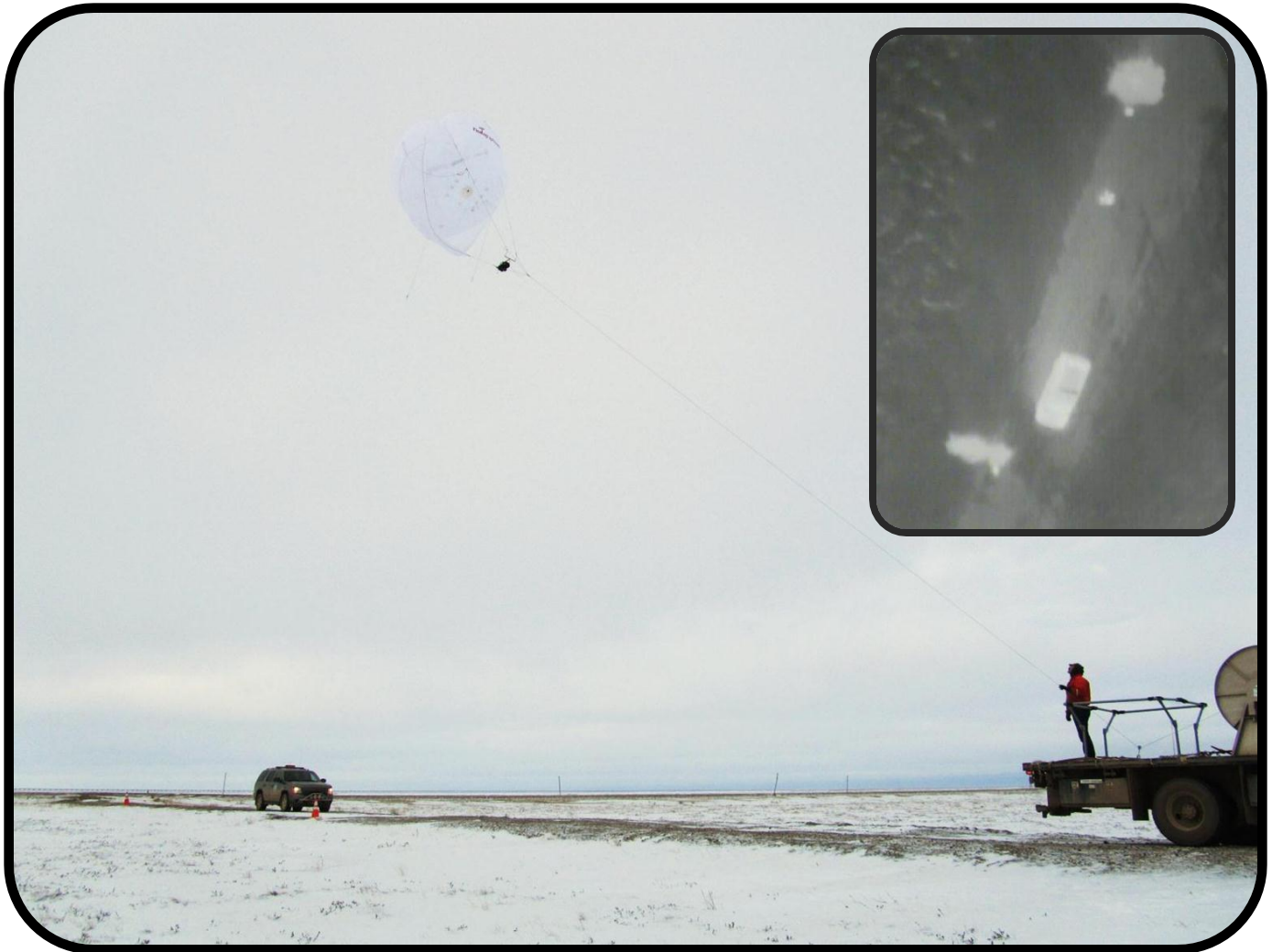




# OSRI

## Annual Report 2010



Pictured is the oil-spill surveillance system being tested in October near Deadhorse, Alaska. (photo courtesy Alaska Clean Seas) The inset is an infrared image from the balloon system of the vehicle, cones, a person, and warm water that extends under the snow lining the edge of the road.

**Prince William Sound Oil Spill Recovery Institute  
Cordova, Alaska**



## **Contents**

Message from the Executive Director .....	3
Advisory Board members .....	4
Scientific and Technical Committee.....	6
Mission and Goals .....	7
<b>UNDERSTAND</b> .....	9
<i>MAINTENANCE OF SNOTEL METEOROLOGICAL STATIONS</i> .....	9
<i>PRINCE WILLIAM SOUND OBSERVATIONAL OCEANOGRAPHY</i> .....	9
<i>ROUTINE FORECASTS USING THE RAMS ATMOSPHERIC CIRCULATION MODEL</i> .....	10
<i>MONTAGUE ISLAND: A CRUCIAL STOPOVER FOR SURFBIRDS AND BLACK TURNSTONES</i> .....	11
<i>PWSSC DATA MANAGEMENT</i> .....	11
<i>FORAGE FISH AND HABITAT ASSOCIATION</i> .....	11
<i>LARVAMAP, A COMMUNITY LARVAL AND INVERTEBRATE TRANSPORT MODEL</i> .....	12
<i>SOCIAL DISRUPTION FROM OIL SPILLS AND SPILL RESPONSE</i> .....	12
<b>RESPOND</b> .....	14
<i>OIL-IN-ICE: TRANSPORT, FATE, AND POTENTIAL EXPOSURE</i> .....	14
<i>CISPRI TEST TANK DEVELOPMENT</i> .....	14
<i>SHOREZONE MAPPING, COPPER RIVER DELTA REGION</i> .....	15
<i>SOUND PREDICTIONS – MODEL VALIDATION EXERCISE</i> .....	15
<b>INFORM</b> .....	17
<i>SCIENCE OF THE SOUND</i> .....	17
<i>FROM THE FOREST TO THE SEA</i> .....	17
<i>WORKSHOPS OR SPECIAL PROJECTS</i> .....	18
<i>FELLOWSHIPS</i> .....	18
<b>OTHER</b> .....	20
<i>RESEARCH PROGRAM MANAGER</i> .....	20
<i>SCIENTIFIC AND TECHNICAL COMMITTEE</i> .....	20
Financials .....	20
Publications and presentations.....	25
Staff .....	26

# OSRI Fiscal Year 2010 Annual Report



Photographs supplied by the staff of OSRI, PWS Science Center, and the individual project team members. The top photo is a current buster system being deployed as part of a training exercise and the bottom is a tanker under escort in Prince William Sound.



## **Message from the Executive Director**

As you review this report on OSRI's programs during fiscal year 2010, it's impressive to note the diversity of projects and, also, the number of partnerships or collaborations. OSRI began its project award program in 1998 and has spent just over \$15 million in 13 years. There have been some bigger project awards – on the order of \$150,000 per year on which OSRI has taken the lead. Often, however, OSRI grants have provided an important boost to a project which is either already underway or needed a small amount to finish the research.

It's through our collaborations and partnerships that we will achieve the most and strongest results. While OSRI's overall spending is relatively small, our strength lies in our ability to act quickly and be flexible. By developing good communication links with the diverse community of agency, academic and industry research programs, we've expanded our potential to contribute to projects led by those groups. Unlike government agencies, OSRI is not required to spend its annual revenues in one year; that was particularly important in 2010 when the stock market's downward spiral caught up with us.

Our 2010 revenues were only \$225,000 in comparison to a \$1 million deposit the previous year. Those revenues result from interest earnings on a \$22.4 million fund maintained within the National Oil Spill Liability Trust Fund. While the 2010 revenues were significantly less than we had expected, there was not a comparable reduction in programs. OSRI was able to use investment earnings on its savings from unspent revenues in prior years to moderate the reduction approved for the 2010 program. Our overall budget decreased from \$1 million in 2009 to \$769,000 in 2010.

It's extremely disappointing to have to reduce spending for oil spill R & D work, particularly in the same year that the Deepwater Horizon spill occurred. While the oil industry is providing significant research funds to focus on that event, one lesson we've learned is that it's critical that such investigations be sustainable.

A handwritten signature in dark ink, appearing to read "Nancy Bird". The signature is fluid and cursive.

Nancy Bird

# OSRI Fiscal Year 2010 Annual Report

## Advisory Board members

Programs of the Oil Spill Recovery Institute (OSRI) are determined by a 16-member Advisory Board composed of: (1) three Federal representatives from the Departments of Commerce, Interior and Transportation appointed by the Secretaries of the respective departments; (2) three State of Alaska representatives from the Departments of Environmental Conservation, Fish and Game, and Natural Resources appointed by the Commissioners of the respective departments; (3) two representatives each from the fishing industry, Alaska Native community (one of whom is a resident of Prince William Sound), Oil and gas industry, all of whom are appointed by the Governor of Alaska; (4) two At-large representatives from communities impacted by the Exxon Valdez oil spill and who are appointed by the remaining Advisory Board members; and (5) One non-voting representative from the Institute of Marine Science at the University of Alaska Fairbanks and one non-voting representative from the Prince William Sound Science Center (PWSSC). The OSRI Advisory Board meets twice each year to set policies, adopt annual work plans and review the implementation of OSRI programs. The Board's structure includes four committees - Executive, Scientific and Technical, Financial and Work Plan - each of which meet as needed throughout the year. Annual work plans are adopted by the Advisory Board in the early fall and determine continuing projects and new project solicitations to be issued in the coming year.

## Federal Representatives



**John Calder, Ph.D., Chair**

Climate Program Office, Arctic Research Program - National Oceanic & Atmospheric Administration  
Silver Spring, Maryland  
Years of Service: 1992-94 & 1999-present



**Douglas Mutter**

Department of Interior  
Anchorage, Alaska  
Years of Service: 1993-present



**Captain Craig Lloyd**

Chief, Response Division, U.S. Coast Guard, 17th District  
Juneau, Alaska  
Years of Service: 2010-present

## State Representatives



**Gayle Martin**

Habitat and Restoration Division, Alaska Dept. of Fish & Game  
Anchorage, Alaska  
Years of Service: 2009-2010



**Carol Fries**

Natural Resources Manager, Alaska Dept. of Natural Resources  
Anchorage, Alaska  
Years of Service: 1997-2010



## Oil Spill Recovery Institute Cordova, Alaska



**Bob Mattson**

Prevention & Emergency Response Program, Alaska Dept. of Environmental Conservation  
Juneau, Alaska  
Years of Service: 2008-2010

### Fishing Industry Representative



**William Lindow**

Cordova, Alaska  
Years of Service: 2006-present

### Alaska Native Representative



**Glenn Ujioka**

Cordova, Alaska  
Years of Service: 1997-present

### Oil & Gas Industry Representatives



**Doug Lentsch**

General Manager, Cook Inlet Spill Prevention & Response, Inc.  
Nikiski, Alaska  
Years of Service: 2001-present



**David Totemoff Sr.**

BP  
Tatitlek, Alaska  
Years of Service: 2008-present

# OSRI Fiscal Year 2010 Annual Report

## At-Large Representatives



**Joe Banta**

Project Manager, Prince William Sound Regional Citizens' Advisory Council  
Anchorage, Alaska  
Years of Service: 2006-present



**Susan Saupe**

Director of Science and Research  
Cook Inlet Regional Citizens' Advisory Council  
Kenai, Alaska  
Years of Service: 2003-present

## Non-Voting Representatives



**John Goering, Ph.D**

Professor Emeritus, Institute of Marine Science, Univ. of Alaska  
Fairbanks, Alaska  
Years of Service: 1992-present



**Charles P. Meacham**

Prince William Sound Science Center Board of Directors,  
Gig Harbor, Washington & Juneau, Alaska  
Years of Service: 2006-present

## Scientific and Technical Committee

This committee provides advice to the OSRI Advisory Board, OSRI Research Program Manager and OSRI Director on the conduct and support of research, projects, and studies related to Arctic and subarctic oil spills and their effects. It includes specialists in matters relating to oil spill containment and cleanup technology, Arctic and sub-Arctic marine environment, and the living resources and socioeconomics of Prince William Sound and its adjacent waters.

**Terry Whitley, Ph.D., Committee Chair** University of Alaska Fairbanks

**Michael T. Bronson, Ph.D.** BP Exploration (Alaska), Inc.

**Henry Huntington, Ph.D.** Huntington Consulting

**Lee Majors** Alaska Clean Seas

**Alan J. Mearns, Ph.D.** National Atmospheric & Oceanic Administration

**Stanley (Jeep) Rice, Ph.D.** National Marine Fisheries Service

**Thomas C. Royer, Ph.D.** Professor Emeritus

**John Kelley, Ph.D.** University of Alaska Fairbanks

**CJ Beegle-Krause, Ph.D.** Environmental Research for Decision, Inc.

**John Goering, Ph.D. (Committee Member Emeritus)**



# Oil Spill Recovery Institute

Cordova, Alaska

## Mission and Goals

The mission of the Prince William Sound Oil Spill Recovery Institute (OSRI) is to support research, education, and demonstration projects all of which are designed to address oil spills in Arctic and sub-Arctic marine environments.

In February 2009 the OSRI Board adopted the following revised goals to guide OSRI work into the future.

### UNDERSTAND

Attain an interdisciplinary understanding of: the fate and effects of spilled oil in Arctic and sub-Arctic marine environments; and the recovery of those environments following a spill.

- Evaluate short and long-term effects
- Identify chemical, biological, and physical impacts and consequences
- Emphasize the nearshore region
- Identify the impacts of oil spill response options
- Profile potential impacts from oil spills on the economy, life-style and well-being of communities and resource users

### RESPOND

Enhance the ability of oil spill responders to mitigate impacts of spills in Arctic and sub-Arctic marine environments.

- Fill knowledge gaps on behavior of spilled oil
- Fill knowledge gaps on use and effectiveness of specific mitigation techniques
- Identify and evaluate new prevention and response technologies

### INFORM

Disseminate information and educate the public on the issues of oil spill prevention, response and impacts.

- Publish scientific and technical results in open literature
- Brief oil spill removal organizations on OSRI products
- Facilitate the exchange of information and ideas through workshops and other forums
- Educate future researchers and responders through K-12 programs, undergraduate internships , and graduate fellowships
- Convey information to the general public through various media

### PARTNER

Partner with other organizations to take advantage of shared funding, facilities, knowledge and experience.

- Collaborate with other partners in achieving a long-term coastal and ocean observing system for Alaska
- Coordinate with other efforts related to OSRI's mission
- Expand OSRI's involvement in Arctic research through partnership opportunities



# OSRI Fiscal Year 2010 Annual Report

## Background

The Prince William Sound (PWS) Oil Spill Recovery Institute (OSRI) was authorized in 1990 by the United States Congress to “*identify and develop the best available techniques, equipment, and materials for dealing with oil spills in the Arctic and sub-Arctic marine environments*”; and, also to “*determine, document, assess and understand the long range effects of the EXXON VALDEZ oil spill on the natural resources of Prince William Sound. . . and the environment, the economy and the lifestyle and wellbeing of the people who are dependent on them* (Title V, Section 5001, Oil Pollution Act of 1990).” In 1996, the act was amended to expand the area of emphasis from the Exxon Valdez oil spill region to the Arctic and sub-Arctic marine environments. A 2005 amendment extends OSRI programs to continue until one year after the completion of oil exploration and development efforts in Alaska.

OPA90 identifies the PWS Science and Technology Institute (known as the PWS Science Center) in Cordova, Alaska, as administrator and home for OSRI. Between 1992 and 1995, Congress appropriated \$500,000 for the OSRI program. Since 1996, when amendments instituted a funding mechanism for OSRI, the program has received annual interest earnings from a \$22.5 million portion of the National Oil Spill Liability Trust Fund.

OPA90 also set up an Advisory Board to determine policies of and programs supported by OSRI. This includes oversight of the development of strategic plans, research plans, and annual work plans. The Advisory Board includes three federal, three state, two oil and gas industry, two fishing industry, two native community, and two at-large representatives. Additionally, there are non-voting members from the Institute of Marine Science/ University of Alaska Fairbanks, and the Prince William Sound Science Center. The Board’s structure includes four committees - Executive, Scientific and Technical, Financial and Work Plan - each of which meet as needed throughout the year. Annual work plans are adopted by the Advisory Board in the early fall and determine continuing projects and new project solicitations to be issued in the coming year.

OSRI’s first strategic plan for oil pollution research and development (1995) focused on the risks and costs of oil spills. Recognizing GLOBEC’s conclusions about our weakness in making physical and biological predictions, and the consequential impact on our understanding of damages caused by oil spills, the OSRI program incorporated GLOBEC’s goal and approach to improve prediction of natural changes. This approach also improves our assessment of costs, a key element in identifying the best oil spill prevention and response technologies. The mission and goal statements of the strategic plan were reviewed and modified in 2002 and 2008. The first review led to development of a five-year Science Plan that was adopted in 2005.

OSRI solicited its first proposals for grant projects in late 1997. Since 1998, OSRI has awarded approximately one million dollars a year to support a wide range of projects. The projects awarded funds in any given year are outlined in the annual work plan which is, in turn, based on the five-year Science Plan (originally adopted in 2005). The Science Plan is organized around four strategic goals: Understand, Respond, Inform and Partner. To address the Understand goal, OSRI has sponsored physical oceanography and meteorological programs designed to develop a Nowcast-Forecast system for the Sound. That effort led to OSRI’s support of a Prince William Sound Observing System, a pilot project for the Alaska Ocean Observing System ([www.aos.org](http://www.aos.org)). OSRI is pleased to partner with the North Pacific Research Board in support of additional ecological research.

OSRI works with a wide array of industry and agency organizations to sponsor technological improvements for oil spill response. This includes contributing to the testing of new skimmer technologies, sensitivity index maps, and sponsoring workshops to identify best practices and research needs. With the increased desire to develop in the offshore regions of the Arctic, there is increased emphasis to improve technologies for oil spill response in ice laden waters.

OSRI sponsors educational and informational programs at all levels. It supports K-12 classroom programs and has recently worked to include more technology in the education programs. It also sponsors summer activities, undergraduate scholarships, and graduate fellowships.



## Oil Spill Recovery Institute Cordova, Alaska

### Programs

#### UNDERSTAND

These projects are designed to help attain an interdisciplinary understanding of: the fate and effects of spilled oil in Arctic and sub-Arctic marine environments; and the recovery of those environments following a spill. To date the focus has been on Prince William Sound in partnership with the Alaska Ocean Observing System. The desire is to develop a four-dimensional interdisciplinary understanding of Prince William Sound to enable detection and prediction of spill-related impacts and subsequent recovery. To achieve this objective we need to collect observations of the physical and biological environments and integrate them with biological and physical models.

#### Physical Science Program

##### MAINTENANCE OF SNOTEL METEOROLOGICAL STATIONS



Snowpack Telemetry (SNOTEL) stations set up in partnership with the Natural Resources Conservation Service (NRCS) measure wind speed and direction, air temperature, air pressure, and precipitation from snow and rain throughout the year (<http://www.wcc.nrcs.usda.gov/snotel/Alaska/alaska.html>). They are fully-automated, land-based stations that are usually set up in remote locations. Since the summer of 2005, six new SNOTEL stations were deployed at sea level in Prince William Sound (PWS), and two stations were installed at an alpine elevation. Data transmitted by the weather stations are accessible through the Alaska Ocean Observing System (AOOS) website and are archived at the University of Alaska ([www.aoos.org](http://www.aoos.org)). Data from these stations are expected to improve the hydrological model needed for understanding ocean circulation and to verify meteorological models run for Prince William Sound.

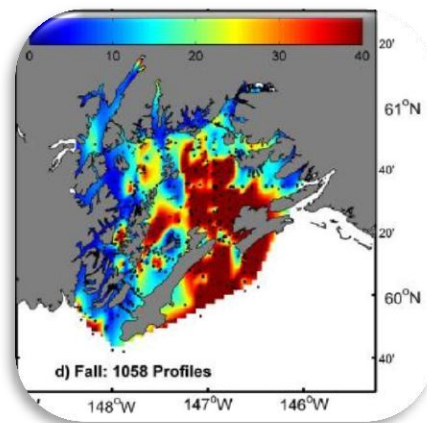
This is a continuing program with \$24,000 awarded in FY10 to Richard McClure., U.S. Natural Resources Conservation Service. An additional \$10,000 was available through OSRI for logistical costs and \$5,000 for telemetry. Deployment of the SNOTEL stations were funded by a combination of grants to the PWS Science Center from the National Oceanic and Atmospheric Administration, AOOS, PWS Regional Citizens' Advisory Council and OSRI. Annual maintenance costs for all stations are provided by OSRI.

##### PRINCE WILLIAM SOUND OBSERVATIONAL OCEANOGRAPHY

A staff position at the PWS Science Center is funded by OSRI to conduct basic and applied research in Prince William Sound (PWS) and the Gulf of Alaska (GOA). The research focus is on understanding the physical circulation and mixing of the waters of the Sound to improve our understanding of that ecosystem. Areas of research included in this project during 2009 are:

- 1) Long-term monitoring of the water exchange between the Gulf of Alaska and Prince William Sound.
- 2) Monitoring of the seasonal variability of the hydrographic properties and circulation in PWS.
- 3) Participation in the Sound Predictions experiment to test the Ocean Observing System.

The water exchange program aims to provide an improved description of the flow through the two major straits connecting PWS and the GOA to provide a



# OSRI Fiscal Year 2010 Annual Report

better understanding of the relationship between circulation variability and biological variability in PWS. Two relatively deep-water moorings are deployed in Hinchinbrook Entrance and Montague Straits. The moorings are instrumented with acoustic Doppler current profilers and three conductivity temperature recorders. The moorings are recovered and serviced at roughly six month intervals; the instruments are downloaded, cleaned and serviced. Final recovery of the moorings occurred in the spring of 2010.

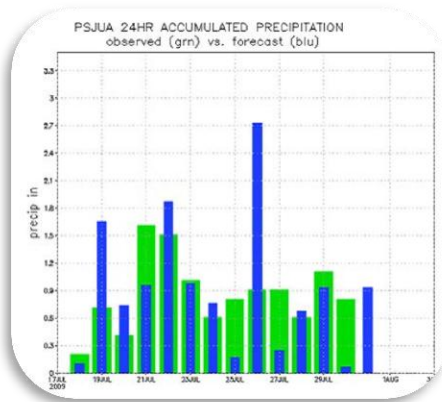
The seasonal variability program provides longer time series measurements that are the basis for developing an oceanographic climatology. The climatology provides information on the hydrography properties necessary in oil spill modeling and permit better discrimination of seasonal anomalies for ecosystem research. Vertical profiles of temperature and salinity are acquired using a conductivity-temperature-depth profiler during two to four cruises per year. Sampling stations cross the central basin of the Sound and the entrances to the Sound. Data from this effort was combined with historical conductivity-temperature-depth (CTD) data to provide a climatology of surface oceanographic conditions in Prince William Sound. The report can be accessed at <http://www.pws-osri.org/publications/MLD-Report.pdf>.

Analysis of data collected during the Sound Predictions exercise in the summer of 2009 continued in this year. The focus being on the formation and disruption of a gyre observed in the central Sound.

This is a continuing program with \$110,000 awarded in FY10 to Mark Halverson, Prince William Sound Science Center. This program is funded by a combination of grants to the PWS Science Center from the National Oceanic and Atmospheric Administration, the Alaska Ocean Observing System, and OSRI.

## Modeling

### *ROUTINE FORECASTS USING THE RAMS ATMOSPHERIC CIRCULATION MODEL*



The Alaska Experimental Forecast Facility (AEFF) at the University of Alaska Anchorage is now providing two daily numerical weather forecast models for the Prince William Sound region using the Regional Atmospheric Modeling System (RAMS) and the Weather Research Forecasting (WRF) model. These models produce hourly 3-d forecast fields of a host of variables, including: temperature, pressure, winds (3-d), humidity, precipitation, and cloudiness. The models can also act as an integrator of data, by filling in the gaps or data voids, acting as surrogate observations in those places where direct observations do not exist. The models utilize grid nesting, in effect telescoping down from a coarse-mesh grid that covers all of Alaska and the surrounding oceans, to an intermediate grid that covers all of southern Alaska and the Gulf of Alaska, and ultimately down to the fine-mesh grid covering PWS and its intricate terrain.

The model was supported to ensure it was available for the Sound Predictions experiment during the summer of 2009. The model is used by the ocean circulation and wave modeling groups at the Jet Propulsion Lab and Texas A&M University as well as providing predictions for users in Prince William Sound. Analysis in FY10 focused on the precipitation estimates that are incorporated in the circulation models. This analysis compared the daily modeled precipitation with the measurements at various SNoTel locations. The results were mixed with the model demonstrating skill at the precipitation estimates, but local conditions created under and over estimates of the amount.

This is a continuing program with no new funds awarded in FY10. The project is led by Peter Q. Olsson, Ph.D., University of Alaska Anchorage. This program is funded by grants from AOOS and OSRI. The final report can be obtained at [http://www.pws-osri.org/programs/projects/annual\\_reports/2009/08-10-19%20Olsson%20Met.pdf](http://www.pws-osri.org/programs/projects/annual_reports/2009/08-10-19%20Olsson%20Met.pdf).



## Oil Spill Recovery Institute Cordova, Alaska

### Biological Science Program

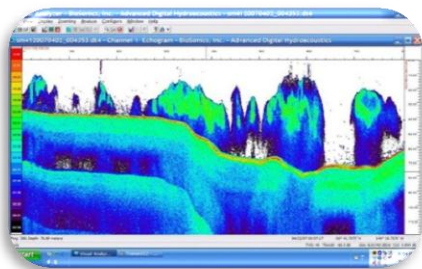
#### MONTAGUE ISLAND: A CRUCIAL STOPOVER FOR SURFBIRDS AND BLACK TURNSTONES

Surfbird (*Aphriza virgata*) and Black Turnstone (*Arenaria melanocephala*) are shorebird species that utilize Prince William Sound's intertidal zone during their migrations. This project will improve our understanding of the phenology and length of stay of Surfbirds and Black Turnstones using northern Montague Island. This will help estimate the population size of these birds using this area to allow updates to the Environmental Sensitivity Index maps. Birds are to be radio tagged and surveys of the beach conducted to establish when and how the birds use the intertidal zone.

This is a continuing project with no new funds awarded in FY10. The project is led by Mary Anne Bishop, Ph.D., Prince William Sound Science Center. The project is also receiving funding from Alaska Department of Fish and Game through a State Wildlife Grant.



#### PWSSC DATA MANAGEMENT



The goal of this project is to develop a data management system for the data collected by the Prince William Sound Science Center (PWSSC) investigators. This is desired since the PWSSC investigators have collected significant amounts of data for OSRI and data relevant to understanding the recovery of Prince William Sound after the EXXON Valdez oil spill. A well designed data management structure facilitates the interchange of data and ideas, providing for easier exchange of information with education and outside groups, and reduces the risk of data being lost.

This is a new program with \$25,130 awarded to Dick Thorne, Ph.D. at PWSSC and \$45,020 to Rob Bochenek at Axiom Consulting in FY10. This effort builds upon the work Axiom is doing for the Alaska Ocean Observing System.

#### FORAGE FISH AND HABITAT ASSOCIATION

New habitat maps of Prince William Sound allow us to begin to explore questions about how forage fish are associated with the nearshore habitat. This project aims to combine new ShoreZone mapping data with the Alaska Department of Fish and Game herring database. The goal is to examine relationships between herring spawning habitat and recruitment success to determine if there are identifiable habitat types or locations that lead to more successful herring recruitment.

Herring population levels in PWS and Cook Inlet dropped dramatically after the Exxon Valdez oil spill. Why they have not recovered is still undetermined. This project combines new and old data sets to explore and determine the effect of spawning habitat on recruitment. The data indicates a strong relationship between the location of herring spawn and the existence of sheltered rock shores or wave-cut platforms in Kamishak Bay. Issues with irregular survey effort limit the ability to do a similar analysis in Prince William Sound.



This is a continuing program with no new funding in FY10. The work is being conducted by Rob Bochenek, Axiom Consulting. The final report is at [http://www.pws-osri.org/programs/projects/annual\\_reports/2008/08-10-18%20final.pdf](http://www.pws-osri.org/programs/projects/annual_reports/2008/08-10-18%20final.pdf).

# OSRI Fiscal Year 2010 Annual Report

## LARVAMAP, A COMMUNITY LARVAL AND INVERTEBRATE TRANSPORT MODEL

Understanding larval transport and survival is critical to assess potential effects of oil spills and effective fisheries management. Larval transport models aid fisheries, habitat and marine protected area decision makers in understanding how ocean circulation and larval behavior affect survival. This project continues development of a community larval transport model, LarvaMap, and expands the Regional Ocean Modeling System (ROMS) model time-series data for Prince William Sound (PWS) in 2004 and 2009 to a 7-year time series from 2004 to 2010. The LarvaMap / ROMS combination will be used to generate probability maps of settlement for Pacific herring and Dungeness crab.



LarvaMap is a 3D web-based larval fish and invertebrate transport model connected to ROMS circulation fields for the northeast Pacific, funded by the NOAA Alaska Fisheries Science Center (AFSC). LarvaMap can use any circulation dataset formatted using the network Common Data Format for Climate and Forecast (NetCDF CF) available through a Thematic Realtime Environmental Distributed Data Services (THREDDS) data server (TDS). Both NetCDF and TDS are oceanographic community standards. LarvaMap output can be viewed in combination with field data and circulation model results using HabitatSpace, a 4D data analysis tool previously developed by members of this team for the AFSC.

LarvaMap will be enhanced with user capability to construct egg and larval stage drift and behavior characteristics by leveraging Sarah Hinckley's (NOAA/AFSC) larval behavior model and new research. The Herring and Dungeness crab organisms constructed in this study will be available in LarvaMap's library for direct use or modification.

This is a new program with \$75,000 awarded to CJ Beegle-Krause, Ph.D. at Research4D and \$25,000 to Xiaochun Wang, Ph.D. at UCLA in FY10. Funding was awarded in FY10; however, due to the Deepwater Horizon incident the work on this project did not begin until FY11.

## Socioeconomic Research

### SOCIAL DISRUPTION FROM OIL SPILLS AND SPILL RESPONSE

Oil spill response planners never disregard the human dimensions of oil spills. In fact, the National Contingency Plan requires that items of economic and environmental importance that are threatened by a spill be covered in the plan. However, the strength of ecological concerns and the wealth of information on ecological sensitivity tend to be primary drivers in contingency planning. The socioeconomic lags behind the ecological in terms of readily available information and tools to assess sensitivity. Social endpoints that are acutely threatened *are* protected in an emergency response, but the systematic assessment of social and economic effects is not widely done in area-based contingency planning processes. This research project investigates what is involved in bringing a systematic assessment of socioeconomic vulnerability considerations into area-based oil spill contingency planning. While this project has one eye on the ultimate goal of producing practical decision-support or social impact assessment tools, it presupposes that several types of information need to be collected, evaluated, and synthesized before such tools can be constructed. Specifically: (1) human dimensions endpoints threatened by oil spills need to be systematically identified; (2) the relationships between these endpoints, effects, and planning and management actions should be evaluated; (3) the sufficiency of existing data and data-analysis tools to characterize and anticipate these causal relations must be assessed. Initial inquiries with emergency responders and contingency planners into these questions have validated their importance.

Investigators designed and implemented a survey of economic leaders and government officials in Cordova to identify endpoints of concern and use the conceptual framework of vulnerability to identify key factors influencing losses. The information gathered will be structured in a way that facilitates planning interventions. In Phase 2, the project investigates to what extent existing data are capable of depicting the human dimensions considerations identified in Phase 1 and will propose recommendations for how a planning process strongly led by ecological considerations can be broadened to



## Oil Spill Recovery Institute Cordova, Alaska

also include the most important human dimensions. These recommendations will also summarize how oil spill planning can proceed using a perspective that highlights the coupled human and natural systems.

The project is to examine four locations around the nation where spills occurred. There will be a variety of lengths of time since the spill and types of communities are to be examined.

This is a continuing program with no new funding awarded in FY10. The work is being conducted by Thomas Webler, Ph.D., Social and Environmental Research Institute. The majority of the work is funded through a grant from the Coastal Response Research Center. The OSRI funding provided for the inclusion of Cordova in the analysis.



Oil rig in Cook Inlet. Photograph by Kevin Co for Cook Inlet Regional Citizens' Advisory Council.

# OSRI Fiscal Year 2010 Annual Report

## RESPOND

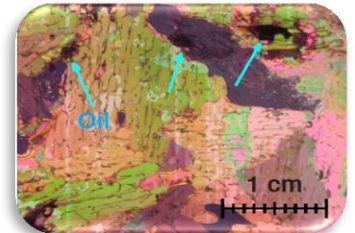
The harsh environment found at high latitudes makes many existing oil spill response technologies ineffective. Projects funded under this goal are intended to enhance the ability of oil spill responders to mitigate impacts of spills in Arctic and sub-Arctic marine environments. This can be accomplished by developing or adapting equipment for oil spill response in Arctic and sub-Arctic marine environments, or by improving our understanding of the impacts of different response options.

### OIL-IN-ICE: TRANSPORT, FATE, AND POTENTIAL EXPOSURE

As part of the Joint Industry Program on the Arctic, OSRI has teamed with the Coastal Response Research Center to fund a series of studies aimed at understanding oil encapsulated in ice. Oil spilled in the arctic marine environment can be rapidly frozen into the ice sheet. The oil will in this way be to some extent preserved, in the sense that evaporation, dissolution, and degradation are expected to be greatly reduced. This implies that the oil will retain much of its potential acute toxicity upon release from the ice, either via transport in brine channels and/or eventual breakup and melting of the ice sheet. The purpose of this project is to provide a basis and methodology for estimating routes, magnitudes, and bioavailability of potential environmental exposures and concentrations of oil components migrating through the ice regime as the oil is subjected to a freezing-thawing cycle. This information can then be used to provide the basis for environmental risk and impact assessments.

The primary components of the proposed study are:

- Transport of dissolved crude oil hydrocarbons in ice
- Biodegradation of crude oil hydrocarbons in ice
- Modeling of the transport and biodegradation of crude oil hydrocarbons in ice

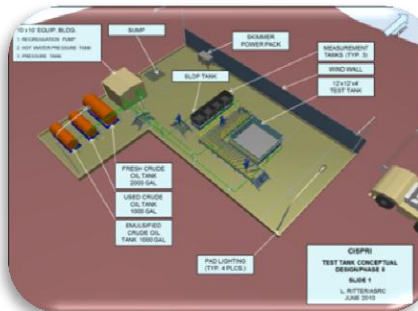


OSRI is supporting the University of Alaska led component of this project. This component will develop a numerical model of the transport of the water-soluble compounds in sea ice. The model will be run to assess the sensitivity to conditions such as, ice growth rate, temperature, oil properties, etc. They are also working with SINTEF in the design of laboratory experiments in the transport of oil through ice columns. Based on this effort a simple parameterization scheme was developed to describe the flux of water soluble contaminants through different ice layers and into the water column. The parameterization can serve as the basis to assess the fluxes of contaminants out of the ice containing entrained oil in the context of oil spill dispersal and response simulations.

This is a continuing program with no new funds awarded in FY10. The project is being led by Drs. Hajo Eicken and Chris Petrich, University of Alaska Fairbanks. The final report is to be posted at [http://www.pws-osri.org/programs/project\\_list.php?year=2009](http://www.pws-osri.org/programs/project_list.php?year=2009) under the project listing.

### CISPRI TEST TANK DEVELOPMENT

The value of hands-on, “real” oil skimming is immeasurable; having the ability to fine-tune our skills while finding the optimum operating parameters of our skimmers, learning the best decontamination / cleaning methods for the equipment, and putting our Spill Technicians in a real oil environment adds incredible value to spill response in Alaska’s marine waters. This project contributes to the development of a test facility at the Cook Inlet Spill Prevention and Response Inc. location. This provides us with a facility to test new equipment in the future.

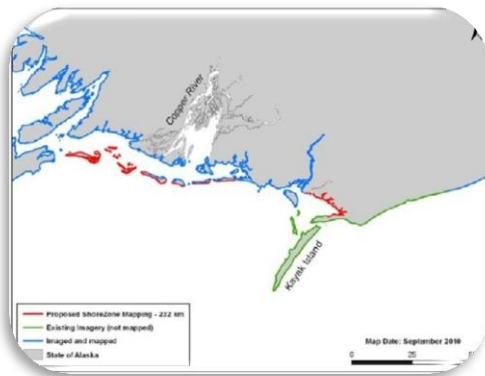


This is a new project with \$24,995 awarded to Todd Paxton at CISPRI in FY10. This funding combined with several other sources of funding in the development of this test facility.



## Oil Spill Recovery Institute Cordova, Alaska

### SHOREZONE MAPPING, COPPER RIVER DELTA REGION



The Alaska ShoreZone program is a coastal habitat mapping system that has been applied to almost 50,000 km of the 75,000 km Alaska coastline. The map provides habitat classification and beach characteristics and comes complete with detailed aerial photographs of the entire coastline that can be used when looking for determining access points. The mapping presently extends from the Columbia River mouth in Oregon to Bristol Bay, Alaska, representing a nearly 100,000 km contiguous dataset. A 421 km mapping gap presently exists along the Copper River delta coastline. (approximately Kayak Is. to Cordova). This project processes half of the available imagery in that gap.

This is a new project with \$19,680 awarded to John Harper at Coastal & Ocean Resources Inc. in FY10. Data and imagery from this project can be accessed at <http://alaskafisheries.noaa.gov/habitat/shorezone/szintro.htm>.

### SOUND PREDICTIONS – MODEL VALIDATION EXERCISE

OSRI has made a considerable investment in the development of numerical ocean and atmospheric models with the goal of developing tools that can aid oil spill modelers in the future. To test our progress a model validation and test of the Prince William Sound Ocean Observing System (Sound Predictions) experiment was conducted in the summer of 2009. The experiment lasted for two weeks at the end of July. The time period spanned the neap and spring tide cycles and a range of wind and freshwater input. Three vessels were used to support the different components of the experiment with one vessel focusing on hydrographic surveys, a second focusing on drifter deployment and retrieval, and a third supporting the autonomous underwater vehicles and drifter retrievals. High-frequency radar measurements of surface currents were made in central PWS. Atmospheric, ocean circulation, wave, and nutrient-phytoplankton-zooplankton models were run using the inputs being provided by the field measurements. Results from the models were also used as inputs to the oil spill trajectory models used by NOAA and Alyeska Pipeline.

In support of this experiment, OSRI committed funds in FY09 to support four components of the experiment. They are; additional measurement needs, autonomous underwater vehicle sampling, NPZ measurements, and bird and mammal observations. Support of this experiment was also provided by the Alaska Ocean Observing System, the National Aeronautic and Space Administration, the Prince William Sound Regional Citizens' Advisory Council, and the University of Alaska. Analysis of data collected by some of these projects continued into FY10.

### Autonomous Underwater Vehicle Support for Ocean Modeling in Prince William Sound

Near-continuous measures of salinity and temperature in Prince William Sound were made using autonomous underwater vehicles during the Sound Prediction experiment. Two types of vehicles were used in order capture both the temporal and spatial variability in water masses, mixed layer depths, the influence of tides in the region, and the influence of freshwater runoff. A Webb Research glider operated in the center of the sound, while a REMUS-100 was used to sample in areas of interest. Initially the glider required some adjustment of ballast to allow proper operation in PWS. Once it was properly operating it flew east-west along a path crossing the central part of PWS.



The REMUS was deployed on a daily basis. The deployment location and survey track depended on model input needs, weather conditions, and logistical constraints. Individual deployments lasted up to twelve hours, which is the battery

# OSRI Fiscal Year 2010 Annual Report

endurance limit and covered up to 80 kilometers during that time. Through the duration of a deployment the vehicle undulated between the surface and 90 m depth providing high-spatial resolution temperature and salinity data. The effort in FY10 focuses on analysis of data from the exercise.

This is a continuing program with no new funds awarded in FY10 to Mark Moline, Ph. D., California Polytechnic State University. The final report can be obtained at [http://www.pws-osri.org/programs/projects/annual\\_reports/2009/09-10-05%20final.pdf](http://www.pws-osri.org/programs/projects/annual_reports/2009/09-10-05%20final.pdf).

## Collection of plankton and nutrient samples



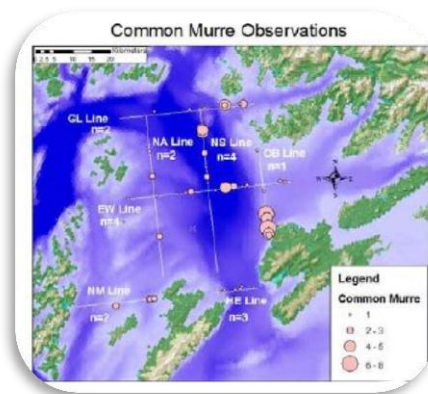
Samples of nutrients, phytoplankton, and zooplankton were collected on the hydrographic survey vessel. These samples are to be used to provide ground-truth for the nutrient-phytoplankton-zooplankton model developed by the Alaska Ocean Observing System. That model was developed with no information about typical nutrient or plankton concentrations. This field effort also provides an indication of the planktonic community in the water column for analysis of potential impacts of dispersed oil on the ecosystem.

This is a continuing program with no new funds awarded in FY10 to Rob Campbell, Ph. D., Prince William Sound Science Center. The final report for this project can be obtained at [http://www.pws-osri.org/programs/projects/annual\\_reports/2009/09-10-13\\_final.pdf](http://www.pws-osri.org/programs/projects/annual_reports/2009/09-10-13_final.pdf).

## Collection of bird and mammal observations

At the suggestion of the Scientific and Technical Committee a project was developed to make bird and mammal observations during the field experiment. These observations provide the basis for being able to estimate the impact of a decision to apply dispersants if a spill had occurred in the area. The information from the bird and mammal project will be combined with that from the collection of plankton for that analysis. The distribution will also be analyzed in relationship to the distribution of physical features, such as fronts.

This is a continuing program with no new funds awarded in FY10 to Mary Anne Bishop, Ph. D., Prince William Sound Science Center. The final report can be found at [http://www.pws-osri.org/programs/projects/annual\\_reports/2009/09-10-15\\_final.pdf](http://www.pws-osri.org/programs/projects/annual_reports/2009/09-10-15_final.pdf).





## Oil Spill Recovery Institute

Cordova, Alaska

### INFORM

The projects described in this section are designed to disseminate information and educate the public on the issues of oil spill prevention, response, and impacts. OSRI funds projects to educate the public at all ages, supports graduate students, supports workshops and symposia that allow researchers to present results, and provides direct outreach through the web.

#### SCIENCE OF THE SOUND



Science of the Sound is a collaborative education program developed to provoke inquiry into the natural world, to increase science and ecological literacy and to foster responsible use of natural resources. The program is designed to enhance science education in the communities of Prince William Sound (PWS) and is implemented in partnership among the PWS Science Center, the U.S. Forest Service Cordova Ranger District and other local organizations. There are four components to Science of the Sound programs:

The Discovery Room program serves all students in grades K-6 in Cordova, and provides supplemental opportunities for hands-on science and environmental learning. Programs are executed during the school year with monthly environmental monitoring

field trips to give students experience at collecting and recording data in the field.

During Outreach Discovery trips, Science Center educators travel to the oil spill-affected Villages of Chenega Bay and Tatitlek to implement Discovery Room lessons adapted to fit the village school's interests and grade-levels.

Science Center educators work closely with science teachers in the Cordova School District to organize classroom presentations and field trips for Cordova Junior High and High School students. Science Center educators coach a team of high school students to compete in the Alaska Tsunami Bowl, the state competition of the National Ocean Science Bowl.

Community Programs are primarily science lectures geared for adults and families presented weekly during the months of September to May. Periodic field trips are also offered. Forty five programs were given in the last season. Attendance varies widely depending on the topic and meeting location, with an average from 15 to 25 people and occasionally a meeting room capacity of 45. Science Center educators collaborate with Alaska SeaGrant, the U.S. Forest Service and the local Audubon Society chapter to recruit scientists and environmental professionals to give evening presentations on topics relevant to the region.

This is a continuing program with \$40,000 awarded in FY10 to Lindsay Butters, PWS Science Center, Cordova, Alaska. Additional funding for this project is provided by British Petroleum, ConocoPhillips, the PWS Science Center, community contributions, and various private and other government foundations.

#### FROM THE FOREST TO THE SEA

From the Forest to the Sea Summer Science Camp is a field-based youth camp program run in collaboration with the U.S. Forest Service, Cordova Ranger District. Participants learn about the natural environment that surrounds them through scientific investigations, data collection and a variety of fun outdoor adventure activities. Participants may hike through the temperate rainforest, observe glaciers up close, canoe through wetlands, and explore the intertidal zone and open ocean while



# OSRI Fiscal Year 2010 Annual Report

paddling a kayak. Lessons are developed to explore scientific principals through outdoor, hands-on explorations. Emphasis is placed on the interconnected nature of all ecosystems, and the role human influence plays in each.

The Ocean Science and Leadership Expedition (OSLE) component is a ten-day intensive field course for high school students. The program teaches oceanographic principles and coastal and marine ecosystems. The program culminates in the students participating in an incident command for an oil spill scenario. Students from the Gulf of Mexico region were recruited to gain lessons learned about spills from the experience of people in Prince William Sound.

This is a continuing program with \$8,000 awarded in FY10 to Lindsay Butters, PWS Science Center, Cordova, Alaska. Additional funding for this project was provided by British Petroleum, ConocoPhillips, the PWS Science Center, and other private and sometimes, government foundations.

---

## WORKSHOPS OR SPECIAL PROJECTS

These funds are to support workshops or special projects at the discretion of the OSRI Advisory Board. The following workshops and science meetings were supported in FY10.

Alaska Marine Science Symposium, \$2,000. This symposium is the primary facility for disseminating research results related to Alaska's Arctic and Subarctic marine environments.

Alaska Forum on the Environment, \$5,000. This symposium brings together speakers, panels, and participants to discuss issues related to Alaska's Environment, including the impact of oil spills. This year an *Exxon Valdez* oil spill twentieth anniversary special section was added to discuss the impacts of the spill and how spill response has changed over the twenty years.

NRDA in Arctic Waters: The Dialogue Begins. \$7,000 This workshop was led by the Coastal Response Research Center at the University of New Hampshire. The goal of the workshop was to initiate a dialogue among NRDA practitioners and Arctic scientists that will identify the most significant data gaps in our understanding of the ecologies of resources potentially at risk from oil released into Alaskan Arctic waters, including fate and exposure pathways. A complete report from the workshop can be found at [http://www.crrc.unh.edu/workshops/nrda\\_arctic/index.html](http://www.crrc.unh.edu/workshops/nrda_arctic/index.html).

---

## FELLOWSHIPS

OSRI funds are provided to support graduate student research projects that will enhance scientific understanding of the marine ecosystem, provide information needed by managers and decision-makers for oil spill response and recovery, and improve public awareness and understanding of marine and estuarine ecosystems. The OSRI Graduate Research Fellowship Program offers qualified masters and doctoral students the opportunity to address scientific questions of significance to sub-Arctic and Arctic cold climate regions resulting in high-quality research focused on improving oil spill response and recovery issues.

---

### Matthew Druckenmiller, University of Alaska Fairbanks

Doctoral candidate

Advisor: Hajo Eicken

Promoting sustainable oil and gas development on Alaska's North Slope through local-scale integration of geophysical and traditional knowledge.

Increased oil and gas activities in Alaska's Beaufort and Chukchi Seas may serve as a catalyst to more thoroughly investigate the research methodologies and institutional practices that incorporate local and traditional knowledge (LTK), thus promoting a sustainable future for North Slope communities, the coastal ecosystem, and the oil and gas industry itself. Most climate models and sea-ice investigations operate at resolutions not suited for observing the critical processes and variability that exist on the local level; therefore, information required by local





## Oil Spill Recovery Institute Cordova, Alaska

institutions and oil and gas developers is often not readily available. Given that many Iñupiat Eskimos possess a valuable and nonreplicable understanding of local and regional sea-ice dynamics and unexpected and rare sea-ice events, their knowledge may greatly contribute to decisions made regarding oil and gas development and oil spill response planning and operations.

A systematic investigation of local scale sea-ice system services (SISS) and sea-ice hazards provides a framework for identifying stakeholder-relevant sea-ice variables and collecting and documenting LTK. This project will: (1) investigate the landfast ice and adjacent pack ice in the Bering Strait and the Chukchi and Beaufort Seas using geophysical techniques, such as SAR satellite imagery and coastal radar, and the observations of various Iñupiat sea-ice experts, and (2) systematically document SISS and hazards through sea-ice use mapping and interviews. While the research in the broadest context involves a diverse set of stakeholders, its focus is on sea-ice information relevant to oil and gas development and oil spills in ice-covered waters. The main product of this work will be a GIS-based map for use by planners and developers that geographically organizes sea-ice information by the local services and hazards it provides, while also temporally organizing key events in the ice-year, such as when landfast ice stabilizes or when it becomes dynamic in a specific location.

\$25,000 was provided in FY10 to continue this project.

---

### Emilie Springer, University of Alaska Fairbanks

Masters candidate

Advisor: Maribeth Murray

Cultural dimensions of community response preparation and vulnerability to oil impacts of Copper River Fisheries and the community of Cordova.



The research objectives of this project are to investigate the cultural dimensions of community response preparation and vulnerability to oil impacts of the Copper River region in Prince William Sound. Basic demographic information will be considered but the intention is to focus on cultural connections between individuals and their communities, the knowledge systems people may refer to in the event of a disaster related to oil contamination and the way that information is communicated across community boundaries. Three case studies will be performed: 1) the physical community of Cordova, 2) the occupational community of S01A permit holders, and 3) the institutional community of the Prince William Sound Regional Citizen Advisory Commission.

Research methods for this project are grounded in qualitative social science. They will include: participant observation, focus group interviews, individual interviews, surveys, response mapping and preparation of a final chart to demonstrate knowledge variations within each case-study. Following preliminary fieldwork, a cultural consensus analysis may be applied to one or more of the three cases.

This project responds to the OSRI research focus area 3: **Socio-economics**. It will be valuable to the efforts of OSRI because it will identify and compare local, industry and institutional knowledge of the Copper River ecosystem, perceived oil-related threats to the ecosystem and current concerns that the groups hold about management plan strategies. Understanding knowledge diversity and varied attitudes towards environmental protection and oil-related problems can contribute to improved response, observation and monitoring activities in the region. This social theme has not been widely cataloged in previous research related to human dimensions of oil-spills.

This in a new project with \$25,000 awarded in FY10.

# OSRI Fiscal Year 2010 Annual Report

## OTHER

---

### *RESEARCH PROGRAM MANAGER*

Funds are provided for the expense of the OSRI Research Program Manager (RPM) to track existing programs, develop new programs, develop partnerships, and outreach OSRI programs. Some major activities were the development of the draft five-year research plan, development of the FY11 work plan, updating the OSRI website, and coordination of the Sound Predictions experiment. This year the OSRI annual report was printed in house so those costs are contained in the RPM budget.

Expenses related to this position are combined with the travel expense of the Scientific and Technical Committee described below. Total expenses for these two components was \$122,660.

---

### *SCIENTIFIC AND TECHNICAL COMMITTEE*

The Scientific and Technical Committee meets twice a year to assist in developing the annual work plan and to advise OSRI on implementation of the work plan. Funding is provided to cover the travel costs of the 10 members of the Scientific and Technical committee.



M/V Pathfinder in Busby Bay after hitting Bligh Reef.

Photo courtesy ADEC – J. Engles



# Oil Spill Recovery Institute

Cordova, Alaska

## Financials

Funds for the Oil Spill Recovery Institute were authorized by the United States Congress through the Oil Pollution Act of 1990 (OPA'90) and amending legislation. The Prince William Sound (PWS) Science Center, a non-profit research and education institute in Cordova, Alaska, administers the OSRI programs as directed by OSRI's Advisory Board. The PWS Science Center receives the interest earnings from a \$22.5 million trust managed by the U.S. Treasury and held within the National Oil Spill Liability Trust Fund. These funds originated from the Trans-Alaska Pipeline Authority and are dedicated to finance the OSRI programs.

The following pages include the Statements of Financial Position for the Prince William Sound Science Center and the Financial Position and Statement of Activities related to the OSRI programs for the fiscal year 2009. Fiscal year 2008 data is provided for comparison

Professional audits of the PWS Science Center's financial records, including the OSRI program fund, are completed annually by a nationally recognized accounting firm. The fiscal year 2009 audits were completed by Mikundra, Cottrell & Co., Anchorage, Alaska. Copies of audited financial statements are available upon request to Penelope Oswalt, Finance Director, PWS Science Center, P.O. Box 705, Cordova, Alaska, 99574, or email [poswalt@pwssc.org](mailto:poswalt@pwssc.org).

Summary of OSRI program expenditures FY10 and FY09

<b>Program Areas</b>	<b>FY10</b>	<b>FY09</b>
Administration	152,416	204,987
Research (Understand)	267,486	334,346
Research (Respond)	107,625	219,285
Public Education & Outreach (Inform)	119,123	178,887
Other Programs	122,660	112,882
<b>TOTALS</b>	<b>769,310</b>	<b>1,050,337</b>



# OSRI Fiscal Year 2010 Annual Report

## Statement of Financial Position

Including the Oil Spill Recovery Institute  
 Year Ended September 30, 2010  
 (with comparative totals for 2009)

	General Fund	Plant Fund	Program Fund	2010	Totals 2009
<b>Assets:</b>					
Cash	19,860		67,254	87,114	177,889
Accounts receivable				0	369
Grants receivable			256,506	256,506	233,984
Prepays and other assets	40,817			40,817	51,546
Investments			2,148,730	1,766,497	2,148,730
Due from other funds	296,050		65,777	361,827	292,709
Leasehold	1,500			1,500	19,500
Property and equipment, net of accumulated depreciation		902,453		902,453	832,548
<b>Total assets</b>	<b>358,227</b>	<b>902,453</b>	<b>2,156,034</b>	<b>3,416,714</b>	<b>3,757,275</b>
<b>Liabilities:</b>					
Accounts payable	173,217			173,217	152,827
Wages, taxes & benefits payable	133,146			133,146	147,023
Current portion of long-term debt			11,645	11,645	
Deferred to revenue	7,835		124,296	132,131	644,208
Due to other funds	65,777		296,050	361,827	292,709
Long-term debt			107,437		
<b>Total liabilities</b>	<b>379,975</b>		<b>539,428</b>	<b>919,403</b>	<b>1,236,767</b>
<b>Net assets:</b>					
Temporarily restricted	1,500			1,500	19,500
Unrestricted	(23,248)	902,453	1,616,606	2,495,811	2,501,008
<b>Total net assets</b>	<b>(21,748)</b>	<b>902,453</b>	<b>1,616,606</b>	<b>2,497,311</b>	<b>2,520,508</b>
<b>Total liabilities &amp; net assets</b>	<b>358,227</b>	<b>902,453</b>	<b>2,156,034</b>	<b>3,416,714</b>	<b>3,757,275</b>



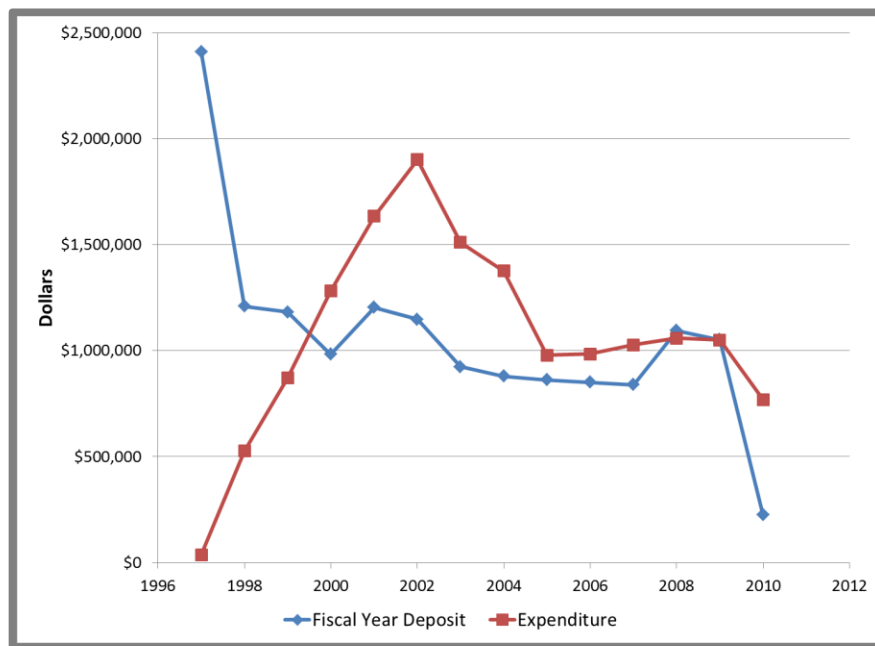
# Oil Spill Recovery Institute

## Cordova, Alaska

### Oil Spill Recovery Institute Programs Combined Statement of Financial Position

Year Ended September 30, 2010  
(with comparative totals for 2009)

	OSRI Totals	
	2010	2009
<b>Assets</b>		
Cash	67,254	109,412
Investments	1,766,497	2,148,730
<b>Total assets</b>	<b>1,833,751</b>	<b>2,258,142</b>
<b>Liabilities</b>		
Deferred revenue	48,128	591,541
Due to other funds	22,315	26,919
<b>Total liabilities</b>	<b>70,443</b>	<b>618,460</b>
<b>Net assets - unrestricted</b>	<b>1,763,308</b>	<b>1,639,682</b>
<b>Total liabilities and net assets</b>	<b>1,833,751</b>	<b>2,258,142</b>



Deposits and expenditures per fiscal year since the original deposit in fiscal year 1997 are shown. While the expenditures initially lagged the deposits, expenditures have recently been greater than deposits so at the end of fiscal year the cumulative deposits are approximately equal to the cumulative expenditures. The low deposit in FY 10 caused us to start spending from interest earned on the funds.

# OSRI Fiscal Year 2010 Annual Report

## Oil Spill Recovery Institute Programs

### Combined Statement of Activities

Year Ended September 30, 2010

(with comparative totals for 2009)

	OSRI Totals	
	2010	2009
<b>Revenues:</b>		
Grants and contributions - Federal	769,310	1,050,375
Interest	164	3,202
Unrealized gains on investments	123,463	67,195
Total revenues	892,937	1,120,772
<b>Expenses:</b>		
Salaries and benefits	287,726	380,306
Travel	36,525	42,779
Professional services	13,224	15,219
Subcontracts and charter costs	33,672	15,248
Supplies	5,136	17,490
Telephone	2,307	5,666
Network	2,666	
Postage and freight	712	1,578
Printing, publications and copying	1,410	6,773
Facilities and rent expenses	350	
Utilities	8,000	8,000
Insurance	938	2,694
Equipment maintenance	10,795	9,325
Advertising	0	17
Other	5,582	5,563
Grants awarded	295,005	338,532
Total expenses before interfund facility, equipment costs, and indirect costs	704,048	849,190
Interfund facility and equipment costs	13,140	13,140
Indirect costs	43,841	67,708
Total expenses	761,029	930,038
Change in net assets	131,908	190,734
Net assets at beginning of year	1,639,682	1,569,287
Transfers to Plant Fund	(8,282)	(120,339)
<b>Net assets at end of year</b>	1,763,308	1,639,682



## **Publications and presentations**

### ***Peer-reviewed Publications and Theses***

- Hansen, H., D. B. McDonald, P. Groves, J. A. K. Maier, and M. Ben-David. 2009. Social networks and the formation and maintenance of river otter groups. *Ethology*. 115: 384-396.
- Mooers, C. N. K., X. Wu, and I. Bang. 2009. Performance of a nowcast/forecast system for Prince William Sound, Alaska. *Continental Shelf Research*. 29: 42-60.
- Bishop, M. A., B. F. Reynolds, and S. P. Powers. 2010. An *in situ*, individual-based approach to quantify connectivity of marine fish: ontogenetic movements and residency of lingcod. *PLoS ONE*. 5:
- Druckenmiller, M. L., H. Eicken, J. C. George, and L. Brower. 2010. Assessing the shorefast ice: Iñupiat whaling trails off Barrow, Alaska. in *SIKU: knowing our ice*. Kupnik I., Apora C., Gearheard S., Laidler G.J., and Keilsen Holm L. (Eds.). Springer, 203-228.
- Kline, T. C. Jr. 2010. Stable carbon and nitrogen isotope variation in the northern lampfish and *Neocalanus*, marine survival rates of pink salmon, and meso-scale eddies in the Gulf of Alaska. *Progress in Oceanography*. 87: 49-60.
- Reynolds, B. F., S. P. Powers, and M. A. Bishop. 2010. Application of acoustic telemetry to assess residency and movements of rockfish and lingcod at created and natural habitats in Prince William Sound. *PLoS ONE*. 5:
- Singhal, G., V. G Panchang, and J. L. Lillibridge. 2010. Reliability assessment for operational wave forecasting system in Prince William Sound, Alaska. *Journal of Waterway, Port, Coastal, and Ocean Engineering*. 136: 337-349.
- Webler, T., and F. Lord. 2010. Planning for the human dimensions of oil spills and spill response. *Environmental Management*. 45: 723-738.

### ***Presentations and other publications***

- Druckenmiller, M.L; H. Eicken. Stability of Shorefast Sea Ice: A Model for Sea-Ice System Users. Second Conference for Sustainability IGERTS, Arizona State University, Tempe, AZ, October 8-10, 2009.
- Campbell, R., An empirical test of an NPZ model during the 2009 AOOS observing system experiment. Eastern Pacific Oceanography Conference. Sidney, BC. 2009.

# OSRI Fiscal Year 2010 Annual Report

## Staff



**Nancy Bird**  
OSRI Executive Director  
President, Prince William Sound Science Center



**W. Scott Pegau, Ph.D.**  
OSRI Research Program Manager



**Penelope Oswald**  
Finance Director,  
Prince William Sound Science Center



**Shelley Grant**  
Bookkeeper,  
Prince William Sound Science Center



**Linée Perkins**  
Administrative Assistant,  
Prince William Sound Science Center



# Oil Spill Recovery Institute

Cordova, Alaska

PO. Box 705  
Cordova, Alaska 99574  
(907) 424-5800  
pwssc@pwssc.org  
[www.pws-05n1.org](http://www.pws-05n1.org)

