Exxon Valdez Oil Spill Trustee Council

FINAL FY12 - FY16 Work Plan for Restoration, Research and Monitoring Projects:

Fiscal Year 2012

Revised July 17, 2017

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FISCAL YEAR 2012

FINAL WORK PLAN

November 28, 2012

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Exxon Valdez Oil Spill Trustee Council

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Notice

The abstract of each proposal was written by the authors of the proposals to describe their projects. To the extent that the abstracts express opinions about the status of injured resources they do not represent the views of the Executive Director or other staff of the *Exxon Valdez* Oil Spill Trustee Council, nor do they reflect policies or positions of the Trustee Council.

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FY12 Funding Recommendations

Project Number	Principal Investigator	Project Title (abbr.)	Total Requested	FY12 Requested	FY12 Approved	Science Panel	Science Coord.	PAC	Executive Director	Trustee Council
12120118	Ammann	Community-based Marine Debris Program	$1,090,000.00	$534,100.00	$0.00	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund	**Do Not Fund**
12120115	Anderson	Vessel Wash-Down and Wastewater Recycling Facility	$739,100.00	$97,800.00	$97,800.00	Fund	Fund	Fund	Fund	**Fund**
12120100	EVOS Admin	EVOS Administration	$1,711,790	$1,711,790	$1,711,790	Not Reviewed	Not Reviewed	Not Reviewed	Fund	**Fund**
11100112-A	Irvine	Amendment to Lingering Oil on Boulder-Armored Beaches	$61,700.00	$61,700.00	$61,700.00	Not Reviewed	Fund	Not Reviewed	Fund	**Fund**
12120112	Jennings	PWS Harbor Cleanup Project	$1,090,000.00	$79,570.00	$19,883.00	Do Not Fund	Do Not Fund	Do Not Fund	Fund	**Fund Reduced**
12120120	Jones	Data Management and Synthesis	$1,733,915.00	$446,573.00	$446,573.00	Fund	Fund	Not Reviewed	Fund	**Fund**
12120114	McCammon	LTM - Marine Conditions and Injured Resources and Services	$11,938,100.00	$2,460,500.00	$2,460,500.00	Fund	Fund	Fund	Fund	**Fund**
12120117	Nixon	Lingering oil distribution modeling	$177,400.00	$177,400.00	$177,400.00	Fund	Fund	Fund	Fund	**Fund**
12120116	Pallister	Marine Debris Removal	$1,106,400.00	$384,400.00	$481,064.00	Fund	Fund	Fund	Fund	**Fund**
12120111	Pegau	PWS Herring Research and Monitoring Program	$5,759,600.00	$990,500.00	$990,500.00	Fund	Fund	Fund	Fund	**Fund**
12120113	Pegau	Lessons learned and implications to future spill response	$762,673.00	$528,868.00	$0.00	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund	**Do Not Fund**
12120119	Whissel	Maine Debris Program	$1,082,830.00	$1,082,830.00	$0.00	Do Not Fund	Do Not Fund	Do Not Fund	Do Not Fund	**Do Not Fund**

PROJECTS INCLUDED IN THE PWS HERRING RESEARCH AND MONITORING PROGRAM

Project Number	Principal Investigator	Project Title (abbr.)	Total Requested	FY12 Requested	FY12 Approved	Science Panel	Science Coord.	PAC	Executive Director	Trustee Council
12120111A	Bishop	PWS Herring Program - Validation of Acoustic Surveys	$592,900.00	$68,000.00	$68,000.00	Fund	Fund	Fund	Fund	**Fund**
12120111B	Bishop	PWS Herring Program - Tracking Seasonal Movements	$107,800.00	$65,500.00	$65,500.00	Fund	Fund	Fund	Fund	**Fund**
12120111C	Bochenek	PWS Herring Program - Data Management Support	$331,100.00	$130,800.00	$130,800.00	Modify	Modify	Modify	Modify	**Fund**
12120111D	Boswell	PWS Herring Program - Non lethal herring sampling	$94,900.00	$94,900.00	$94,900.00	Fund	Fund	Fund	Fund	**Fund**
12120111E	Buckhorn	PWS Herring Program - Expanded Adult Herring Surveys	$334,000.00	$6,500.00	$6,500.00	Fund	Fund	Fund	Fund	**Fund**
12120111F	Buckhorn	PWS Herring Program - Juvenile Herring Abundance Index	$404,100.00	$90,100.00	$90,100.00	Fund	Fund	Fund	Fund	**Fund**
12120111G	Buckhorn	PWS Herring Program - Intensive surveys of juvenile herring	$133,200.00	$50,100.00	$50,100.00	Fund	Fund	Fund	Fund	**Fund**
12120111H	Pegau	PWS Herring Program - Outreach and Education Program	$154,000.00	$16,500.00	$16,500.00	Fund	Fund	Fund	Fund	**Fund**
12120111I	Heintz	PWS Herring Program - Fatty Acid Analysis	$65,500.00	$18,400.00	$18,400.00	Fund	Fund	Fund	Fund	**Fund**
12120111J	Heintz	PWS Herring Program - Age at first spawning for herring in PWS	$71,400.00	$49,600.00	$49,600.00	Fund	Fund	Fund	Fund	**Fund**
12120111K	Hershberger	PWS Herring Program -Herring Disease Program	$871,800.00	$0.00	$0.00	Fund	Fund	Fund	Fund	**Fund**
12120111L	Kline	PWS Herring Program - Herring Condition Monitoring	$974,100.00	$0.00	$0.00	Fund	Fund	Fund	Fund	**Fund**
12120111M	Kline	PWS Herring Program - Juvenile Herring Intensive Montoring	$304,700.00	$207,000.00	$207,000.00	Fund	Fund	Fund	Fund	**Fund**
12120111N	Moffitt	PWS Herring Program - Scales as growth history records	$129,500.00	$86,200.00	$86,200.00	Fund	Fund	Fund	Fund	**Fund**
12120111O	Pegau	PWS Herring Program - Coordination and Logistics	$1,513,000.00	$327,200.00	$327,200.00	Fund	Fund	Fund	Fund	**Fund**
12120111P	Wildes	PWS Herring Program - Herring Genetics	$103,600.00	$0.00	$0.00	Fund	Fund	Fund	Fund	**Fund**
12120111Q	Branch	PWS Herring Program - Population Dynamics Modeling	$427,082.00	$36,907.00	$36,907.00	Fund	Fund	Fund	Fund	**Fund**

PROJECTS INCLUDED IN THE LONG-TERM MONITORING OF MARINE CONDITIONS AND INJURED RESOURCES AND SERVICES

Project Number	Principal Investigator	Project Title (abbr.)	Total Requested	FY12 Requested	FY12 Approved	Science Panel	Science Coord.	PAC	Executive Director	Trustee Council
12120114A	Batten	LTM Program - Continuous Plankton Recorder	$279,500.00	$0.00	$0.00	Fund	Fund	Fund	Fund	**Fund**
12120114B	Bird	LTM Program - Coordination and Logistics	$1,418,200.00	$263,300.00	$263,300.00	Fund	Fund	Fund	Fund	**Fund**
12120114C	Bishop	LTM Program - Seabird Abundance in Fall and Winter	$380,900.00	$51,700.00	$51,700.00	Fund	Fund	Fund	Fund	**Fund**
12120114D	Bochenek	LTM Program - Data Management	$817,400.00	$163,500.00	$163,500.00	Modify	Modify	Modify	Modify	**Fund**
12120114E	Campbell	LTM Program - Oceanographic Conditions in PWS	$1,041,600.00	$238,100.00	$238,100.00	Fund	Fund	Fund	Fund	**Fund**
12120114F	Coletti	LTM Program - Ability to Detect Trends in Nearshore Marine Birds	$32,700.00	$32,700.00	$32,700.00	Fund	Fund	Fund	Fund	**Fund**
12120114G	Doroff	LTM Program - Oceanographic Monitoring in Cook Inlet	$778,200.00	$191,900.00	$191,900.00	Fund	Fund	Fund	Fund	**Fund**
12120114H	Holderied	LTM Program - Science Coordination and Synthesis	$708,500.00	$123,500.00	$123,500.00	Fund	Fund	Fund	Fund	**Fund**
12120114I	Hollmen	LTM Program - Conceptual Ecological Modeling	$431,000.00	$83,100.00	$83,100.00	Fund	Fund	Fund	Fund	**Fund**
12120114J	Hopcroft	LTM Program - Seward Line Monitoring	$470,200.00	$98,100.00	$98,100.00	Fund	Fund	Fund	Fund	**Fund**
12120114K	Irons	LTM Program - PWS Marine Bird Surveys	$681,400.00	$206,300.00	$206,300.00	Fund	Fund	Fund	Fund	**Fund**
12120114L	Konar	LTM Program - Ecological Communities in Kachemak Bay	$239,800.00	$48,100.00	$48,100.00	Fund	Fund	Fund	Fund	**Fund**
12120114M	Matkin	LTM Program -Long-term killer whale monitoring	$538,700.00	$7,200.00	$7,200.00	Fund	Fund	Fund	Fund	**Fund**
12120114N	Moran	LTM Program - Humpback Whale Predation on Herring	$591,900.00	$127,400.00	$127,400.00	Fund	Fund	Fund	Fund	**Fund**
12120114O	Piatt	LTM Program - Forage Fish Distribution & Abundance,	$967,600.00	$209,900.00	$209,900.00	Fund	Fund	Fund	Fund	**Fund**
12120114P	Weingartner	LTM Program – Continuing GAK1 Monitoring	$579,300.00	$109,500.00	$109,500.00	Fund	Fund	Fund	Fund	**Fund**
12120114Q	Ballachey	LTM Program - EVO Exposure of Harlequin Ducks and Sea Otters	$204,200.00	$204,200.00	$204,200.00	Fund	Fund	Fund	Fund	**Fund**
12120114R	Ballachey	LTM Program - Nearshore benthic systems in the Gulf of Alaska	$1,559,900.00	$282,400.00	$282,400.00	Fund	Fund	Fund	Fund	**Fund**
12120114S	Carls	LTM Program - Oil Level and Weathering Tracking	$217,100.00	$19,600.00	$19,600.00	Fund	Fund	Fund	Fund	**Fund**

Continuing Projects in FY12

Project #	Principal Investigator	Project Title (abbr.)	FY12 Funding	First Year Funded
10100132-G	Bishop	PWS Herring Survey: Top-Down Regulation by Predatory Fish	$193,400.00	FY10
10100750	Bodkin	Evaluation of Recovery and Restoration of Injured Nearshore Resources	$165,329.00	FY10
10100132-F	Brown	PWS Herring Survey: Herring, Predator, and Competitor Density	$153,055.60	FY10
10100624	Bychkov	Measuring Interannual Variability in the Herring's Forage Base	$65,100.00	FY10
10100132-A	Campbell	PWS Herring Survey: Plankton and Oceanographic Observations	$200,100.00	FY10
10100290	Carls	The Exxon Valdez Trustee Hydrocarbon Database	$9,300.00	FY10
10100132-E	Gay	PWS Herring Survey: Nursery Habitats of Juvenile Pacific Herring	$90,000.00	FY10
10100132-D	Heintz	PWS Herring Survey: Predictors of Winter Performance	$99,000.00	FY10
10100132-I	Hershberger	PWS Herring Survey: Herring Disease Program (HDP)	$295,800.00	FY10
10100132-C	Kline	PWS Herring Survey: Pacific Herring Energetic Recruitment Factors	$265,000.00	FY10
10100132-H	Kuletz	PWS Herring Survey: Seasonal & Interannual Trends in Seabird Predation	$150,900.00	FY10
10100574	Lees	Re-Assessment of Bivalve Recovery	$32,600.00	FY10
10100742	Matkin	Killer Whales in Prince William Sound/Kenai Fjords	$125,775.10	FY10
10100132	Pegau	PWS Herring Survey: Comm. Involvem., Outreach, Logistics, & Synthesis	$354,300.00	FY10
10100132-B	Thorne	PWS Herring Survey: Assessment of Juvenile Herring Abundance	$173,600.00	FY10
10100340	Weingartner	Long-Term Monitoring of the Alaska Coastal Current	$133,600.00	FY10
FY12 Continuing Project Funding Total			**$2,506,859.70**	

Descriptions of New and Continuing Projects in FY12

Project Number: **10100132-G**

Project Title: **PWS Herring Survey: Top-Down Regulation by Predatory Fish on Juvenile Herring**

Principal Investigator: Mary Anne Bishop

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: Sean Powers

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $185,500.00	**FY11:** $183,300.00	**FY12:** $193,400.00
FY13: $116,700.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $678,900.00

Abstract:

Based on population trends, the Prince William Sound (PWS) Pacific herring population does not show signs of recovering. Predation pressure on juvenile herring has been cited as an important factor in preventing recovery. Juvenile herring are heavily predated by multiple species of fish, including rockfish, a species group injured by the Exxon Valdez Oil spill with unknown recovery status. This proposal is for a four-year study to investigate fish predation on the 0-age class herring over winter, a critical bottleneck for recruitment. We will examine the spatial and temporal abundance of fish predators in and around juvenile herring schools, as well as the physical and biological characteristics of the herring schools on which they feed. We will also conduct laboratory experiments to determine fish predators' daily rations and prey preferences. Our project is a component of the PWS Herring Survey program and relies on predator surveys being performed on integrated November and March cruises. Our models will provide estimates of juvenile herring consumption by the most important fish predators. Ultimately, this study will improve understanding of the role of fish predation on herring recruitment, will provide protocols and recommendations for long-term fish predator monitoring and management, and will help to identify candidate sites for herring supplementation efforts.

Science Panel Comments:

Predation has been identified as a significant constraint to the recovery of herring in PWS. The Trustees have recently funded two projects investigating the impact of seabird and whale predation on herring. This study will provide a more complete picture of the role predation plays in the herring lifecycle by determining the influence of fish predators.

Science Panel Recommendation: Fund

Science Coordinator Comments:

The effects of predatory fish on herring have not been studied even though it has been identified as a potential limiting factor for the restoration of herring. The data collected in this project will further our understanding of the impact of this type of predation and will give a deeper understanding of herring's lack of recovery.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100750**

Project Title: **Monitoring for Evaluation of Recovery and Restoration of Injured Nearshore Resources**

Principal Investigator: James Bodkin

Affiliation: US Geological Survey

Co-PIs/Personnel: Tom Dean

Disbursing Agency: USGS

Project Location: Western Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $187,129.00	**FY11:** $166,419.00	**FY12:** $165,329.00
FY13: $103,411.60	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $622,288.60

Abstract:

The proposed project is designed to assist in the evaluation of recovery and restoration of injured resources in Prince William Sound. The primary objective is to initiate or continue recovery and restoration monitoring in the nearshore in Prince William Sound following the plan developed in Restoration Project 050750 and tested in Restoration Project 070750. The goal of this program is to evaluate the current status of EVOS injured resources and services (recreational, subsistence, and passive use), to determine when populations may be considered recovered, and to foster recovery of those resources by identifying and recommending actions in response to factors limiting recovery. The National Park Service and USGS began implementation of a similar nearshore monitoring plan outside of Prince William Sound (i.e., along the Katmai, Kenai Fjords, and Lake Clark National Park coasts, including both oiled and unoiled sites) in 2006. This program is collecting information similar to the data sets that have been used to assess recovery of injured resources in Prince William Sound (e.g., population abundance and survival of sea otters, population abundance of harlequin ducks and other nearshore birds, abundance estimates for mussels, clams, and other intertidal organisms). Contrasts among trends in injured resources in and outside Prince William Sound, including both oiled and unoiled areas will provide the primary means of resource evaluation. Funds for conducting some of these studies in Prince William Sound (e.g., bird and mammal surveys, D. Irons USFWS) are being sought by other proposals submitted to the Trustee Council and are not addressed herein. Our purpose is to implement a nearshore monitoring program in Western Prince William Sound related to EVOS injured resources and to make it comparable to the program being carried out by the National Park Service in the Gulf of Alaska outside of Prince William Sound. This proposed nearshore sampling in Prince William Sound, in conjunction with nearshore sampling and data management supported by NPS and USGS will provide the foundation of a comprehensive restoration monitoring program for the entire oil spill area.

Science Panel Comments:

This proposal provides a logical next step in development of a program to determine long-term health of the intertidal community and associated resources that were clearly impacted by the spill. It specifically addresses recovery status of injured intertidal communities for which little current information is available. The proposal builds on work funded by other agencies to provide an important gulf-wide perspective.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Priority Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **10100132-F**

Project Title: **PWS Herring Survey: Sound Wide Juvenile Herring, Predator, and Competitor Density via Aerial Surveys, submitted under the BAA AB133F-09-RP-0059**

Principal Investigator: Evelyn Brown

Affiliation: Flying Fish Ltd.

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: PWS

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $160,140.60	**FY11:** $153,055.60	**FY12:** $153,055.60
FY13: $35,001.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $501,252.80

Abstract:

As a component of the integrated PWS Herring Survey (Pegau, P.I.), this project provides 1) a sound-wide, spatially-explicit map of juvenile herring densities, 2) synoptic distributions of herring predator and competitors, and 3) builds on 5 years of previous PWS surveys. June-August surveys map age 1 overwinter survivorship, the timing, spatial extent, and density of age 0 recruiting to nursery habitat, summer mortality of age 1 herring, as well as associated changes in predator/competitor densities. Validation sampling will be provided by a shared vessel with the PWS Herring Survey monthly zooplankton cruises (Campbell, P.I.). Combined with data from other projects within and outside of the PWS Herring Survey, this project's data provides 1) inputs, outputs, and validation for overwinter survival and density-dependent models of predation, growth and disease, 2) an initial estimate of age 2 immature herring recruitment, and 3) spatial information needed to plan, initiate, and evaluate intervention actions.

Science Panel Comments:

The objectives, while good, are probably not achievable with the proposed level of effort suggested. Consequently the results could fall short of the objectives. Regardless some of the results could be very useful, even with inherent limitations. The main technical issues noted by the panel concern species identification from the air: it is not sufficient that the observer is convinced of the species identity – there must be a validation process that is transparent and convincing. Some form of ground-truthing is required. The Science panel also wondered about limitation of quantitative estimates of fish schools and why there was no explicit reference to analysis of photographic records. Although the Science panel was highly skeptical of many of the claims made in the proposal it recognized that interest and dedication of the researchers, and acknowledges that areal work could provide a valuable support for the herring Survey team. Therefore the recommendation was to fund the project for one year and re-evaluate the proposal before further support.

Science Panel Recommendation: Fund Reduced

Science Coordinator Comments:

While I concur with several of the science panel's comments on this project, I do believe that this work will provide valuable data for the Council's herring restoration efforts. The researcher is experienced in this type of data collection and will be coordinating closely with the other members of the PWS Herring Survey team to ground-truth the aerial observations.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100624**

Project Title: **Measuring Interannual Variability in the Herring's Forage Base from the GOA - Submitted Under the BAA**

Principal Investigator: Alexander Bychkov

Affiliation: PICES

Co-PIs/Personnel: Sonia Batten

Disbursing Agency: NOAA

Project Location: Shelf waters SW of PWS, Cook Inlet, northern GOA

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $61,900.00	**FY11:** $63,600.00	**FY12:** $65,100.00
FY13: $15,000.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $205,600.00

Abstract:

Herring from Prince William Sound feed on zooplankton, some originating within the Sound and some from the Gulf of Alaska (GOA) introduced to PWS via a variety of processes. Additionally, adult herring almost certainly forage outside of the Sound, feeding on zooplankton over the wider Alaskan shelf. Understanding the sources of variability in the herring forage base is essential to efforts to understand the herring recovery process and to address basic resource management questions. Direct measurements inside PWS do not explain how the interannual variation in ocean food sources creates interannual variability in PWS zooplankton, nor when changes in ocean zooplankton are to be seen inside PWS. A ten-year time series of seasonal zooplankton data from the Alaskan shelf and northern oceanic GOA has been maintained through support from a variety of agencies including the EVOS TC. The Continuous Plankton Recorder (CPR) survey is a cost-effective, ship-of-opportunity based sampling program that includes community involvement and has a proven track record. The existing time series shows considerable interannual variation in GOA zooplankton abundance and is essential baseline data to underpin herring restoration efforts. EVOS TC support is now requested to maintain the sampling in this region at the current resolution while we examine the linkages between PWS and GOA zooplankton.

Science Panel Comments:

This project provides the only long-term record of plankton abundance and species composition important to understanding the inter-annual variation in herring food from the Gulf of Alaska. This information is necessary to understand herring mortality and long-term trends in herring abundance. The proposers are global leaders in the field and have successfully maintained a time series of such information for a decade using a consortium of funders, including the EVOSTC. The approach using vessels of opportunity and continuous plankton recorders has provided information of the highest quality for the lowest costs for over 50 years. This is the longest plankton time series in the Pacific.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **10100132-A**

Project Title: **PWS Herring Survey: Plankton and Oceanographic Observations, Submitted Under the BAA**

Principal Investigator: Robert Campbell

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $201,500.00	**FY11:** $197,300.00	**FY12:** $200,100.00
FY13: $64,400.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $663,300.00

Abstract:

Herring stocks collapsed in the years following the Exxon Valdez Oil Spill. The cause of the collapse remains highly controversial, and several empirical and theoretical studies have implicated different factors, including the spill, disease outbreaks, fishing activity, and ecosystem productivity. Herring stocks have not rebounded since the collapse in the early 90's and show no signs of recovery; similarly controversial, varied, and not necessarily mutually exclusive. The work described in this proposal is part of several collaborative proposals to survey herring in PWS, and seeks to monitor the environmental and food climate experienced by herring in order to address the hypothesis that carrying capacity can be limiting the recovery of herring. Observations of environmental conditions and plankton abundance over time will be integrated with observations of herring distributions and energetics, in order to assess how the food climate in Prince William Sound may structure herring populations in space and time.

Science Panel Comments:

The science panel endorsed this project because it addressed fundamental issues related to the role of food availability and the decline or lack of recovery of herring. Food limitation over the winter is seen to be a credible explanation as a factor affecting the survival of age 0+ herring over the winter. This project will address a basic part of the hypothesis. The work also could have implications for factors affecting other species, including competitors and predators of herring. The reviews were positive and the PI appears to be productive. Also the proposal is connected and coordinated with other concurrent projects in the herring survey.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **10100290**

Project Title: **The Exxon Valdez Trustee Hydrocarbon Database**

Principal Investigator: Mark Carls

Affiliation: NOAA/NMFS Auke Bay Laboratory

Co-PIs/Personnel: Marie Larsen

Disbursing Agency: NOAA

Project Location: Auke Bay Laboratories – TSMRI, Juneau, AK

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $9,300.00	**FY11:** $9,300.00	**FY12:** $9,300.00
FY13: $9,300.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $37,200.00

Abstract:

This is an on-going service project that provides data and sample archiving services for all samples collected for hydrocarbon analysis in support of Exxon Valdez Oil Spill Trustee Council projects. These data represent samples collected since the oil spill in 1989 to the present and include National Resource Damage Assessment (NRDA) studies (environmental and laboratory) and Restoration and Recovery data. This project serves as an archive for chemical analyses and sample data and storage of physical samples that have not been analyzed and provides copies of the ACCESS database to interested parties. The project also responds to several Freedom of Information Act (FOIA) requests each year for information associated with these data. Interpretative services for these data are available.

Science Panel Comments:

This proposal provides ongoing support for maintaining, updating, and serving hydrocarbon data that are critical to future evaluations of recovery and restoration.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **10100132-E**

Project Title: **PWS Herring Survey: Physical Oceanographic Characteristics of Nursery Habitats of Juvenile Pacific Herring, submitted under the BAA AB133F-09-RP-0059**

Principal Investigator: Shelton Gay

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince Willam Sound, Alaska

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $88,400.00	**FY11:** $83,100.00	**FY12:** $90,000.00
FY13: $91,500.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $353,000.00

Abstract:
The objectives of this research are to build upon a physical oceanographic data base started during the SEA project and continued under a recent EVOS funded project: Physical Oceanographic Factors Affecting Productivity in Juvenile Pacific Herring Nursery Habitats. The rationale of this project is based upon past research of juvenile Pacific herring in PWS, which has shown that recruitment is highly influenced by conditions within nursery sites affecting survival within the first year. Important among these conditions is the pre-winter condition of juvenile (age-0) herring and the effects of water temperatures on metabolism and hence over-winter survival. Past studies of the physical oceanography of nursery fjords has indicated that each site has a unique set of hydrographic conditions that are influenced by both local processes and water exchange between the GOA and PWS. These factors vary significantly depending on geographic location, basin morphometry, watershed topography and proximity to tidewater glacial fjords. The proposed study will continue monitoring the physical properties within the four SEA nursery fjords and additional sites as determined by future herring surveys, and collect time-series data on temperature, salinity and fluorescence to determine the variation among nurseries in factors such as ocean climate, stratification, mixing, phytoplankton biomass, and energy constraints imposed on juvenile herring by seasonal changes in water temperatures. The data will also assist in evaluating potential sites for future supplementation efforts in restoring the herring population.

Science Panel Comments:
This project will continue to make key hydrographic and circulation measurements in PWS. Such measurements are critical to other studies, like that of Kline, and to constructing a synthetic population model for herring.

Science Panel Recommendation: Fund

Science Coordinator Comments:
I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey -

see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **10100132-D**

Project Title: **PWS Herring Survey: Value of Growth and Energy Storage as Predictors of Winter Performance in YOY Herring from PWS**

Principal Investigator: Ronald Heintz

Affiliation: NOAA/NMFS Auke Bay Laboratory

Co-PIs/Personnel: JJ Vollenweider

Disbursing Agency: NOAA

Project Location: Eaglek, Simpson, Whale and Zaikof and other bays

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $99,000.00	**FY11:** $99,000.00	**FY12:** $99,000.00
FY13: $9,600.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $306,600.00

Abstract:

This proposal examines the reliability of fall growth rates as an indicator of over-winter performance among YOY herring in Prince William Sound. The Trustee Integrated Herring Restoration Program cites the need for identifying parameters that reliably indicate condition. Parameters such as size or energy density can provide misleading results. While size is a good predictor of over-winter survival in a given year, there is no critical size that predicts survival across years. Similarly, changes in energy density may not reflect the severity of winter. We propose that fall growth rate predicts performance because herring acquire the bulk of their lipid in fall. Individuals experiencing high growth in fall are likely to obtain disproportionately large energy reserves. We propose using models relating RNA/DNA ratios to growth obtained under another Trustee study to estimate growth in field specimens collected during the survey period. In addition we will examine how energy is partitioned between structural and storage compartments. Combining these data with those of other projects being proposed under the PWS Herring Survey will allow us to test the hypothesis that growth in fall is the most consistent indicator of over winter survival because fall growth provides for the greatest provisions of stored energy.

Science Panel Comments:

The science panel noted concern that ongoing work by the PI should be brought to completion before starting a new project. Further there was concern that the proposed sample size was too small and not random enough to provide convincing results.

Science Panel Recommendation: Do Not Fund

Science Coordinator Comments:

This project will provide information that will be important in understanding over winter performance of young of the year herring in PWS.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:
Not Available

Executive Director Recommendation: Do Not Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **10100132-I**

Project Title: **PWS Herring Survey: Herring Disease Program (HDP)**

Principal Investigator: Paul Hershberger

Affiliation: US Geological Survey

Co-PIs/Personnel: Maureen Purcell, Jim Winton

Disbursing Agency: USGS

Project Location: Prince William Sound, Sitka Sound, Puget Sound, USGS - Marrowstone Marine Field Station

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $81,800.00	**FY11:** $284,100.00	**FY12:** $295,800.00
FY13: $313,500.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $975,200.00

Abstract:

The Herring Disease Program (HDP) is part of a larger integrated effort, the PWS herring survey: Community Involvement, Outreach, Logistics, and Synthesis submitted under the BAA (outlined in a separated proposal by Dr. Scott Pegau), that is intended to identify juvenile rearing bays, measure factors limiting the success of juvenile herring, and provide recommendations for spatial and temporal coverage of future monitoring efforts. Within this integrated effort, the HDP is intended to evaluate the impact of infectious and parasitic diseases on the failed recovery of the PWS herring population by placing special emphasis on disease processes affecting juvenile cohorts. The framework for the 2010 - 2013 HDP involves a combination of field surveillance efforts and laboratory-based empirical disease process studies. Field surveillance efforts will provide continued and expanded infection and disease prevalence data for herring populations in Prince William Sound (PWS), Sitka Sound, and Puget Sound. Additionally, samples from field surveillance efforts will be processed using newly-developed disease forecasting tools to provide annual risk assessments that quantify the potential for future disease epizootics. Empirical disease process studies will provide an understanding of cause and effect epidemiological relationships between the host, pathogen, and environment; understanding of these relationships represents a first step towards developing additional disease forecasting tools. Specific emphasis will be placed on refining our understanding disease processes specific to viral hemorrhagic septicemia (VHS) and ichthyophoniasis, two primary diseases of herring in PWS.

Science Panel Comments:

This proposal describes continuation of herring disease monitoring and research into its role in combination with other interacting stressors in suppressing herring recovery in PWS. This is done in coordination with the broader Herring Survey program proposed by Scott Pegau. Although a continuation of an ongoing project, this proposal clearly identifies a set of new objectives that are appropriate and compelling. Specifically, the laboratory experiments evaluating the cause-effect epidemiology of how host, parasite, and environmental factors interact to dictate disease impacts is especially promising. The survey work also focuses on disease effects on YOY herring in ways that may lead to much improved understanding of disease impacts on herring because of the complex role of historical exposure and immunity in determining impacts later in the life history. Herschberger and colleagues have been exceptionally productive in their past EVOS work. Although this project is expensive over its 4 years, the costs are appropriate for the type of research required, involving sophisticated lab assessments of multiple diseases.

The Science Panel recommends FUND – even if the entire Herring Survey is not funded or slow to be funded because this project can stand on its own merits (although needs field ship platforms for collections of herring).

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:

Not Available

Executive Director Recommendation: Priority Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100132-C**

Project Title: **PWS Herring Survey: Pacific Herring Energetic Recruitment Factors**

Principal Investigator: Thomas Kline

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10:	$258,700.00	**FY11:**	$256,600.00	**FY12:**	$265,000.00
FY13:	$218,300.00	**FY14:**	$0.00	**FY15:**	$0.00

Total Funding Approved: $998,600.00

Abstract:

This project is one component of the greater integrated study titled PWS herring survey: Community Involvement, Outreach, Logistics, and Synthesis (Pegau, P.I.). This proposed effort seeks to improve understanding of habitat utilization by juvenile herring, especially age 0, and to help identify candidate sites that could be potentially used for supplementation efforts. This particular proposal builds on 15 years of experience in assessment of juvenile herring in PWS using isotope and energetic techniques. We propose to measure energy levels of juvenile herring and other fishes in 8 juvenile herring nursery areas. Four of these areas, Simpson Bay, Eaglek Bay, Whale Bay and Zaikof Bay, were the focus of earlier investigation by the Sound Ecosystem Assessment (SEA) program in 1995-96 as well as a current Council-funded "PWS Herring Forage Contingency" project. Four additional sites will be selected based on historical data and community input and the 'blitz' sampling program. We propose to conduct surveys three times per year, pre- and post-winter and summer, for three years (including a planning year). The pre- and post-winter series will complement other studies that propose to examine overwinter change in energetics. The pre- and post-winter periods have been examined for the past three years. The summer period will provide a link between a more dispersed age 0 herring distribution following larvae drift and the subsequent overwintering locations. The fourth year of the project will focus on data analysis, synthesis and reporting.

Science Panel Comments:

The science panel recognized that although highly specialized, past work has made a substantial contribution to the scientific literature on herring in PWS and elsewhere. The reviews were positive and the only negative comment concerned the high costs of sample analysis. Now there is increasing recognition that herring research in PWS must be coordinated with other projects, both conceptually and operationally. The Science panel would have preferred to see how this proposal would be connected and integrated with other concurrent work.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100132-H**

Project Title: **PWS Herring Survey: Seasonal & Interannual Trends in Seabird Predation on Juvenile Herring**

Principal Investigator: Katherine Kuletz

Affiliation: US Fish & Wildlife Service

Co-PIs/Personnel: Mary Anne Bishop

Disbursing Agency: USFWS

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10:	$147,200.00	**FY11:**	$163,900.00	**FY12:**	$150,900.00
FY13:	$102,900.00	**FY14:**	$0.00	**FY15:**	$0.00

Total Funding Approved: $564,900.00

Abstract:

Predation pressure on juvenile Pacific herring has been identified by the 2008 Integrated Herring Restoration Plan as one of five potential factors limiting recovery of Prince William Sound herring. Juvenile herring are heavily predated by multiple species of seabirds, including six species initially injured by the Exxon Valdez oil spill and three species that have not yet recovered (Marbled Murrelet, Kittlitz's Murrelet and Pigeon Guillemot). This study will investigate the spatial and temporal abundance of seabird predators in and around juvenile herring schools during three time periods: August, November and March. We will also examine the physical and biological characteristics of the fish schools seabirds feed on. Our project is a component of the integrated, multi-project PWS Herring Survey program and relies on seabird surveys being performed on vessels associated with hydroacoustic juvenile herring surveys. Our bioenergetic models will provide estimates of juvenile herring consumption by the most important seabird predators, including inter- and intra-annual variability in consumption rates. This study will improve understanding of the role of seabird predation on herring recruitment and will help to identify candidate sites for herring supplementation efforts.

Science Panel Comments:

This study will investigate the spatial and temporal abundance of seabirds around juvenile herring schools during three time periods: August, November and March. It will also examine the physical and biological characteristics of the herring schools on which seabirds feed. This is a fairly well conceived and systematic approach to evaluating one source of predation pressure on Pacific herring. However, the project is strongly oriented towards herring as a source of nutrition for seabirds rather than as predators of herring. The most important objective of this study should be to quantify the amount of juvenile herring consumed by sea birds rather than the importance of herring to the diet of sea birds. Sea birds are likely important predators on juvenile herring, but it should not take 3 or 4 years to make a rough estimate of how important seabirds are as juvenile herring predators relative to other predators, i.e. marine mammals. A first order estimate might even be reasonably done with the data at hand.

Science Panel Recommendation: Do Not Fund

Science Coordinator Comments:

While I agree with some of the science panel's concerns, only five surveys have been completed to date and more data will be needed to make an educated estimate of the effect of seabird predation on herring. The addition of night surveys will allow the team to relate seabird densities concurrent with Dr. Richard Thorne’s nighttime herring hydroacoustic surveys.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:

Not Available

Executive Director Recommendation: Do Not Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100574**

Project Title: **Re-Assessment of Bivalve Recovery on Treated Mixed-Soft Beaches in Prince William Sound**

Principal Investigator: Dennis Lees

Affiliation: Littoral Ecological & Environmental Services

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound, from Eleanor Island south to Latouche Island

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $133,600.00	**FY11:** $95,400.00	**FY12:** $32,600.00
FY13: $0.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $261,600.00

Abstract:

Studies from 1989 through 1997 suggested that bivalve assemblages on beaches in Prince William Sound (PWS) treated with high-pressure hot-water washing remain damaged. An EVOS-funded study in 2002 confirmed this hypothesis; hardshell clams were only one-third as abundant at washed sites as at unwashed sites. Considering the importance of hardshell clams to sea otters, other nearshore predators, and humans, this finding is important.

Using information from 1989, we constructed a preliminary recovery trajectory. This model predicts that clam assemblages at washed sites in PWS will require more than five decades to recover. Subsequently, a less extensive study of clam assemblages in PWS and research in other areas suggest that hardshell clams may be experiencing recruitment failures throughout the Pacific Northwest. By re-evaluating the status of clam populations at 40 sites sampled in 2002, this project will provide insights into: 1) the recovery trajectory for PWS clam assemblages by adding a third point for abundance at washed sites; and 2) the generality of the hypothesis that hardshell clams are experiencing recruitment failures throughout the Pacific Northwest.

Science Panel Comments:

This proposal was responsive to the guidance of the science panel and trustee council staff. The addition of FitzGerald provides a geomorphologist of obvious experience with a sufficient level of effort in each year to have a good chance of developing a viable means of quantifying this difficult concept of armoring. I consider the increase of 23% in the budget to be appropriately defended and necessary. This proposal is now appropriate for funding and important because it will address an injured resource (Clams), update its recovery status, and develop geomorphological methods of measuring armoring.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel's recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

The PAC recommends this project for funding if the PI satisfactorily collaborates with Project 10100829 (Shigenaka) and if their combined effort does not exceed $150,000 in FY10.

Public Advisory Committee Recommendation: Fund Contingent

Executive Director Comments:

Not Available

Executive Director Recommendation: Could Wait

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100742**

Project Title: **Monitoring, Tagging, Feeding Studies, and Restoration of Killer Whales in Prince William Sound/Kenai Fjords 2010-2012 Submitted under the BAA**

Principal Investigator: Craig Matkin

Affiliation: North Gulf Oceanic Society

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound/ Kenai Fjords

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $132,309.70	**FY11:** $132,309.70	**FY12:** $125,775.10
FY13: $0.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $390,394.50

Abstract:

The proposed project is a 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. The project also extends the scope of the basic monitoring to include an innovative satellite tagging program to examine habitat preference and incorporates a more extensive examination of feeding habits using observational and chemical techniques. The project will delineate important habitat and variations in pod specific movements and feeding behavior within a temporal and geographic framework. Results will allow us to more closely examine the potential for restoration. The project will more clearly delineate the role of killer whales, both fish eating and mammal eating in the nearshore ecosystem and possible effects on the restoration recovery of harbor seals and sea otters. Community based initiatives, educational programs, and programs for tour boat operators will continue to be integrated into the work to help foster restoration by improving public understanding and reducing harassment of the whales.

Science Panel Comments:

This proposal continues the monitoring of killer whales in PWS, focusing on the injured resident AB pod and the transient AT1 population. New tagging technologies and expanded temporal sampling into the winter help expand the understanding of recovery processes that will emerge from this work. Matkin's past performance on EVOS studies has been excellent and public and scientific interest is still intense. The top apex consumer of the entire coastal ecosystem can have dramatic impacts on the entire ecosystem so this study is central to a system-wide understanding of its status.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Priority Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **10100132**

Project Title: **PWS Herring Survey: Community Involvement, Outreach, Logistics, and Synthesis, Submitted Under the BAA**

Principal Investigator: William Pegau

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $343,100.00	**FY11:** $385,600.00	**FY12:** $354,300.00
FY13: $97,400.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $1,180,400.00

Abstract:

This proposal contains the overview of a coordinated set of ten proposals from multiple organizations that are designed to address the Herring Surveys section of the Invitation for Proposals. It describes how individual components are being integrated to provide information needed to make informed decisions on herring restoration.

The objectives of the integrated herring survey program are:
1) Identify juvenile rearing bays for use in restoration planning.
2) Measure factors that may limit the success of herring recruitment including factors of oceanographic conditions, food availability, disease, overwinter energetics of juvenile herring, and predation.
3) Provide protocols and recommendations for spatial and temporal coverage of monitoring projects for potential inclusion in the core herring restoration effort.

This proposal describes the community involvement and outreach efforts, the integration of programs, sharing of logistics, and the responsibility for developing the final synthesized report.

Science Panel Comments:

Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:

This proposal will serve as the unifying point for the entire PWS Herring Survey team and will provide appropriate outreach to the spill-effected communities. Dr. Pegau will be responsible for synthesizing the nine scientific research projects completed as part of the herring survey, which will be critical in understanding the state of herring in the Sound and assisting the Council in determining next steps for herring restoration.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

The PAC recommended an overall 10% decrease in funding on the entire suite of 10100132 PWS Herring Survey proposals. This decrease would be determined by the team leader/synthesizer for this effort.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100132-B**

Project Title: **PWS Herring Survey: Assessment of Juvenile Herring Abundance and Habitat Utilization, Submitted Under the BAA**

Principal Investigator: Richard Thorne

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10: $170,200.00	**FY11:** $196,700.00	**FY12:** $173,600.00
FY13: $56,200.00	**FY14:** $0.00	**FY15:** $0.00

Total Funding Approved: $596,700.00

Abstract:

The objectives of the proposed effort are to improve understanding of habitat utilization by juvenile herring, especially age 0, and to help identify candidate sites that could be potentially used for supplementation efforts. The proposal builds on three years of experience in assessment of juvenile herring in PWS using hydroacoustic techniques. We proposed to measure juvenile herring and other fish abundance in several potential juvenile herring nursery areas. Four of these areas, Simpson Bay, Eaglek Bay, Whale Bay and Zaikof Bay, were the focus of earlier investigation by the SEA program in 1995-96 as well as a current Council-funded project, "Trends in adult and juvenile herring distribution and abundance in Prince William Sound". Additional sites will be selected based on historical data and community input. We propose to conduct surveys three times per year: pre- and post-winter and summer. The pre- and post-winter series will complement other studies that propose to examine overwinter mortality, including energetics. The pre- and post-winter periods have been examined for the past three years. The summer period will provide a link between a more dispersed age 0 herring distribution following larvae drift and the subsequent overwintering locations. In addition, a 4-day survey of adult herring will be conducted in conjunction with the post-winter juvenile survey. This project will provide essential data on the distribution and abundance of juvenile herring and their competitors and predators. It will also assist development of a "Core Data Collection" program. The project is one part of a collaborative program for PWS herring surveys coordinated through the Prince William Sound Science Center.

Science Panel Comments:

This proposal represents a continuation of basic acoustic survey work for herring in PWS. The reviews were positive with the only concern mentioned was that the work had developed into a monitoring exercise and not a test of hypotheses. Indeed, past work has provided support for ADFG assessment work, but there also are a number of peer-reviewed scientific papers that have developed from this work. The Science panel noted that this proposal supports several other projects in the herring survey Team proposal. The Science panel also recognized the cooperative work with the ADFG and the solid publication record from previous work.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Possible reduction as a function of the recommended overall 10% decrease of the 10100132 PWS Herring Survey - see 10100132.

Public Advisory Committee Recommendation: Fund Reduced

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **10100340**

Project Title: **Long-Term Monitoring of the Alaska Coastal Current**

Principal Investigator: Thomas Weingartner

Affiliation: University of Alaska Fairbanks

Co-PIs/Personnel: None

Disbursing Agency: ADFG

Project Location: Gulf of Alaska

Project Type: Continuing

Funding Approved by Fiscal Year:

FY10:	$141,500.00	**FY11:**	$138,700.00	**FY12:**	$133,600.00
FY13:	$0.00	**FY14:**	$0.00	**FY15:**	$0.00

Total Funding Approved: $413,800.00

Abstract:

This program continues a 39-year time series of temperature and salinity measurements at hydrographic station GAK 1. The data set, which began in 1970, now consists of monthly CTDs and a mooring with 6 - 7 temperature/conductivity recorders throughout the water column, a fluorometer and nitrate sensor at 20 m depth and a nitrate sensor at 150 m depth. The project monitors five important Alaska Coastal Current ecosystem parameters and to quantify and understand interannual and longer period variability in:

1. Temperature and salinity throughout the 250 m deep water column,
2. Near surface stratification,
3. Near and subsurface nitrate supply on the inner shelf,
4. Fluorescence as an index of phytoplankton biomass, and
5. Atmosphere-ocean heat fluxes.

In aggregate these variables are basic descriptors of the Alaska Coastal Current, an important habitat and migratory corridor for organisms inhabiting the northern Gulf of Alaska, including Prince William Sound.

Science Panel Comments:

The proposal was extremely well written and clearly outlined the historical importance of the GAK1 line that has provided basic oceanographic observations (temperature and salinity) for three decades. In addition, the proposal clearly states how these data are critical to restoration. The proposal seeks continued funding for the GAK1 line and includes funds for addition of nitrate and fluorescence sensors at that site. The continued funding of GAK1 is critical to understanding the oceanographic environment, its influence on biological resources over time, recovery of injured resources, and potential restoration activities. No specific changes to the project were recommended, although access to more recent data through the website would be helpful. Currently only summaries of data obtained after 2006 are available. A more synthetic analysis of current GAK1 data and those obtained from elsewhere (e.g. as part of herring or nearshore projects) would also be welcomed in future proposals.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Priority Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **11100853**

Project Title: **Pigeon Guillemot Restoration Research in Prince William Sound, Alaska**

Principal Investigator: David Irons

Affiliation: USFWS

Co-PIs/Personnel: Dan Roby

Disbursing Agency: USFWS

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY11: $0.00	**FY12:** $0.00	**FY13:** $0.00
FY14: $0.00	**FY15:** $0.00	**FY16:** $0.00

Total Funding Approved: $0.00

Abstract:

This amendment to project 070853, Pigeon Guillemot Restoration Research in Prince William Sound, Alaska, provides an opportunity to restore the population of Pigeon Guillemots (Cepphus columba) in Prince William Sound, Alaska, which has declined by more than 90% at the Naked Island group since 1989. A restoration plan for Pigeon Guillemots in PWS was prepared to address the species' lack of population recovery following injury by the 1989 Exxon Valdez oil spill. Predation on nests and adults by mink is now the primary limiting factor for guillemot reproductive success and population recovery at the most important historical nesting site for guillemots in PWS (i.e., the Naked Island group). Mink on the Naked Island group are descended in part from fur farm stock and apparently were introduced to the island group during the 1980s. Eradication of mink at these islands was selected as the preferred restoration alternative because it is feasible and most likely to result in the recovery of guillemots in PWS. Other alternatives are either currently unavailable or unlikely to be effective. An eradication effort is likely to be successful due to both well-developed methods and the low likelihood of re-colonization. Potential negative effects of the preferred alternative are either negligible or largely avoidable. The guillemot population at the Naked Island group would likely double within the first 10 years following mink eradication, and the Sound-wide population of guillemots would likely increase within 15 years of mink eradication at the Naked Island group, once guillemots nesting at the Naked Island group had become a source population for other parts of PWS.

Science Panel Comments:

This proposal has been previously submitted to the EVOS Trustee Council and reviewed by the Science Panel. Support for the work was strong among the Science Panel members. One concern that arose pertained to the question of whether the mink found today on Naked and nearby Islands in the Naked group are descendants of the animals introduced artificially or whether these are fully native mink with an intact natural genome. That question has now been answered with DNA analysis revealing a mixed genome, not reflecting a pure native stock. This answer would appear to satisfy the question of whether these mink are natural (no) and to allow the extermination to move forward, if supportable scientifically by the Science Panel and Trustee staff and if politically and financially acceptable to the Trustee Council.

Here I will provide a review of the adequacy of the science. First, it is noteworthy that PIGUs are the only bird species still listed as Not Recovering after EVOS. Second, the importance of Naked Island and its potential recovery to this species is evident – the Naked Island group held about 25% of the PIGU population in PWS prior to the spill despite representing only 2 % of the PWS shoreline. Third, the inference that mink represent the impediment to PIGU recovery on Naked is strong, based especially on comparison Smith Island where mink are absent and PIGU survival is good. Fourth, the contention that strong recovery of PIGUs on Naked would lead to spread and re-colonization of other

suitable sites in PWS is a reasonable expectation, so restoration on Naked pays a wider dividend of recovery elsewhere in PWS. Fifth, we know that the introduced foxes are now gone from Naked so that isn't the problem. Sixth, the alternatives analysis is compelling in showing that no other restoration option would work and that eradication is the only solution. For example, providing more of the now reduced lipid-rich prey would be useless, resulting in feeding mink better not in enhancing PIGU survival and abundance. Culling would be a half-step and require costly intervention forever, and thus can be rejected as a viable restoration option. Seventh, elimination of predatory mammals on islands is a well-established practice to enhance ground-nesting seabirds and other birds.

Consequently, this proposal makes good sense scientifically and addresses an ongoing restoration failure of importance. The only questions involve the costs and the potential use of dogs, if trapping fails to get every last mink in the eradication process. The costs are 2.4 Million or 1.3 Million if a National Wildlife Foundation match is obtained. We concur that these cost estimates are reasonable because a 3-5 year time frame is needed to complete the removal. So while high, the expenditures are likely justified. The use of dogs in the removal of mink seems to possibly conflict with animal rights as an unacceptably cruel practice.

Science Panel Recommendation: Fund

Science Coordinator Comments:

This proposal is scientifically compelling and builds on four years of work focused on this topic. While the idea of a direct restoration project is appealing, I am concerned that the total project cost is very high in relation to the total number of nests that they project will be added to the island complex.

Science Coordinator Recommendation: No Consensus

Public Advisory Committee Comments:

Not Applicable

Public Advisory Committee Recommendation: Not Reviewed

Executive Director Comments:

I do not have a recommendation for this project. The project is very compelling because it potentially provides active restoration for an injured species. However, the high cost and speculation regarding the longterm outcome needs to be weighed carefully by the Council.

Executive Director Recommendation: No Consensus

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **11100112**

Project Title: **Lingering Oil on Boulder-Armored Beaches in the Gulf of Alaska 22 Years after the Exxon Valdez Oil Spill**

Principal Investigator: Gail Irvine

Affiliation: Not Available

Co-PIs/Personnel: Mark Carls, Dan Mann

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: Continuing

Funding Approved by Fiscal Year:

FY11: $0.00	**FY12:** $0.00	**FY13:** $0.00
FY14: $0.00	**FY15:** $0.00	**FY16:** $0.00

Total Funding Approved: $0.00

Abstract:

We want to continue long-term monitoring of lingering oil at six Gulf of Alaska sites where we have tracked the fate and persistence of stranded Exxon Valdez oil over the last 22 years. It has been six years since our last survey revealed that relatively unweathered oil still persisted at some sites. Interestingly these sites have less weathered oil (e.g., contains more n-alkanes) than similarly aged oil from Prince William Sound. All five of our monitoring sites on the Katmai National Park coast are boulder beaches with high wave energies. Accepted knowledge predicted that rapid natural weathering of stranded oil would occur in such settings. This was not the case, and we are still figuring out why. We think it is because the boulder armors that cover these shorelines protect the underlying oil. In addition to resampling our monitoring plots, we will be testing to see if oil is leaking out from these beaches. By extending our long term study of oil stranded on this little understood shoreline type, we will contribute important new data useful for predicting the geographic distribution of lingering oil, assessing its potential for continued pollution, and designing methods for its remediation.

Science Panel Comments:

This proposal represents a plan to return to oiled shorelines in the Kenai Fjords and Katmai National Parks and re-sample to determine the degree of oil persistence and its state of weathering so as to provide an updated record of the degree of persistence of oil and toxicity. Five of the historically sampled (on three previous dates) sites fall within Designated Wilderness. The project will also deploy passive samplers to assess whether oil is escaping into the sea waters and thus the ecosystem from the sub-surface reservoirs of lingering contamination. The last such survey occurred 6 years ago.

Costs of this project are relatively modest (178K in 2011 and 26K in 2012). This team has conducted identical surveys and related research in the past so the cost estimates presented in the detailed budget are likely accurate. The team produces partners from 3 different organizations, the National Park Service, the University of Alaska, and NOAA-Auke Bay lab. They each are experienced and well qualified for this work. This project examines beaches that differ from those already assessed in PWS in that these are high-energy beaches that would have been anticipated to promote oil weathering and degradation but surprisingly did not. The sequestering of oil in the sub-surface sediments of these beaches is thought to result from armoring by large boulders. In addition to repeating the surveys, this project proposes to assess the stability of the interlocking boulder assemblies as a mean of assessing whether that stability is involved in creating protection of buried oil from oxygen that could induce normal weathering. If true, this could suggest remediation procedures that could be subsequently tested.

On balance, this project has merit and would contribute useful observations on the extent of oil disappearance and chemical weathering over the past 6 years on troublesome sites. It would also advance to some degree our understanding of how oil sequestration pe3rsists in these energetic environments. The study lacks the detailed engineering, chemistry, and process-oriented science evident in the Buofadel proposal, yet this one does have merit and is far less expensive. The PIs have done a responsible job of writing up and publishing results of the previous surveys and participated in the EVOS process broadly. The fact that these problems persist in Designated Wilderness and shores of National Parks gives special urgency to progressing towards remediation. This proposal is of value but would not be rated as high in priority as the Boufadel proposal. There is some question as to whether the 30-d strip deployment used to detect any oil release from the sub-surface pools of lingering oil is to be done for and usually only a single 30-d period, in which case the weather and wave conditions could well make the outcome non-representative. Also would repeated-measures ANOVA provide more powerful tests and more insights? Furthermore, non-parametric tests like the Wilcoxon tests proposed are typically less capable of detecting differences than normal-based statistics and usually an arcsin transformation serves well to render variances equal and thus normality-based testing justifiable. But these are just quibbles in an otherwise well designed study plan.

Funding of this project is supported, which is reasonably priced with compelling budget justification, addresses an ongoing contamination issue, has potential to lead to mitigation (clean-up) measures, differs from the PWS beaches on which oil lingers in substantive ways, and affects a NPS which requires some special consideration.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel's review of this project.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Applicable

Public Advisory Committee Recommendation: Not Reviewed

Executive Director Comments:

This project has merit and is of interest. However, this project examines the where and why of lingering oil, while the Boufadel project squarely addresses the more immediate Council concern of what should be done. Thus I would prioritize funding of the Boufadel project.

Executive Director Recommendation: Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **12120115**

Project Title: **Seward Marine Industrial Center Vessel Wash-Down and Wastewater Recycling Facility**

Principal Investigator: Kari Anderson

Affiliation: City of Seward

Co-PIs/Personnel: None

Disbursing Agency: ADEC

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $97,800.00	**FY13:** $641,300.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $739,100.00

Abstract:
The City of Seward is requesting $739,100 from the Exxon Valdez Oil Spill Trustee Council (EVOSTC) to construct a Vessel Wash-Down and Wastewater Recycling Facility at the Seward Marine Industrial Center. The project would include a concrete pad that drains into a system that collects, treats, and recycles 100 percent of the wastewater for subsequent vessel washing. The project would involve hiring consultants to design and permit the facility and a contractor to build the facility. To engage the public, newsletters, meetings, website updates, and other activities would occur throughout the project. It is expected that the project would take two years to complete. The Vessel Wash-Down and Wastewater Recycling Facility is proposed under the Harbor Protection and Marine Restoration focus area under the Storm Water, Wastewater, and Harbor Projects subject area of the EVOSTC FY 2012 grant program. Seward was initially impacted by EVOS in April 1989. In the years following the Spill, the area has struggled to recover. The City of Seward is proposing the Vessel Wash-Down and Wastewater Recycling Facility because standard vessel wash-down procedures can release toxic metals and liquid and solid wastes from antifoulants and hull maintenance debris into the marine environment. The project would help protect Resurrection Bay from incremental pollution associated with vessel cleaning and maintenance activities, which could keep the area from recovering from Spill.

Science Panel Comments:
Marine pollution from vessel washdown is a concern in the spill area and can negatively affect the injured and recovering species. The proposal is detailed and the PIs have a high degree of experience.

The project should describe how the long term maintenance of the facility will be supported by the community or harbor operators. It is not clear if there is a long term operating and maintenance commitment by City of Seward. A 5-month timeline (including design) may not be enough time to acquire all necessary permits.

Science Panel Recommendation: Fund

Science Coordinator Comments:
I concur with the science panel and Executive Director.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Outstanding legal issues have been resolved and Trustee Council questions have been answered.

Public Advisory Committee Recommendation: Fund

Executive Director Comments:

I concur with the Science Panel's recommendations. I have requested and received needed additional information and recommend this project for funding.

Executive Director Recommendation: Fund

Trustee Council Comments:

April 2011 comments:
The Council requests the proposer provide additional detail and confirmation that the proposed facility is not legally required. In addition, the Council requests additional information regarding which other spill communities have such a facility, the fee structure for those facilities, and a rationale as to why the Council funding this facility would not disadvantage these other communities economically. .

June 2011 comments:
With regard to the question of whether the proposed Facility is legally required, the proposer has submitted an ADEC APDES Inspection report from June 2010 and the City attorney's letter summarizing the status of the 2005 lawsuit against the City of Seward. It appears that there are no outstanding legal requirements. ADOL and USDOJ are currently reviewing this additional information and have not indicated that they have reached an alternate conclusion.

With regard to whether the Council funding of the proposed project give the City of Seward an unfair economic advantage over other Harbor's facilities: The proposed project is for a vessel wash down and wastewater recycling facility. The City notes that vessel owners chose a facility based upon their homeport, fuel cost involved to reach the facility, size/cost of the travelift services and the availability of parts and maintenance. The availability of a wash-down pad, as proposed in this project, is not typically a consideration. Each spill-area community had the opportunity to submit an application, though only the City of Seward made the effort to do so.

With regard to the timeline of construction, there is a two-year planning and construction plan.

Trustee Council Decision: Fund

Project Number: **12120114-Q**

Project Title: **Long Term Monitoring Program - Evaluating Chronic Exposure of Harlequin Ducks and Sea Otters to Lingering EVO in Western PWS**

Principal Investigator: Brenda Ballachey

Affiliation: Not Available

Co-PIs/Personnel: Jim Bodkin, Liz Bowen, Dan Esler, Keith Miles

Disbursing Agency: USGS

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $204,300.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $204,300.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et al. in spring 2011. Sea otter and sea duck populations in PWS were injured as a result of the Exxon Valdez oil spill, with evidence for both immediate acute mortality and longer term injury from chronic exposure to oil spilled in 1989. For both species, it appears that full recovery is not yet complete. Prior EVOSTC projects have examined continuing exposure to lingering oil as a factor constraining recovery, using biomarker assays (the cytochrome P4501A biomarker, CYP1A, to evaluate oil exposure in harlequins, and gene expression assays to evaluate exposure and health of sea otters). Harlequin ducks have continued to show elevation of CYP1A in oiled areas through 2009, suggesting exposure is still a concern; harlequin populations were resampled in spring 2011 and results of CYP1A assays on those samples are pending. For sea otters, recent studies have shown that abundance in the vicinity of northern Knight Island has not yet returned to pre-spill levels, and that otters are foraging in areas where lingering oil persists in sediments. Most recently, gene expression assays have been developed, using an array of genes to specifically quantify oil exposure and health status of sea otters. We propose to resample harlequin and sea otter populations in western PWS in 2012 to assess biomarker levels, as a continued effort to measure exposure of these nearshore residents to lingering oil and monitor the status of their recovery as injured species, and as indicators of recovery of the overall nearshore ecosystem.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Continuing project authorized in prior fiscal year, no issues. Recommend fund.

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-R**

Project Title: **LTM Program - Nearshore benthic systems in the Gulf of Alaska**

Principal Investigator: Brenda Ballachey

Affiliation: Not Available

Co-PIs/Personnel: Tom Dean

Disbursing Agency: USGS

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $230,671.00	**FY13:** $293,210.00	**FY14:** $321,005.00
FY15: $298,660.00	**FY16:** $321,005.00	**FY17:** $0.00

Total Funding Approved: $1,464,551.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et al. in 2011. This component focuses on resources within the nearshore ecosystem. The primary objective is to continue recovery and restoration monitoring in nearshore areas in the Gulf of Alaska, including study areas within Prince William Sound, Kenai Fjords, Katmai, and Kachemak Bay, following the plan initially developed in Restoration Project 050750 and tested in Restoration Project 070750. We will evaluate the current status of EVOS injured resources and services (recreational, subsistence, and passive use) to determine when populations may be considered recovered, and to foster recovery of those resources by identifying and recommending actions in response to any factors that may be limiting recovery. The USGS, National Park Service and the University of Alaska Fairbanks are partnering to accomplish these goals. Information collected will include data sets that have been used previously to assess recovery of injured resources in Prince William Sound (e.g., population abundance and survival of sea otters, abundance estimates for mussels, clams, and other intertidal organisms). Contrasts among trends in injured resources across study areas, including both oiled and unoiled areas, will provide the primary means of resource valuation. Our purpose is to implement a nearshore monitoring program that is comparable at multiple locations across the Gulf of Alaska. The nearshore sampling in Prince William Sound, in conjunction with sampling of other areas, will provide the foundation of a comprehensive restoration nearshore monitoring program for the entire oil spill area and form an integral part of the larger Long-Term Monitoring project.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-A**

Project Title: **LTM Program - Long-term Monitoring of zooplankton populations on the Alaskan Shelf and Gulf of Alaska using Continuous Plankton Recorders**

Principal Investigator: Sonia Batten

Affiliation: Not Available

Co-PIs/Personnel: Alex Bychkov

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $66,800.00	**FY14:** $68,800.00
FY15: $70,700.00	**FY16:** $73,100.00	**FY17:** $0.00

Total Funding Approved: $279,400.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. Many important species, including herring, forage outside of Prince William Sound for at least some of their life history (salmon, birds and marine mammals for example) so an understanding of the productivity of these shelf and offshore areas is important to understanding and predicting fluctuations in resource abundance. The Continuous Plankton Recorder (CPR) has sampled a continuous transect extending from the inner part of Cook Inlet, onto the open continental shelf and across the shelf break into the open Gulf of Alaska monthly through spring and summer since 2004. There are also data from 2000-2003 from a previous transect. The current transect intersects with the outer part of the Seward Line and provides complementary large scale data to compare with the more local, finer scale plankton sampling on the shelf and in PWS. We propose to continue sampling this transect through 2016. Resulting data will enable us to identify where the incidences of high or low plankton are, which components of the community are influenced, and whether the whole region is responding in a similar way to meteorological variability. Evidence from CPR sampling over the past decade suggests that the regions are not synchronous in their response to ocean climate forcing. The data can also be used to try to explain how the interannual variation in ocean food sources creates interannual variability in PWS zooplankton, and when changes in ocean zooplankton are to be seen inside PWS. The CPR survey is a cost-effective, ship-of-opportunity based sampling program supported in the past by the EVOS TC that includes local involvement and has a proven track record.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-B**

Project Title: **LTM Program - Administration, Science Review Panel and PI Meeting Logistics, and Outreach and Community Involvement**

Principal Investigator: Nancy Bird

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $0.00

Abstract:

This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et al. This Detailed Project Description(DPD) addresses administration and fiscal management of the program, travel and logistics for science review, principal investigator annual meetings, and the Outreach Steering Committee, and administrative support for the Outreach and Community Involvement component of the LTM program.

In order to be most fiscally efficient, the Prince William Sound Science Center is serving as the administrative lead and fiscal agent for the consortium submitting this proposal, as well as for the Herring Program. The Outreach and Community Involvement component will be coordinated by the Alaska Ocean Observing System.

Science Panel Comments:

Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:

Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-A**

Project Title: **PWS Herring Program - Validation of Acoustic Surveys for Pacific Herring Using Direct Capture**

Principal Investigator: Mary Anne Bishop

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $68,100.00	**FY13:** $19,000.00	**FY14:** $16,800.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $103,900.00

Abstract:
Acoustic surveys provide a relatively low-cost, remote sensing tool to estimate species-specific fish biomass and abundance. Interpreting acoustic data requires accurate ground truthing. In Prince William Sound, juvenile herring acoustic surveys have been conducted at the beginning (November) and end (March) of every winter since March 2007. Until now, a variety of methods have been used with limited success to ground truth these surveys.

Pelagic trawls are the recommended method for validating species composition and for obtaining relatively unbiased information on length frequency distribution, age, and other biological information.
Here we propose to use a low-resistance, light-weight midwater trawl capable of increased towing speeds (up to 4 knots) as a method to ground truth acoustic surveys for juvenile and adult herring. Our pelagic trawl surveys will take place in conjunction with and onboard the same vessel as three studies in the PWS Herring Research and Monitoring program: a) Juvenile Herring Abundance Index (years 2-5); b) Acoustic Consistency: Intensive Surveys of Juvenile Herring (year 3); and, c) Expanded Adult Herring Surveys (years 2-5). In year 1 we will also use the trawl to collect juvenile herring during the 9-month intensive Study to Validate the Separate Herring Condition Monitoring Programs. Our project will provide data on species composition and length frequency to aid in the interpretation of current and historical acoustic surveys. In addition it will provide adult herring samples to Alaska Department of Fish and Game for the adult herring age-structure-analyses model and will provide juvenile herring samples to researchers investigating juvenile herring fitness and disease. Our trawls will also provide fishery-independent surveys for non-herring species, thus increasing our knowledge of pelagic fishes in Prince William Sound.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-B**

Project Title: **PWS Herring Program - Tracking Seasonal Movements of Adult Pacific Herring in Prince William Sound**

Principal Investigator: Mary Anne Bishop

Affiliation: Not Available

Co-PIs/Personnel: Sean Powers

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12:	$65,500.00	**FY13:**	$87,300.00	**FY14:**	$142,600.00
FY15:	$135,900.00	**FY16:**	$140,000.00	**FY17:**	$0.00

Total Funding Approved: $571,300.00

Abstract:
Knowledge of fish movements and migrations are critical to understanding fish population dynamics. In Prince William Sound (PWS) adult herring disperse after spawning, however their movement patterns are poorly understood. Currently the only information on adult herring movements are a small number of observations from fishers that suggest PWS herring are regularly migrating out of PWS and onto the shelf. This proposal focuses on verifying adult Pacific herring movements using detections of tagged fish. The Herring Marking Workshop sponsored by EVOS in December 2008, reviewed all potential marking methods for herring and conditionally endorsed acoustic tagging as a method for determining herring movements. This pilot project will acoustic tag adult herring during November around Port Gravina, a spring spawning area. During the second season a small sample of adult herring will be tagged during spring at other spawning areas. We will then examine detections from two, established Pacific Ocean Shelf Tracking (POST) Project's acoustic arrays as well as new arrays to be deployed at the major entrances and passages to Prince William Sound. These acoustic arrays will enable us to determine seasonal movement patterns within and out of Prince William Sound. The proposed project builds on our previous and current research on acoustic-tagged fishes. This project will synergize with efforts of POST and the Ocean Tracking Network (OTN). The ability to track herring is critical to answer many questions including those about stock structure, migration habits, and the occurrence of skip-spawning. Determining the capabilities of this technology will help guide our choice of future research emphasis.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-C**

Project Title: **LTM Program - Long-term monitoring of seabird abundance and habitat associations during late fall and winter in Prince William Sound.**

Principal Investigator: Mary Anne Bishop

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $51,700.00	**FY13:** $78,600.00	**FY14:** $80,900.00
FY15: $83,400.00	**FY16:** $86,300.00	**FY17:** $0.00

Total Funding Approved: $380,900.00

Abstract:

This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. The vast majority of seabird monitoring in areas affected by the Exxon Valdez oil spill has taken place around breeding colonies during the reproductive season, a time when food is generally at its most plentiful. However, seabirds spend most
of the year widely dispersed. Late fall through winter are critical periods for survival as food tends to be relatively scarce or inaccessible, the climate more extreme, light levels reduced, day length shorter and water temperatures colder. Post-spill ecosystem recovery and changing physical and biological factors all have the potential to affect PWS seabird populations. Of the seabirds that overwinter in PWS, nine species were initially injured by the Exxon Valdez oil spill, including three species that have not yet recovered (marbled murrelet, Kittlitz's murrelet and pigeon guillemot). Here we propose to continue to monitor from 2012 through 2016 seabird abundance, species composition, and habitat associations using multiple surveys (up to 5 surveys per season) during late fall and winter. The data will improve our predictive models of seabird species abundance and distribution in relation to biological and physical environmental factors. In addition, by monitoring the top-down forcing by seabirds, a major source of herring predation, this project will complement the suite of PWS Herring Research & Monitoring studies, including improved mortality estimates for herring population models. This project is part of the pelagic component within the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. Our project uses as observing platforms the vessels associated with the LTM Humpback Whale surveys and PWS Herring Research & Monitoring Juvenile Herring Abundance Index as well as the Extended Adult Herring Biomass Surveys and integrates the seabird observations with those studies.

Science Panel Comments:

Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:

Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-C**

Project Title: **PWS Herring Program - Data Management Support**

Principal Investigator: Robert Bochenek

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $0.00

Abstract:
This project supports the EVOS Integrated Herring Research Program with critical data management support to assist study teams in efficiently meeting their objectives and ensuring data produced or consolidated through the effort is organized, documented and available to be utilized by a wide array of technical and non technical users. This effort leverages, coordinates and cost shares with a series of existing data management projects, cyber-infrastructure and partnerships which contribute capacity and information to this effort. During year one and two, this project would focus on providing informatics support to streamline the transfer of information between various study teams and isolate and standardize historic data sets in the general spill affected area for use in retrospective analysis, synthesis and model development. This work would scale down in year three thru five to provide support for general project level data management and archival.

*Funding for this project is included as part of Project 12120111 - PWS Herring Research and Monitoring Program.

Science Panel Comments:
Please refer to comments which can be found under 12120114 - McCammon and 1210120 - Jones.

Science Panel Recommendation: Modify

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Modify

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Modify

Executive Director Comments:
Not Available

Executive Director Recommendation: Modify

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-D**

Project Title: **LTM Program - Data Management Support for the EVOSTC Long Term Monitoring Program**

Principal Investigator: Robert Bochenek

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $157,500.00	**FY13:** $157,400.00	**FY14:** $157,900.00
FY15: $157,900.00	**FY16:** $156,700.00	**FY17:** $0.00

Total Funding Approved: $787,400.00

Abstract:
This project supplies the EVOS Long Term Monitoring (LTM) effort with critical data management support to assist study teams in efficiently meeting their objectives and ensuring data produced or consolidated through the effort is organized, documented and available to be utilized by a wide array of technical and non technical users. This effort leverages, coordinates and cost shares with a series of existing data management projects which are parallel in scope to the data management needs of the long term monitoring program. In the first two years, this project would focus on providing informatics support to streamline the transfer of information between various study teams and isolate and standardize historic data sets in the general spill affected area for use in retrospective analysis, synthesis and model development. These efforts would continue into year three through five but efforts would also focus on developing management and outreach applications for the data and data products produced from the LTM program.

Science Panel Comments:
Please refer to comments which can be found under 12120114 - McCammon and 1210120 - Jones.

Science Panel Recommendation: Modify

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Modify

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Modify

Executive Director Comments:
Not Available

Executive Director Recommendation: Modify

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-D**

Project Title: **PWS Herring Program - Non lethal sampling: In situ estimation of juvenile herring sizes**

Principal Investigator: Kevin Boswell

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $0.00

Abstract:
A common source of bias in acoustic surveys is proper partitioning of size classes and their respective contribution to biomass estimates (see Simmonds and MacLennan 2005). This is particularly evident when considering the probability of encountering multiple size classes (or age classes) within a given survey region, or even within a large school. Several approaches have been successful in estimating in situ size distributions, though many require appropriate light fields to determine target sizes (Foote and Traynor 1988; Gauthier and Rose 2001; Kloser and Horne 2003). Recent application of imaging sonars have proven useful for acquiring high-resolution measurements of target-length distribution, without the need for ambient or external light sources, thereby reducing the potential of behaviorally mediated bias in length estimation. Further, automated analysis software has been refined to rapidly provide length estimates and target tracking parameters, even for tightly schooling fishes.

*Funding for this project is part of Project 12120111 - PWS Herring and Monitoring Program.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **11100836-A**

Project Title: **Pilot studies of bioremediation of the Exxon Valdez Oil Spill - Amendment**

Principal Investigator: Michel Boufadel

Affiliation: Not Available

Co-PIs/Personnel: Jacqui Michel, Brian Wrenn

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $1,199,218.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $1,199,218.00

Abstract:

During the summer of 2011, staff from the Center for Natural Resource Development and Protection at Temple University evaluated the feasibility of enhancing biodegradation (i.e., bioremediation) in order to perform remediation of four Prince William Sound beaches where lingering Exxon Valdez oil persists: EL056C.3 (Eleanor Island), LA015E (Latouche Island), PWS3A44 (Perry Island), and SM006B (Smith Island). Our method relied on injecting beneath the oil layer on each beach a solution of hydrogen peroxide (100 mg/L), lithium nitrate (20 mg N/L), and sodium tripolyphosphate (2 mg P/L). The results from EL056C.3 and SM006B were the only ones available at the time of this request. Those from EL056C.3 showed that the oil in the experimental plots there biodegraded by 30 to 50% within one month. The results from SM006B suggested that no oil biodegradation occurred at that site.

We are proposing to conduct additional feasibilty work in Summer 2012 on two beaches: EL056C.3 and SM006B. On EL056C.3 we propose to expand operations in order to determine the maximum extent of biodegradation on the experimental plot used during Summer 2011 and to extend the boundaries of our technique to include the oil-contaminated areas to the right (facing landward) and in the lower intertidal zone. For SM006B, we are proposing to increase the injection pressure, as we believe most of the injected solutions were depleted within a short distance from the well tips. Beach PWS3A44 is similar in morphology to EL056C, while Beach LA015E had little oil. Therefore, pursuing the investigation on these two beaches is not as crucial as on the two beaches for which additional work is proposed.

This request also seeks funding for a two-step process of evaluating, for suitability as candidates for bioremediation, 53 oiled sites identified by Research Planning Incorporated's (RPI's) model for locating lingering oil as having greater than 30% distribution of moderately oiled residue at a 70% predicted probability value. This evaluation will include a desktop exercise as well as field verification.

Science Panel Comments:

This proposal amendment was reviewed by selected members of the science panel and by other reviewers with applicable knowledge and experience.

This proposal is well justified and represents a cost-effective means of doing triage to make important progress without tackling every possible remediation action, which would be excessively costly. This team lead by Boufadel has performed superbly on previous similar EVOS studies, earning a reputation for keen insight into the processes required for successful bioremediation of shorelines still contaminated by substantial amounts of lingering oil. The Amendment presented here proposes exactly the correct continuation of the previous work. The Boufadel team has prepared

excellent publications for the primary literature so the work they too has both practical clean-up value as well as intellectual value in expanding basic knowledge of th3ese subsurface processes and of remediation techniques.

A follow-up on the Eleanor Island site to test the full extent of the bioremediation success from the previous year is well justified as a further test of principle so as to allow future cost-benefit analysis of subsequent bioremediation actions. Extending application of the process to the contaminated lower intertidal site on Eleanor is also well justified. In addition, a retry at the Smith Island site is also well conceived and that the intent to retry with increased pressure of injection is sensible. Comparative data on bioremediation rates at several sites imply a slower process on Smith, so the hope that greater injection pressure will succeed is based on some empirical support.

Finally, the field testing of the RPI model that identified 53 sites for possible remediation is valuable and worth the effort and costs. By prioritizing these 53 sites by the criteria identified and then visiting up to 20 to confirm the high likelihood of remediation success, future decisions on clean-up can have a sound technical basis that gives confidence in success.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the reviewers recommendation.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Applicable

Public Advisory Committee Recommendation: Not Reviewed

Executive Director Comments:

I recommend funding this project at a not-to-exceed amount of $1.2 million (includes 9% GA and project management fees are waived) and conditioned on my approval of a revised budget.

Executive Director Recommendation: Fund

Trustee Council Comments:

This project requires close coordination with the US Forest Service and the ADEC. Contact information for both organizations will be forwarded to the project leads for their use in scheduling meetings prior to the start of the field work.

Trustee Council Decision: Fund

Project Number: **12120111-Q**

Project Title: **PWS Herring Research and Monitoring Program - Modeling the Population Dynamics of PWS Herring**

Principal Investigator: Trevor Branch

Affiliation: University of Washington

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $36,800.00	**FY13:** $87,029.00	**FY14:** $97,858.00
FY15: $100,416.00	**FY16:** $104,957.00	**FY17:** $0.00

Total Funding Approved: $427,060.00

Abstract:

Robust Pacific herring (Clupea pallasii) populations, suitable for exploitation by commercial fisheries, are typically sustained by periodic recruitment of strong year classes into the adult spawning population. However, the Prince William Sound (PWS) herring population has not had a strong recruitment class since 1989, when the Exxon Valdez Oil Spill (EVOS) occurred. In the EVOS settlement herring were identified as an injured resource and they remain listed as an unrecovered species by the EVOS Trustee Council (EVOSTC). Understanding why herring have not recovered in Prince William Sound requires understanding potential bottlenecks in the herring life cycle. The identification of the limiting conditions to herring recovery requires a series of focused process studies combined with monitoring of the natural conditions that affect herring survival.

Described here is a single project that is a part of an integrative program that will enhance the current monitoring efforts of the Alaska Department of Fish and Game (ADF&G), and examine aspects of particular life stages to allow better modeling of herring populations. The long-term goal of the program is to improve predictive models of herring stocks through observations and research. While we do not anticipate that there will be a major change in our modeling ability in the next five years, we expect that the combination of monitoring and focused process studies will provide incremental changes over the next twenty years and result in a much better understanding of herring populations by the end of the program.

Science Panel Comments:

The Herring Program team clearly gave careful thought to how modeling should be done and who should do it. Their choice and recruitment of Trevor Branch at UW is superb. This is a young rising star in fisheries dynamics modeling, who has many experienced colleagues with whom to interact. His proposal represents a good guideline for the modeling work he will begin, identifying some key processes of high value to the herring program. We expect to see evolution of the modeling as the project develops and see Branch as a leader who will make adaptive additions and modifications as new issues arise. We would like to have seen a more overt mention of how competing drivers of herring mortality will be tested against one another – physiological stress, starvation, top-down predation, and disease. These are clearly embedded in the life history modeling, but model fits to choose the factor or combinations of factors that best fit observed abundance changes would be welcome.

Comments from Agency Staff (8/31/2011):
Overall
The proponent is a great choice for this work, and having this as a doctoral project is a cost-effective way to get some

very good work done. The project description is light on details, and that is acceptable to a limited extent, given that the work includes an investigation of what has been done and the available data (via the management strategy evaluation), and that it is important to be flexible in model development.

It would be helpful to have more details on the “holistic” model. For example, the Hulson et al. age structured analysis is referenced in relation to the management strategy evaluation, but there is no clear description of how the proposed holistic life-stage model relates to or builds off of the ASA, i.e., what the structure of the “holistic” model will be.

Another concern is that is not clear if or how the “holistic” model will be used to aid in identifying the limiting factors in herring recruitment and recovery. That could be an important aspect of the overall herring program.

The disclaimer in the second paragraph of the “Statement of the Problem” is disconcerting given the intellectual effort that the proposal aims to expend on model development:

“While we do not anticipate that there will be a major change in our modeling ability in the next five years, we expect that the combination of monitoring and focused process studies will provide incremental changes over the next twenty years and result in a much better understanding of herring populations by the end of the program.”

Perhaps the proponent could offer a more detailed, though conditional description of what the expected benefits might be.

Other items

The order of the three tasks is a bit confusing. The tasks given in Methods (p. 3-4) are:
1. Management strategy evaluation to identify most informative datasets –
2. Predict future levels of recruitment – a meta-analysis of time series for other herring and clupeid stocks.
3. Holistic model of herring dynamics – life stage model (age based), tasks conducted by UW students and faculty with access to Hilborn, Punt, and Essington.

The expected order of completion of these tasks as given under Milestones (p.7) is
1. model (by 9/14),
2. MSE (by 9/15), and
3. predict recruitment (by 9/16)

It is not clear why a model will be developed first, and then a different model (ASA) used in the management strategy evaluation. Also, the work to predict future recruitment, as described, appears correlational and doesn’t appear to involve the “holistic” model or a mechanistic understanding of herring dynamics, yet the timeline has this work occurring after initial model development. How would this work be related to the “holistic” model?

Timeline (p. 7) FY12 dates are given as beginning October 1, 2013. Should that be 2011?

The budget includes research assistant-ship and tuition for a Ph.D. student – essentially a half time position dedicated to this research. This is a cost efficient use of funds.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the Science Panel's comments. The PI's identified are skilled and well-respected in their field and will bring valuable experience to this complex project.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

The PAC concurs with the Science Panel recommendation to fund the Branch modeling project. There were no objections.

Public Advisory Committee Recommendation: Fund

Executive Director Comments:

Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:

The PI has satisfactorily addressed the questions raised by both the Council and ADF&G. This project is approved for funding.

Responses:
"PWS herring research and monitoring program – modeling the population dynamics of PWS herring" response to ADF&G agency staff comments on proposal
Exxon Valdez Oil Spill Trustee Council, project number 12120111-Q
Trevor A. Branch, tbranch@uw.edu

This document summarizes changes to the proposal made in response to comments from ADF&G staff. Many valuable comments and clarifications were made, pointing out some parts of the proposal that, in hindsight should have been expanded or simply written better. Throughout, though, the intent was to retain flexibility in the modeling approach that could be used, under the assumption that different types of models would be employed to examine different explanatory factors for the decline of PWS herring.

Substantive comments are interspersed with responses.

"we would have liked to have seen a more overt mention of how competing drivers of herring mortality will be tested against one another"
As suggested by the Science Panel, we intend to compare different drivers of herring mortality (physiological stress, disease, starvation, top-down predation, disease, competition with hatchery salmon, EVOS, etc.) using model fits to the time series of data. Models will be fit in either a likelihood or Bayesian approach, depending on model complexity, allowing for comparison of competing hypothesis with likelihood ratio tests for nested models, or AIC for non-nested models.

"It would be helpful to have more details on the "holistic" model… no clear description of how the proposed holistic life-stage model relates to or builds off of the ASA"
A flexible modeling approach is envisaged, including a range of possible models from modifications to the existing ASA model, to a mechanistic model of each age class, to individual-based modeling, to area-based modeling. Mechanistic models would delve into the particular factors influencing mortality of each age class, to provide predictions that are age-specific and can be compared to observed data on age composition. Individual-based modeling using super-individuals and incorporating detailed space-based information, and variation among individuals in disease-resistance, could provide insight into why spawning has shifted from one area to another. Much of the change in the population consists of the shift in spawning areas from the Northeast region (1970s) to the North (1980s) followed by a collapse in the North and Northeast spawning areas (1990s) and replacement by spawning mainly around Montague Island and the Southeast (Pearson et al. in press). At a coarser scale, aggregating data by these larger areas would allow for intermediate modeling between individual-based and the current ASA model, by accounting for area-specific differences in biological characteristics, disease prevalence, oil spill magnitude, and other factors. It is a near-certainty that the modeling results will feed back into continued development and expansion of the ASA model to include additional relevant factors.

"The disclaimer in the second paragraph of the Statement of the Problem is disconcerting: While we do not anticipate that there will be a major change in our modeling ability in the next five years, we expect that the combination of monitoring and focused process studies will provide incremental changes over the next twenty years and result in a much better understanding of herring populations by the end of the program."
This statement should be removed. It was part of the original overall project proposal, before the modeling component was added to address these exact concerns. The proposed modeling, management strategy evaluation and the meta-

analysis of global herring populations will add substantially to model development and understanding of PWS herring dynamics.

“Perhaps the proponent could offer a more detailed, though conditional, description of what the expected benefits might be.”
1.Modeling: a variety of models will be used to explore which hypotheses best explain the decline and subsequent failure to recover, of PWS herring. Including area-based modeling, mechanistic modeling, and possibly individual based modeling, together with additional modeling approaches to be determined, will greatly expand the range of modeling tools used.
2.Management strategy evaluation: this will be used to determine which data time series contain the most useful information for tracking trends in abundance, and thus provide information about the relative quality of different types of data. Tests include excluding one dataset at a time to see how each dataset influences the ability of management rules to ensure rebuilding while minimizing foregone catch.
3.Management strategy evaluation: the second component of this modeling will be to test and develop alternatives to the current management rules used to manage the fishery.
4.Meta-analysis of herring populations: this will result in estimates of the average duration of fisheries collapse for different herring population, the expected autocorrelation in recruitment, and hence a quantitative estimate of the probability of recovery of PWS herring based solely on other herring populations.

“The order of the tasks is a bit confusing”
The description of the tasks should have been arranged in the same order as the timeline, but was erroneously not. Clearly model development and enhancement should be first, since this may inform or provide alternatives to the ASA model. Management strategy evaluation should follow this modeling process, since MSE requires an underlying model to test datasets and management rules. The meta-analysis to predict recruitment could be conducted at any point, either before, after, or in parallel with the other two tasks. It is meant to provide a predictive assessment of the likelihood of recovery independent of data from PWS herring. Thus the order could be model, MSE, meta-analysis, or it could be meta-analysis, model, MSE.

“It is not clear why a model will be developed first, and then a different model (ASA) used in the MSE”
As indicated above, model development is first since this may suggest modifications to the ASA model used to manage the fishery at present. MSE will still use the ASA (together with alternative models) since this is the most realistic way to model actual management decisions, which are based on ASA.

“The work to predict future recruitment, as described, appears correlational and doesn’t appear to involve the “holistic” model or a mechanistic understanding of herring dynamics”
This meta-analysis is deliberately designed to borrow data from other herring stocks. Numerous herring stocks around the world have collapsed in analogous ways to the PWS herring stock, while some have also recovered. The RAM Legacy database (Ricard et al. 2011 in press) which I have made extensive use of, and contributed to (Branch et al. 2010, Branch et al. 2011), contains 23 stock assessments for Clupea pallasii or Clupea harengus. This database will be expanded to include more herring stocks, which will be used to answer the questions “What is the average duration of low biomass for herring stocks”, “How many years should we expect low recruitment to continue for?” and “What is the typical autocorrelation in recruitment among years”. This section is deliberately intended to be of global importance and independent of factors involved in the collapse of any particular herring stock such as the PWS stock. Another way of thinking about this is that this meta-analysis provides a “control”, thus if the average duration of collapse in other herring stocks is 5 years, the PWS collapse is certainly exceptional and strongly suggests some factor that is specific to PWS; but if the average duration of collapse in other herring stocks is 30 years, then the PWS collaps

Trustee Council Decision: Fund

Project Number: **12120111-E**

Project Title: **PWS Herring Program - Expanded Adult Herring Surveys**

Principal Investigator: Michele Buckhorn

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: Dick Thorne

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $6,300.00	**FY13:** $81,300.00	**FY14:** $65,600.00
FY15: $87,300.00	**FY16:** $81,300.00	**FY17:** $0.00

Total Funding Approved: $321,800.00

Abstract:
Prince William Sound herring stock biomass estimates from hydroacoustic surveys provide a direct measure of the stock abundance and are also a primary input into the age-structured assessment (ASA) model that is the forecasting tool used for managment. Prior to 2001, the hydroacoustic surveys were conducted exclusively by the Prince William Sound Science Center (PWSSC). Since 2001, the effort has been shared between PWSSC and the Cordova office of Alaska Department of Fish and Game (ADF&G). While the ADF&G considers the hydroacoustic surveys to be critical (Steve Moffitt, personal communication) the lack of a commercial herring fishery in PWS since 1998 has reduced management priorities for herring. Thus the PWSSC contribution has become critically important for the long-term, especially if a future fishery appears only a remote possibility. With the level of effort available over the past several years, PWSSC and ADF&G individually have achieved herring biomass estimates with a precision of about ±30%, which is insufficient for management purposes. However, the combined effort currently meets management requirements for precision. Current stock assessment efforts by ADF&G resource managers in PWS focus on the largest spawning aggregations. The objective of this study is to increase the current survey area of adult spawning beyond the Port Gravina and Fidalgo areas to provide a more precise estimate of spawning biomass. We propose to extend the PWSSC acoustic surveys to help identify the relative contributions of additional spawning aggregations over temporal and spatial scales. This will help establish more accurate estimates of the total herring biomass in PWS and provide an alert to changes in biomass in different regions. Beginning in FY2013 and continuing until 2016, hydroacoustic surveys will be conducted in late spring (April-May) to assess adult spawning biomass. ADF&G will continue to conduct direct sampling for age/length/weight. Additional direct capture will be conducted using a midwater trawl at adult spawning sites (See Bishop proposal).

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-F**

Project Title: **PWS Herring Program - Juvenile Herring Abundance Index**

Principal Investigator: Michele Buckhorn

Affiliation: Not Available

Co-PIs/Personnel: Dick Thorne

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $86,800.00	**FY13:** $77,200.00	**FY14:** $63,600.00
FY15: $81,800.00	**FY16:** $79,900.00	**FY17:** $0.00

Total Funding Approved: $389,300.00

Abstract:
Management of the Pacific herring stock in Prince William Sound (PWS), Alaska, is based primarily on an age-structured-assessment (ASA) model. The current model, developed in 2005, incorporates both hydroacoustic estimates of the adult herring biomass and an index of the male spawning, called the “mile-days of spawn”. Unfortunately, the forecast is based on measurements from the previous year and does not have a direct measure of future age 3 recruitment. Current knowledge suggests that most mortality occurs during the first winter of life, so the relative recruitment may be fixed by the end of the first year. Consequently, estimates of relative abundance of age 1 and age 2 fish should provide an index of future recruitment. An index of age 0 fish would also provide a forecast of recruitment if additional information were available on the magnitude of the first year mortality. We will conduct annual fall surveys (FY2013-2016) of 8 bays; four of which will be the Sound Ecosystem Assessment (SEA) bays (Cooney et al. 2001). This will maintain a continual database from these locations. The other 4 bays will be selected based upon the survey results of the current EVOSTC FY10 Herring Survey Project (# 10100132). Surveys will be conducted using 120 kHz split-beam hydroacoustic unit in a stratified systematic survey design (Adams et al. 2006). For this study, direct capture will be directed to size and species composition. A midwater trawl will be used to sample randomized transects within each strata.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-G**

Project Title: **PWS Herring Program - Intensive surveys of juvenile herring**

Principal Investigator: Michele Buckhorn

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: Dick Thorne

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $48,300.00	**FY13:** $0.00	**FY14:** $73,500.00
FY15: $6,500.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $128,300.00

Abstract:
Hydroacoustic surveys of juvenile herring nursery areas in Prince William Sound have been conducted during fall and late-winter for the last several years. The number of locations surveyed have varied from 5-9, including the 4 Sound Ecosystem Assessment (SEA) bays. However, each seasonal effort has conducted only a single night survey in each of these locations. Thorne (2010) examined seasonal changes from fall 2006 to spring 2009. He showed that apparent overwinter mortality of age 0 herring appeared to be greatest in Simpson Bay and least in Whale Bay. However, the differences in seasonal abundance could be attributed to mortality, emigration, or changes in ambient light. We propose to address these uncertainties with an intensive fall and late winter/spring intensive survey. The fall series will start mid-October 2014 and extend to the first week of December. The late winter/spring series will begin the 3rd week of February 2015, and extend into the 2nd week of April. We propose to conduct the surveys in two bays sufficiently adjacent to cover each bay each night, such as Simpson Bay, Port Gravina, Windy Bay or St. Mathews Bay. In addition to the hydroacoustic surveys, we propose a single night of direct capture effort in each location for each of the survey weeks (See Bishop, this proposal). The survey design will follow the historic zig zag transects run by Thorne since 1993 in order to remain consistent with that sampling design and to put the long term fall and spring surveys into context.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-E**

Project Title: **LTM Program - Long-term monitoring of oceanographic conditions in Prince William Sound**

Principal Investigator: Robert Campbell

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $229,300.00	**FY13:** $186,200.00	**FY14:** $190,200.00
FY15: $196,200.00	**FY16:** $201,600.00	**FY17:** $0.00

Total Funding Approved: $1,003,500.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. This project is intended to provide physical and biological measurements that may be used to assess bottom-up impacts on the marine ecosystems of Prince William Sound. Specifically, it is proposed to deploy an autonomous profiling mooring in central Prince William Sound that will provide high frequency (~daily) depth-specific measurements of physical (temperature, salinity, turbidity), biogeochemical (nitrate, phosphate and silicate) and biological (Chlorophyll-a concentration) parameters that will be telemetered out in near real-time. Several regular vessel surveys are also proposed to provide ground-truth data for the mooring, and to attempt to capture some of the spatial variability in PWS. As well as the mooring site, the surveys will visit all four of the SEA bays to maintain ongoing EVOSTC funded time series measurements at those sites and to support proposed herring research (Pegau et. al). The major entrances (Hinchinbrook Entrance and Montague Strait) will also be visited. The surveys will make the same suite of measurements as the mooring, and will also collect water and plankton samples. This project will also link significantly with the herring research efforts proposed by Pegau et al., and will analyze plankton samples collected during intensive studies of juvenile herring feeding and energetics.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-S**

Project Title: **LTM Program - Extending the Tracking of oil levels and weathering (PAH composition) in PWS through time.**

Principal Investigator: Mark Carls

Affiliation: Not Available

Co-PIs/Personnel: Mandy Lindeberg, Jeep Rice

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $19,600.00	**FY13:** $13,100.00	**FY14:** $169,200.00
FY15: $8,700.00	**FY16:** $6,500.00	**FY17:** $0.00

Total Funding Approved: $217,100.00

Abstract:
Intertidal areas in western Prince William Sound were extensively coated with Exxon Valdez oil; oil still remains in many beaches, presumably with declining impacts on intertidal invertebrates such as mussels, and also predators such as sea otters and harlequin ducks. This project would revisit approximately 12 of the worst case sites to continue the long term data set that tracks oil quantity and weathering composition in the contaminated sediments, and establish long term oil monitoring sites that would be re-sampled every 5 years over the next 20 years.

This project fills two needs: understanding the “dose” levels (past and present) for species such as mussels, intertidal invertebrates, sea otters, and harlequin ducks; and (2) understanding the natural degradation of quantity and composition of PAH over a long time course. Understanding exposure doses is important to injured species, and this would complement the biomarker analyses of lingering exposure on sea otters and harlequin ducks (Ballachey; Esler). Understanding oil loss over time is important for understanding full recovery of the habitat; in Alaska, this time course is apparently longer than in lower latitude environments. This study would complement and extend previous work, and would complement the remediation studies by Boufadel in 2011-12 as well as the Irvine study outside of PWS in 2011-12.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-F**

Project Title: **LTM Program - Data synthesis, analysis and recommendations for sampling frequency and intensity of nearshore marine bird surveys to detect trends utilizing existing data from the Prince William Sound, Katmai and Kenai Fjords coastlines**

Principal Investigator: Heather Coletti

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: USNPS

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $32,700.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $32,700.00

Abstract:

This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. Skiff based surveys for marine birds along the Prince William Sound, Katmai and Kenai Fjords coastlines have been
conducted for over 5 and 20 years, respectively. The results of these surveys provide estimates of the species composition, relative abundance, and distribution of all marine birds and mammals within this nearshore zone. The focus of these surveys is on marine birds that are trophically linked to the nearshore food web, and include species of sea ducks(Harlequin ducks, Barrow's and common goldeneye, and scoters), mergansers (common and red-breasted), and shorebirds, specifically the black oystercatcher, cormorants, glaucouswinged
gulls and pigeon guillemots. Sustainability of long-term monitoring programs requires the optimization of sampling intensity and efforts to minimize costs while concurrently having sufficient power to detect a trend. While there has been critical thought in the past regarding these questions, current available analytical methods now allow for the use of existing data in simulations, using a Bayesian framework, to estimate number of samples and sample frequency required to detect a specified trend as well as examine effects contributing to variation, such as imperfect detection.

Science Panel Comments:

Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:

Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-G**

Project Title: **LTM Program - Long-term monitoring of oceanographic conditions in Cook Inlet/Kachemak Bay to understand recovery and restoration of injured near-shore species. Project Period: October 1,**

Principal Investigator: Angela Doroff

Affiliation: Not Available

Co-PIs/Personnel: Kris Holderied

Disbursing Agency: NOAA

Project Location: Lower Cook Inlet

Project Type: New

Funding Approved by Fiscal Year:

FY12: $191,900.00	**FY13:** $38,200.00	**FY14:** $166,400.00
FY15: $133,700.00	**FY16:** $108,800.00	**FY17:** $0.00

Total Funding Approved: $639,000.00

Abstract:

This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. The Kachemak Bay Research Reserve (KBRR) and NOAA Kasitsna Bay Laboratory jointly propose to continue and enhance oceanographic monitoring in Kachemak Bay and lower Cook Inlet, in order to provide the physical data needed for a comprehensive restoration monitoring program in the Exxon Valdez oil spill (EVOS) affected area. This project will leverage and enhance KBRR water quality monitoring stations, establish routine small boat oceanographic and plankton surveys to assess spatial, seasonal and inter-annual variability in water mass movement, leverage information from previous oceanographic surveys, provide environmental information to aid separately proposed benthic monitoring projects, and benefit from a new NOAA ocean circulation model for Cook Inlet. Longterm monitoring of physical changes and connectivity in the marine environment is essential to understand what drives both gradual and sudden changes in coastal ecosystems and estuarine systems in the affected area, including Prince William Sound and Cook Inlet. In addition to longterm effects from the EVOS, these coastal waters and habitats are impacted by the other physical stressors including climate change, ocean acidification, and continuing land-level and sedimentation changes from the 1964 earthquake and isostatic rebound from melting glaciers. The Cook Inlet/Kachemak Bay oceanographic information from this project will allow determination of patterns and trends in ocean circulation and plankton and aid in interpretation of biological monitoring data on the status and trends of injured resources in the near-shore environment. In conjunction with separately proposed oceanographic monitoring projects in PWS and the Gulf of Alaska, the project will enable assessment of whether circulation patterns in the Gulf of Alaska are synchronous with near-shore trends, which has implications for biological abundance and diversity. Our objective is to implement an enhanced, long-term Cook Inlet near-shore oceanographic monitoring program that directly informs management for sustained recovery and restoration of EVOS-injured resources in the face of environmental variability, shifts and long-term changes.

Science Panel Comments:

Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:

Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-I**

Project Title: **PWS Herring Program - Fatty Acid Analysis as Evidence for Winter Migration of Age-0 Herring in Prince William Sound**

Principal Investigator: Ronald Heintz

Affiliation: Not Available

Co-PIs/Personnel: JJ Vollenweider

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12:	$18,400.00	**FY13:**	$47,100.00	**FY14:**	$0.00
FY15:	$0.00	**FY16:**	$0.00	**FY17:**	$0.00

Total Funding Approved: $65,500.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et al. Monitoring of age-0 herring should be an important component of the Trustee herring program, but the appropriate spatial scale for monitoring is unknown. The current program assumes age-0 herring remain in their nursery bays over winter. If true, observations of differences among bays in terms of age-0 condition and marine conditions will allow for identifying conditions that lead to improved recruitment to age-1. We propose to test the assumption by monitoring the fatty acid (FA) composition of age-0 herring over winter. The FA composition of depot lipids derives from diets (Budge et al. 2006), so differences in the prey fields in different bays should produce differences in the FA compositions of herring in those bays (Otis et al. 2009). Therefore, the FA composition of age-0 herring in fall can act as a natural tag for identifying migration. Changes in FA composition due to winter feeding are likely to be minimal because age-0 herring experience energy deficits in winter, proscribing lipid storage. We plan to test this assumption in a laboratory study. We hypothesize that migration of herring will result in increasing similarity of herring FA compositions over winter. Alternatively, if the FA composition of age-0 herring in given bays remains constant over winter then migration must be limited.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-J**

Project Title: **PWS Herring Program - What is the age at first spawning for female herring in PWS?**

Principal Investigator: Ronald Heintz

Affiliation: Not Available

Co-PIs/Personnel: JJ Vollenweider

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $49,600.00	**FY13:** $21,800.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $71,400.00

Abstract:
The predictive capabilities of current population models of herring in Prince William Sound may be improved by validating the estimated proportions of fish in each age class that spawn and knowing the proportions of primiparous individuals in each age class. Determination of age at first spawn has been accomplished via 1) analysis of differential growth increments on scales, 2) histological analysis of egg development in ovaries. While the histological method provides direct observation of the spawning history of individuals it is unlikely that developing oocytes can be observed among spawners. Hence the histological analysis must occur some months after spawning. We propose to examine scales of female herring collected from spawning aggregates in PWS to identify the spawning history of each year class. We will also validate the scale technique by comparing the results of scale analysis with that of histological analysis of oocyte development. The validation will likely be used on fish sampled some time after spawning. In order to identify the optimal time we will iteratively sample ovaries in fish held in the lab after spawning. Estimates of the proportion of primiparous fish in the spawning population will provide a means for adjusting estimates of the total post-spawning biomass in the ASA by indicating proportion of each age class that was not on the spawning grounds in the previous year. This study will consequently serve to develop an inexpensive method for improving the accuracy of spawning stock biomass estimates.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-K**

Project Title: **PWS Herring Program -Herring Disease Program**

Principal Investigator: Paul Hershberger

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: USGS

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $0.00	**FY14:** $281,900.00
FY15: $291,900.00	**FY16:** $298,000.00	**FY17:** $0.00

Total Funding Approved: $871,800.00

Abstract:
The Herring Disease Program (HDP) is part of a larger integrated effort, Prince William Sound Research and Monitoring (outlined in a separated proposal by Dr. Scott Pegau). Within this integrated effort, the HDP is intended to evaluate the impact of infectious and parasitic diseases on the failed recovery of the PWS herring population. The framework for the 2012 – 2016 HDP involves a combination of field surveillance efforts, field-based disease process studies, and laboratory-based controlled studies. Field surveillance efforts will provide continued and expanded infection and disease prevalence data for herring populations in Prince William Sound (PWS), Sitka Sound, and Puget Sound. Additionally, samples from field surveillance efforts will be processed using newly developed disease forecasting tools to provide annual risk assessments that quantify the potential for future disease epizootics. Laboratory-based empirical studies will provide an understanding of cause-and effect epidemiological relationships between the host, pathogen, and environment; understanding of these relationships represents a first step towards developing additional disease forecasting tools. Specific emphasis will be placed on refining our understanding disease processes specific to viral hemorrhagic septicemia (VHS) and ichthyophoniasis, two primary diseases of herring in PWS. Additionally, a novel diagnostic tool for Ichthyophonus, a fluorescent in situ hybridization (FISH) probe, will be developed.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-H**

Project Title: **LTM Program - Science Coordination and Synthesis for the Long Term Monitoring Program**

Principal Investigator: Kristine Holderied

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $123,500.00	**FY13:** $139,000.00	**FY14:** $148,300.00
FY15: $146,100.00	**FY16:** $151,600.00	**FY17:** $0.00

Total Funding Approved: $708,500.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et al. Long-term monitoring has been implemented within the Exxon Valdez Oil Spill (EVOS)-affected region, with support from the EVOS Trustee Council (TC), agencies, North Pacific Research Board, Alaska Ocean Observing System, other research grant organizations, and citizen science programs. However, many of these efforts have been conducted independently, with emphasis on monitoring of single species or within individual disciplines. By explicitly providing for science coordination and syntheses of data from our proposed long-term monitoring program, as well as incorporating an interdisciplinary framework into program development and implementation, we seek to improve open access to multi-disciplinary data and promote use of integrated information from the entire program for both research and resource management in the EVOS-affected region. The science coordination and synthesis component of our integrated program will improve linkages between monitoring in different regions (Prince William Sound, Gulf of Alaska shelf, lower Cook Inlet) as well as between disciplines in a given region, as a way to better discern the impacts of environmental change on restoration and continued recovery of injured resources. Science coordination will include facilitating program planning and sharing of information between principal investigators, developing annual reports on the science program, and
coordinating ongoing evaluation of the overall program. Science synthesis efforts will help integrate information across the entire program and will be closely coordinated with the conceptual ecological modeling and data management teams in our integrated program.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-I**

Project Title: **LTM Program - Conceptual Ecological Modeling**

Principal Investigator: Tuula Hollmen

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: ADFG

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $83,100.00	**FY13:** $91,900.00	**FY14:** $95,600.00
FY15: $78,600.00	**FY16:** $81,900.00	**FY17:** $0.00

Total Funding Approved: $431,100.00

Abstract:

This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. Under this research project, we will develop conceptual ecological models to support the synthesis and planning relating to the long term monitoring program in Prince William Sound, outer Kenai coast, and lower Cook Inlet/Kachemak Bay. To develop these models, we will summarize system components, processes, and influences into a synthetic framework. The conceptual models will assist in identification of data needs and development of further long term monitoring priorities, and support ecosystem based understanding, monitoring, and management of resources within our study area. The conceptual models will also provide guidance for development of numerical and quantitative models of system function and responses to external influences. Finally, the conceptual models will provide a communication tool among scientists, resource managers, policy-makers, and the general public, and will offer

outreach opportunities for our project by using data visualization and interactive web-based tools. Development of conceptual ecological models is a multi-step, iterative process, responding to evolving understanding of the structure and dynamics of the system by

revising and refining models throughout the process. Specific steps of the process involve: defining goals and scope of the modeling, summarizing current understanding of system structure and processes, defining environmental and anthropogenic influences included in the modeling, development of relevant hierarchies and submodels, refining models with increased understanding of system function, and development of interactive and visualization tools to provide methods to use models for long term planning, development of hypotheses, data exploration, and outreach.

Science Panel Comments:

Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:

Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-J**

Project Title: **LTM Program - The Seward Line: Marine Ecosystem monitoring in the Northern Gulf of Alaska.**

Principal Investigator: Russell Hopcroft

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: ADFG

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $94,500.00	**FY13:** $57,600.00	**FY14:** $96,800.00
FY15: $100,200.00	**FY16:** $103,700.00	**FY17:** $0.00

Total Funding Approved: $452,800.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. The ocean undergoes year-to-year variability in the physical environment, superimposed on longerterm cycles, and potential long-term trends. These variations influence ocean chemistry, and propagate through the lower trophic levels, ultimately influencing fish, seabirds and marine mammals. Over the past 50 years the Northern Pacific appears to have undergone at least one clear “regime shift”, while the last 12 years have seen multi-years shifts of major atmospheric indices, leaving uncertainty about what regime the coastal Gulf of Alaska is currently in. Regime shifts are often expressed as fundamental shifts in ecosystem structure and function, such as the 1976 regime shift that resulted in a change from a shrimp dominated fisheries to one dominated by pollock, salmon and halibut. Long-term observations are also critical to describe the current state, and natural variability inherent in an ecosystem at risk of significant anthropogenic impact. Given the potential for such profound impacts, this proposal seeks to continue multidisciplinary observations which began in 1997 along the Seward Line and in PWS that assess the current state of the Northern Gulf of Alaska, during 2012-2017. Such observations form critical indices of ecosystems status that help us understand some key aspects of the stability or change in upper ecosystems components for both the short and longerterm. By analogy, the weather has been for more than a hundred years, yet regular observations are still needed to know what is happening and what can be expected in the near future.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120100**

Project Title: **EVOS Administration**

Principal Investigator: Elise Hsieh

Affiliation: EVOSTC

Co-PIs/Personnel: None

Disbursing Agency: ADFG

Project Location:

Project Type: New

Funding Approved by Fiscal Year:

FY12:	$1,711,790.00	**FY13:**	$0.00	**FY14:**	$0.00
FY15:	$0.00	**FY16:**	$0.00	**FY17:**	$0.00

Total Funding Approved: $1,711,790.00

Abstract:

The budget structure is designed to provide a clearly identifiable allocation of the funds supporting Trustee Council activities. The program components are:

• Administration Management
• Data Management
• Science Management
• Public Advisory Committee (PAC)
• Habitat Protection Program
• Trustee Council Member Direct Expenses
• Liaison Program Support/Project Management
• Alaska Resources Library & Information Services (ARLIS)

The budget estimates detailed within those specified program components are projected based upon prior year actual expenditures and include the application of estimated merit step increases, as well as payroll benefits increases. Detailed budget component items are either “continuing” or “ongoing” from program directives already approved by the Trustee Council and cover necessary day-to-day operational costs of the Exxon Valdez Oil Spill Restoration Office and administrative costs associated with overseeing current Trustee Council program objectives.

Science Panel Comments:

Not Applicable

Science Panel Recommendation: Not Reviewed

Science Coordinator Comments:

Not Applicable

Science Coordinator Recommendation: Not Reviewed

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-K**

Project Title: **LTM Program - Continuing the Legacy: Prince William Sound Marine Bird Population Trends**

Principal Investigator: David Irons

Affiliation: Not Available

Co-PIs/Personnel: Kathy Kuletz

Disbursing Agency: USFWS

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $206,300.00	**FY13:** $24,200.00	**FY14:** $211,000.00
FY15: $24,200.00	**FY16:** $215,600.00	**FY17:** $0.00

Total Funding Approved: $681,300.00

Abstract:
We propose to conduct small boat surveys to monitor abundance of marine birds in Prince William Sound, Alaska, during July 2012, 2014, and 2016. Eleven previous surveys have monitored population trends for marine birds and mammals in Prince William Sound after the Exxon Valdez oil spill. We will use data collected to examine trends from summer to determine whether populations in the oiled zone are increasing, decreasing, or stable. We will also examine overall population trends for the Sound. Continued monitoring of marine birds and synthesis of the data are needed to determine whether populations injured by the spill are recovering. Data collected from 1989 to 2010 indicated that pigeon guillemots (Cepphus columba) and marbled murrelets (Brachyramphus marmoratus)) are declining in the oiled areas of Prince William Sound. We have found high inter-annual variation in numbers of some bird species and therefore recommend continuing to conduct surveys every two years. These surveys are the only ongoing means to evaluate the recovery of most of these injured marine bird species. Surveys would also benefit the benthic monitoring and forage fish monitoring aspects of the Long-term Monitoring Project as well as the Herring Project.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **11100112-A**

Project Title: **Lingering Oil on Boulder-Armored Beaches in the Gulf of Alaska 22 Years after the Exxon Valdez Oil Spill**

Principal Investigator: Gail Irvine

Affiliation: USGS

Co-PIs/Personnel: Mark Carls, Dan Mann

Disbursing Agency: USGS

Project Location: Gulf of Alaska

Project Type: New

Funding Approved by Fiscal Year:

FY12: $61,700.00	**FY13:** $25,600.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $87,300.00

Abstract:
This FY12 amendment to Project 11100112 solely requests funding to complete sampling that was detailed in the original proposal, but which could not be accomplished in 2011 because of extremely bad weather. Costs, primarily in logistics (contracts) and personnel time, were incurred in the attempted sampling and form the main part of our request. In 2011 we were on a vessel in Cook Inlet/Shelikof Strait for 7 days and were only able to sample on 2 low tides. After five days of bad weather, when it became clear that we could not sample our suite of sites, we concentrated on accomplishing Objective 2 (determining if oil is leaking out of the sites), which involved placing passive samplers at just 2 sites and nearby controls. Since these samplers are extremely sensitive to waterborne hydrocarbons, finishing Objective 2 reduces the conflict between that sampling and some of our traditional sampling that can disrupt the oil at a site (e.g., taking oiled sediment samples, and assessing the depth of subsurface oil via dip stones). Thus, even though we visited two sites – and visually observed appreciable persistent oil at both, we could not do those disruptive forms of sampling which are extremely important components of the long-term monitoring. This amendment to our proposal will allow the complete re-sampling of our 6 Gulf of Alaska long-term monitoring sites in 2012. Our overall objectives have not changed, but we have modified the due dates for this study and have provided a budget that addresses the additional costs required.

Science Panel Comments:
Not Applicable

Science Panel Recommendation: Not Reviewed

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Applicable

Public Advisory Committee Recommendation: Not Reviewed

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120112**

Project Title: **PWS Harbor Cleanup Project**

Principal Investigator: Laurel Jennings

Affiliation: NOAA

Co-PIs/Personnel: Erika Ammann

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $19,883.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $19,883.00

Abstract:
The National Oceanic and Atmospheric Administration (NOAA) Restoration Center (RC) proposes to establish a new funding opportunity for Prince William Sound coastal communities to help them prevent small but damaging toxic releases originating from harbors and marinas. This opportunity will build upon existing resources and knowledge and provide communities with a long serving set of methods for handling small spills and re-engage an already informed group of concerned citizens to help run the program after the five years of EVOS funding is completed. This effort will review past EVOS assistance to harbors ensuring that past EVOS expenditures for equipment are utilized to the maximum efficiency, identify technology advancements that can improve current activities in the marinas, and create a local investment and ownership in the success of chosen projects. The purpose of this project will be to protect marine resources negatively affected in EVOS from future aggravation and pollution.

Science Panel Comments:
April 2011 comments below. In response, the Proposer has reduced their budget to $1 million and has indicated funding from NOAA in the final proposal.

The panel has several key concerns regarding the proposed program. First, a significant portion of the funding requested will be spent in administrative and travel costs for the Seattle, WA and Anchorage, AK based team. Second, the narrative does not provide enough information to determine the potential effectiveness of the program. Finally, there is no established plan for outreach and education that would be critical for this type of effort.

There are only general descriptions of types of activities that might be included in community-specific plans. There are references other Best Management Practices (BMP) but does not commit to following any particular BMP. There seems to be overlap in scoping and assessment phases with an already existing Alaska Clean Harbor project funded for $282,615 by CIAP grant (see CIAP approved state plan, http://dnr.alaska.gov/coastal/CIAP/ciap_Fall.htm). Unless coordination is required, there may be duplication of effort with the Clean Harbor program at significantly higher expense in this project. Travel costs seem high, especially in the implementation phases that do not involve public outreach. Most of the staff is coming from Seattle which increases the cost, but there is not much justification in the proposal other than relationship building with communities. The listed project managers do not seem to have much experience with harbor operations, so technical assistance may be limited.

Science Panel Recommendation: Do Not Fund

Science Coordinator Comments:

The team has reduced their budget as requested by the Council. I continue to be concerned that the first projects will not even be selected until June 2013 leaving only three field seasons available for the actual work. Also, the current timeline would not allow the Council (who will only be meeting annually in Aug/Sep) the opportunity to review the projects prior to their selection and implementation.

Science Coordinator Recommendation: Do Not Fund

Public Advisory Committee Comments:

A revised proposal with funds leveraged has reduced the cost of this effort, which will be managed by NOAA staff. While there are merits to the cleanup of harbors, the Trustee Council should proceed with caution, as there are few details at this time explaining what this project will accomplish.

Public Advisory Committee Recommendation: Do Not Fund

Executive Director Comments:

The proposer has responded to SP and TC concerns and submitted a reduced-budget proposal that mitigates issues identified prior. However, the PAC has identified concerns with funding an largely administrative process and I agree with the Science Coordinator's concerns. This is an important focus area, as also discussed by the PAC, but due to those issues, my "fund" recommendation is fairly soft.

Executive Director Recommendation: Fund

Trustee Council Comments:

Below are the April 2011 comments from the Council after review of the draft proposal. A revised proposal has been submitted in response to their concerns.

The Council requests the proposer review the Science Panel comments and strengthen it's proposal and adjust the budget to $1 million dollars.

September 2011 comments:
The Council did not vote to fund this entire request. However, it did request a revised proposal and budget that would be limited to the scoping and RFP phase, concluding with presentation to the Council of the proposals received in response to the RFP and with a budget not-to-exceed $125,000 (plus 9% GA). The following items were also specifically noted as being of interest:

1. Greater staffing efficiency for travel in the spill-area communities: limit travel time and number of travelers to only those necessary.

2. Consult EVOSTC office staff members, such as Cherri Womac, who have experience locating free or low-cost meeting rooms in these communities.

3. Work with DEC staff to ensure that the scoping/RFP phase seeks proposals for work which is not already legally-required by state or federal law.

4. The currently-proposed timeframe for scheduling meetings in the communities is an extremely busy time for harbor personnel. It is recommended that you determine when other meetings with harbor personnel are occurring and/or adjust your schedule to dates that are outside of the commercial fishing season.

5. The scoping/RFP phase should emphasize to proposers and interested parties that the Council's current intent is to consider funding proposals with a total not to exceed the remaining amount of the original NOAA Clean Harbor proposal. For example, if the entire $125,000 is used during the scoping/RFP phase, fund proposals up to a total of

approximately $953,750.

This revised proposal will be reviewed for funding by the Elise Hsieh, the Executive Director. Upon her approval, funds can be released for this revised proposal.

October 2011:
A revised proposal has been submitted by the team. At this time, funding has only be approved to complete the scoping and RFP development phase of this project. The Council will review the completed RFP at a later date and will determine at that time if future funding is warranted.

Trustee Council Decision: Fund Reduced

Project Number: **12120120**

Project Title: **Collaborative Data Management and Holistic Synthesis of Impacts and Recovery Status Associated with the Exxon Valdez Oil Spill**

Principal Investigator: Matthew Jones

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location:

Project Type: New

Funding Approved by Fiscal Year:

FY12: $427,766.00	**FY13:** $447,719.00	**FY14:** $358,468.00
FY15: $365,239.00	**FY16:** $71,154.00	**FY17:** $0.00

Total Funding Approved: $1,670,346.00

Abstract:
The AOOS-led Long-Term Monitoring (LTM) and the PWSSC-led Herring Research and Monitoring (HRM) programs propose an ambitious monitoring and research agenda over the next five years. These efforts could facilitate a more thorough understanding of the effects of the oil spill if the new data and information on the spill-affected ecosystems are effectively managed and collated along with historical data on these systems, and then used in a comprehensive synthesis effort. We propose a collaboration among NCEAS and the AOOS LTM and HRM teams to help build an effective data management cyberinfrastructure for proposed monitoring efforts and organize these data with historical data, including previous EVOSTC-funded efforts, to prepare for synthesis and ensure all data are organized, documented and available to be used by a wide array of technical and non-technical users. Building on the LTM and HRM syntheses and modeling efforts and the 20-year historical data from EVOSTC projects and any available current data, NCEAS would convene two cross-cutting synthesis working groups to do a full-systems analysis of the effects of the 1989 oil spill on Prince William Sound and the state of recovery of the affected ecosystems.

Science Panel Comments:
These comments are from the two science panel members that have been tasked by the panel to with work with the EVOSTC staff on the data management and synthesis topic.

The Panel does not believe that Axiom currently has the capacity to conduct the most effective management of the data. The biological investigations produced by the suite of projects included in this proposal package generate data that are challenging to code in ways that facilitate their combination with other data such as physical or chemical variables. The discipline that handles these challenges is known as informatics. The Science Panel views the inexperience of Axiom personnel as a critical problem. This concern does not imply inadequate capability of the key staff of Axiom. It is a reflection of their limited experience. Consequently, establishing a partnership between Axiom and NCEAS makes sense because Matt Jones and NCEAS are willing to share their cutting-edge expertise. NCEAS is the “National” Center for Ecological Analysis and Synthesis and the principals of the NCEAS proposal are leaders in this field. Pairing NCEAS with Axiom, would promote information sharing of NCEAS’ expertise, such emerging data standards as DateOne and on a suite of data manipulation and synthesis tools, such as meta-analysis methods. This information transfer represents critical capacity building within Alaska that would greatly benefit EVOSTC, AOOS, NPRB, and other important research and monitoring enterprises.

The willingness of NCEAS to collaborate with Axiom is evident from their proposals and discussions with Rob Bochenek, Elise, Molly, and others. Nevertheless, the most creative and appealing aspect of the proposal provided by

NCEAS, and which builds on technical metadata processing that NCEAS excels in, relates to the second phase of work – the synthesis activities. Some syntheses have indeed been supported by the EVOS Trustee Council over the years. These include very important outputs of the program – a synthesis of novel oil toxicity mechanisms in pink salmon by Rice et al. 2003; a book edited by Spies that placed the oil and natural resources of coastal Alaska in a context of changing climate; reviews of the delayed and indirect mechanisms by which EVOS oil caused ecological injuries by Peterson et al. (2003); and reviews of multi-year EVOS oil persistence on Alaskan beaches by Short and colleagues. Despite these valuable legacies, more synthesis is needed into the future, including on herring, where numerous potential explanations for its lack of recovery exist and a growing body of diverse data requires synthesis to extract now cryptic insights.

Phase II of the NCEAS proposal promises facilitation of just such synthesis outputs. This activity is extremely important for both the Herring and especially the Long-term Monitoring programs. The Panel recommends funding of this Phase II, under conditions that reflect engagement of the PIs from these two programs to develop the questions to be addressed and help select the experts who will participate in the study groups and synthesis efforts.

The Panel notes that failure to solve the problem of creating an enduring depository for EVOS-Trustee funded data is a long-standing problem. At least 10 year ago, the EVOS Trustee Council and staff endorsed the responsible and ethically necessary principle that each study funded by the Council must deliver all resulting data in electronic form to the council staff as part of their final reporting obligations. Despite this mandate, there exists now no data base of the historically-funded projects. This issue has great capacity to embarrass the Council and the memory of the past failures motivates the Panel to recommend finally solving this problem by engaging the undeniable expertise and pre-eminence of NCEAS to collaborate in this venture.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel and strongly recommend that this proposal be funded. Data may be the single largest legacy of these programs and it is critical that the work starts on the strongest foundation possible.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Applicable

Public Advisory Committee Recommendation: Not Reviewed

Executive Director Comments:

I also strongly concur with the science panel and science coordinator. The PAC was also strongly in favor of this very important collaboration, historical data recovery and the synthesis work.

Executive Director Recommendation: Fund

Trustee Council Comments:

Not Available

Trustee Council Decision: Fund

Project Number: **12120111-L**

Project Title: **PWS Herring Program - Herring Condition Monitoring**

Principal Investigator: Thomas Kline

Affiliation: Not Available

Co-PIs/Personnel: Ron Heintz

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $141,700.00	**FY14:** $147,200.00
FY15: $156,600.00	**FY16:** $162,300.00	**FY17:** $0.00

Total Funding Approved: $607,800.00

Abstract:
Outlined here is a single herring monitoring project that is a part of an integrative program that will enhance the current herring monitoring efforts and examine aspects of particular life stages to allow better modeling of Prince William Sound herring populations. The long-term goal of the program is to improve predictive models of herring stocks through observations and research.

This project will be furthering the development of a herring overwintering mortality model that began with an ongoing monitoring project that began in 2007 and incorporates results from Prince William Sound herring research dating as far back as the 1990's. The model runs by applying herring condition observations made before and after winter. Accordingly, herring are sampled in November and the following March. Present sampling will end in March 2012. Proposed sampling will commence in November 2012 and end in March 2016. A future project is expected to continue the time series beginning in November 2016. The purpose of the time series is to relate overwinter mortality to herring recruitment.

This project will be furthering the development of a herring overwintering mortality model with additional data types as well energy levels per se. The goal is use physiological indicators to realistically modify the daily energy loss rate in the overwintering model. The results of model improvement will be tested using the March data model validation approach begun during the project that began in 2007.

Additionally, we will be assessing effects of competition of other juvenile fishes on condition of age-0 herring using stable isotope analysis on an opportunistic basis.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-M**

Project Title: **PWS Herring Program - A high temporal and spatial resolution study to validate the separate herring condition monitoring program.**

Principal Investigator: Thomas Kline

Affiliation: Not Available

Co-PIs/Personnel: Ron Heintz

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $174,300.00	**FY13:** $77,300.00	**FY14:** $20,400.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $272,000.00

Abstract:

Described here is a single process study project that is a part of an integrative program that will enhance the current monitoring efforts, and examine aspects of particular life stages to allow better modeling of Prince William Sound herring populations. The long-term goal of the program is to improve predictive models of herring stocks through observations and research. The herring monitoring program is necessarily of coarse temporal and spatial resolution with just two observations per year at narrowly defined sampling sites spread around the large area comprising Prince William Sound. Data interpretation requires a greater context to impart greater meaning. In the case of temporal variation of herring condition it would be useful to know (1) how sensitive the herring overwinter mortality model is to starting time, and (2) the timing of recovery from winter starvation. In the case of spatial variation of herring condition it would be useful to know how sensitive the herring overwinter mortality model is to immigration and emigration from areas immediately adjacent to where herring are sampled at the time of our November and March surveys.

Fine-scale temporal and spatial variability at designated herring monitoring sites has never been characterized and therefore remains a data gap with potential ramifications for interpreting observed variation of herring condition that is part of the herring monitoring program as well as the aforementioned modeling. This will be addressed by sampling at Simpson Bay, which has been a key monitoring site for juvenile herring since the 1990's. Energy content and RNA/DNA will be measured monthly from September 2011 until June 2012 to assess fine-scale temporal variability. Fine-scale spatial variability will be assessed by sampling in November and March five separate sub-areas of a more extensive Simpson Bay than what is typically done during surveys. The results of the analysis will be contributed to the herring synthesis effort that will take place in FY14.

Science Panel Comments:

Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:

Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-L**

Project Title: **LTM Program - Long-term monitoring of Ecological Communities in Kachemak Bay: a comparison and control for Prince William Sound.**

Principal Investigator: Brenda Konar

Affiliation: Not Available

Co-PIs/Personnel: Katrin Iken

Disbursing Agency: ADFG

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $48,100.00	**FY13:** $48,200.00	**FY14:** $48,100.00
FY15: $48,100.00	**FY16:** $47,400.00	**FY17:** $0.00

Total Funding Approved: $239,900.00

Abstract:
This project will evaluate ecological communities in Kachemak Bay. Following protocols established for Prince William Sound, we will monitor sea otter abundance, diet and carcasses, seabird carcasses, marine debris, abundance and distribution of rocky intertidal plants and invertebrates, abundance and size frequency of clams and mussels on gravel beaches, and selected environmental parameters in Kachemak Bay. All protocols have been established and are described for Prince William Sound. These same protocols as will be used in this study. These Kachemak Bay data will be compared with those being collected in Prince William Sound and may be able to act as a control if an oil spill were to occur in the Sound again. The data will also be comparable to data being collected in Kenai and Katmai National Parks (National Park Service SWAN Nearshore Monitoring Program) using the same methods as used in Prince William Sound.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-M**

Project Title: **LTM Program - Long-term killer whale monitoring in Prince William Sound/ Kenai Fjords**

Principal Investigator: Craig Matkin

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $7,200.00	**FY13:** $122,500.00	**FY14:** $122,500.00
FY15: $122,600.00	**FY16:** $122,600.00	**FY17:** $0.00

Total Funding Approved: $497,400.00

Abstract:
The proposed project is a continuation of the monitoring of AB pod and the AT1 population killer whale populations in Prince William Sound on an annual basis. These groups of whales suffered serious losses at the time of the oil spill and have not recovered at projected rates. Monitoring of all the major pods and their current movements, range, feeding habits, and contaminant levels will help determine their vulnerability to future perturbations, including oil spills. The project also extends the scope of the basic monitoring to include an innovative satellite tagging program used to examine habitat preference, feeding ecology and assist in relocating whales for feeding studies. It continues examination of feeding habits using observational and innovative chemical techniques. The study will delineate important habitat, variations in pod specific movements and feeding behavior within a temporal and geographic framework. We will describe the role of both fish eating and mammal eating killer whales in the near-shore ecosystem and their impacts on prey species. Community based initiatives, educational programs, and programs for tour boat operators will continue to be integrated into the work to help foster restoration by improving public understanding and reducing harassment of the whales.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114**

Project Title: **Long-Term Monitoring of Marine Conditions and Injured Resources and Services**

Principal Investigator: Molly McCammon

Affiliation: Alaska Ocean Observing System

Co-PIs/Personnel: Nancy Bird, Kris Holderied

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $2,460,500.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $2,460,500.00

Abstract:
In the two decades following the Exxon Valdez oil spill (EVOS), and after extensive restoration, research and monitoring efforts, it has been recognized that full recovery from the spill will take decades and requires long-term monitoring of both the injured resources and factors other than residual oil that may continue to inhibit recovery or adversely impact resources that have recovered. Monitoring information is valuable for assessing recovery of injured species, managing those resources and the services they provide, and informing the communities who depend on the resources. In addition, long-term, consistent, scientific data is critical to allow us to detect and understand ecosystem changes and shifts that directly or indirectly (e.g. through food web relationships) influence the species and services injured by the spill.

An integrated monitoring program requires information on environmental drivers and pelagic and benthic components of the marine ecosystem. Additionally, while extensive monitoring data has been collected thus far through EVOS Trustee Council-funded projects as well as from other sources and made publicly available, much of that information needs to be assessed holistically to understand the range of factors affecting individual species and the ecosystem as a whole. Interdisciplinary syntheses of historical and ongoing monitoring data are needed to answer remaining questions about the recovery of injured resources and impacts of ecosystem change. We propose to develop and implement a long-term monitoring program that meets the need for information to guide restoration activities, including data on the status and condition of resources, whether they are recovering, and what factors may be constraining recovery. The ultimate goal of the long-term monitoring program is to provide sound scientific data and products to inform management agencies and the public of changes in the environment and the impacts of these changes on injured resources and services.

Science Panel Comments:

April 2011 Comments:
This proposal is well presented and provides a thorough long-term monitoring program for the spill area. The team is experienced and well -qualified to complete the proposed work. The outreach and education strategies and partnerships are well thought-out and have the potential to provide effective means to disseminate information and engage community members in understanding the results of the integrated monitoring program. The potential future development of a citizen monitoring program would provide another effective strategy. The Science Panel was especially impressed with the section called ‘cross-cutting’ that showed the linkages with the Herring Program.

Gathering and making data available will be the keystone of this program. The Science Panel expressed serious concerns about past performance of some participants and that the data management team does not have sufficient

expertise or scientific guidance to deliver a useable data system. In addition, it is not clear at all there is a plan for the inclusion of structurally diverse data: where and how will such data be organized so that relevant data and metadata from a broad array of disciplines can be assembled in one database. The panel viewed this as this as an informatics problem that, if not resolved at the onset, will jeopardize the long-term program. There is a very clear need to overcome critical technological impediments to accomplishing synthetic, integrative environmental science, while at the same time promoting more open access to information and data sharing. It is critical that this database be open source and be compliant with the Knowledge Network for Biocomplexity metadata compliant with Ecological Metadata Language. In addition, there should be a plan from the outset as to how to incorporate this data into NPRB's GOAIERP program at the end of the first five-year contract cycle.

Therefore, we strongly recommend that the Council provide assistance from an organization such as the National Center for Ecological Analysis and Synthesis (NCEAS) for peer review and technical assistance to the data management team.

With regard to the separate lingering oil monitoring proposal included within the Program proposal, the Panel has no objection to the funding of this additional project.

June 2011 Individual panel member comments:
Seabird monitoring costs double in year 3 – The explanation is clear, although the basis for why two surveys may be needed in year 3 and what is lost when only 1 is done is unclear.

Cost breakdown for Coordination, data management, outreach, and administration – The suite of activities included under this heading is now explicit as are the total costs associated with each one in the budgets provided. I wish to note, however, the "conceptual modeling" project of Hollmen does not fall into any of these categories – it is a scientific study, not an administrative service, outreach activity, coordination, or data management task, and should be reviewed as such. In that context, I examined the Hollmen proposal and have some concerns. Although intended to be "conceptual modeling", I find no mention of any concepts in the proposal. I cannot find indication of the methodological approaches to be used and why they were chosen. For example, will this be a Bayesian process? Will modeling be ecosystem based? Will ECOPATH of something analogous be employed? There are no literature cotations in this proposal. For 395K over 5 years, more detail would seem to be called for. I cannot find a CV included for the PI, Hollmen. Does she have modeling experience, and, if so, in what types of models?

Synthesis concerns – the PIs provide a thoughtful and compelling response to this issue, providing an excellent overview and demonstrating potential for meaningful syntheses.

Data management – The PIs make a strong case for the cost efficiencies associated with leveraging that lower the costs of the data management for EVOS Trustee projects by joining with AOOS in a coordinated effort with a single consultant-provider. The response also makes a justifiable case for why teaming up with AOOS makes sense – because of their presumed permanence as compared to other science programs. I am impressed that Phil Mundy chairs the AOOS external advisory committee and concur that he has the experience and wisdom to provide rational advice and guidance. Nevertheless, the bottom line after all is said and done is – Does Axiom deliver the data products that are acceptable to the scientists it is serving. This response document appears to argue that the scientists that participate in the Monitoring Program are indeed satisfied. So that helps me side with continuing the relationship with Axiom. Nevertheless, this document implies a willingness to interact with NCEAS and to discuss their recommendations for improvements in all aspects of Axiom's data management services and I think that facilitating that set of interactions in a meaningful way (meaning to sufficient depth and not just superficial) is important for piece-of-mind given delays in delivery of reports from Axiom on past EVOS Trustee contracts. I am also curious to know of the outstanding final reports have indeed been completed successfully at this time. I see argued in this response document that the past scientist clients of AXIOM are satisfied with the company's services, which addresses one major issue raised by the science Panel.

I am pleased by the acceptance of specific suggestions by the science panel.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I agree with the science panel and Executive Director. I also have serious concerns regarding the data program and

would encourage the Council to assist the team by providing funding for a collaborator to assist the data team in their development of the data program. My concerns regarding the proposed contractor are based on a poor past performance with meeting deadlines and producing deliverables. I also believe that the final product would greatly benefit if Axiom was given assistance from a group that has experience working with large heterogeneous data sets.

The PI's that are included in this program proposal have extensive experience gathering data in PWS and have contributed to several long-term data sets that will be the foundation of this program. The team's quick response to our data set questions demonstrates their ability to work together and to openly share information with their fellow researchers.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:

There was strong concern about the program's data manager serving the entire program. Since April, the data manager's work has been favorably reviewed, has submitted late deliverables to the Council and several data management options have been produced by this program and outside entities. These options presented are in conjunction with leaders in the field of heterogeneous scientific database management and are excellent options. I recommend the Council pursue one of these options to ensure successful management of the data produced by this and past Council-funded efforts.

Executive Director Recommendation: Fund

Trustee Council Comments:

April 2011 comments:
This team is selected as a preferred proposer.

Trustee Council Decision: Fund

Project Number: **12120111-N**

Project Title: **PWS Herring Program - Scales as growth history records for Pacific herring**

Principal Investigator: Steven Moffitt

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: ADFG

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $86,200.00	**FY13:** $43,300.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $129,500.00

Abstract:
Robust Pacific herring (Clupea pallasii) populations, suitable for exploitation by commercial fisheries, are typically sustained by periodic recruitment of strong year classes into the adult spawning population. However, the Prince William Sound (PWS) herring population has not had a strong recruitment class since 1989, when the Exxon Valdez Oil Spill (EVOS) occurred. Identification of conditions limiting herring recovery requires a series of focused process studies combined with monitoring of the natural conditions that affect herring survival.

Fish grow in response to the extrinsic influences of their environment constrained by the intrinsic influences of genetic predisposition for growth and of size already attained. Understanding how these intrinsic and extrinsic sources of variability influence growth is important for several reasons. Variation in growth has a strong affect on the selection of appropriate harvest policies that are based on demographic models that reflect the natural processes.

Analysis of growth increments between annular patterns on scales can provide a means to reconstruct past growth changes that can assist in determining the possible environmental and density-dependent causes of growth variation. Growth increment information incorporates a longitudinal history of growth that increases the effective degrees of freedom and can be used in modeling changes in growth in relationship to environmental and population indices Determining the underlying distribution of individual growth patterns can provide improved inputs into population dynamics models that are used to establish harvest guidelines.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-N**

Project Title: **LTM Program - Long-term monitoring of humpback whale predation on Pacific herring in Prince William Sound**

Principal Investigator: John Moran

Affiliation: Not Available

Co-PIs/Personnel: Jan Straley

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $127,400.00	**FY13:** $128,800.00	**FY14:** $139,600.00
FY15: $141,600.00	**FY16:** $54,400.00	**FY17:** $0.00

Total Funding Approved: $591,800.00

Abstract:
?We will evaluate the impact by humpback whales on Pacific herring populations in Prince William Sound. Following protocols established during the winters of 2007/08 and 2008/09(EVOSTC project PJ090804). We will continue to monitor the seasonal trends and abundance of humpback whales in Prince William Sound. Prey selection by humpback whales will be determined through acoustic surveys, visual observation scat analysis and prey = sampling. Chemical analysis of blubber samples (stable isotopes and fatty acid analysis) will provide a longer term perspective on whale diet and shifts in prey type. These data will be combined in a bioenergetic model to determine numbers of herring consumed by whales, with the long term goal of enhancing the age structure modeling of population with better estimates of predation mortality. □

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120117**

Project Title: **Spatial synthesis of lingering oil distribution modeling with population and biomarker data for recovering species**

Principal Investigator: Zachary Nixon

Affiliation: Research Planning, Inc.

Co-PIs/Personnel: Brenda Ballachey, Jim Bodkin, Dan Esler, Jacqui Michel

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $177,362.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $177,362.00

Abstract:
Much recent work has been carried out in Prince William Sound (PWS) to characterize the distribution and ongoing impacts of lingering subsurface oil from the Exxon Valdez Oil Spill (EVOS). The ongoing work of Bodkin et al., Esler et al., and Monson et al., (1994, 1999, 2000, 2002, 2010, in press) have provided an unprecedented understanding of the ongoing recovery status of certain recovering species via detailed population dynamics and measures of individual health: biomarker expression, contaminant concentrations, and pathological effects. In parallel, Michel et al.,(2009) and Boufadel et al., (2010) have successfully characterized, synoptically, and in spatial detail, the distribution of and factors contributing to the ongoing presence of lingering oil reservoirs within PWS and the wider EVOS impact area. We propose to synthesize these two bodies of work by rigorously examining the strength of spatial correlations between measures of recent and ongoing impact to recovering species, at both the individual and population level, and where lingering subsurface oil is specifically estimated to persist. Presence or absence of such links will provide insight into the recent and potentially ongoing nature of the impact of this oil, and could guide proposed remediation efforts with specificity not previously possible.

Science Panel Comments:
The science panel recommends this proposal for funding.

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120116**

Project Title: **Marine Debris Removal**

Principal Investigator: Chris Pallister

Affiliation: Gulf of Alaska Keeper

Co-PIs/Personnel: None

Disbursing Agency: ADEC

Project Location: Gulf of Alaska

Project Type: New

Funding Approved by Fiscal Year:

FY12:	$490,000.00	**FY13:**	$450,497.00	**FY14:**	$358,400.00
FY15:	$0.00	**FY16:**	$0.00	**FY17:**	$0.00

Total Funding Approved: $1,298,897.00

Abstract:
GoAK is submitting a comprehensive 3-part marine debris cleanup program. We understand that the call of this grant is to provide $1,000,000 of funding for marine debris removal over a 2-year period. Immediately following are two proposed cleanup projects for 2012 and 2013 that request a total EVOSTC funding level of $730,000. The proposed projects for 2012 and 2013 have also been included as part of the marine debris proposal submitted to EVOSTC by the NOAA team. However, at the urging of Peter Murphy, NOAA's MD Regional Coordinator (see attached letter from Peter Murphy, NOAA MD Regional Coordinator, pg.54), and after consultation with EVOSTC staff, GoAK is also submitting an alternative proposal. This alternative proposal includes the proposed 2012 and 2013 removal projects, plus a request for a third year of funding for a project in 2014. We hope this proposal is considered carefully. These three projects in total request $1,015,000 in EVOSTC funding. Over a three year period, GoAK can match EVOSTC funding at more than a 1 to 1 level. Stretching the funding over three years allows GoAK to raise more matching funds to help clean another 20 miles of horribly fouled coast and remove an additional 80 to 100 tons of plastic marine debris. We submit these projects with the intention that if EVOSTC decides not to fund a third year project, then it would consider the 2012 and 2013 projects as the complete proposal. For that reason, we have submitted complete project budgets and descriptions for each individual cleanup season.

GoAK solicited project proposals from five separate organizations with past experience in marine debris work and community outreach. The Center for Alaskan Coastal Studies, the Chugach National Forest and Alaska Geographic jointly submitted Proposal 1. The Marine
Conservation Alliance Foundation submitted Proposals 2 and 3. The Alaska Sea Life Center submitted Proposal 4. Each of the proposed outreach projects are stand-alone programs. As such, the Council can select any combination of the projects to satisfy the public outreach objective. All projects selected by the Council will coordinate in such than components of each project do not overlap. Projects will also use the same educational data, such as miles cleaned, the amount of marine debris removed per mile up in the cleanup area, the types and quantities of marine debris, habitat and animals impacted, etc., in their individual projects so that a consistent message is delivered.

Outreach Proposal 1: The Center for Alaskan Coastal Studies, Chugach Forest Service and Alaska Geographic "Youth Action on Marine Debris: from the field to the classroom". Total Cost: $151,946

Outreach Proposal 2: Marine Conservation Alliance Foundation "EVOSTC Marine Debris Cleanup Documentation Film". Total Cost: $30,584

Outreach Proposal 3: Marine Conservation Alliance Foundation "EVOSTC Outreach Marine Debris Prevention Tide Book Project". Total cost: $26,090

Outreach Proposal 4: Alaska SeaLife Center "Marine Debris Exhibit at the Alaska SeaLife Center". Total Cost: $166,051

Science Panel Comments:

This long term marine debris removal program has been ongoing for the past 10 years. The costs seem to be reasonable considering the logistics, although it was unclear if they are relying on the NOAA grant to complete the work. The PI's are experienced but outreach efforts are weak and the project lead is in Anchorage. The team leader should speak with Village of Eyak team to see if there might be an opportunity for partnership.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel and the Executive Director.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:

I concur with the Science Panel's recommendations. The proposal is extremely detailed and the PIs are already achieving a high level of debris survey and removal. Their familiarity with and effectiveness in this area is impressive.

Gulf of Alaska Keeper has worked to strengthen their public outreach and determine whether Council funds would be eligible for fed match. In between debris cleanup trips this summer, they have are collaborating with the Chugach Children's Forest.org project, Alaska Geographic, and the Chugach School District to involve students from Chenega and Tatitlek, and the Alaska Sealife Center regarding an interactive marine debris exhibit. They have made excellent inroads to expand their outreach.

As requested by the Council, GoAK has submitted an addendum with a menu of four public outreach proposals. My preliminary recommendation is in favor of funding Proposal 1, Youth Action on Marine Debris, with the Center for Alaskan Coastal Studies, Chugach Forest Service and Alaska Geographic. This proposal is diversified, highly leveraged and well-designed.

Executive Director Recommendation: Fund

Trustee Council Comments:

The Council recommends this proposal's outreach component be strengthened. In particular, the Council encourages the Proposer to consult with Village of Eyak with regard to enhancing GoAK outreach in that community and to pursue additional involvement from other spill communities and organizations that reach youth involvement, such as the Alaska Geographic program and the USFS Chugach Childrens' Group. Please consult with NOAA as to whether Council funds would be eligible for matching fund programs, as noted in your proposal, and provide this information to us and as part of your final proposal. If this proposal is funded by the Council, Council staff will request that NOAA be the project manager, which may lend additional, NOAA expertise to the project.

Trustee Council Decision: Fund

Project Number: **12120111**

Project Title: **PWS Herring Research and Monitoring Program**

Principal Investigator: William Pegau

Affiliation: Prince William Sound Science Center

Co-PIs/Personnel: None

Disbursing Agency: ADFG

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $990,500.00	**FY13:** $1,074,200.00	**FY14:** $1,364,300.00
FY15: $1,194,500.00	**FY16:** $1,136,600.00	**FY17:** $0.00

Total Funding Approved: $5,760,100.00

Abstract:

Robust Pacific herring (Clupea pallasii) populations, suitable for exploitation by commercial fisheries, are typically sustained by periodic recruitment of strong year classes into the adult spawning population. However, the Prince William Sound (PWS) herring population has not had a strong recruitment class since 1989, when the Exxon Valdez Oil Spill (EVOS) occurred. In the EVOS settlement herring were identified as an injured resource and they remain listed as an unrecovered species by the EVOS Trustee Council (EVOSTC). Understanding why herring have not recovered in Prince William Sound requires understanding potential bottlenecks in the herring life cycle. The identification of the limiting conditions to herring recovery requires a series of focused process studies combined with monitoring of the natural conditions that affect herring survival.

Described here are projects for a program that will enhance the current monitoring efforts of the Alaska Department of Fish and Game (ADF&G), and examine aspects of particular life stages to allow better modeling of herring populations. The long-term goal of the program is to improve predictive models of herring stocks through observations and research. While we do not anticipate that there will be a major change in our modeling ability in the next five years, we expect that the combination of monitoring and focused process studies will provide incremental changes over the next twenty years and result in a much better understanding of herring populations by the end of the program.

Science Panel Comments:

April 2011 comments:
This program seeks to add to the existing body of knowledge that began under the PWS Herring Survey program in FY10. The proposed projects will provide both new and continuing information regarding the current status of herring in PWS. The data collected under this program will be made available to researchers and the public and will provide critical information for resource managers. The continuation of current outreach and education strategies from the PWS Herring Survey projects and the additional strategies in the proposal have the potential to provide effective means to disseminate information and engage the fishing community and other community members in understanding the results of the integrated monitoring program.

The Panel recommends funding most components of this proposal, but reiterates the same serious concern about the data management components. Again the science panel strongly recommends that the Council provide assistance from an organization such as the National Center for Ecological Analysis and Synthesis (NCEAS) for peer review and technical assistance to the data management team.

The success of this proposal will depend on the reliability of herring spawn surveys which are not part of the present

groups of proposals. Herring assessments in PWS, and everywhere else in the eastern Pacific, use spawn surveys as an essential part of the assessment. The approach currently used in PWS differs from all others in the use of mile-days, whereas all other jurisdictions use a static measure of spawn, once spawning is completed. Also, the completeness of the spawn surveys has been questioned. (Note: these comments should not be construed as criticism of ADFG or their staff because the panel recognizes the effort and dedication made by such staff. On the contrary, the comments and recommendations related to spawn surveys should be seen as an initiative to provide assistance to field staff associated with herring assessment. The benefits of such assistance will accrue both to the science and management of PWS herring). Nearly all of the proposals are predicated on the availability of reliable herring spawning biomass assessments that are, in turn, dependent on accurate spawn surveys. To provide credible support for these proposals and for management advice future estimation of spawn must be made with a level of accuracy that consistent with that used in other jurisdictions. To provide credible management advice future estimation of spawn must be made with a level of accuracy that is required to support the assessments. There are concerns that substantial amounts of spawn may have gone undetected in some years and that some of the past spawn estimates may have been made inaccurately through error in the estimated width and density of spawn. Such concerns may not be valid but there is no way to determine this without additional work. Therefore to evaluate whether the accuracy and reliability of present and past estimation of herring spawn in PWS is accurate, we recommend developing diver-assisted surveys. The science panel noted that diver surveys, yielded different results in the past (details provided in Recommendations to Team Leader). This would also include an assessment model and biological sampling review.

Herring Stock Assessment Modeling: A Science Panel Recommendation for Review
Success of the herring program will depend on the reliability of ADF&G herring spawn surveys. Nearly all of the proposals are predicated on the availability of reliable herring spawning biomass assessments that are, in turn, dependent on accurate herring assessments.

Herring assessments in PWS, like everywhere else in the eastern Pacific, use spawn surveys as an essential part of the assessment. The approach used in PWS, however, differs from all others in that PWS uses mile-days, whereas all other jurisdictions use a static measure of spawn, once spawning is completed. Herring assessments also rely on accurate bio-sampling for estimates of size and age of herring. Recently, the completeness of the spawn surveys has been questioned and many have questioned the reliability of the present assessments. Additional effort may be required for all aspects of herring assessments to ensure that they are done well and are well-regarded. These comments above should not be construed as criticism of ADFG or their staff, as their present staff are clearly dedicated and hard-working.

To provide credible support for these proposals and for management advice future estimation of spawn must be made with a level of accuracy that consistent with that used in other jurisdictions. To provide credible management advice future estimation of spawn must be made with a level of accuracy that is required to support the assessments.

June 2011 Individual panel member comments:
Linkages among the projects is done in a thoughtful and detailed fashion. I see huge progress in how well the leaders of the herring program are viewing this Program as a whole and integrating its pieces. I commend the PIs. Specifically, the logistic coordination is compelling and achieves cost efficiencies as well as intellectual linkages. The temporal staging of various research efforts is likewise logical and well conceived. And I concur that the acoustics studies do involve three different efforts with different gear, sampling methods, and targets, so that any synergies are limited, largely to whether adult herring are encountered during sampling targeting juveniles and this is addressed.

Science Panel Recommendation: Fund

Science Coordinator Comments:

I concur with the science panel. I also have serious concerns regarding the data program and would encourage the Council to assist the team by providing funding for a comprehensive review of the data program.

I also concur with the science panel that the fundamental data that will be utilized by the program should be rigorously reviewed to ensure the best possible platform for the herring projects. I do believe that the data that has been gathered by ADF&G for PWS herring has been carefully gathered and reviewed. I would like to continue working with staff at ADF&G to determine what actions would have the greatest benefit to both the herring program and ADF&G managers. The possible addition of a staff position at ADF&G that would work closely with herring program would be of tremendous value to both the program and the management agency.

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:

Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:

April 2011 Comments

There has been strong concern about the program's data manager serving the entire program. Since April, the data manager's work has been favorably reviewed, has submitted late deliverables to the Council and several data management options have been produced by this program and outside entities. These options presented are in conjunction with leaders in the field of heterogeneous scientific database management and are excellent options. I recommend the Council pursue one of these options to ensure successful management of the data produced by this and past Council-funded efforts.

In addition, the program and ADF&G have discussed what actions would enhance the program's value to the management of herring. Both entities recommend the Council fund 70% of a ADF&G biometrician III or a fisheries scientist I to coordinate with the herring program and to also focus on a modeling effort. This is included in our draft administrative budget and has the strong support of individual Science Panel members. We have continued to decrease our admin budget, but are also positioning our staff and agency staff to support the long-term programs.

Executive Director Recommendation: Fund

Trustee Council Comments:

This team is selected as a preferred proposer.

Trustee Council Decision: Fund

Project Number: **12120111-H**

Project Title: **PWS Herring Program - Outreach and Education Program**

Principal Investigator: William Pegau

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $0.00	**FY14:** $0.00
FY15: $0.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $0.00

Abstract:
The Outreach & Education project is designed to enhance the PWS Herring Program research activities by showcasing their relevancy, broadening their applicability and extending their impact to people in the community. PWSSC educators will work with PWS Herring Research and Monitoring principal investigators (PI) and project collaborators to prepare public education materials that communicate the purpose, goals and results of the research program to “non-scientist” audiences and stakeholders in communities in and beyond the spill affected area.
Outreach and education products will extend and transfer Pacific herring and marine ecosystem information to inform the public of local research activities and improve their ecological and ocean science literacy.

The specific objectives of this proposal, which includes the outreach and education components of the PWS Herring Research and Monitoring Program, are to:

1) Disseminate PWS herring research information and lessons learned in this program to individuals, groups, policy makers, resource managers and institutions in PWS, including the effected fishing community.

2) Extend and transfer PWS herring research-based outreach and education products to general audiences in and beyond the spill affected areas of PWS.

3) Integrate community involvement into the planning and sampling programs through citizen science opportunities and public workshops

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-O**

Project Title: **PWS Herring Program - Coordination and Logistics**

Principal Investigator: William Pegau

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $15,900.00	**FY13:** $29,400.00	**FY14:** $31,500.00
FY15: $34,700.00	**FY16:** $36,900.00	**FY17:** $0.00

Total Funding Approved: $148,400.00

Abstract:
This project is for the coordination and logistics aspects of the proposed program titled, “PWS Herring Research and Monitoring”. The objectives of the program are 1) Provide information to improve input to the age-structure-analysis (ASA) model, or test assumptions within the ASA model, 2) Inform the required synthesis effort, 3) Address assumptions in the current measurements, and 4) Develop new approaches to monitoring. The Coordination and Logistics program objectives are to 1) ensure coordination between projects to achieve the program objectives, 2) Provide a synthesis from existing results, and 3) provide logistical support to the various projects.

Coordination includes scheduling of projects to ensure the maximum sharing of vessel time and so that projects dependent on results or samples from another project are in the correct order. Coordination will be primarily through email and teleconference, but each year all the investigators are required to meet in person. Coordination is also taking place with the existing Herring Survey program, the Long-Term monitoring program, and ADF&G herring sampling.

Logistics is primarily in providing vessel time although a remotely operated vehicle is requested in this budget to support non-lethal fish identification and being able to search under the ice.
The synthesis to be provided by this project is leveraging the required synthesis of the existing Herring Survey program. We intend to update that effort with new results and add a section on how environmental conditions affect herring growth.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-O**

Project Title: **LTM Program - Monitoring long-term changes in forage fish distribution, abundance, and body condition in Prince William Sound.**

Principal Investigator: John Piatt

Affiliation: Not Available

Co-PIs/Personnel: Mayumi Arimitsu

Disbursing Agency: USGS

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $209,900.00	**FY13:** $202,400.00	**FY14:** $202,400.00
FY15: $202,400.00	**FY16:** $150,300.00	**FY17:** $0.00

Total Funding Approved: $967,400.00

Abstract:
In response to a lack of recovery of wildlife populations following the Exxon Valdez Oil Spill (EVOS), and evidence of natural background changes in forage fish abundance, there was a significant effort to document forage fish distribution, abundance, and variability in Prince William Sound (PWS) in the 1990's. We propose to adopt some of these earlier sampling schemes and protocols to continue monitoring forage fish in Prince William Sound with fishing and acoustic surveys of forage fish, and to measure indices of forage fish condition and foraging success.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120114-P**

Project Title: **LTM Program - Long-term Monitoring of Oceanographic Conditions in the Alaska Coastal Current from Hydrographic Station GAK 1.**

Principal Investigator: Thomas Weingartner

Affiliation: Not Available

Co-PIs/Personnel: None

Disbursing Agency: ADFG

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12:	$105,500.00	**FY13:**	$108,400.00	**FY14:**	$111,500.00
FY15:	$114,700.00	**FY16:**	$118,000.00	**FY17:**	$0.00

Total Funding Approved: $558,100.00

Abstract:
This program continues a 40-year time series of temperature and salinity measurements at hydrographic station GAK 1. The data set, which began in 1970, now consists of monthly CTDs and a mooring with 6 temperature/conductivity recorders throughout the water column, a fluorometer and nitrate sensor at 20 m depth and a nitrate sensor at 150 m depth. The project monitors four important Alaska Coastal Current ecosystem parameters that will quantify and help understand interannual and longer period variability in:

1. Temperature and salinity throughout the 250 m deep water column,
2. Near surface stratification,
3. Near and subsurface nitrate supply on the inner shelf,
4. Fluorescence as an index of phytoplankton biomass, and

In aggregate these variables are basic descriptors of the Alaska Coastal Current, an important habitat and migratory corridor for organisms inhabiting the northern Gulf of Alaska, including Prince William Sound.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund

Project Number: **12120111-P**

Project Title: **PWS Herring Program - Herring Genetics**

Principal Investigator: Sharon Wildes

Affiliation: Not Available

Co-PIs/Personnel: Jeff Guyon

Disbursing Agency: NOAA

Project Location: Prince William Sound

Project Type: New

Funding Approved by Fiscal Year:

FY12: $0.00	**FY13:** $0.00	**FY14:** $50,500.00
FY15: $53,100.00	**FY16:** $0.00	**FY17:** $0.00

Total Funding Approved: $103,600.00

Abstract:
This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon et. al. The purpose of this proposal is to determine the genetic stock structure of Pacific herring in Prince William Sound using available microsatellite markers. Samples will be collected and their genetic characteristics compared between locations, spawning times and years. In addition, year classes within spawning stocks will also be analyzed for genetic differences. Herring will be collected from two geographical disparate locations within Prince William Sound, one from the east and one from the west. Each location will be extensively sampled such that at least 200 samples from each group (for a specific location, year, spawn time, and age class) will be available for analysis. As a control, a small group of 200 Pacific herring will also be collected from Lynn Canal. Lynn Canal herring are (1) easily accessible from Auke Bay Laboratories, (2) of high priority to the National Marine Fisheries Service and the Alaska Department of Fish and Game, and (3) have been part of our herring program for the last 2 years. DNA will be isolated from each collection of 200 herring and the samples genotyped using a group of microsatellite markers, many of which have already been standardized in our laboratory for Pacific herring (Wildes et al., accepted Fish Bull). To date, over 40 herring microsatellite markers have been described and each loci contains multiple alleles making them ideal genetic markers for analyzing migratory fish like herring with limited stock structure. Resulting genotypes will be compared to determine the genetic uniqueness of each collection using standard analyses (FST and G-test). Principle component analyses will be performed to illustrate stock separations. Chord distances will be calculated and a phlyogenetic tree constructed to illustrate genetic relationships. Finally, genetic results will be summarized to communicate their biological significance, as well as their significance to management and restoration.

Science Panel Comments:
Not Available

Science Panel Recommendation: Fund

Science Coordinator Comments:
Not Available

Science Coordinator Recommendation: Fund

Public Advisory Committee Comments:
Not Available

Public Advisory Committee Recommendation: Fund

Executive Director Comments:
Not Available

Executive Director Recommendation: Fund

Trustee Council Comments:
Not Available

Trustee Council Decision: Fund