

Appendix K – OSRI Grant Policy Manual

Final Report Form - Oil Spill Recovery Institute

An electronic copy of this report shall be submitted by mail, or e-mail to the OSRI Research Program Manager wspgaw@pwssc.org and Financial Office poswalt@pwssc.org
Mailing address: P.O. Box 705 - Cordova, AK 99574 -

Deadline for this report: Submittal within 90 days of grant/award expiration. **Also**, note that a summary Financial Statement shall be submitted **within 45 days** of the grant expiration. The final invoice and financial statement is due within 90 days of the grant/award expiration.

Today's date: 10/10/13

Name of awardee/grantee: Prince William Sound Science Center/Kara Johnson

OSRI Contract Number: 11-10-04

Project title: Science of the Sound

Dates project began and ended: January 1, 2011 – September 30, 2013

PART I - Outline for Final Program or Technical Report

This report must be submitted by all grantees. However, for those whose project work resulted in a peer reviewed publication (whether in draft or final form), this report may be abbreviated and the publication attached as part of the report.

- A. Non-technical Abstract or summary of project work that does not exceed 2 pages and includes an overview of the project. This abstract should describe the nature and significance of the project. It may be provided to the Advisory Board and could be used by OSRI staff to answer inquiries as to the nature and significance of the project.**

Note: we rebranded our education programs from Science of the Sound to Headwaters to Ocean Education.

During the 2012-13 season, the Prince William Sound Science Center's (PWSSC) education staff directly engaged with over 1,347 participants and indirectly served another 27,785 more for a total of over 29,000 people. PWSSC educators coordinated Discovery Room programs for 97 students and facilitated a salmon rearing tank in the Cordova elementary school. We conducted four Discovery Outreach programs in rural Alaskan villages for 210 students and supervised water quality monitoring in local waterways. We coached two teams for National Ocean Sciences Bowl (finished 4th and 21st overall at the regional competition) and held 32 Community Lectures for 606 people. All lectures were recorded and uploaded to our website and YouTube station for web distribution. Over summer, we held six summer camps for 73 campers. Regional and Science Center research projects were brought to a wide audience in the Prince William Sound and Copper River region through 3 *Field Notes* radio programs and 20,000 copies of our annual *Delta Sound Connections* newspaper publication. Additionally, we hosted our first AmeriCorps member who served as Education Assistant. We partnered with Alaska Sealife Center, Center for

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Alaskan Coastal Studies, Kachemak Bay Research Reserve, and Centers for Ocean Science Education Excellence (COSEE) to create an informal education coalition that supports the development of a cohesive, state-wide approach to marine education.

Our programs would not be possible without the support of community partners. Copper River Watershed Project (CRWP) provided staff time to assist with Discovery Room. CRWP and Alaska Department of Fish and Game provided staff time and equipment for the salmon rearing tank, egg collection, and facilitating the weekly monitoring by the elementary students. Alaska Sea Grant Marine Advisory Program and Prince William Sound Audubon Society provided assistance for the community lecture series while PWS Community College supported broadcasting the lecture series to Valdez and outreach trips to Valdez.

B. Review objectives as described in original proposal and state whether these objectives were achieved.

Objectives for 2012-2013 (FY13)

Fifth Grade: Ocean Science and Fisheries

Funded in part by BP Exploration (Alaska), Inc., ConocoPhillips, *Exxon Valdez* Oil Spill Trustees Council Herring Research and Monitoring Program and Oil Spill Recovery Institute and

Goals for Ocean Science and Fisheries

- Students use scientific equipment and instruments to collect and analyze scientific data
- Students understand the function and structure of marine ecosystems
- Students understand herring biology and the important role herring play in marine ecosystems
- Students understand the carbon cycle
- Students examine interactions between atmosphere, carbon cycle and ocean acidification
- Students examine the impacts of climate change on marine ecosystems and fisheries
- Students are exposed to careers in science, technology engineering and math

Cordova's 5th grade (approximately 12 students) participated in seven Discovery Room sessions and four monitoring field trips to increase their understanding of ocean sciences, oceanographic monitoring and fisheries. The Ocean Science and Fisheries program helped students understand the value of long-timeline datasets and honed their data collection skills while they measured temperature, pH, dissolved oxygen, salinity, turbidity and of nitrite, phosphate, and iron. Guest scientists from PWSSC and AK DF&G provided additional expertise.

Students studied the potential impacts of climate change on ocean ecosystems, and how ocean conditions, such as pH, affect the ability of marine organisms to survive and reproduce. Students used microscopes to observe herring scales collected in different years by the AK DF&G and correlated varying growth rates of the herring, based on distance between annual rings on the scales, to ocean temperature data. During the final session, students completed a Jeopardy! game to test what they learned about marine science.

Table 3. 5th Grade Oceanographic Monitoring program activities and products.

Activity/Product	Description
Lesson Plans	Delivered 8 lesson plans relating to oceanography and fisheries: <ol style="list-style-type: none"> 1. Animals in their Environment/Oceanographic Monitoring Concepts 2. Oceanographic Monitoring Training 3. Oceanographic Monitoring Tools/Tests and Herring Scale Analysis/Growth 4. Climate Change in Alaska 5. Herring Dissection with Dr. Michele Buckhorn 6. Climate Change and the Carbon Cycle Part 1 7. Climate Change and the Carbon Cycle Part 2 8. Ocean Monitoring and Climate Change 9. Assessment of school year/ Jeopardy!
Classroom Sessions	Planned and facilitated 7 classroom and lab sessions
Field Trips	Planned and facilitated 4 field trips to conduct oceanographic monitoring
Evaluation Tools	<ol style="list-style-type: none"> 1. Review questions: following each classroom session, educators asked students a series of questions to assess student learning 2. Workbook with questions, puzzles, and other activities 3. Jeopardy!: facilitated at the final session as a summative evaluation
Publicity	Monthly reports of student activities were published on our blog at www.pwssc.org/blog

Sixth Grade: Ocean Technology, Arctic Ecosystems and Oil Spill Response

Funded in part by BP Exploration (Alaska), Inc., ConocoPhillips and Oil Spill Recovery Institute

Goals for Ocean Technology, Arctic Ecosystems and Oil Spill Response

- Students examine the Arctic environment and associated threats
- Students understand why the Arctic is so important for petroleum resource extraction and identify associated impacts of extraction
- Students understand how physical properties of ocean water affect objects in the water
- Students understand how technology is used in real-world environmental applications, such as ocean monitoring and oil spill response
- Students examine the sources and impacts of oil pollution in marine environments
- Students are exposed to careers in science, technology engineering and math

Sixth grade students participated in the Ocean Technology, Arctic Ecosystems and Oil Spill Response program through eight classroom sessions and eight lab sessions. 24 students learned about the technology used to explore and study the ocean, Arctic ecosystems, sources of oil pollution in the ocean, effects of oil spills on the physical and biological aspects of oceans and coasts, and how to build Remotely Operated Vehicles (ROVs).

In lab sessions, students participated in hands on activities and demonstrations to learn basic ocean science concepts including density, pressure, and buoyancy. Students learned about the impacts of climate change on Arctic animals and ecosystems. Students calculated the percent and graphed the sources of oil spills and researched oil spills around the world. Students concluded

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their year of study by working in teams to build ROVs and operate them in the pool to respond to a number of challenges that represented an under-ice oil spill. Several parents and community members attended the event and the event was written up in the local paper.

Table 4. 6th Grade Ocean Technology program activities and products.

Activity/Product	Description
Lesson Plans	Delivered 11 lesson plans relating to Arctic ecology and technologies used in ocean exploration and oil spill response: <ol style="list-style-type: none"> 1. Introduction to Ocean Technology 2. Properties of Water (Lab) 3. Arctic Ecosystems 4. Arctic Ecosystems (Lab) 5. Marine Oil Spill Response Methods 6. Oil Spill Cleanup/Oily Sediments (Lab) 7. Petroleum Products 8. Oil Spill Research/Alaska Oil Spill Game (Lab) 9. Designing and building Remotely Operated Vehicles (ROVs) to respond to a mock oil spill (2 Classes and 1 Lab) 10. ROV Demonstration: response to a mock oil spill (Lab) 11. Assessment of school year/Jeopardy!
Classroom Sessions	Planned and facilitated 7 classroom sessions
Lab Sessions	Planned and facilitated 7 lab sessions
Events/Demonstrations	1. Mock Oil Spill , Cordova pool, Cordova's 6 th grade (April 2013)
Evaluation Tools	<ol style="list-style-type: none"> 1. Pre- and post-tests and survey to measure knowledge, interest and stewardship actions 2. Workbook with questions, puzzles, and other activities 3. Students built an ROV and operated it to respond to a mock oil spill 4. Jeopardy!: facilitated at the final session as a summative evaluation
Publicity	Monthly reports of student activities were published on our blog at www.pwssc.org/blog Newspaper coverage of mock oil spill cleanup

National Ocean Sciences Bowl

Goals for NOSB

- Broaden students' awareness of the latest scientific research on the oceans and the critical impact of the oceans on global climate, weather, economic well-being, history, and culture
- Use the oceans as a tool for cross-disciplinary science education and as a vehicle for teaching biology, physics, chemistry, geology, and mathematics
- Give oceanographic research programs the opportunity to develop new links with their local pre-college community and open students' eyes to ocean-related career options
- Reach out to new students and communities to boost participation by minorities, women, and disadvantaged students.
- Develop basic scholastic research and presentation skills

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Educators coached two teams (11 students (5 male and 6 female; 1 Alaskan Native) in preparation for the Tsunami Bowl, Alaska’s regional National Ocean Sciences Bowl competition. Approximately 48 practice sessions were held this year. Of these sessions, 7 were led by guest scientists and 3 were webinars from the National Ocean Sciences Bowl.

For this year’s research project, each team had to develop a management plan for a valuable resource. The Tenacious Dawgsharks project, “*Wells and Whales: The Ecological Effects and Future of Cook Inlet Hydrocarbon Production*” won 3rd place for the research paper, 2nd place for the presentation, and 1st place overall for the research project. Tenacious Dawgsharks placed 6th in the quiz bowl and 4th overall in the Tsunami Bowl. The Omnicient Octopodes participated placed 15th in the quiz bowl and 21st place overall.

This year at the NOSB competition, we engaged 20 teams (of 4-5 students each and their coaches) in an ROV build and oil spill response challenge (140 people). Teams from around the state built ROVs and operate them to respond to the mock under-ice oil spill challenge.

Outreach Discovery

Funded in part by Alyeska Pipeline Service Company, BP Exploration (Alaska), Inc., ConocoPhillips, *Exxon Valdez* Oil Spill Trustees Council Herring Research and Monitoring Program, North Pacific Research Board, Oil Spill Recovery Institute, and PWS Regional Citizens Advisory Council

Goals for Outreach Discovery

- Bring tested *Discovery Room* lessons to students from other communities
- Increase student understanding and connection to the natural world
- Students understand the function and structure of ecosystems
- Provide rural students access to learning opportunities that use scientific equipment
- Students are exposed to careers in science, technology engineering and math

Four Outreach Discovery programs were conducted during the school year.

In February 2013, we visited Kodiak and engaged 28 students from the 7th-12th grades in oil spill cleanup and ROV builds as well as Arctic ecosystems. Also in February, we hosted an ROV challenge event at the NOSB regional competition, the Tsunami Bowl; 20 teams (of 4-5 students each and their coaches) from around Alaska participated. We traveled to Valdez in March 2013 to conduct ROV builds for 10 9th-12th graders as well as teach about Arctic ecosystems to 20 3rd graders. In May 2013, we taught 12 Chenega Bay students in 3rd-12th grades about herring and salmon ecology as well as water quality monitoring.

C. Describe problems or roadblocks encountered in project implementation.

Due to reductions in staffing we have not yet been able to completely standardize all lesson plans for web distribution but we have been able to map them to Alaska State Standards. Over the past

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year, the PWSSC website was redesigned and rebranded but we have not been able to post lesson plans. Once lessons have been finalized, we will post them on the website.

Over the last year, PWSSC initiated rebranding efforts and a website redesign. Since then, we have begun designing marketing materials to outreach our lesson plans. We are working with the company that helped with the PWSSC rebranding efforts to create unified outreach materials. We have also drafted an outreach plan which focuses on presence at various conferences and identifying potential teacher partners.

D. Highlight accomplishments, whether or not they were part of the original proposal.

Highlights from 2012-13 H2O Education Program

Though not directly funded by OSRI, we would like to report on these additional outreach activities:

- Partnership with SAGA to host our first AmeriCorps Member
- Recording of all lecture series presentations and posting on-line (606 attendees, 455 online viewers)
- NOSB ROV event (140 students and teachers/chaperones from around Alaska)
- DanceTeacher Magazine article about our efforts to turn STEM into STEAM
- Construction of cabin and wood shed for our campground
- Hosting two visiting groups and four work groups (Warren Wilson College, Sierra Club, SAGA; 56 people)
- Coordinating with marine science education partners to form a state-wide coalition
- Development of videos to advertise/highlight our education programs
- Cordova Clean Harbor pamphlet (300 people)
- Creation of new lesson plans and activities about Arctic ecosystems
- Clean-up of 50 bags of trash from the Cordova harbor for Earth Day (45 people)
- Hosting Girdwood Elementary students for Copper River Delta Shorebird Festival (30 students)
- Continuation of environmental monitoring
- Skype sessions with partner classrooms
- Salmon incubation tank

E. Conclusions.

PWSSC educators successfully engaged almost 30,000 students and adults directly or indirectly. We diversified our approach to teaching to include kinesthetic and artistic methodologies to provide greater educational access to students with different learning styles. We continued successful hands-on observational teaching tools such as the salmon tank. We increased our electronic media access to interested constituents through social media channels. We continue to improve and expand our lesson units and assessment materials for each grade.

F. Appendix including copies of all written reports or publications completed or in progress, resulting from the project work. This also includes abstracts of papers presented at conferences. Please note the acknowledgment of OSRI support stated in Section 10.3.4 of the Grant Policy Manual.

- **Community Lecture Series**
<http://pwssc.org/educate/community-2/lecture-series/>
http://www.youtube.com/playlist?list=PL0Q2XZKI0dBs7miEChFpsbeOM_lshxi9X
- **Field Notes**
<http://pwssc.org/educate/community-2/field-notes/>
<http://www.youtube.com/playlist?list=PL0Q2XZKI0dBU7F8T6FxxvE3bER7VFCTu5g>
- **Cordova Times**
 - Discovery Room (1/18/13)
 - National Ocean Sciences Bowl Article (2/01/13)
 - Cordova Harbor cleanup (4/26/13)
 - ROV water challenge (5/17/13)
 - Odiak Pond Water Quality Monitoring (5/31/13)
 - Discovery Room highlights (5/31/13)
 - Copper River Stewardship Program (5/31/13)
 - Summer camps (6/7/13)
 - Copper River Wild! Salmon Festival (7/5/13)
- **Copper River Record**
 - Copper River Stewardship Program (5/30/13)
- **DanceTeacher Magazine**
<http://www.dance-teacher.com/2013/08/science-class-gets-its-groove-on/>
- **PWS RCAC The Observer Newsletter**
 - Ocean Science Festival: Valdez (January 2013)
 - ROV outreach trip (May 2013)
 - Oil Spill Education Workgroup (May 2013)
- **PWSSC Breakwater Newsletter**
 - Discovery Room (Fall 2012)
 - Ocean Science Festival: Cordova (Fall 2012)
 - Delta Sound Connections is available (April 2013)
 - Summer camps (April 2013)
 - Cordova Harbor Cleanup (April 2013)
 - Ocean Science Festival: Valdez (April 2013)
 - ROV outreach trip (April 2013)
 - Summer camps (July 2013)
 - Discovery Room in DanceTeacher Magazine (October 2013)

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Part II - Final Financial Statement

Please complete the attached Excel spreadsheet (GPM-appendix I – Fin Rpt Form).