

FY14 PROGRAM PROJECT PROPOSAL FORM

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

Project Period: February 1, 2014 – January 31, 2015

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

FY12	FY13	FY14	FY15	FY16	TOTAL
16,500	30,500	\$32,700	36,000	38,300	154,000

(Funding requested must include 9% GA)

Non-EVOSTC Funds to be used:

FY12	FY13	FY14	FY15	FY16	TOTAL
		0			

Date: August 30, 2013

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. Summary of Project to Date (if applicable)

All written and web-based outreach materials have been produced as proposed, including seven *Project Profiles*, six *Delta Sound Connections* articles/infographics, and three articles in the *Breakwater* newsletter. The herring research webpage is live and we will continue to add content ([www. http://pwssc.org/research/fish-2/pacific-herring/](http://pwssc.org/research/fish-2/pacific-herring/)). A video of a *Community Lecture* was posted on the *PWSSC YouTube Channel* (<http://youtu.be/NIVTcpxLccw>) and blog and *Facebook* posts have been made.

Education programs about Pacific herring research have been delivered to school groups in Cordova, and Chenega Bay, and to science campers participating in PWSSC's summer education programs. To date, PWSSC educators have delivered twelve *Discovery Room* programs, one *Outreach Discovery* program and herring-themed lessons in four *Summer Field Programs*. Six *Community Lectures* presented by project PIs have also been held. Three *Field Notes* radio programs were produced and aired on KCHU public radio.

I am behind on two milestones: marketing of herring lesson plans to programs outside of this region (September 2012) and the production of three *Field Notes* programs (May 2013). These delays are the result of my being pregnant and having a baby in January 2013, and setbacks caused by the revision of the *Field Notes* radio program format by PWSSC. I expect to have the three radio programs completed by December 2013 and the lesson plans prepared for public outreach by May 2014.

II. PROJECT DESIGN

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.

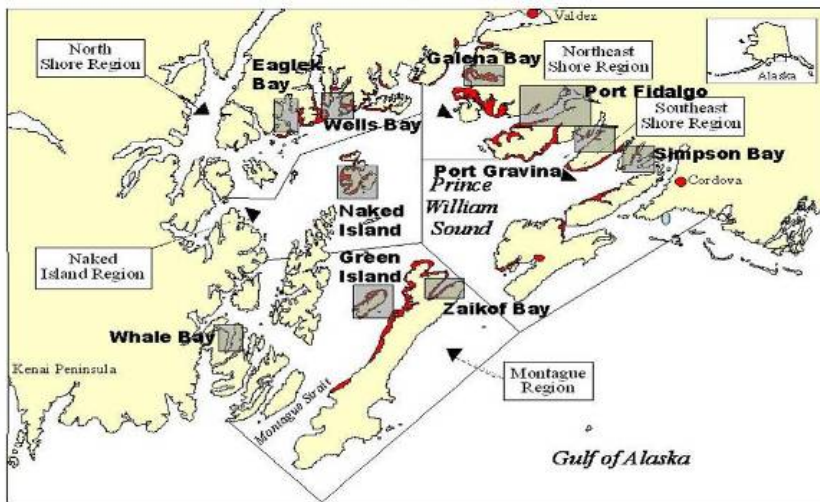


Figure 1. PWS study area, including the four SEA bays (Whale, Zaikof, Eaglek, and Simpson, as well as other bays historically important for juvenile herring).

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. CV's/RESUMES

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EDUCATION

Post Baccalaureate, University of Wisconsin, Stevens Point

Fundamentals of Environmental Education, 2006

Applied Environmental Education Program Evaluation, 2007

Strategic Planning and Implementation, 2007

Johnson State College, Johnson, VT, 2004

B.S. Environmental Science-Integrated Science

Graduated Cum Laude

PROFESSIONALEXPERIENCE

PrinceWilliam Sound Science Center, Cordova, AK

A non-profit research and education organization with a focus on ecosystem science in Coastal Alaska

Education Specialist **December 2012-present**

- Produce written, radio and web-based outreach materials to communicate ecosystem research information to the general public.
- Develop/oversee delivery of educational programs that engage students and community members in presentations, hands-on activities and field experiences to learn about ecosystem science research in the Prince William Sound region.

Education Program Coordinator **November 2004-2011**

Education Program Development and Coordination responsibilities:

- Coordinate logistics for summer Science Camps and field courses for youth aged 7-18 and adults. Oversee program advertising and recruitment, registration, scholarships, staff training, field camp, meals, healthcare, adventure activities, educational programming and evaluation.
- Plan and implement standards-based science education programs for students in K-6 grades with an emphasis on place-based, experiential learning. Curriculum compilations include salmon and herring biology, lake and ocean monitoring and oil spill response technology.
- Design and conduct environmental monitoring projects to involve 4-6 grade students in field research techniques and credible data collection. Recent projects focused on salmon habitat, water quality and weather.
- Collaborate with community partners to coordinate community festivals and one-day events to educate participants about the ecosystems of PrinceWilliam Sound and the Copper River Delta. Events include Copper River Delta Shorebird Festival, Copper River Wild! Salmon Festival, Tidepooling for Tots and Community Kayak Day.
- Coordinate Cordova's National Ocean Sciences Bowl program and coach high school students in preparation for the regional competition.

Program Administration responsibilities:

- Prepare grant proposals and project budgets, \$1000-\$135,000.

- Submit annual progress reports to funders and education updates to the PWSSC board.
- Supervise school-year and summer program education staff members.
- Conduct program evaluation and strategic planning activities.

Prince William Sound Community College, Cordova, AK September-December 2008

Biology Teacher Assistant

- Prepared laboratory for student activities, facilitated lab experiments and graded student work.

Harborside Pizza, Cordova, AK June 2006-present

Bookkeeper

Restaurant Management responsibilities

- Assist in implementation of the Harborside Pizza Development and Business Plans.
- Maintain accounting records and financial documents including balance sheets, profit & loss statements and annual sales projections.

Cambridge Elementary School, Cambridge, VT January-May 2004

Volunteer Program Coordinator

- Prepared nature education workshops for second and third graders for the Environmental Learning for the Future (ELF) program. Topics included animal and plant adaptations, nature's designs and earth's systems.

Learning Resource Center, Johnson State College, VT October-May 2003

English and Earth Science Tutor

- Tutored students in College Writing and Earth Science courses.
- Assisted with test preparation and research skills, proofreading and paper revision techniques.

PROJECT COLLABORATION

Alaska River Expeditions: Geology of the Copper River Watershed field course.

Copper River Watershed Project: Discovery Room, Copper River Stewardship Program, community monitoring.

Cordova and Chugach School Districts: Discovery Room, Outreach Discovery, National Ocean Sciences Bowl, monitoring projects

Prince William Sound Science Center research staff: youth science camps, adult workshops, community lectures, student presentations, outreach materials.

Other project partners: Cordova Arts and Pageants, Cordova District Fishermen United, Native Village of Eyak, Prince William Soundkeeper Wrangell Institute of Science and Environment

U.S. Forest Service Cordova Ranger District: Discovery Room, science and wetlands ecology camps

WORKSHOPS ATTENDED

- 2006 Project WET activity and curriculum use training
- 2006 Alaska Natural Resource and Outdoor Education workshop series
- 2007, 2008 Communicating Ocean Science, AK Marine Science Symposium
- 2007 Project WILD, Project WILD Aquatic and Alaska Wildlife Curriculum training
- 2010 Citizen Science for K-12 Teachers, Kachemak Bay Research Reserve
- 2012 Adobe software skills workshop, Kristin Link via Copper River Watershed Project
- 2012 ServSafe Food Protection Manager Certification Program, Anchorage CHARR

IV. 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</i> webpage: 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</i> page: 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

FY 14, 1st quarter (February 1 – May 31, 2014)

May Evaluate/update oceanography and herring *Discovery Room* program curriculum
Participate in Principal Investigator update and outreach meeting
Delivery of *Community Lectures* complete for FY14
Production of written outreach materials complete for FY14 (*Delta Sound Connections*, *Breakwater* newsletter articles, *Project Profiles*)
Herring lesson plans ready for public outreach/marketing

FY 14, 2nd quarter (June 1, 2014-August 30, 2014)

August Delivery of *Field Notes* complete for FY14
August Deliver *Summer Field Program*
August Submit Project Annual Report

FY 14, 3rd quarter (September 1, 2014-November 30, 2014)

September Delivery of *Outreach Discovery* program complete for FY14
October Begin implementing oceanography and herring *Discovery Room*

FY 14, 4th quarter (December 1, 2015 – January 31, 2015)

December Develop *Field Notes* radio program based on fall surveys
January Alaska Marine Science Symposium

V. BUDGET

Budget Form (Attached)

Please complete the budget form for each proposed year of the project.