), who we understand are submitting four proposals. Their work with juvenile herring may be directly applicable to our modeling, in that recruitment estimates may be a function of predation on juvenile herring.

III. SCHEDULE

A. Project Milestones

October 2007: Field work and data collection completed.
June 2008: Submit manuscripts for publication

B. Measurable Project Tasks

PWS

FY 07, 1st quarter November-December:	Trawl surveys. Photo id training and humpback whale photo id.
FY 07, 2nd quarter January-March:	Aerial surveys Begin prey analysis. Continue humpback whale photo id.
FY 07, 3rd quarter April-June:	Aerial surveys, acoustic and trawl surveys. Continue humpback whale photo id. Assemble mark-recapture data from photo IDs.
FY 07, 4th quarter August-September:	Analyze prey samples. Continue humpback whale photo id. Submit Annual Report. Conduct mark-recapture analyses of PWS and Sitka whales from historical datasets.

PWS and Sitka

FY 08, 1st quarter October-December:	AFS meeting. Small boat surveys in Sitka Sound. Complete surveys and sample analysis. Begin model development.

FY 08, 2nd quarter
January- March: Small boat surveys in Sitka Sound. Complete modeling. Begin report and manuscript preparation.

FY 08, 3rd quarter
April-June: Complete reports and manuscript. Submit publications.

Lynn Canal

FY 07, 1st quarter
November-December: Coordinate with Alaska Marine highway and local air taxis to locate humpback whales in southern Lynn Canal. Begin aerial, acoustic and trawl surveys. Begin humpback whale photo id.

FY 07, 2nd quarter
January-March: Continue aerial, acoustic and trawl surveys
Begin prey analysis. Continue humpback whale photo id.

FY 07, 3rd quarter
April-June: Coordinate with Allen Marine whale watching tour to locate humpback whales. Continue with acoustic and trawl surveys. Analyze prey samples. Continue humpback whale photo id.

FY 07, 4th quarter
August-September: Continue with acoustic and trawl surveys. Analyze prey samples. Continue humpback whale photo id.
Submit Annual Report.

FY 08, 1st quarter
October-December: AFS meeting.
Complete surveys and sample analysis. Assemble mark-recapture data.

FY 08, 2nd quarter
January- March: Conduct mark-recapture analysis. Compare whale population estimates with whale consumption estimates. Begin report and manuscript preparation.

FY 08, 3rd quarter
April-June: Complete reports and manuscript. Submit publications.

IV. RESPONSIVENESS TO KEY TRUSTEE STRATEGIES

A. Community Involvement and Traditional Ecological Knowledge (TEK)

This project relies heavily on local knowledge and community involvement. We are relying on local knowledge to identify survey locations. In addition, we will rely on local businesses to provide information on whale locations. We are also relying on residents of Chenega to conduct small-boat-surveys in PWS..

B. Resource Management Applications

This project offers fishery managers with a direct estimate of the mortality due to whale predation. Humpback whale abundance is increasing in the Gulf of Alaska, consequently these data will also be of direct value to managers seeking to develop ecosystem based approaches to fishery management. The project will also increased knowledge of humpback whale movements and winter feeding ecology

V. PUBLICATIONS AND REPORTS

We envision four primary peer review publications resulting from this study:

1. Winter abundance, distribution, and movement patterns of humpback whales in PWS and southeast Alaska
2. Seasonal changes in the diets of humpback whales foraging in southeast Alaska and PWS.
3. Prey consumption rates of humpback whales from PWS and southeast Alaska.
4. Non-recovery of Prince William Sound herring: disease, predation, and recruitment failure",
5. Final Report: The effect of winter whale predation on herring stocks in PWS, Sitka Sound, and Lynn Canal

We anticipate that each of the collaborators will participate in the production of four peer review manuscripts. However we have tentatively identified lead authorship of the first with Straley, the second two with ABL and the fourth with Quinn.

VI. PROFESSIONAL CONFERENCES

Result from this project will be presented at the Alaska Marine Science Symposium and at other professional meetings.

Literature Cited

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Heintz, R.A., and Vollenweider, J.J. *In review*. Seasonal and ontogenetic changes in the energy allocation strategies of walleye pollock. Canadian Journal of Fisheries and Aquatic Sciences.

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Williams, E.H., and Quinn, T.J., II. 2000. Pacific herring, *Clupea pallasi*, recruitment in the Bering Sea and Northeast Pacific Ocean: I. Relationships among different populations. Fish. Ocean. 9: 285-299.

Funding for FY 07 was approved by the Trustee Council on 11/14/06; FY 08 is pending

Budget Justification: NOAA & ADF&G = $513.5K

This is a two year collaborative proposal among researchers at the Auke Bay Lab, University of Alaska Fairbanks, and University of Alaska Southeast. We will cooperate with researchers from the Alaska Department of Fish and Game, Prince William Sound Science Center and community members from the Village of Chenega. The modeling of portion of this project will be lead by T. Quinn II at UAF. J. Straley at UAS will lead the humpback whale portion of this project. ABL personnel will be responsible for herring biomass/energetic estimates.

Auke Bay Lab Budget Specifics

Personnel: $39,900
FY 07 $17,100
FY 08 $22,800
One and half months salary and overtime for J. Moran/ year.
One month salary and overtime for J. Vollenwieder/ year.

Travel: $6,400
FY 07 $2,400
FY 08 $4,000
Travel to PWS for field work and Anchorage to present results at proffesional conferences.

*Contractual*Sample Analysis
FY 07 Total = $79.5K
Includes vessel and air charters, soft labor to process samples, but NOT Straley or Quinn
FY 08 Total = $131.5K
Includes vessel and air charters, soft labor to process samples, but NOT Straley or Quinn

Contractual Details: (See UAF & UAS Details for ADF&G RSA for Contracted Services)

- Acoustic interpretation and quality assurance- Richard Thorne of the PWSSC will assist ABL personnel in the interpretation of acoustic data. Dr. Thorne has extensive experience conducting acoustic herring surveys in PWS.
- Chenega/Sawmill Bay humpback whale photo-ID/ herring sampling: Kate McLaughlin, of Chenega, will be contracted for monthly surveys in PWS. She has already collected three years of humpback whale data in our Chenega/Sawmill study area. Her local knowledge and proximity to for to foraging will provide detailed data at a relatively low cost.
- Aircraft charter (PWS) - Aerial survey time to locate whale aggregations.
- Vessel Charter (PWS) - Trawl/acoustic surveys
- Aircraft charter (Lynn Canal and Sitka) - Aerial survey time to locate whale aggregations.
- Vessel Charter (Lynn Canal and Sitka) - Trawl/acoustic surveys

Commodities: $21,000
To prepare PWS sample for shipping, fuel for Lynn Canal surveys and miscellaneous supplies.
FY 07 $10,000
FY 08 $11,000

Equipment: $0

No new equipment will be purchased with EVOSTC funds.

University of Alaska Fairbanks Budget Justification

Total UAF Request for FY 2007 & FY 2008 = $55.8

Salaries & Benefits: *$39.6K*

For this two-year budget, the annual budget includes 1 month of funding for Quinn ($13.8K, $14.4K), and 2 months of summer stipend for graduate student Peter Hulson ($5.4K, $6K).

Staff benefits are applied according to UAF's benefit rates for FY07, negotiated with the Office of Naval Research (ONR). A copy of the rate proposal is available at: http://www.alaska.edu/ controller /cost-analysis/cost_reports.html. Beginning in FY08 additional student healthcare costs are estimated to be $500 per semester. These healthcare costs will be paid by from other funds.

Travel: *$4K*

Domestic

Travel to the EVOS annual meeting each year is included ($2K each year).

Commodities*: $1K*

Minimal project supply costs of $500 per year are included ($.5K each year).

Indirect Costs: *UAF: $11.2K*

Facilities and Administrative (F&A) Costs are negotiated with the Trustee Council and are calculated at 25% of the Total Direct Costs (TDC). TDC includes Total Direct Costs minus subcontracts in excess of $25,000 and equipment. Regarding subcontracts, the indirect rate is 25% of the first $25,000 of each subcontract, plus 5% of each subcontract's cost in excess of $25,000 and less than $250,000, plus 2% of each subcontract's cost in excess of $250,000. A copy of the agreement is available at: http://www.alaska.edu/ controller/cost-analysis/negotiated_agreements.html.

No UAF match funds are included in this project.

University of Alaska Southeast Budget Justification - $137.1K

***FY 07* $45.3**

Salary and Wages ($19.4K) - J. Straley, humpback whale project director (PD), will coordinate the collection of humpback whale photo identification data in Lynn Canal and Prince William Sound and work with the data analyst, T. Quinn, in preparing the data for quantitative analysis. Ms. Straley will train project staff on site (both areas) in the collection of photographic data, including effort and other related data. She will be responsible for grant administration, oversight of the humpback whale data and final report preparation that will describe numbers, movement, distribution and residency times of individual humpback whales in the study areas. J. Cedarleaf, research assistant, will conduct the photographic matching to various catalogs (collections of fluke photographs) in the North Pacific, manage the database (data entry and organization) and oversee photographic quality. Funds are requested for three months of salary for J. Straley (this will include travel (meetings and training), administration, analysis and report/paper writing) and one month of salary for Ms. Cedarleaf.

Fringe benefits ($10.9K) - Fringe benefits for the PD are requested at the standard faculty UAS rate, 55%, and for the Research Assistant at standard staff benefits of 57%.

Travel ($3.9K) - Travel funds are requested for the PD on site visits to train project staff in Juneau and Chenega for 5 days at each location, including travel time. Additional funds are requested for travel to Juneau to work with the data analyst and other project personnel (2 trips). Travel will account for about one month of the PD's time.

Other Direct Costs ($2.0K) – Funds are requested to purchase photographic supplies, including a photographic printer, paper and other miscellaneous supplies.

Indirect Costs ($9.1K) – Calculated at 25% EVOS research rate.

FY 08 **$91.9K**

Salary and Wages ($37.9K) - J. Straley, humpback whale PD, will coordinate the second year of data collection of humpback whale photo identification data in Lynn Canal and Prince William Sound (Chenega/Sawmill Bay). In year two, two additional study areas will be added to the project. Ms. Straley will conduct humpback photo identification surveys twice monthly and assist project staff with hydroacoustic prey assessment monthly surveys in Sitka Sound from August through March. Ms. Straley will conduct the photo identification work in the areas of Prince William Sound outside of Chenega/Sawmill Bay in conjunction with the monthly hydroacoustic surveys. She will continue to work with the data analyst, T. Quinn, in preparing the data for quantitative analysis. She will be responsible for grant administration, oversight of the humpback whale data and final report preparation that will describe numbers, movements, distribution and residency times of individual humpback whales in the study areas. J. Cedarleaf, research assistant, will conduct the photographic matching to various catalogs (collections of fluke photographs) in the North Pacific, manage the database (data entry and organization) and oversee photographic quality. Funds are requested for five months of salary for J. Straley (this will include field research, travel (meetings, presentations and training) months, administration, analysis and report/paper writing) and three months of salary for Ms. Cedarleaf.

Fringe benefits ($20.9K) - Fringe benefits for the PD are requested at the standard faculty UAS rate, 55%, and for the Research Assistant at standard staff benefits of 57%.

Travel ($7.3K) - Travel funds are requested for the PD to work with project staff in Juneau twice and conduct field research (4 trips) in Prince William Sound. Funds are requested for travel to the January 2008 Marine Science Symposium in Anchorage.

Other Direct Costs ($7.4K) – Funds are requested for boat fuel, maintenance and replacement parts for the Sitka Sound surveys. Costs for publication of one peer-reviewed paper are requested, as well. Funds are requested to purchase replacement printing and photography supplies.

Indirect Costs ($18.4K) – Calculated at 25% for EVOS research rate.

Non-EVOS Funds ($370K) – Annually $185K will be donated federally by Auke Bay Lab for salary and equipment to assist with the completion of this project.

CURRICULUM VITAE

Stanley D. Rice
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EDUCATION

Ph.D., Toxicology and Comparative Physiology, 1971, Kent State University
M.S., Biology, 1968, California State University Chico
B.A., Biology, 1966, California State University Chico

EXPERIENCE

1987-	Program Manager, Habitat and Oil Spill Programs NOAA, AFSC, Auke Bay Laboratory
1971-1986	Physiologist NOAA, AFSC, Auke Bay Laboratory

Over 127 peer reviewed publications; over 100 in toxicology.

Herring Articles

Peterson, C. H., S. D. Rice, J. W. Short, D. Esler, J. L. Bodkin, B. E.Ballachey, and D. B. Irons. 2003. Long-term ecosystem response to the Exxon Valdez oil spill. Science 302: 2082-2086.

Barron, M.G., M.G. Carls, J.W. Short, and S.D. Rice. 2003. Photoenhanced toxicity of aqueous phase and chemically dispersed weathered Alaska North Slope crude oil to Pacific herring eggs and larvae. Environ. Toxicol. Chem. 22(3): 650-660.

Carls, M.G., S.D. Rice, and J.E. Hose. 1999. Sensitivity of fish embryos to weathered crude oil: Part I. Low level exposure during incubation causes malformations, genetic damage, and mortality in larval Pacific herring (Clupea pallasi). Environmental Toxicol. Chem. 18:481-493.

Carls, M. G., G. D. Marty, T. R. Meyers, R. E. Thomas, and S. D. Rice. 1998. Expression of viral hemorrhagic septicemia virus in prespawning Pacific herring (*Clupea pallasi*) exposed to weathered crude oil. Can. J. Fish. Aquat. Sci. 55: 2300B2309.

Johnson, S.W., M.G. Carls, R.P. Stone, C.C. Brodersen, and S.D. Rice. 1997. Reproductive success of Pacific herring (Clupea pallasi) in Prince William Sound, Alaska, six years after the Exxon Valdez oil spill. Fishery Bulletin 95: 368-379.

Thomas, R. E., M. G. Carls, S. D. Rice, and L. Shagrun. 1997. Mixed function oxidase induction in pre- and post-spawn herring (*Clupea pallasi*) by petroleum hydrocarbons. Comparative Biochemistry and Physiology 116C (2): 141-147.

Moles, A.D., S.D. Rice, and M.S. Okihiro. 1993. Herring parasite and tissue alterations following the *Exxon Valdez* oil spill. Proceedings of the 1993 International Oil Spill Conference, March 20 - April 1, 1993, Tampa, Florida.

Rice, S.D., M.M. Babcock, C.C. Brodersen, M.G. Carls, J.A. Gharrett, S. Korn, A. Moles, and J. Short. 1987. Lethal and sublethal effects of the water-soluble fraction of Cook Inlet crude oil on Pacific herring *Clupea harengus pallasi* reproduction. U.S. Dep. Commer., NOAA Tech. Memo. NMFS F/NWC-111, 63 p.

Rice, S.D., M.M. Babcock, C.C. Brodersen, J.A. Gharrett, and S. Korn. 1987. Uptake and depuration of aromatic hydrocarbons by reproductively ripe pacific herring and the subsequent effect of residues on egg hatching and survival. *In* Pollution and Physiology of Estuarine Organisms (Edited by W.B. Vernberg, A. Calabrese, F.P. Thurberg, and F.J. Vernberg), pp. 139-154. Belle W. Baruch Libr. Mar. Sci. 17, University of South Carolina Press, Columbia.

Collaborators: Malin Babcock, Mark Carls, Pat Harris, Ron Heintz, Larry Holland, Marie Larsen, Margo Lindeberg, Jacek Maselko, Jerome Pella and Jeffrey Short: NOAA
Mace Barron (EPA), Brenda Ballachey, James Bodkin, Gail Irvine (USGS), J. Cusick (NPS), David Irons (USFWS)

Daniel Esler (Simon Fraser), Gary Marty, Diane Naydan (UC Davis), Charles Peterson (UNC Chapel Hill), Robert Thomas (CSU Chico), William Driskell, Michael Lilly, and James Payne (private contractors)

CURRICULUM VITAE

Terrance J. Quinn II
Professor of Fish Population Dynamics
Juneau Center, School of Fisheries and Ocean Sciences
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FAX 907-796-2050
E-mail: Terry.Quinn@uaf.edu
Birthdate: October 27, 1952

EDUCATION

Ph.D., Biomathematics, 1980, University of Washington, Seattle WA
M.S., Fisheries, 1977, University of Washington, Seattle WA
B.A., Mathematics, 1973, University of Colorado, Boulder CO

EXPERIENCE

1998-	Professor of Fish Population Dynamics, Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks
1985-1997	Associate Professor of Fish Population Dynamics, Juneau Center, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks
1978-1985	Biometrician, International Pacific Halibut Commission

Books

Funk, F., T.J. Quinn II, J. Heifetz, J.N. Ianelli, J.E. Powers, J.F. Schweigert, P.J. Sullivan, and C.-I. Zhang (editors). 1998. Fishery Stock Assessment Models. Proc. Symp. Fishery Stock Assess. Models 21st Cent. Alaska Sea Grant College Program, Fairbanks AK, AK-SG-98-01. 1054 p.

National Research Council. 1998a. Improving Fish Stock Assessments. National Academy Press, Washington DC. 177 p. (co-chair and co-author)

National Research Council. 1998b. Review of Northeast Fishery Stock Assessments. National Academy Press, Washington DC. 128 p. (chair and co-author)

Quinn, T.J., II, and R.B. Deriso. 1999. Quantitative Fish Dynamics. Oxford University Press, New York. 542 pp.

Herring Articles

Marty, G.D., Quinn, T.J., II, Carpenter, G., Meyers, T.R., and Willits, N.H. 2003. Role of disease in abundance of a Pacific herring population. Can. J. Fish. Aquat. Sci. 60: 1258-1265.

Quinn, T.J., II, Marty, G.D., Wilcock, J., and Willette, M. 2001. Disease and population assessment of Pacific herring in Prince William Sound, Alaska. University of Alaska Sea Grant, AK-SG-01-04, Fairbanks. pp. 363-379.

Rooper, C.N., Haldorson, L.J., and Quinn, T.J., II. 1998. An egg-loss correction for estimating spawning biomass of Pacific herring in Prince William Sound, Alaska. Alaska Fishery Research Bulletin 5: 137-142.

Rooper, C.N., Haldorson, L.J., and Quinn, T.J., II. 1999. Habitat factors controlling Pacific herring (*Clupea pallasi*) egg loss in Prince William Sound, Alaska. Canadian Journal of Fisheries and Aquatic Sciences 56: 1113-1142.

Williams, E.H., and Quinn, T.J., II. 1997. Age-structured analysis of Pacific herring from Norton Sound, Alaska. Alaska Fish. Res. Bull. 4: 87-109.

Williams, E.H., and Quinn, T.J., II. 1998. A parametric bootstrap of catch-age compositions using the Dirichlet distribution. Proc. Fishery Stock Assess. Models 21st Century, AK Sea Grant College Program, Fairbanks, AK: 371-384.

Williams, E.H., and Quinn, T.J., II. 2000a. Pacific herring, *Clupea pallasi*, recruitment in the Bering Sea and North-east Pacific Ocean: I. Relationships among different populations. Fisheries Oceanography 9: 285-299.

Williams, E.H., and Quinn, T.J., II. 2000b. Pacific herring, *Clupea pallasi*, recruitment in the Bering Sea and Northeast Pacific Ocean: I. Relationships to environmental variables and implications for forecasting. Fisheries Oceanography 9: 300-315.

Collaborators : Ram Myers, Paul Fanning, Robert Mohn, Paul Radomski, Jim Bence, Richard Deriso, Hal Geiger, Clive Turnbull, Vidar Wespestad, Gordon Kruse, John Calambokidis, Chris Gabriele, Jan Straley, Sally Mizroch, Joe Niebauer, Steve Hare, Paul Spencer, Jeremy Collie, Jim Ianelli, Martin Dorn, Anne Hollowed, Richard Marasco, Reg Watson, Fritz Funk, Lewis Haldorson, William Smoker, Gary Marty, John Wilcock, Lev Zhivotovsky, Tony Gharrett, Doug McBride, Peggy Merritt, Richard Gates, Jeff Fujioka, Ben van Alen, Pat Livingston, Graeme Parks, Milo Adkison, Robert Small, Carl Safina, Andy Rosenberg, Steve Moffitt

Students
Bonita Nelson, Jack Turnock, Scott Johnson, Bob Lafferty, Scott MacPherson, Nicole Szarzi, Robert Marshall, Lowell Fair, Daniel Bosch, Edgar Jones, Jon Heifetz, Peter Hagen, Randy Ericksen, Lewis Coggins, Erik Williams, Caihong Fu, Matthew Foster, Dana Hanselman, James Savereide, Brian Battaile, Colin Schmitz, Ben Williams, Briana Witteveen, Sara Miller, Kray Van Kirk, Haixue Shen, Peter Hulson, Joe Liddle. (Not chaired but significant involvement: Jie Zheng, Mike Sigler,Peggy Merritt, Ed Farley, Chris Rooper, Michio Fukushima, William Templin)

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EDUCATION:

1994 Master of Science, Biological Oceanography, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, Fairbanks, AK (Dr. F. Fay, Advisor)
1975 Bachelor of Science, College of Fisheries, University of Washington, Seattle, WA
1974/76 Friday Harbor Marine Lab, U. W.: Invertebrate biology, embryology and botany field courses

PROFESSIONAL BACKGROUND:

1999-present **ASSISTANT PROFESSOR OF BIOLOGY** University of Alaska Southeast-Sitka
1994-1999 **ASSISTANT PROFESSOR** University of Alaska Southeast-Sitka and University of Alaska Fairbanks, College of Rural Alaska, Rural Alaska Science and Math Network.
1979-1999 **INDEPENDENT MARINE BIOLOGIST**
1988-1992 **MARINE BIOLOGIST** Glacier Bay National Park, Alaska
1987-1988 **INSTRUCTOR** University of Alaska Southeast-Sitka
1980-1984 **FISHERIES BIOLOGIST** NSRAA Sitka, AK
1979 **WILDLIFE BIOLOGIST** U.S. Forest Service, Sitka, AK
1977-78 **BIOLOGICAL TECHNICIAN** U.S. Fish and Wildlife Service, Sitka, AK
1974-1977 **WILDERNESS RANGER**, U.S. Forest Service, Winthrop, WA

OTHER SKILLS:

Biopsy (crossbow and rifle) for genetic sampling of marine mammals
Digital and film photography used for photo identification of marine mammals
Trained by NMFS for conducting necropsies and disentanglements in fishing gear
Extensive boat (to 50') driving and maintenance skills (primarily outboard)
Through knowledge of the waters of southeastern Alaska from Dixon Entrance to Yakutat Bay
Statistical analysis using various software and Microsoft Excel programs
Database programs (Access)
Sitka WhaleFest board president and co-speaker selection committee chair (along with Dr. Mike Castellini, UAF) to select scientists to speak at the annual symposium on marine research in the North Pacific

SELECTED PUBLICATIONS AND REPORTS:

Straley, J.M and A.W. Trites. 2005. Investigations of Transient Killer Whale Predation in Southeastern Alaska. Final report to the North Pacific Marine Science Foundation and Alaska Fisheries Development Foundation . NA04NMF4390067. 4 pp.

Straley, J., A. Thode, V. O'Connell, L. Behnken, S. Mesnick and J. Liddle. 2005. Sperm Whale and Longline Fisheries Interactions in the Gulf of Alaska. Final Report to the North Pacific Research Board, Anchorage, AK. 15 pp.

Sigler, M.F., C. R. Lunsford, **J. M. Straley** and J. Liddle. In Review. Sperm whale depredation of sablefish longline gear in the northeast Pacific Ocean.

Gabriele, C.M., **J.M. Straley** and J. L. Neilson. In Review. Age at first calving of female humpback whales in southeastern Alaska. Canadian Journal of Zoology

Mizroch, S.A., L.M. Herman, **J.M. Straley**, D. Glockner-Ferrari, C. Jurasz, J.D. Darling, S. Cerchio, C.M. Gabriele, D.R. Salden and O. von Ziegesar. 2004. Estimating the adult survival rate of Central North Pacific humpback whales. Journal of Mammology.

Straley, J.M., T.J. Quinn and C.M. Gabriele. 2002. Estimate of the abundance of humpback whales in southeastern Alaska 1994-2000. Final contract report G00000756, National Marine Mammal Laboratory, 7600 Sandpoint Way N.E. Seattle, WA 98115. 22pp.

Straley, J. M., S. A. Mizroch, C. M. Gabriele, O. v. Ziegesar, L. M. Herman, A. S. Craig, D. Glockner-Ferrari, C. S. Baker, J. Darling, D. McSweeney, C. Jurasz, S. Cerchio, D. Salden, J. K. Jacobsen and G. Ellis. 2001. Birth intervals and calving rates of central North Pacific humpback whales. In: ed. 14th Biennial Conference on the Biology of Marine Mammals, Vancouver, British Columbia. pp. 207.

Gabriele, C.M, **J. M. Straley**, S.A. Mizroch, C.S. Baker, A.S. Craig, L.M. Herman, D.Glockner-Ferraari, S.Cerchio, P. von Ziegesar, J. Darling, D. McSweeney, T.J. Quinn II and J. J. Jacobsen. 2000. Estimating the mortality rate of humpback whale calves in the central North Pacific Ocean. Can. J. Zool. 79:589-600

Gabriele, C.M., **J.M. Straley**, L.M. Herman and R.J. Coleman. 1996. Fastest documented migration of a North Pacific humpback whale. Marine Mammal Science 12:457-464.

Straley, J. M. and C. M. Gabriele. 1997. Humpback whales of southeastern Alaska: a catalog of photographs. National Park Service, Gustavus, Alaska 99826. 107 pp.

Straley, J.M. 1994. Seasonal characteristics of humpback whales (*Megaptera novaeangliae*) in southeastern Alaska. Master's thesis, University of Alaska Fairbanks, Fairbanks, AK. 121pp.

Straley, J.M., C.M. Gabriele, C.S. Baker. 1994. Annual reproduction by individually identified humpback whales (*Megaptera novaeangliae*) in Alaskan waters. Marine Mammal Science 10(1):87-92.

Straley, J.M. 1991. Population characteristics of humpback whales (*Megaptera novaeangliae*) in Glacier Bay and adjacent waters 1990. National Park Service, Glacier Bay National Park, Gustavus, AK. 21pp.

Straley, J.M. 1990. Fall and winter occurrence of humpback whales *(Megaptera novaeangliae)* in southeastern Alaska. Reports of the International Whaling Commission (Special Issue 12):319-24.

Straley, J.M. 1990. Assessment of possible humpback whale *(Megaptera novaeangliae)* displacement from Prince William Sound to southeastern Alaska, fall 1989 and winter 1990. Report to NMFS, National Marine Mammal Laboratory, Seattle, WA.

INVITATIONAL WORKSHOPS, APPOINTMENTS, COMMITTES, GRANTS:

2006 Steering committee to develop a research strategy for a study of North Pacific killer whales with a focus on predation upon marine mammal populations

2005 Steering committee to organize a workshop: Fisheries Depredation by Killer and Sperm Whales: Behavioural Insights, Behavioural Solutions. Vancouver Aquarium, October 2006

2005 Invitational workshop to develop a research plan for assessing populations of sperm whales

2004 Invitational workshop to assess fishing gear modifications to reduce large whale entanglement

2003-07 North Pacific Research Board grant to study sperm whale fisheries interactions in Gulf of Alaska

2004-05 Regional coordinator and received grant for North Pacific humpback whale study (SPLASH)

2002 Steering committee to develop a basin wide study of North Pacific humpback whales (SPLASH)

2002 Invitation to technical workshop on Cetacean Interactions with Commercial Longline Fisheries in the South Pacific Region: Approaches to Mitigation, Apia, Samoa, 11-15 November 02

2002 NMFS NMML grant to estimate the abundance of humpback whales in southeastern Alaska

2001 NOAA, NPUMMRC & CIFAR grants to study predation of Steller sea lions by killer whales in southeastern Alaska

1997 President Sitka WhaleFest, a non profit dedicated to celebrating marine wildlife in the North Pacific through community and educational events

1996 Appointment by NMFS to the Alaska Regional Scientific Review group for marine mammals

1988 Alaska Marine Mammal Health and Stranding Network member includes large whale disentanglement

RECENT COLLABORATORS:

John Calambokidis, Cascadia Research, Olympia, WA
Christine Gabriele, Glacier Bay National Park and Preserve, Gustavus, AK
Craig Matkin, North Gulf Oceanic Society
Sarah Mesnick, Southwest Fisheries Science Center, La Jolla, CA
Janet Neilson, Glacier Bay National Park and Preserve, Gustavus, AK
Tory O'Connell, Commercial Fisheries, Alaska Department of Fish and Game, Sitka, Alaska
Terry Quinn, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, Juneau, AK
Aaron Thode, Scripps Institution of Oceanography, La Jolla, CA

Ron A. Heintz
Fishery Research Biologist
National Marine Fisheries Service
Auke Bay Laboratory
11305 Glacier Hwy.
Juneau, AK 99801 USA

Voice: (907) 789-6058
Fax : (907)789-6094
EMAIL: Ron.Heintz@NOAA.GOV

EDUCATION:

B.S. Ecology Ethology and Evolution, June 1979, University of Illinois, Urbana Illinois
M.S. Fisheries Biology, May 1987, University of Alaska, Juneau Alaska
PhD Candidate: University of Alaska, Fairbanks Alaska

PROFESSIONAL MEMBERSHIPS:

American Fisheries Society
American Institute of Biological Scientists
American Chemical Society

EMPLOYMENT AND STUDY FOCUS:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Auke Bay Laboratory since 1985.

Prior to 2000

Examined the effects of crude oil exposure during embryogenesis on the life history of fish.

Since 2000

Leads AFSC Nutritional Ecology Laboratory program investigating the nutritional status and trophic relationships of marine forage species.

SELECTED BIOENERGETIC/LIPID BIOCHEMISTRY PUBLICATIONS:

Vollenweider, Johanna J. **R. Heintz** and B. Kelly. In Review. Seasonal variation in the proximate composition and whole-body energy content of forage fish. Marine Ecology Progress Series.

Heintz R. and J Volllenweider. In Review. Seasonal and ontogenetic changes in the energy allocation strategies of walleye pollock. Can. J. Fish. Aquat. Sci.

Hudson, JP, **R. Heintz,** J Vollenweider. Overwinter energy dynamics of capelin and eulachon in southeastern Alaska. Fishery Bulletin.

Vollenweider, Johanna J., Jamie Womble, **Ron Heintz**. Forage fish species contribution to total energy content of Steller sea lion diet in southeastern Alaska. Proc. 22nd Wakefield Fisheries Symposium: Sea Lions of the World

Otis, T., **R.A. Heintz** and K.P. Severin. In Review. Discriminating among Alaska's herring stocks using heart fatty acid profiles and otolith microchemistry. Oil Spill Restoration Project Final Report (Restoration Project 02538), Alaska Department of Fish and Game, Homer, Alaska.

Heintz, R.A., B.D. Nelson, J. Hudson, M. Larsen, and L. Holland. 2004. Marine subsidies in freshwater: Effects of salmon carcasses on lipid class and fatty acid composition of juvenile coho salmon. Trans. Am. Fish. Soc. 133:559-567.

Gende, S.M., T.P. Quinn, M.F. Willson, **R. Heintz**, T. M. Scott. 2004. Magnitude and fate of salmon-derived nutrients and energy in a coastal stream ecosystem. J. Fresh. Ecol. 19:149-160.

John R. Moran

Auke Bay Laboratory (As of 21 Aug 2006)
Tel: (907) 796-6161
Email: john.moran@uas.alaska.edu

EDUCATION

University of Alaska Fairbanks, M.S. in Fisheries, August 2003.
University of New Hampshire, B.A. in Zoology, minor in Marine Biology, May 1989.

PROFESSIONAL EXPERIENCE

Research Associate, *University of Alaska Southeast, Juneau, AK.* September 2003-present
Research Assistant, *University of Alaska Fairbanks, Juneau, AK*. January 2002-May 2003
Weir Crew Leader, *SWCA, Salt Lake City, UT.* September 2001-November 2001
Graduate Intern, *Alaska Department of Fish and Game, Juneau, AK.* April 2000-April 2001
Teaching Assistant, *University of Alaska Fairbanks, Juneau, AK.* September 1999-December 2000
Biological Technician (Fisheries), *U.S. Fish and Wildlife Service, Togiak NWR, Dillingham, AK***.** April 1998-August 1999
Biological Science Technician (Wildlife), *U.S. Fish and Wildlife Service, Togiak NWR, Dillingham, AK*
Fisheries Technician/Tagger/Diver, *Prince William Sound Aquaculture, Cordova, AK.* February 1992-April 1993

PAPERS (primary author)

Moran, J.R., B.P. Kelly, O.Badajos, and M. Kunnasranta. The influence of environmental variables on counts of visible ringed seals. In prep.

Moran, J.R., M.D. Adkison, and B.P. Kelly. Counting seals: Estimating the unseen fraction using a photographic capture-recapture and covariate model. In prep. for the Canadian Journal of Zoology.

Moran, J.R. 2003. Counting seals: Estimating the unseen fraction using a covariate and capture-recapture model. M.S. Thesis, University of Alaska Fairbanks.

Moran, J.R., and C. A. Wilson. 1996. Abundance and distribution of marine mammals in northern Bristol Bay and southern Kuskokwim Bay - a status report of the marine mammal monitoring effort at Togiak NWR. Annual report 1995. USFWS report, 19 pp. Dillingham, AK.

Moran, J.R. 1994. Landbird monitoring at Cape Peirce, Alaska, 1994. USFWS report, 4 pp. Dillingham, AK.

Moran, J.R.1994. Waterfowl and shorebird observations at Chagvan Bay and Cape Peirce, Alaska, 1994. USFWS report, 8 pp. Dillingham, AK

Moran, J.R. 1994. Small mammal studies and observations at Cape Peirce, Alaska, 1993. USFWS report, 5 pp. Dillingham, AK.

PAPERS (co-author)

Kelly, B.P., S. Nghiem, M. Kunnasranta, O.Badajos, J. Moran, and D. Douglas. The Ringed Seal's Sense of Snow. In prep.

Swanson, B.J., B.P. Kelly, C. Maddox, and J.R. Moran. Shed seal skin as a source of DNA molecular. In press. for Molecular Ecology Notes.

Wilson C.A., J.R. Moran, and R. Mac Donald. Pacific walruses (*Odobenus rosmarus divergens*) falling from cliffs in southwestern Alaska. In review for Marine Mammal Science.

Kelly, B., O. Badajos, M. Kunnasranta and J. Moran. 2005. Timing and re-interpretation of ringed seal surveys. Final report to Coastal Marine Institute, University of Alaska Fairbanks.

Lisac, M.J. and J.R. Moran 1999. Migratory and seasonal distribution of Dolly Varden *Salvelinus malma* in the Togiak River watershed, Togiak National Wildlife Refuge. Progress report 1999. USFWS report, 28 pp. Dillingham, AK.

Wilson C.A. and J.R. Moran. 1997. Abundance and distribution of marine mammals in northern Bristol Bay and southern Kuskokwim Bay-a status report of the marine mammal monitoring effort at Togiak NWR. Annual report 1997. USFWS report, 33 pp. Dillingham, AK.

Haggblom, L., and J. Moran 1995. The status of kittiwakes, murres, and cormorants at Cape Peirce, Bristol Bay, Alaska, Summer 1994. USFWS report, 14 pp. Dillingham, AK.

Haggblom, L., and J. Moran. 1994. The status of kittiwakes, murres, and cormorants at Cape Peirce, Bristol Bay, Alaska, Summer 1993. USFWS report, 20 pp. Dillingham, AK.

RECENT COLLABORATORS:

Brendan Kelly, University of Alaska Southeast, Juneau, AK
Mervi Kunnasranta, University of Joensuu, Joensuu, Finland
Peter Boveng, Polar Ecosystem Program, NMML, NMFS, Seattle, WA
Lois Harwood, Department of Fisheries and Oceans Canada, Yellowknife, NT, Canada
Tom Smith, EMC EcoMarine Corporation,Quebec, Canada
Rex Snyder, Nanuuq Commission, Anchorage, AK

DATA MANAGEMENT AND QUALITY ASSURANCE/ QUALITY CONTROL STATEMENT

This project involves collecting and processing data, conducting surveys, taking measurements, and modeling. Data management and quality control will be the responsibility of Dr. Stanley Rice of the Auke Bay Lab, using established scientific protocols. If this proposal is funded, then we will work with EVOSTC to set up a data management plan, so that essential data on humpback whales and herring will be archived. Computer models will be provided in electronic form along with detailed explanations of how they work. We will use MetaLite, freeware created by USGS for collecting and validating Federal Geographic Data Committee (FGDC)-compliant metadata, as requested.

1. Study design and statistical analyses are given elsewhere in this proposal.
2. Standard scientific protocols will be used for field studies and hypothesis testing.
3. Data characteristics
    a. Metadata will be provided if the proposal is funded.
    b. Quantitiative datasets will be obtained for humpback whales, herring, and related factors in three locations: Prince William Sound, Sitka Sound, and Lynn Canal.
4. Our cited literature describes the methods to be used for converting signals to observations.
5. Handling and custody of samples will follow standard ABL and University protocols.
6. Calibration and evaluation of analytical instruments are routinely performed at ABL and the University of Alaska.
7. Standard software will be used (Microsoft Office, R, Mark).

SIGNIFICANCE OF WHALE PREDATION ON MORTALITY RATE OF PACIFIC HERRING IN PRINCE WILLIAM SOUND
Metadata:

Identification_Information:
Citation:
Citation_Information:
Originator: S.D. Rice, J Moran, R. Heintz, T Quinn and J Straley
Publication_Date: 20091001
Title:
SIGNIFICANCE OF WHALE PREDATION ON MORTALITY RATE OF PACIFIC HERRING IN PRINCE WILLIAM SOUND
Geospatial_Data_Presentation_Form: atlas
Publication_Information:
Publication_Place: Juneau AK
Publisher: NOAA
Description:
Abstract:
Pacific herring (Clupea pallasi) in Prince William Sound (PWS) have been classified as "not-recovered" by the Exxon Valdez Oil Spill Trustee Council. Predation by marine mammals has been cited as a factor in the failure of this population to rebound. We will assess the significance of humpback whale predation on herring in PWS, particularly in winter. Specifically we will estimate the number of whales foraging in winter, determine when and if there is a prey switch to herring, and how long whales focus on herring as prey. Year one, is stand alone, small in scale with an intense monitoring strategy; year 2 would expand the scale up in area significantly. These data will be combined in a bioenergetic model to determine numbers of herring consumed (and energy content consumed). Lastly, the estimated numbers of herring consumed would be included in an age-structured model so that the significance of whale predation on herring recovery can be evaluated.
Purpose:
The purpose of this data set is to document whale predation on Pacific herring in PWS and determine if that predation contributes signficantly to herring mortality rates.
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Time_Period_Information:
Range_of_Dates/Times:
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Ending_Date: 20091001
Currentness_Reference: publication date
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Theme_Keyword: ecological dynamics
Theme_Keyword: dinámica ecológica
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Theme_Keyword: peces
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Contact_Person: Jeep Rce
Contact_Organization: NOAA Auke Bay Lab
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Address_Type: Mailing and Physical Address
Address: 11305 Glacier Hwy
City: Juneau
State_or_Province: AK
Postal_Code: 99801
Contact_Voice_Telephone: 907-789-6020
Contact_Facsimile_Telephone: 907-789-6094
Contact_Electronic_Mail_Address: jeep.rice@noaa.gov
Distribution_Liability: none

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Contact_Organization: NOAA Auke Bay Lab
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have been classified as "not-recovered" by the Exxon Valdez Oil Spill Trustee
Council.  Predation by marine mammals has been cited as a factor in the
failure of this population to rebound.  We will assess the significance of
humpback whale predation on herring in PWS, particularly in winter.
Specifically we will estimate the number of whales foraging in winter,
determine when and if there is a prey switch to herring, and how long whales
focus on herring as prey.   Year one, is stand alone, small in scale with an
intense monitoring strategy; year 2 would expand the scale up in area
significantly.
These data will be combined in a bioenergetic model to determine numbers of
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of herring consumed would be included in an age-structured model so that the
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    Citation_Information:
      Originator: S.D. Rice, J Moran, R. Heintz, T Quinn and J Straley
      Publication_Date: 20091001
      Title: SIGNIFICANCE OF WHALE PREDATION ON MORTALITY RATE OF PACIFIC HERRING IN PRINCE WILLIAM SOUND
      Geospatial_Data_Presentation_Form: atlas
      Publication_Information:
        Publication_Place: Juneau AK
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    Abstract:
      Pacific herring (Clupea pallasi) in Prince William Sound (PWS) have been classified as "not-recovered" by the Exxon Valdez Oil Spill Trustee Council. Predation by marine mammals has been cited as a factor in the failure of this population to rebound. We will assess the significance of humpback whale predation on herring in PWS, particularly in winter. Specifically we will estimate the number of whales foraging in winter, determine when and if there is a prey switch to

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Progress: Complete
Maintenance_and_Update_Frequency: As needed
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Bounding_Coordinates:
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Theme_Keyword_Thesaurus: predator prey relationships
Theme_Keyword: ecological dynamics
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Place:
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Contact_Person: Jeep Rce
Contact_Organization: NOAA Auke Bay Lab

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Contact_Organization: NOAA Auke Bay Lab
Contact_Address:
Address_Type: Mailing and Physical Address
Address: 11305 Glacier Hwy
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2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
October 1, 2006 - September 30, 2007

Budget Category:	Approved FY 2007	Proposed FY 2008	Project Totals	ADF&G	NOAA	TOTAL
				$210.2	$303.3	$513.5
Personnel	$17.1	$22.8	$39.9			
Travel	$2.4	$4.0	$6.4			
Contractual	$151.9	$252.0	$403.9			
Commodities	$10.0	$11.0	$21.0			
Equipment	$0.0	$0.0	$0.0			
Subtotal	$181.4	$289.8	$471.2			
General Administration	$16.3	$26.0	$42.3			
Project Total	$197.7	$315.8	$513.5			
Full-time Equivalents (FTE)	0.2	0.3				
Other Resources	$185.0	$185.0	$370.0			

Funding for FY 07 was approved at the Trustee Council meeting of 11/14/06; FY 08 is pending. A rounding error, requiring a deduction of $100 has been corrected within the agencies' G&A figures.

Non-EVOS Funds ($370K)

Annually $185K will be donated federally by Auke Bay Lab (NOAA) for salary and equipment to assist with the completion of this project.

FY07 - FY08

Rev. 8/10

Project Number: 070804
Project Title: Role of Whale Predation on Dynamics of Herring in Prince William Sound
Lead Agency: NOAA- Auke Bay Lab

FORM 2A MULTI-TRUSTEE

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

Budget Category:	Approved FY 2007	Proposed FY 2008	Project Totals
Personnel	$17.1	$22.8	$39.9
Travel	$2.4	$4.0	$6.4
Contractual	$79.5	$131.5	$211.0
Commodities	$10.0	$11.0	$21.0
Equipment	$0.0	$0.0	$0.0
Subtotal	$109.0	$169.3	$278.3
General Administration	$9.8	$15.2	$25.0
Project Total	$118.8	$184.5	$303.3
Full-time Equivalents (FTE)	0.2	0.3	
	Dollar amounts are shown in thousands of dollars.		
Other Resources	$185.0	$185.0	$370.0

Comments:
Auke Bay Laboatory will provide 2 months of Robert Bradshaw (proximate analysis for 12 K), 2 months of John Moran for 12K, 1 month of JJ Vollenweider for 6K , 3 months of Ron Heintz for 30K and 1 month of Jeep Rice for 18 K for data collections, chemical analysis quality control for a total of 78K in labor. We will also will donate 50 K in acoustic gear and chemical analysis instruments. We will also provide vessel and other logistical support for 58 K for a total of 185K annually.

FY07-FY 08

Rev. 8/10

Project Number: 070804
Project Title: Role of Whale Predation on Dynamics of Herring in Prince William Sound
Agency: NOAA- Auke Bay Lab

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

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2007
John Moran	Fishery Biologist		1.5	5.7	1.5	10.1
JJ Vollenweider	Fishery Biologist		1.0	5.7	1.3	7.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		2.5	11.4	2.8	
					Personnel Total	$17.1

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2007
Annual Workshop	0.4	1	2	0.2	0.8
					0.0
Jnu-Cordova field sampling	0.4	3	2	0.2	1.6
					0.0
					0.0
					0.0
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					0.0
					0.0
					0.0
					0.0
				Travel Total	$2.4

FY07

Rev. 8/10

Project Number: 070804
Project Title: Role of Whale Predation on Dynamics of Herring in Prince William Sound
Agency: NOAA- Auke Bay Lab

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

Contractual Costs:		Proposed	
Description		FY 2007	
Chemistry lab analysis contract labor- ABL		20.0	
Field Assistant contract labor		4.5	
Humpback Photo ID contract labor		7.0	x
Hydroacoustic Training contract labor		5.0	x
Charter Aircraft count survey labor		2.0	
Charter Aircraft for aerial surveys		11.0	x
Vessel Charter for pery samling		30.0	x
When a non-trustee organization is used, the form 4A is required.	**Contractual Total**	$79.5	

Commodities Costs:		Proposed	
Description		FY 2007	
Freight costs for field gear		4.0	x
Field supplies and fuel		6.0	x
	Commodities Total	$10.0	

FY07

Rev. 8/10

Project Number: 070804
Project Title: Role of Whale Predation on Dynamics of Herring in Prince William Sound
Agency: NOAA- Auke Bay Lab

FORM

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

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2007
			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.			0.0
		New Equipment Total	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

FY07

Rev. 8/10

Project Number: 070804
Project Title: Role of Whale Predation on Dynamics of Herring in Prince William Sound
Agency: NOAA- Auke Bay Lab

FORM

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

Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2007
JJ Vollenweider	Fishery Biologist		1.5	5.7	1.5	10.1
John Moran	Fishery Biologist		2.0	5.7	1.3	12.7
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		3.5	11.4	2.8	
					Personnel Total	$22.8

Travel Costs:		Ticket	Round	Total	Daily	Proposed
Description		Price	Trips	Days	Per Diem	FY 2007
Annual Workshop		0.4	1	2	0.2	0.8
						0.0
Jnu-Cordova field sampling	aucoustics	0.4	7	2	0.2	3.2
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
					Travel Total	$4.0

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Agency: NOAA- Auke Bay Lab

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October 1, 2006 - September 30, 2007

Contractual Costs:	Proposed
Description	FY 2008
Chemistry lab analysis contract labor- ABL	25.0
Field Assistant contrat labor	5.0
Humpback Photo ID contract labor	10.0
Charter Aircraft count survey labor	2.0
Aircraft charter surveys	19.5
Vessel charters	70.0
Contractual Total	$131.5

Commodities Costs:	Proposed
Description	FY 2008
Freight costs for gear	5.0
Field gear costs, fuels sample preservation	6.0
Commodities Total	$11.0

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New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2008
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Those purchases associated with replacement equipment should be indicated by placement of an R.			0.0
		New Equipment Total	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

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

Budget Category:	Approved FY 2007	Proposed FY 2008	Total ADF&G
Personnel	$0.0	$0.0	$0.0
Travel	$0.0	$0.0	$0.0
Contractual	$72.4	$120.5	$192.9
Commodities	$0.0	$0.0	$0.0
Equipment	$0.0	$0.0	$0.0
Subtotal	$72.4	$120.5	$192.9
General Administration	$6.5	$10.8	$17.3
Project Total	$78.9	$131.3	$210.2
Full-time Equivalents (FTE)	0.0	0.0	
	Dollar amounts are shown in thousands of dollars.		
Other Resources	$0.0	$0.0	$0.0

Comments:

FY07-FY 08

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2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
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Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2007
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		0.0	0.0	0.0	
					Personnel Total	$0.0

Travel Costs:	Ticket	Round	Total	Daily	Proposed
Description	Price	Trips	Days	Per Diem	FY 2007
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
					0.0
				Travel Total	$0.0

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Contractual Costs:	Proposed
Description	FY 2007
4A/B Link - University of Alaska Fairbanks - Quinn	27.1
4A/B Link - University of Alaska Southeast - Straley	45.3
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$72.4

Commodities Costs:	Proposed
Description	FY 2007
Commodities Total	$0.0

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

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

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

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Personnel Costs:		GS/Range/	Months	Monthly		Proposed
Name	Position Description	Step	Budgeted	Costs	Overtime	FY 2008
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
	Subtotal		0.0	0.0	0.0	
					Personnel Total	$0.0

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

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2007 EXXON VALDEZ TRUSTEE COUNCIL PROJECT BUDGET
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Contractual Costs:	Proposed
Description	FY 2008
4A/B Link - University of Alaska Fairbanks - Quinn	28.6
4A/B Link - University of Alaska Southeast - Straley	91.9
When a non-trustee organization is used, the form 4A is required. **Contractual Total**	$120.5

Commodities Costs:	Proposed
Description	FY 2008
Commodities Total	$0.0

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

New Equipment Purchases:	Number	Unit	Proposed
Description	of Units	Price	FY 2008
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
			0.0
Purchases associated with replacement equipment should be indicated by placement of an R.			0.0
		New Equipment Total	$0.0

Existing Equipment Usage:	Number	Inventory
Description	of Units	Agency

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