Fishing vessels training with response equipment in Prince William Sound.

Prince William Sound Oil Spill Recovery Institute
Cordova, Alaska
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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

The past year was one of transitions for OSRI. Our shift from the 2005-2010 Science Plan to the 2011-2015 Plan allows us to continue or complete a mix of ongoing projects while initiating new projects within our four focus areas. In general, the differences between the two science plans are fairly subtle. OSRI’s goals remain the same, but focal areas within the goals shifted. The new science plan’s “Understand” goal places less emphasis on developing modeling capabilities for forecasting ocean and atmospheric conditions and more emphasis on utilizing and validating existing models. The “Respond” goal identifies the need to improve technologies associated with recovering oil in ice-covered waters. In the “Inform” goal, we continue to improve our technology education component and will see OSRI-funded education programs delivered throughout a greater geographic range.

One thing that hasn’t changed is our desire to partner with other organizations to promote projects that meet OSRI’s goals; we’ll see a number of new partnerships come to fruition in the coming year. Increased oil and gas development and shipping activities in the Arctic are presenting a variety of opportunities for new partnerships. Several new Arctic-related Joint Industry Programs were initiated this year; these promise to devote several million dollars towards research topics of importance to OSRI. Industry also continues to invest in environmental research in support of exploration efforts. The research includes both in-house sponsored work and providing funds for the North Slope Borough to conduct additional research as identified by the people of the region. OSRI will continue to seek opportunities to support and partner in these efforts, where appropriate.

There also was a transition in the OSRI funding structure last year. We still are funded by the interest from $22.5M of principal in the Oil Spill Liability Trust Fund, but the investments are now evenly spread over bonds that mature throughout a ten-year period. Previously, the funds were invested in a single five-year bond that caused some large fluctuations in OSRI funding. The new investment structure is more predictable and stable. That said, interest rates remain low, so our anticipated funding remains well below some of the historic levels. That said, we continue to seek ways to bolster OSRI’s ability to support research, education and technology development efforts compatible with our mission.

Finally, this fiscal year marks a transition in the Executive Director position. At the end of September, candidates were interviewed and Katrina Hoffman was selected to replace Nancy Bird as the Executive Director. Nancy is off to work on new opportunities and to be able to spend more time with her family. OSRI welcomes Katrina to the organization.

Katrina Hoffman, Executive Director, and Nancy Bird, Former Executive Director
Oil Spill Recovery Institute
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

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

Samantha Carroll
Natural Resources Manager, Alaska Dept. of Natural Resources
Anchorage, Alaska
Years of Service: 2010-present
Gary Folley  
Prevention & Emergency Response Program, Alaska Dept. of Environmental Conservation  
Soldotna, Alaska  
Years of Service: 2010-present

Fishing Industry Representative

William Lindow  
Cordova, Alaska  
Years of Service: 2006-present

Alaska Native Representative

Glenn Ujioka  
Cordova, Alaska  
Years of Service: 1997-present

Angela Totemoff  
Eagle River, Alaska  
Years of Service: 2011-present

Oil & Gas Industry Representatives

Doug Lentsch  
General Manager, Cook Inlet Spill Prevention & Response, Inc.  
Nikiski, Alaska  
Years of Service: 2001-2011

Andres Morales  
General Manager, Cook Inlet Spill Prevention & Response, Inc.  
Nikiski, Alaska  
Years of Service: 2011-present

David Totemoff Sr.  
BP  
Tatitlek, Alaska  
Years of Service: 2008-present
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 Whittle, Ph.D., Committee Chair University of Alaska Fairbanks
Eppie Hogan BP Exploration (Alaska), Inc.
Stacy Studebaker former teacher
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)
Mission and Goals

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

In February 2009 the OSRI Board adopted the following 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 2011 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.aaos.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.
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). 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 FY11 to Richard McClure, U.S. Natural Resources Conservation Service. 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
An observational oceanography program at the Prince William Sound Science Center was supported by OSRI through FY10. 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 include:
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 observation program ended in 2010, but analysis of data collected by this project continued into FY11. 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 better understanding of the relationship between circulation variability and biological variability in...
PWS. Two relatively deep-water moorings were deployed in Hinchinbrook Entrance and Montague Straits to monitor currents and oceanographic properties.

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. A manuscript titled “Disruption of a cyclonic eddy circulation by wind stress in Prince William Sound, Alaska” has been accepted for publication in 2012 in Continental Shelf Research.

This is a continuing program led by Dr. Mark Halverson of the Prince William Sound Science Center with no new funding awarded. This program has been 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.

**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. During damage assessments surveys following the 1989 *Exxon Valdez* oil spill, it was discovered that Prince William Sound’s Montague Island was a spring stopover area for both Surfbird and Black Turnstone. This study was undertaken during the spring of 2010 aimed to update baseline information on the numbers and distribution of Surfbird and Black Turnstone stopping and Montague Island. Reduced numbers of spring migrant Black Turnstones and Surfbirds were detected. Less than 7,800 shorebirds were observed over a 19 day survey, which is less than single-day counts observed in the 1990s. It was found that Unakwik Inlet in northern Prince William Sound has an important migration stopover for Surfbirds. None of the birds radio-tagged in Washington were detected in Prince William Sound. These results suggest that Black Turnstone and Surfbird have either altered their migration behaviors or have both undergone significant population declines.

This is a continuing project with no new funds awarded in FY11. The project is led by Dr. Mary Anne Bishop, Prince William Sound Science Center. The project is also receiving funding from Alaska Department of Fish and Game through a State Wildlife Grant. The project final report can be obtained at [http://www.pws-osri.org/programs/projects/annual_reports/2009/09-10-16.pdf](http://www.pws-osri.org/programs/projects/annual_reports/2009/09-10-16.pdf).

**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. A stand-alone data management system based on the system used by the Alaska Ocean Observing System was delivered to the Prince William Sound Science Center for their scientists to begin to populate.

This is a continuing program with no new funds awarded in FY11. This effort builds upon the work Axiom is doing for the Alaska Ocean Observing System. The project final report can be obtained at [http://www.pws-osri.org/programs/projects/annual_reports/2010/10-10-05.pdf](http://www.pws-osri.org/programs/projects/annual_reports/2010/10-10-05.pdf).
**SHORELINE BIOTA MONITORING PROGRAM**

When an oil spill impacts the intertidal zone it is important to understand what the baseline conditions were and how the impacted area recovers. Unfortunately, there is seasonal and inter-annual temporal variability in the biota of this area that makes it difficult to take a snapshot of conditions and consider them as a baseline. With the work of the ShoreZone program a very detailed snapshot of the intertidal biota is becoming available. This project aims to complement the high-spatial resolution mapping efforts by providing temporal information to add to the spatial information. One issue that needs to be addressed in designing a temporal monitoring component is how to keep the cost of the program reasonable. In an effort to devise an economical monitoring program OSRI has funded Coastal and Ocean Resources Inc. to develop protocols for an economical approach to temporal monitoring. They have proposed a set of protocols based on time-lapse photography and citizen monitoring. This information is to be validated using existing intertidal monitoring data.

This is a new program with $29,200 awarded to Dr. John Harper at Coastal and Ocean Resources Inc.

**DATA RECOVERY: BEAUFORT SEA EPIBENTHOS**

A major challenge in understanding the impacts of an oil spill is having historical data available to provide a baseline. This work seeks to rescue data on epibenthic invertebrates sampled by trawls and photographs in the Alaskan Beaufort Sea during Western Beaufort Sea Ecological Cruises (WEBSEC) and Outer Continental Shelf (OCS) cruises in the 1970s. The material includes station information, count and weight data, a taxonomic inventory and yet unidentified samples. The historic data in question will form a reference point for the 1970s and can in the future be compared to current surveys in the Beaufort Sea done in 2008 and 2011. The rescue involves 1) transforming tables from reports into digital format, 2) processing unsorted samples, 3) updating the taxonomy to today’s standard, 4) making the data available to recognized open access online data bases, and 5) integrating the taxonomic inventory into the Arctic Register of Marine Species.

This is a new program with $49,985 awarded to Dr. Bodil Bluhm at the University of Alaska Fairbanks.

**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 continuing program with no new funds awarded in FY11. The work is being conducted by Dr. CJ Beegle-Krause, Ph.D. at Research4D and Dr. Xiaochun Wang. at UCLA. Funding was awarded in FY10; however, due to the Deepwater Horizon incident the work on this project did not begin until FY11.
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.

ARCTIC ENVIRONMENTAL RESPONSE MANAGEMENT APPLICATION DEVELOPMENT

NOAA has initiated the development of an Arctic ERMA Site. The Environmental Response Management Application (ERMA®) is a web-based data management platform integrating real-time (weather, currents, etc.) and static data in an easy-to-use format. ERMA allows environmental responders and decision-makers ready access to response-relevant data for spill drills, planning, response, assessment, and restoration, as well as for other incidents and natural disasters. ERMA is a Web site that incorporates static base layers along with real-time streams of data (e.g., weather, tides, ship tracking data, etc.) into a fast, user-friendly Geographic Information System (GIS) that is accessible to the command post as well as people in the field and other locations. OSRI funding is being used to support the development and data compilation for the ERMA Arctic website. This includes compiling existing data relevant to the Alaskan arctic and subarctic to provide the context for potential oil releases and other incidents.

This is a new program with $50,000 awarded to John Murphy at Genwest in FY11. This funding is being combined with funds from NOAA.

DETECTION AND MAPPING OF OIL SPILLS UNDER SEA ICE

One of the first issues that will be faced if there is a spill under sea ice is how to find the oil. A practical system for oil spill response in the sea ice environment must be capable of rapidly mapping the extent and quantity of oil over large areas and under a range of ice and weather conditions. There are some tactics and systems in place or being developed for detecting oil from above the ice. This project builds upon the increased capabilities of autonomous underwater vehicles and the idea that it is simpler to detect the oil if you don’t have to penetrate through the ice.

This project is designed to develop and test a suite of sensors for mounting on an autonomous underwater vehicle for detection and mapping of oil under the full range of ice conditions and oil conditions expected to occur. This approach has the advantage of being independent of ice conditions and allows direct measurement of the oil (both under the ice and in the water column), unlike surface based methods. A combination of desk studies and tank experiments will be used to analyze the efficacy and accuracy of a suite of potential oil detection sensors.

This is a new project with $79,600 awarded to Dr. Jeremy Wilkinson at the Scottish Association for Marine Science and $70,300 to Dr. Hanumant Sing at the Woods Hole Oceanographic Institute in FY11. This funding combined with several other sources of funding in the development of this test facility.
**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 continuing project with no new funds awarded in FY11. The work is being done by Dr. John Harper at Coastal & Ocean Resources Inc. The project has been completed and data and imagery from this project can be accessed at [http://alaskafisheries.noaa.gov/habitat/shorezone/szintro.htm](http://alaskafisheries.noaa.gov/habitat/shorezone/szintro.htm).

**RECOVERING OIL FROM WATER**

As a result of the Deepwater Horizon oil spill in the Gulf of Mexico a competition was held to test novel concepts for improving oil spill recovery. The competition was sponsored by Wendy Schmidt through the X challenge. More information about the challenge can be found at [http://www.iprizecleanoceans.org/](http://www.iprizecleanoceans.org/). One of the more innovative approaches being tested was the system from Pacific Petroleum Recovery Inc. that is based on equipment commonly used in the fishing industry. This approach provides a low-cost system with spare parts readily available throughout Alaska.

This is a new program with $10,000 awarded in FY11 to Kevin Kennedy at Pacific Petroleum Recovery Inc. The funds were used to support travel costs associated with demonstrating the capabilities of this system.

**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 FY11 to support two analyses of the experiment.
Oil Spill Drift Trajectory Analysis from the 2009 Field Experiment

The proposed analysis of the observational data and model predictions for *Sound Predictions* is based on trajectory predictive ability. The intent is to identify areas of higher and lower predictive skill for the field conditions during the experiment, and provide insight and recommendations for future improvements.

The work will examine the effect of observational data assimilation in potential oil spill simulations by comparing observed and simulated drifter trajectories using the General NOAA Operational Modeling Environment ( GNOME) model. Observed circulation fields (winds and currents), and two different types of the PWS circulation fields (nowcast and forecast) will be examined in order to isolate the effects of data assimilation without re-running the circulation models. The hindcast fields will have assimilated all available observations, while the forecast fields will not have the benefit of the observational program. Simulated trajectories will be compared with observed drifter trajectories during Sound Predictions, and the other observational data will be used to construct hypotheses for any trajectory differences. If necessary, a diagnostic circulation model will be constructed in GNOME to test these hypotheses.

This is a new program with $24,800 awarded in FY11 to Dr. CJ Beegle-Krause at Research4D.

Quantifying the effects of ocean observations and circulation models on oil spill trajectory forecast skill

Regional coastal ocean observing efforts such as the Alaska Ocean Observing System (AOOS) are part of the national Integrated Ocean Observing System (IOOS). A major goal of IOOS is to provide real-time observational data for assimilation models that can provide comprehensive forecasts of regional atmospheric and oceanic conditions. One major user group of ocean forecasts is the oil spill response community. The *Sound Predictions* exercise in 2009 was designed to evaluate the skill of weather, wave, and ocean circulation models. The proposed work is to evaluate the utility of ocean observing system measurements and numerical simulation forecasts in improving the performance of models that forecast oil spill trajectories. The primary objective is to quantify the effect of ocean observations and circulation model forecasts on the performance of an oil spill trajectory forecast model in Alaska coastal waters. A secondary objective is to evaluate the ocean circulation model performance in accurately simulating surface water circulation as measured by various direct observations.

This is a new program with $24,800 awarded in FY11 to Dr. Carl Schoch at the Alaska Ocean Observing System.
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 $45,000 awarded in FY11 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.

**SUMMER OUTREACH DISCOVERY**

A number of oil spill related activities have been developed for use in summer and school year education programs. However many of the activities do not seem to have been incorporated by organizations other than the ones that developed the activities. This includes several activities developed by the Prince William Sound Science Center with funding from OSRI. In order to get broader use of oil spill related activities in the various summer programs around the state OSRI funded a five-year program designed to identify organizations that would be interested in incorporating spill related materials, modify the materials to be appropriate for those organizations, and to train the organization on how to effectively deliver the materials.
This is a new five-year program with $20,000 awarded in FY11 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.

**REMTELY OPERATED VEHICLE KIT**

This project is for the development of a transportable student activity kit focused on oil spill science and robotic technology. The Oil Spill Response ROV Kit (Remotely Operated Vehicle Kit) will be a teacher and classroom ready “stand alone” education unit containing the materials needed to deliver lessons on marine oil spills and oil spill response technologies.

Using materials contained within the kit, teachers will provide instruction on the potential adverse impacts of oil spills on water, and discuss technological challenges to oil spill cleanup. Students will use materials provided in the kit to construct Remote Operated Vehicles designed to clean up simulated oil (popcorn) spilled into a swimming pool, harbor or pond. Students will compete to see what design best recover the spilled popcorn.

The ROV Kit will be available for loan by school teachers, informal and home school programs and Scout/other youth groups. We will actively market the kit through our education contacts statewide and through targeted outreach to include a diverse array of student groups and communities.

This is a new program with $20,000 awarded in FY11 to Lindsay Butters, PWS Science Center, Cordova, Alaska.

**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 FY11.

Alaska Marine Science Symposium, $4,000. 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.

Arctic ERMA. $3,000 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 to determine which datasets were most important for incorporation into the ERMA platform and determine where those data were located. A complete report from the workshop can be found at [http://www.crrc.unh.edu/workshops/arctic_erna/index.html](http://www.crrc.unh.edu/workshops/arctic_erna/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.
Alexandra Ravelo, University of Alaska Fairbanks  
Masters candidate  
Advisor: Brenda Konar  
Epibenthic communities in the Beaufort Sea.

The purpose of this study is to characterize the epibenthic communities in the central Beaufort Sea (between 147° and 150° west longitude) and compare these communities to the ones found in the adjacent Chukchi Sea. These goals will be accomplished by joining an existing cruise in the summer 2011 that will be conducting epibenthic beam trawls for fishes in the central Beaufort. At this time, very little is known about these soft sediment epibenthic communities of the central Beaufort Sea. Considering the potential oil exploration that this area will be subject to, there are intrinsic needs to increase our knowledge of these communities to be able to monitor the changes caused by anthropogenic activities and better preserve our natural resources. An existing database of epibenthic communities in the Chukchi Sea surveyed in 2009 and 2010 using the same equipment will be used to make comparisons between the two seas. The central Beaufort Sea base-line data collected will include overall species composition and distribution and also abundance, biomass, size and sex structure of targeted species. Multiple questions will be asked with these base-line epibenthic data, including: 1. Are epibenthic communities distributed in patches or are all species evenly distributed throughout the study area? 2. Which species are most important in determining community structure as far as abundance and biomass? 3. What is the current population structure of the most important species as far as size frequency, abundance, biomass, and male to female sex ratio? 4. Does the community vary with any environmental (depth, grain size, temperature, salinity) or fish community parameters? The importance of this project is centered on the need for having a better understanding of the epibenthic community composition and the structuring environmental variables that take place.

This is a new project with $25,000 provided in FY11.

Lindsay Saum, University of Alaska Fairbanks  
Doctoral candidate  
Advisor: David Crowley  
Remediation monitoring using microbial DNA profiles.

Lingering oil pockets still found in the beaches of the Prince William Sound (PWS) demonstrate that petroleum hydrocarbons can persist and continue to damage ecosystems decades after initial cleanup efforts following a marine oil spill. Currently, the methods of monitoring marine oil bioremediation efficiency are chemical processes that can take over a month to return results and can cost up to $1,000 per assay if outsourced commercially. The goal of this research project is to develop molecular biology tools to monitor the state of polycyclic aromatic hydrocarbon (PAH) degradation in oil contaminated beach sediments in near real-time by tracking the dominant bacterial species and their associated dioxygenase genes that function for oil degradation. Bacterial populations of PWS beaches will be collected via sediment sampling as well as activated carbon sampling columns. The extracted and purified microbial DNA will be amplified at both the 16S rRNA and dioxygenase gene sequences via polymerase chain reaction (PCR), and analyzed with terminal restriction fragment length polymorphism (TRFLP) through capillary electrophoresis. In order to quantify the 16S rRNA gene sequences, each purified DNA sample will also be analyzed via real-time PCR using primers for bacterial species of interest. The community composition and dioxygenase enzyme patterns will then be used to train a neural net statistical program for pattern recognition of PAH degradation status. Chemical analyses will be conducted via gas chromatography to verify the PAHs present in each sample.

The results of this project will produce a more rapid and inexpensive method of monitoring the rate of marine oil degradation by microbial communities. Potential application of the data generated by this procedure includes evaluation and addition of the dominant bacterial species’ trace nutrient requirements in order to achieve effective biostimulation in the PWS.

This is a new project with $25,000 provided in FY11.
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 is a continuing project with $25,000 awarded in FY11.

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 implementing the new five-year research plan, development of the FY12 work plan, participating in a test of oil spill fluorometers, and updating the OSRI outreach materials. 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 $132,392.

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
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 2011. Fiscal year 2010 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.

Summary of OSRI program expenditures FY11 and FY10

<table>
<thead>
<tr>
<th>Program Areas</th>
<th>FY11</th>
<th>FY10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>161,771</td>
<td>152,416</td>
</tr>
<tr>
<td>Research (Understand)</td>
<td>202,293</td>
<td>267,486</td>
</tr>
<tr>
<td>Research (Respond)</td>
<td>50,265</td>
<td>107,625</td>
</tr>
<tr>
<td>Public Education &amp; Outreach (Inform)</td>
<td>91,821</td>
<td>119,123</td>
</tr>
<tr>
<td>Other Programs</td>
<td>132,392</td>
<td>122,660</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>638,542</strong></td>
<td><strong>769,310</strong></td>
</tr>
</tbody>
</table>
### Statement of Financial Position

Including the Oil Spill Recovery Institute  
Year Ended September 30, 2011  
*(with comparative totals for 2010)*

<table>
<thead>
<tr>
<th></th>
<th>General Fund</th>
<th>Plant Fund</th>
<th>Program Fund</th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>39,731</td>
<td>138,685</td>
<td>178,366</td>
<td>87,114</td>
<td></td>
</tr>
<tr>
<td>Receivables</td>
<td></td>
<td>289,105</td>
<td>289,105</td>
<td>256,506</td>
<td></td>
</tr>
<tr>
<td>Prepaids and other assets</td>
<td>44,912</td>
<td>44,912</td>
<td></td>
<td>40,817</td>
<td></td>
</tr>
<tr>
<td>Investments</td>
<td></td>
<td>1,616,397</td>
<td>1,616,397</td>
<td>1,766,497</td>
<td></td>
</tr>
<tr>
<td>Due from other funds</td>
<td>321,782</td>
<td>35,467</td>
<td>357,249</td>
<td>361,827</td>
<td></td>
</tr>
<tr>
<td>Leasehold</td>
<td>1,500</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Property and equipment, net of accumulated depreciation</td>
<td></td>
<td>759,843</td>
<td>759,843</td>
<td>902,453</td>
<td></td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>406,425</td>
<td>759,843</td>
<td>2,079,604</td>
<td>3,245,872</td>
<td></td>
</tr>
</tbody>
</table>

| **Liabilities:**    |              |            |              |      |      |
| Accounts payable    | 205,149      |            | 205,149      | 173,217 |
| Wages, taxes & benefits payable | 155,066 | 155,066 | 133,146 |
| Current portion of long-term debt | | 10,238 | 10,238 | 11,645 |
| Deferred to revenue | 7,268        | 35,467     | 42,735       | 132,131 |
| Due to other funds  | 35,467       | 321,782    | 357,249      | 361,827 |
| Long-term debt      |              | 57,064     |              |      |
| **Total liabilities** | 402,950     | 424,551    | 827,501      | 919,403 |

| **Net assets:**     |              |            |              |      |      |
| Temporarily restricted | 0           | 759,843    | 1,655,053    | 2,418,371 |
| Unrestricted        | 3,475        |            | 2,495,811 |
| **Total net assets** | 3,475        | 759,843    | 1,655,053    | 2,418,371 |

| **Total liabilities & net assets** | 406,425 | 759,843 | 2,079,604 | 3,245,872 |

OSRI Fiscal Year 2011 Annual Report
Oil Spill Recovery Institute Programs
Combined Statement of Financial Position
Year Ended September 30, 2011
(with comparative totals for 2010)

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>138,635</td>
<td>67,254</td>
</tr>
<tr>
<td>Investments</td>
<td>1,616,397</td>
<td>1,766,497</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>1,755,032</td>
<td>1,833,751</td>
</tr>
<tr>
<td><strong>Liabilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deferred revenue</td>
<td>0</td>
<td>48,128</td>
</tr>
<tr>
<td>Due to other funds</td>
<td>23,662</td>
<td>22,315</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td>23,662</td>
<td>70,443</td>
</tr>
<tr>
<td><strong>Net assets - unrestricted</strong></td>
<td>1,731,370</td>
<td>1,763,308</td>
</tr>
<tr>
<td><strong>Total liabilities and net assets</strong></td>
<td>1,755,032</td>
<td>1,833,751</td>
</tr>
</tbody>
</table>

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 deposits in FY 10 and 11 led to us spending from interest earned on the funds.
Oil Spill Recovery Institute Programs
Combined Statement of Activities
Year Ended September 30, 2011
(with comparative totals for 2010)

<table>
<thead>
<tr>
<th></th>
<th>OSRI Totals 2011</th>
<th>OSRI Totals 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenues:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants and contributions - Federal</td>
<td>535,562</td>
<td>769,310</td>
</tr>
<tr>
<td>Interest</td>
<td>588</td>
<td>164</td>
</tr>
<tr>
<td>Unrealized gains on investments</td>
<td>70,459</td>
<td>123,463</td>
</tr>
<tr>
<td><strong>Total revenues</strong></td>
<td>606,609</td>
<td>892,937</td>
</tr>
<tr>
<td><strong>Expenses:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salaries and benefits</td>
<td>322,969</td>
<td>287,726</td>
</tr>
<tr>
<td>Travel</td>
<td>31,187</td>
<td>36,525</td>
</tr>
<tr>
<td>Professional services</td>
<td>19,587</td>
<td>13,224</td>
</tr>
<tr>
<td>Subcontracts and charter costs</td>
<td>0</td>
<td>33,672</td>
</tr>
<tr>
<td>Supplies</td>
<td>4,323</td>
<td>5,136</td>
</tr>
<tr>
<td>Telephone</td>
<td>2,519</td>
<td>2,307</td>
</tr>
<tr>
<td>Network</td>
<td>5,029</td>
<td>2,666</td>
</tr>
<tr>
<td>Postage and freight</td>
<td>777</td>
<td>712</td>
</tr>
<tr>
<td>Printing, publications and copying</td>
<td>2,786</td>
<td>1410</td>
</tr>
<tr>
<td>Facilities and rent expenses</td>
<td>750</td>
<td>350</td>
</tr>
<tr>
<td>Utilities</td>
<td>8,000</td>
<td>8,000</td>
</tr>
<tr>
<td>Insurance</td>
<td>938</td>
<td>938</td>
</tr>
<tr>
<td>Equipment maintenance</td>
<td>0</td>
<td>10,795</td>
</tr>
<tr>
<td>Other</td>
<td>5,098</td>
<td>5,582</td>
</tr>
<tr>
<td>Grants awarded</td>
<td>185,963</td>
<td>295,005</td>
</tr>
<tr>
<td><strong>Total expenses before interfund facility, equipment costs, and indirect costs</strong></td>
<td>589,926</td>
<td>704,048</td>
</tr>
<tr>
<td>Interfund facility and equipment costs</td>
<td>13,140</td>
<td>13,140</td>
</tr>
<tr>
<td>Indirect costs</td>
<td>35,481</td>
<td>43,841</td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td>638,547</td>
<td>761,029</td>
</tr>
<tr>
<td>Change in net assets</td>
<td>(31,938)</td>
<td>131,908</td>
</tr>
<tr>
<td>Net assets at beginning of year</td>
<td>1,763,308</td>
<td>1,639,682</td>
</tr>
<tr>
<td>Transfers to Plant Fund</td>
<td>0</td>
<td>(8,282)</td>
</tr>
<tr>
<td><strong>Net assets at end of year</strong></td>
<td>1,731,370</td>
<td>1,763,308</td>
</tr>
</tbody>
</table>
Publications and presentations

Peer-reviewed Publications and Theses


Presentations and other publications


Oil tracking drifters deployed in Prince William Sound to test spill response models.
Staff

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

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

Penelope Oswalt
Finance Director,
Prince William Sound Science Center

Shelley Grant
Bookkeeper,
Prince William Sound Science Center

Linée Perkins
Administrative Assistant,
Prince William Sound Science Center