

***Oceanographic conditions in Prince William Sound – Campbell (PWSSC, 15120114-E)***

<b>FY15 PROPOSAL SUMMARY PAGE</b> <b>Continuing, Multi-Year Projects</b>																								
<b>Project Title:</b> Long term monitoring of oceanographic conditions in Prince William Sound																								
<b>Project Period:</b> February 1, 2015 – January 31, 2016																								
<b>Primary Investigator(s):</b> Campbell, Robert W., PWS Science Center, 300 Breakwater Ave., Box 705, Cordova, AK, 99574; rcampbell@pwssc.org																								
<b>Study Location:</b> Prince William Sound, Hinchinbrook Entrance, Montague Strait, Simpson Bay, Whale Bay, Eaglek Bay, Zaikof Bay																								
<b>Project Website:</b> www.gulfwatchalaska.org																								
<p><b>Abstract*:</b> This project is a component of the integrated Long-term Monitoring of Marine Conditions and Injured Resources and Services submitted by McCammon <i>et. al.</i> 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, over the course of the growing season (focused on the vernal and autumn blooms). 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 <i>et. al.</i>). 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 <i>et al.</i></p>																								
<p><b>Estimated Budget:</b></p> <p><b>EVOSTC Funding Requested* (must include 9% GA):</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th style="width: 16.6%;">FY12</th> <th style="width: 16.6%;">FY13</th> <th style="width: 16.6%;">FY14</th> <th style="width: 16.6%;">FY15</th> <th style="width: 16.6%;">FY16</th> <th style="width: 16.6%;">TOTAL</th> </tr> <tr> <td>\$238.1</td> <td>\$193.2</td> <td>\$197.3</td> <td style="background-color: yellow;">\$203.7</td> <td>\$211.9</td> <td>\$1,044.2</td> </tr> </table> <p><b>Non-EVOSTC Funds to be used:</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th style="width: 16.6%;">FY12</th> <th style="width: 16.6%;">FY13</th> <th style="width: 16.6%;">FY14</th> <th style="width: 16.6%;">FY15</th> <th style="width: 16.6%;">FY16</th> <th style="width: 16.6%;">TOTAL</th> </tr> <tr> <td></td> <td></td> <td></td> <td style="background-color: yellow;">\$145</td> <td>\$135</td> <td></td> </tr> </table>	FY12	FY13	FY14	FY15	FY16	TOTAL	\$238.1	\$193.2	\$197.3	\$203.7	\$211.9	\$1,044.2	FY12	FY13	FY14	FY15	FY16	TOTAL				\$145	\$135	
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<b>Date:</b> September 2, 2014																								

## **I. EXECUTIVE SUMMARY**

The goal of this program is to deliver a monitoring program that will return useful information on temporal and spatial changes in the marine environment, at a reasonable cost, and with a reasonable amount of effort. The data should be depth-specific (because water column stability is important to ecosystem productivity), of high enough frequency to capture timing changes (changes that occur on order of weeks), and give an idea of spatial variability in the region. As well, given that PWS herring will remain a funding priority of the EVOSTC in the next 20 years, any long term monitoring efforts should be integrated with future herring studies as well as building upon ongoing work funded by the trustee council. Specific objectives include:

1. Install and maintain an autonomous profiling mooring in PWS that will measure daily profiles of temperature, salinity, oxygen, chlorophyll-a (as a proxy for phytoplankton biomass), turbidity and nitrate concentration in the surface layer (0-100 m).
2. Conduct regular surveys in PWS to tie in spatial variability to the high frequency time series provided by the mooring.
3. Support continued herring research by maintaining the existing time series (hydrography, plankton and nutrients) at the four SEA bays.

## **II. COORDINATION AND COLLABORATION**

### **A. Within the Program**

Provide a list and clearly describe the present functional and operational relationships with other program projects. This includes any coordination that has taken or will take place and what form the coordination will take (shared field sites or researchers, research platforms, sample collection, data management, equipment purchases, etc.).

1. All plankton samples collected by the lower Cook Inlet group (Angela Doroff) are analyzed as part of this project.
2. Following extended discussions as to sampling protocols for zooplankton among the different projects (PIs Batten, Doroff and Hopcroft), we have begun a simple comparison study to examine how the different gears used are sampling and how they might be compared.
3. Working specifically with Sonia Batten, plankton categories have been defined so that the more detailed taxonomic categories determined as part of this project may be “downscaled” so to be comparable with the Continuous Plankton Recorder surveys conducted by Batten.
4. A dialog has begun among all of the PIs of the “Environmental Drivers” section on data availability to better understand variability in the spring bloom throughout the northern Gulf of Alaska.

### **B. With Other Council-funded Projects**

Indicate how your proposed project relates to, complements or includes collaborative efforts with other proposed or existing projects funded by the Council that are not part of your program.

This project has provided plankton data to researchers within the PWS Herring Survey (PI Ron Heintz), and regularly sends live and preserved plankton to the Hershberger group at Marrowstone Research Station for genetic and histological work looking for vectors of fish pathogens.

### **C. With Trustee or Management Agencies**

1. A researcher from NOAA (Johanna Vollenweider) working on a project independent of the council-funded effort has attended a cruise, to collect herring scales and tissue samples for development of better age determination methods.
2. Seawater samples have been collected for the Ocean Acidification research group at NOAA AFSC/UAF Ocean Acidification Research Center (contact: Natalie Monacci).

3. ADF&G was assisted with a check on reported herring spawn in Port Eccles (contact: Steve Moffitt).
4. Seawater samples are being taken during all cruises in 2014 to send to the WHOI radioisotope group, which will be tested for the presence of isotopes characteristic of the 2011 Fukushima Daiichi nuclear disaster (contact: Ken Buesseler).
5. Project staff are an on-call response vessel for emergency retrieval of a number of gliders (surface and subsurface) deployed in PWS by NOAA AFSC staff in 2014 (contact: Wiley Evans).

### III. PROJECT DESIGN – PLAN FOR FY15

#### A. Objectives for FY15

- Objective 1.** Install and maintain an autonomous profiling mooring in PWS.
- Objective 2.** Conduct regular surveys in PWS.
- Objective 3.** Support continued herring research by maintaining the existing time series (hydrography, plankton and nutrients) at the four SEA bays.

#### B. Changes to Project Design

The original intention of this project was to leave the profiling mooring in place operationally for most of the year. After 1.5 years of operation, we have learned that significant maintenance and calibration work is required, and that winter conditions are energetic enough that it is unwise to leave such an expensive piece of equipment in place all winter long. Given that much of the profiler's instrumentation is biophysical, we have focused on the productivity season in PWS, deploying the profiler in late winter (prior to the spring bloom), and retrieving it in late autumn (following the autumn bloom period). The profiler is bleeding-edge technology, and this project is by far the most northerly and deepest deployment of the system to date, and it has suffered a number of malfunctions, necessitating unplanned (and unbudgeted) trips to retrieve/redeploy the mooring. Communications have also been something of an issue (the local cellular provider's data service could charitably be referred to as "flakey"), but all data is logged internally and analyzed post-hoc.

It was originally planned to measure macronutrients (nitrate, phosphate, silicic acid) via Capillary Electrophoresis (CE), and considerable time and effort (under this project, and other non-TC projects) has been expended working up various methods, with limited success: CE is a separation technique (similar to HPLC, but using electric current instead of pressure), and the non-nutrient cations present in seawater interfere considerably with the analysis. We have been working with a CE chemist in the Czech Republic who has worked with saline samples, and in the meantime have gone back to the standard wet-chemical methods for the analysis of nutrients and are working on the backlog that has accumulated.

### IV. SCHEDULE

#### A. Project Milestones for FY 15

- Objective 1.** Install and maintain an autonomous profiling mooring in PWS.  
*To continue into autumn 2014 (~early November) and resume in March 2015*
- Objective 2.** Conduct regular surveys in PWS.  
***Surveys will be conducted in August, October and November 2014, and six cruises will be conducted in 2015.***
- Objective 3.** Support continued herring research by maintaining the existing time series (hydrography, plankton and nutrients) at the four SEA bays

***Surveys in the bays will be conducted in August, October and November 2014, and six cruises will be conducted in 2015.***

**B. Measurable Project Tasks for FY 15**

Specify, by each quarter of each fiscal year, when critical project tasks (for example, sample collection, data analysis, manuscript submittal, etc.) will be completed, as submitted in your original proposal. Please identify any substantive changes and the reason for the changes. Please format your schedule as in the following example:

**FY 15, 1st quarter (February 1, 2015 - April 31, 2015)**

*March: PWS Survey, Mooring deployed*

**FY 15, 2nd quarter (May 1, 2015-July 30, 2015)**

*May: PWS Survey, Mooring maintenance*

*June: PWS Survey, Mooring maintenance*

**FY 15, 3rd quarter (August 1, 2015 – October 31, 2015)**

*August: PWS Survey, Mooring maintenance*

*October: PWS Survey, Mooring maintenance*

*November: PWS Survey, Mooring maintenance*

**FY 15, 4th quarter (November 1, 2015- January 31, 2016)**

*November: Begin analysis and report writing*

**V. PROJECT PERSONNEL – CHANGES AND UPDATES**

No personnel have been added or removed from the project.

**VI. BUDGET**

**A. Budget Forms**

Please see included program workbook for budget forms.

**B. Changes from Original Proposal**

No changes requested.

**C. Sources of Additional Funding**

PWSSC provides a CTD profiler (SBE model 25plus) with several auxiliary sensors (chlorophyll fluorometer, backscatter turbidometer, oxygen sensor, solid state active fluorometer and nitrate analyzer), which is used for all field surveys, and to cross-calibrate with the profiler (value ~\$75K). Extracted chlorophyll-*a* is read on a Turner Designs TD-700 fluorometer (replacement cost ~\$10K). As well as the moored profiler, PWSSC provides a pair of acoustic releases, and a 1-m diameter syntactic foam float with upward and downward looking RDI ADCP current profilers (value ~\$50K). The Alaska Ocean Observing System has also contributed \$10K in FY14 for surveys in PWS.