

**FY12 INVITATION
PROPOSAL SUMMARY PAGE**

Project Title: *PWS Herring Research and Monitoring: Outreach & Education*

Project Period: October 1, 2011-September 30, 2016

Primary Investigator(s): Lindsay Butters, Education Coordinator, PWS Science Center (PWSSC)

Study Location: Prince William Sound (PWS)

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

Estimated Budget: \$153,900

EVOSTC Funding Requested: *(breakdown by fiscal year and must include 9% GA)*

FY 12	FY13	FY14	FY15	FY16
\$16,500	\$30,500	\$32,700	\$35,900	\$38,300

Non-EVOSTC Funds to be used: *(breakdown by fiscal year)* \$0

Date: May 27, 2011

PROJECT PLAN

I. NEED FOR THE PROJECT

A. Statement of Problem

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.

B. Relevance to 1994 Restoration Plan Goals and Scientific Priorities

The proposed program addresses the goals and priorities outlined in the 1994 Restoration Plan (<http://www.evostc.state.ak.us/Universal/Documents/Publications/IHRP%20DRAFT%20-%20July%202010.pdf>) and in the FY 2012 invitation for proposals. In particular our program addresses the need to “Conduct research to find out why Pacific herring are not recovering” and “Monitor recovery”, listed on page 48 of the 1994 Restoration Plan. It will lead to the development of new tools to improve herring management. The latter will be accomplished by providing the information needed to develop or test biological and physical models of herring growth.

In November 2006, a Herring Steering Committee was formed and tasked with developing a focused Restoration Program that identifies strategies to address recovery and restoration of herring, recognizing that activities in the program must span an ecologically relevant time frame that accounts for herring population dynamics and life history attributes. A draft Integrated Herring Restoration Program (IHRP) was completed in the fall of 2008 and was further refined in July of 2010. The main goal of the program is to determine what, if anything, can be done to successfully recover the Pacific herring in PWS. In order to determine what steps can be taken, the program examines the factors limiting recovery of herring in PWS, identifies and evaluates potential recovery options, and recommends a course of action for achieving restoration.

II. PROJECT DESIGN

A. Objectives

Program Objectives:

- 1) *Provide information to improve input to the age-structure-analysis (ASA) model, or test assumptions within the ASA model.* The ASA model is currently used by ADF&G for estimating herring biomass (Hulson et al. 2008). The proposed monitoring efforts are designed to address this objective by either expanding the data available for the existing ASA model or by providing information about factors that determine the size of recruitment events.
- 2) *Inform the required synthesis effort.* Proper completion of a detailed synthesis means being able to access and manipulate different sources of data and information. We are proposing projects that make data available to all researchers.
- 3) *Address assumptions in the current measurements.* Many of the existing studies are based on historical or logistical constraints. We are proposing research necessary to put the existing measurements into context spatially and temporally. This effort will allow the design of the most accurate and efficient monitoring program.
- 4) *Develop new approaches to monitoring.* With technological advances we have the potential to improve our monitoring programs so they require less effort or reduce the need to collect fish.

Because we are at the beginning of a twenty-year effort, we want to maximize the value of any data collected. The objectives listed above are designed to ensure that research and monitoring efforts within the expected twenty-year program are most effective. The programs addressing the objectives provide the information necessary to evaluate existing efforts while continuing to move towards our long-term goal.

Outreach and Education Project Objectives:

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

- 4) 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.
- 5) Extend and transfer PWS herring research-based outreach and education products to general audiences in and beyond the spill affected areas of PWS.
- 6) Integrate community involvement into the planning and sampling programs through citizen science opportunities and public workshops.

The **Outreach & Education** project is designed to enhance the PWS herring research activities by showcasing their relevancy, broadening their applicability and extending their impact to people in communities in and beyond the spill affected areas of PWS. Outreach products and education activities will extend and transfer herring and ecosystem information to inform the public of local research activities and improve their ecological and ocean science literacy. Both formal and informal approaches to science education are used.

The PWSSC education group has experience developing and implementing a diverse array of public outreach and educational activities through its *Science of the Sound* program. Educators will work closely with PWS herring research principal investigators and project collaborators to prepare and distribute 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.

B. Procedural and Scientific Methods

Approach: Our iterative approach to addressing the long-term goal of this program “**to improve predictive models of herring stocks through observations and research**” involves testing the relative importance of factors that may be preventing the recovery of PWS herring. The relative importance of these factors will be identified through an integrated set of studies that include monitoring efforts, shorter field-based process studies focusing on particular aspects of the herring life cycle, and controlled laboratory-based studies intended to determine cause-and-effect relationships. When combined, this approach is intended to inform more directed herring monitoring and modeling efforts by focusing on important population-limiting factors and providing empirical data for the current ASA model. The work outlined here will be informed by projects outlined in a separate long-term monitoring program, such as monitoring of basic oceanographic conditions, food availability, and predator populations. It also builds upon the existing EVOSTC funded PWS Herring Survey research program. The team lead (W. Scott Pegau) on the proposed work is the same team leader as on the PWS Herring Survey program, which allows the proposed work to be fully integrated with the existing work without unnecessary duplication.

C. Data Analysis and Statistical Methods

Not applicable.

D. Description of Study Area

The *PWS Herring Research and Monitoring* program study area includes all of Prince William Sound. However, most of the projects will focus on the four bays (Zaikof, Whale, Eaglek, and Simpson) that were extensively studied during the Sound Ecosystem Assessment study and PWS Herring Survey program (Figure 1). This allows the work to build upon the historical research completed in those bays. These bays also cover four different quadrants of the Sound. We anticipate a potential build out to include other bays or contraction based on the results from the synthesis. As part of the synthesis effort we will be reviewing the question “What is the

appropriate sampling distribution?” as applied to the questions of juvenile herring condition and providing an index of juvenile abundance.

PWS Herring Research and Monitoring: Outreach & Education activities will primarily occur in PWS communities, and some communities outside of the spill affected region.

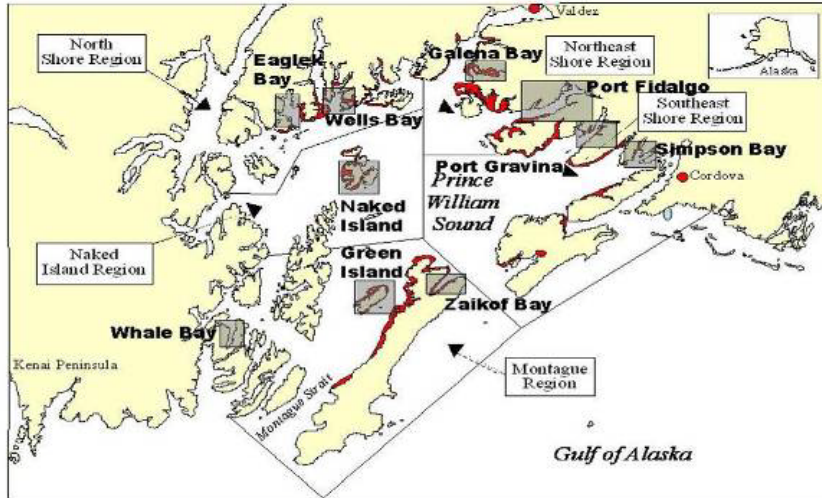


Figure 1. PWS study area, including the four SEA bays (Whale, Zaikof, Eaglek, and Simpson, as well as other bays historically important for juvenile herring.

E. Coordination and Collaboration with Other Efforts

This proposal is part of the integrated “PWS Herring Research and Monitoring” proposal submitted by the Prince William Sound Science Center to the Exxon Valdez Oil Spill Trustee Council. It includes the collaboration and coordination described there for work within the herring research group and with the Long-Term Monitoring proposal submitted by the Alaska Ocean Observing System.

III. SCHEDULE

A. Project Milestones

Objective 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.

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

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

To meet the objectives outlined above, PWSSC educators will produce the public outreach and education materials/programs identified in Table 1.

Table 1. The informal or formal education approaches (**bold**) used to meet objectives, specific products (*italics*), and schedule and frequency/number of outreach and education products developed/delivered by our staff.

1. Written project profiles and articles for public information and use; appropriate for lay audiences for inclusion in newsletters or other science/education publications.		
<i>Delta Sound Connections</i>	20,000 copies distributed annually to residents and visitors to PWS	Contribution of articles by herring researchers FY12-16. Sponsorship and herring program feature FY13 & FY15
<i>PWSSC Breakwater newsletter</i>	Mailed to 325 households/businesses in and outside of Alaska	One herring article per newsletter publication 2-3 time per year FY12-16
<i>Project Profiles</i>	Distribution points: PWSSC, CDFU, Cordova harbor, Chamber of commerce, public locations, Community Education email list-350 subscribers	Three profiles per year developed or updated FY12-16
2. Public presentations to general public audiences.		
<i>Community Lecture Series</i>	(live in Cordova, broadcast to Valdez)	Three presentations delivered by Herring researchers per year FY12-16
<i>Field Notes radio program</i>	(aired and archived KCHU public radio)	Three radio programs produced based on Herring projects per year FY12-16
3. Advertise and involve community members in opportunities to participate in herring research as “citizen scientists.”		
<i>Citizen Science Opportunities</i>	Provide and promote opportunities for the public to become involved in research project activities	Citizen science opportunities promoted on web and during community presentations
4. Develop and advertise web-based materials to communicate the basis, goals and results of the herring research project, and provide access to outreach and education products.		
<i>Herring Program webpage:</i> http://www.pwssc.org/herringsurvey	Basic information about each herring project can be found and links to the annual reports on the EVOSTC website.	Continue to use this as a place to make documents associated with the herring program accessible FY12-16
<i>Herring Program Facebook page:</i> http://www.facebook.com/pages/PWS-Juvenile-Herring-Research/187859711248910	Project photos, news and updates, administered by PWSSC & CDFU	Continue to use popular social media to outreach information associated with the herring program FY12-16

<i>PWSSC YouTube channel:</i> http://www.youtube.com/user/PWSSC	Podcasts (based on <i>Field Notes</i> radio programs) and video clips posted on YouTube	Continue to use popular social media to outreach information associated with the herring program FY12-16
5. Educate targeted groups in the application of research information and sampling methods.		
<i>Discovery Room</i>	5 th Grade Oceanography and Herring curriculum	6 2-hour classroom sessions/monitoring field trips delivered Oct-Apr FY12-16
<i>Outreach Discovery</i>	Stand-alone, hands-on herring and ocean science education programs for students in grades 3-12	1 program delivered to school group outside of Cordova per year FY12-16
<i>Summer Field Programs</i>	Field-based, hands-on herring and ocean science activities for participants in science and environmental camps and day programs	1 program delivered in PWSSC or partner summer program per year FY12-16

The first year (FY12) of this project overlaps with the existing PWS Herring Survey Program. PWSSC educators will use the overlap period to focus increasing capacity to expand the impact and geographic scope of outreach and education efforts. The intention is to provide activities that groups outside our delivery area will utilize without direct funding from this program. To increase the geographic impact of the programs, we propose to modify the current oceanography and herring *Discovery Room*, *Outreach Discovery* and *Summer Education* activities so that the instructional focus is on how a fishery (PWS herring) is affected by changes in the ecosystem. The resultant activities will focus on the ecosystem, which is more transferable, than on a particular fish population. At the same time it will continue to use PWS herring as the central example, which maintains its relevance to this program. The second activity that will take place in the first year is to market the revised programs to other marine education programs in the state. It is important to actively market the activities if we expect them to be utilized by other groups.

B. Measurable Project Tasks

FFY 12 1st Quarter (October 1, 11 to December 31, 11)

October Begin revising/implementing oceanography and herring *Discovery Room* (overlap with current EVOSTC funded PWS Herring Survey program)

December Develop *Field Notes* radio program based on fall surveys

FFY12 2nd Quarter (January 1, 12 to March 31, 12)

January Annual Marine Science Symposium

March Develop/update *Project Profiles* based on surveys & herring data analysis

FFY12 3rd Quarter (April 1, 12 to June 30, 12)

May Evaluate oceanography and herring *Discovery Room* program
Participation in Principal Investigator update and outreach meeting
Delivery of *Community Lectures* and *Field Notes* complete for FY12
Written outreach materials complete for FY12 (*Delta Sound Connections*,
Breakwater newsletter articles, *Project Profiles*)

FFY12 4th Quarter (July 1, 12 to September 30, 12)

July Market revised herring education programs to other marine education
programs in Alaska.
August Deliver *Summer Field Program*
August Submit Annual Report
September Delivery of *Outreach Discovery* program complete for FY12

FFY13 1st Quarter (October 1, 12 to December 31, 12)

October Begin implementing oceanography and herring *Discovery Room*
December Develop *Field Notes* radio program based on fall surveys

FFY13 2nd Quarter (January 1, 13 to March 31, 13)

January Annual Marine Science Symposium
March Develop/update *Project Profiles* based on surveys & herring data analysis

FFY13 3rd Quarter (April 1, 13 to June 30, 13)

May Evaluate oceanography and herring *Discovery Room* program
Participate in Principal Investigator update and outreach meeting
Delivery of *Community Lectures* and *Field Notes* complete for FY13
Written outreach materials complete for FY13 (*Delta Sound Connections*,
Breakwater newsletter articles, *Project Profiles*)

FFY13 4th Quarter (July 1, 13 to September 30, 13)

August Deliver *Summer Field Program*
August Submit Annual Report
September Delivery of *Outreach Discovery* program complete for FY13

FFY14 1st Quarter (October 1, 13 to December 31, 13)

October Begin implementing oceanography and herring *Discovery Room*
December Develop *Field Notes* radio program based on fall surveys

FFY14 2nd Quarter (January 1, 14 to March 31, 14)

January Annual Marine Science Symposium

FFY14 3rd Quarter (April 1, 14 to June 30, 14)

May Evaluate oceanography and herring *Discovery Room* program
Participate in Principal Investigator update and outreach meeting
Delivery of *Community Lectures* and *Field Notes* complete for FY14

Written outreach materials complete for FY14 (*Delta Sound Connections*,
Breakwater newsletter articles, *Project Profiles*)

FFY14 4th Quarter (July 1, 14 to September 30, 14)

August Deliver *Summer Field Program*
August Submit Project Annual Report
September Delivery of *Outreach Discovery* program complete for FY14

FFY15 1st Quarter (October 1, 14 to December 31, 14)

October Begin implementing oceanography and herring *Discovery Room*
December Develop *Field Notes* radio program based on fall surveys

FFY15 2nd Quarter (January 1, 15 to March 31, 15)

January Alaska Marine Science Symposium
March Develop/update *Project Profiles* based on surveys & herring data analysis

FFY15 3rd Quarter (April 1, 15 to June 30, 15)

May Evaluate oceanography and herring *Discovery Room* program
Participate in Principal Investigator update and outreach meeting
Delivery of *Community Lectures* and *Field Notes* complete for FY15
Written outreach materials complete for FY15 (*Delta Sound Connections*,
Breakwater newsletter articles, *Project Profiles*)

FFY15 4th Quarter (July 1, 15 to September 30, 15)

August Deliver *Summer Field Program*
August Submit Project Annual Report
September Delivery of *Outreach Discovery* program complete for FY15

FFY16 1st quarter (October 1, 15 to December 31, 15)

October Begin implementing oceanography and herring *Discovery Room*
December Develop *Field Notes* radio program based on fall surveys

FFY16 2nd quarter (January 1, 16 to March 31, 16)

January Alaska Marine Science Symposium
March Develop/update *Project Profiles* based on surveys & herring data analysis

FFY16 3rd quarter (April 1, 16-June 30, 16)

May Evaluate oceanography and herring *Discovery Room* program
Participate in Principal Investigator update and outreach meeting
Delivery of *Community Lectures* and *Field Notes* complete for FY16
Written outreach materials complete for FY16 (*Delta Sound Connections*,
Breakwater newsletter articles, *Project Profiles*)

FFY16 4th quarter (July 1, 16 to September 30, 16)

July Secure final approval, acceptance of final report
August Deliver *Summer Field Program*

September
September

Delivery of *Outreach Discovery* program complete for FY16
Publication of final report complete, delivered to ARLIS

PWS Herring Research and Monitoring: Outreach & Education
PRINCE WILLIAM SOUND SCIENCE CENTER

Personnel

Year 1: 0.5 months of salary for Lindsay Butters, PI, is requested to develop the necessary infrastructure to implement outreach and education projects in Years 2-5 of the project, to attend the AK Marine Science Symposium in Anchorage, and to deliver herring education programs in communities outside of Cordova.

Comment [L1]: Is this too vague? Just vague enough? I will just need time to research and acquire the necessary infrastructure for program delivery, attend the meetings, and deliver a program during an Outreach Discovery trip.

Years 2 & 3: 2.0 months of salary for Lindsay Butters and 1.0 months of salary for a PWSSC Education Specialist to plan an implement herring outreach and education programs, including youth hands-on science programs, community lectures, radio programs and written publications, and to attend the AK Marine Science Symposium.

Year 4: 2.1 months of salary for Lindsay Butters and 1.1 months of salary for a PWSSC Education Specialist to plan an implement herring outreach and education programs as described above, and to attend the AK Marine Science Symposium.

Year 5: 2.5 months of salary for Lindsay Butters and 1.1 months of salary for a PWSSC Education Specialist to plan an implement herring outreach and education programs as described above, and to attend the AK Marine Science Symposium.

Travel

In years 1-5 travel to the Alaska Marine Science Symposium is requested. In years 1-5 travel to deliver herring education & outreach programs in communities outside of Cordova is requested. In year 3 funds are requested to travel to an EVOSTC review of the Herring and Long-Term Monitoring programs as outlined in the RFP.

Contractual

Each year funds are requested for Information Technology, which includes \$100/person month for network connections and costs associated with software license renewals or purchases. Funds are requested each year for printing/mailing. The request is based on historic and anticipated usage. Funds are also requested each year for communications, which includes \$100/person month for phone, plus additional funds for long distance and fax costs. In years 2 and 4 funds are requested to support the printing and distribution of the Prince William Sound Science Center's annual "Delta Sound Connections" science and natural history publication. The publication will be used to outreach PWS Herring Program information and results to at least 18,000 visitors and residents of the Prince William Sound and South-central Alaska regions.

Commodities

In each year funds are requested for miscellaneous teaching and outreach supplies, and office supplies (paper, pens, printer ink, computer, educational aids etc.) that are typically consumed or utilized in association with the project. In Year 1, funds are requested to acquire items necessary to develop infrastructure and increase capacity to deliver

outreach and education programs, such as computers, audio recorders, digital cameras/camcorders and microfiche readers.

Equipment

No equipment funds are requested.

INDIRECT COSTS

The PWSSC indirect rate is estimated at 30% based on our currently negotiated rate.

