

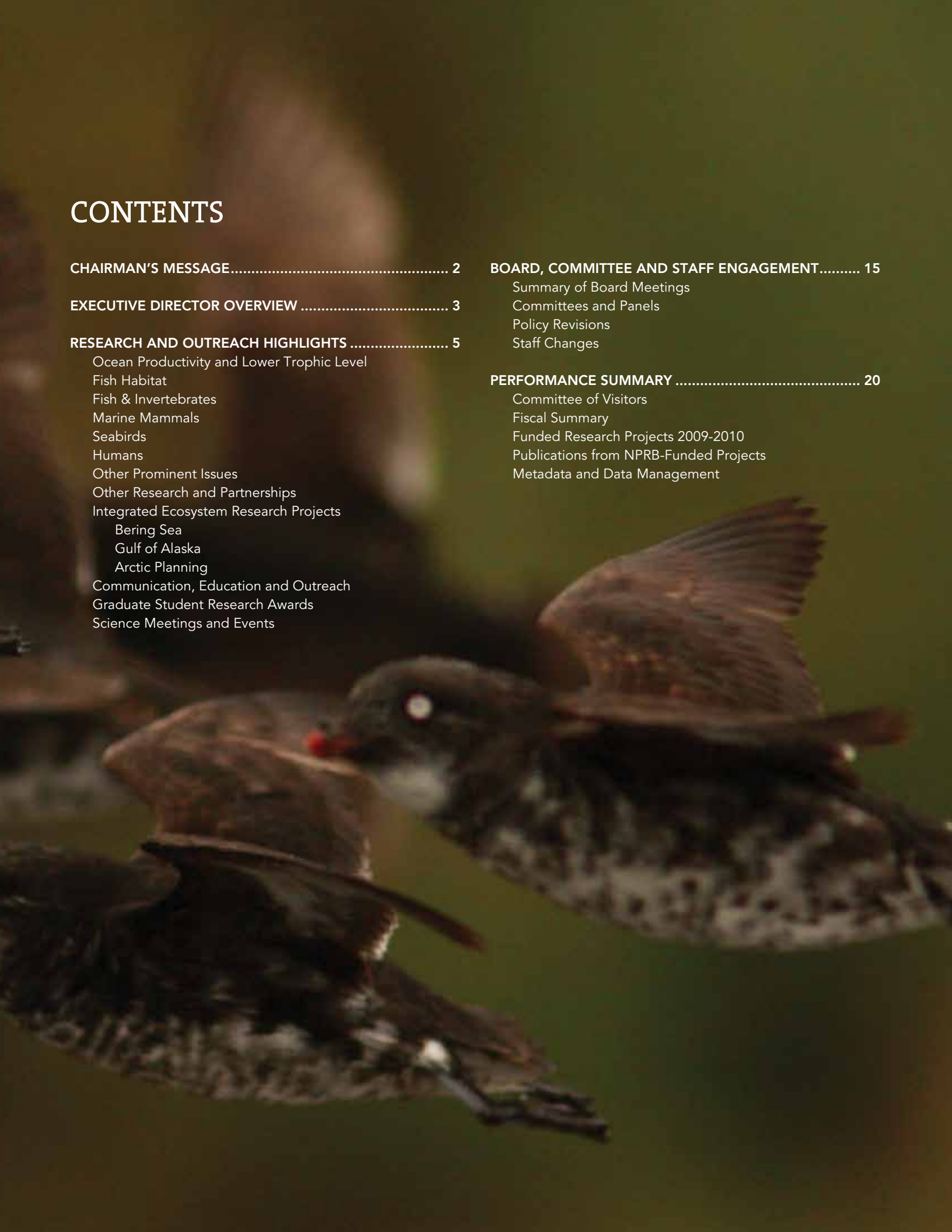


**NORTH PACIFIC RESEARCH BOARD**  
2009-2010



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## Chairman's Message



*Dear NPRB Stakeholder,*

*The North Pacific Research Board is an increasingly influential organization. In keeping with the vision of the late Senator Ted Stevens, who championed the establishment of the Board, we have become a key partner in the multi-institutional effort that enables effective management and sustainable use of the marine resources of the North Pacific.*

*The years 2009 and 2010 were a period of both significant progress and change for the North Pacific Research Board. Not only did we begin a new integrated research program in the Gulf of Alaska, we also began a major leadership transition, with the retirement of our founding Executive Director, Dr Clarence Pautzke. Clarence played a critical role in establishing the Board, its programs, and its style of operations and we are forever indebted to him for his outstanding leadership and commitment to research excellence.*

*After an extensive national search, the Board was delighted to recruit Dr Cynthia Suchman to succeed Dr Pautzke. She will formally begin her new role in mid-2011. In the lead up to her arrival, the Board will continue to work through the recommendations of the independent Committee of Visitors, who undertook a thorough review of the Board operations in 2010. We were delighted to receive their report in December and have initiated a process of improving Board operations where needed.*

*It has been both a pleasure and a privilege to serve as NPRB Chair during the past two years. I would like to thank my fellow Board members and our Science and Advisory Panel members for their exceptional volunteer service in support of our mission and programs. I would also like to thank our grantees and reviewers and our many community, industry, academic, and government partners for their contributions.*

*Finally I would like to recognize the small, but incredibly talented NPRB staff and the NPRB support staff at the Alaska SeaLife Center for all that they do each and every day to ensure we deliver complex cutting-edge science programs so very effectively and efficiently.*

A handwritten signature in black ink, appearing to read 'Ian M. Dutton'.

*Ian M. Dutton PhD.  
Chair*

## Executive Director Overview



*The North Pacific Research Board attained important milestones in 2009 and 2010. Just over 50 new projects were funded through annual requests for proposals (RFP), bringing the total to 252 projects funded for \$41.5 million since 2001. These projects cover all ecosystem levels, though roughly half focus on fish and fish habitat studies, consistent with our mandate to address pressing fishery management issues.*

*Two large ecosystem research programs are underway. These past two years marked the last field seasons for the Bering Sea Integrated Ecosystem Research Program, and increased energy will go into analysis, modeling, reporting and synthesis over the next two years of this historic \$52 million partnership with the National Science Foundation. A comparable, but smaller scale \$17 million program in the Gulf of Alaska is just beginning. It will analyze early survival of five important fish species in the central and southeast Gulf, with a first field season scheduled for 2011.*

*The high Arctic is next up. Although several Arctic projects have been funded through annual RFPs, the Board is considering partnering with other funding organizations to support a distributed biological observatory in the Pacific Gateway region from St. Lawrence Island through Bering Strait to Pt. Barrow. This region is rapidly changing due to ocean warming and melting sea ice. It is highly productive and particularly important as a migratory pathway for fish, bird, and marine mammal species on which local human populations depend. The Board will decide exact funding and program focus in the coming year.*

*Finally, I would note that the Board invited a complete review of its programs, policies, and procedures by an external committee of experts during 2010. The committee reported in December and its recommendations will provide the basis for the Board to move ahead in refreshing its programs and policies under the leadership of the new Executive Director, Dr. Cynthia Suchman, who currently works for the National Science Foundation and will join staff officially in June 2011.*

*It has been my great pleasure to work for the North Pacific Research Board these past nine years and contribute to its development. I have been blessed with a highly competent and professional staff, a Board willing to support research on all aspects of the marine ecosystem, and science and advisory panels that ensured high-quality science tied to pressing issues of concern to stakeholders. I particularly want to thank my three chairmen, David Benton, Tylan Schrock, and most recently, Dr. Ian Dutton, for their guidance, forbearance, and camaraderie over the years.*

*I look forward to watching from afar as this wonderful legacy to Senator Ted Stevens furthers its scientific contributions to our understanding and sustainability of Alaska's highly productive marine ecosystems.*

A handwritten signature in black ink, reading "Clarence Pautzke, PhD". The signature is fluid and cursive, with a large initial "C".

Clarence Pautzke, PhD.  
Executive Director

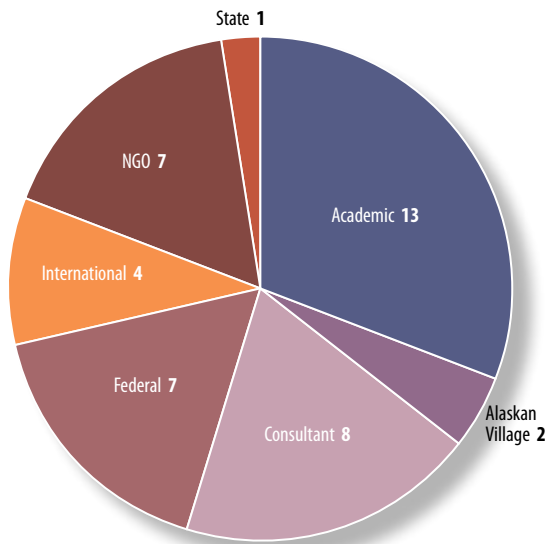


# RESEARCH AND OUTREACH HIGHLIGHTS 2009-2010

The Board funded a broad array of research projects during 2009 and 2010, touching on all aspects of the marine environment. More than \$7.3 million dollars supporting 47 projects were funded through the RFP process, with another \$2.6 million going to five directly funded projects, such as the Seward Line and the continuous plankton recorder consortium, and a special PICES report on marine ecosystems. Sixty-five projects were completed during these two years, bringing the total number of completed projects to 184, out of the 252 funded since the inception of NPRB.

In all, 42 organizations received funding for research in 2009 and 2010, ranging from academic institutions to federal and state government agencies, non-governmental groups, and Alaska villages.

## Breakdown of the 42 Organizations Receiving Research Funds 2009-2010

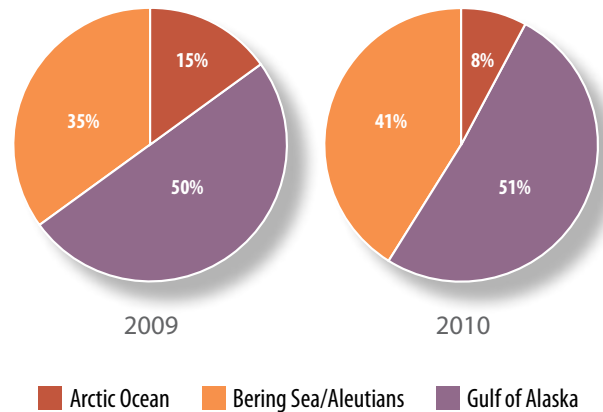


Following the research themes outlined in the NPRB *Science Plan* and armed with cutting-edge ideas from scientific meetings, peer-reviewed publications, and input from agencies, institutions, and researchers around the country, a request for proposals was posted each fall that addressed issues of pressing concern (visit [http://www.nprb.org/proposals/current\\_rfp.html](http://www.nprb.org/proposals/current_rfp.html) for the full requests for proposals). A total of 197 proposals

were reviewed by both experts in the field and then by the NPRB Science Panel, who shared their recommendations for funding with the Board.

The Board ultimately funded 52 projects across all ecosystem levels, including 13 lower trophic level projects, 1 fish habitat, 20 fish and invertebrates, 7 marine mammal, 3 seabird, 2 human, and 6 projects focused on prominent issues. The majority of the projects (28) explored issues in the Gulf of Alaska, while 21 ventured into the Bering Sea, and 2 focused upon the Arctic. However, fifty percent of the funding went to the Bering Sea, with about 38 percent spent in the Gulf of Alaska, and nearly 11 percent in the Arctic. For a complete list of all projects funded in 2009 and 2010, see pages 23-25.

## Funding per Large Marine Ecosystem



Researchers funded by NPRB published 48 scientific papers in 2009 and 2010 in major research journals, bringing the total to 231 to date. This does not include another nine papers resulting from the Bering Sea Project (Bering Sea Ecosystem Study –Bering Sea Integrated Ecosystem Research Program BEST-BSIERP), and one scientific paper written by one of the NPRB graduate student research awardees. The list of papers for 2009-2010 begins on page 26.

## OCEAN PRODUCTIVITY AND LOWER TROPHIC LEVEL

*BASIS FOR ALL LIFE IN THE SEA*

While fishes, marine mammals, and seabirds are the most visible living marine resources at the top of the food chain upon which we depend, it is the tiniest organisms drifting and swimming with the currents that fuel all life in the sea. And our understanding of ocean dynamics depends on our ability to make long-term ocean measurements. In the 2009 and 2010 requests for proposals, NPRB sought projects that would investigate the importance of physical features to ecosystem processes; coupling between shelf, nearshore, and inland waters in the Alaska Coastal Current (ACC) and the importance of freshwater runoff; changing Arctic food webs; ocean acidification in Alaska waters, as well as other oceanography and lower trophic level research.

The projects funded over the last two years include rescuing zooplankton data from the U.S. Coast Guard's Western Beaufort Sea Ecological Cruises (WEBSEC) in the 1970s; looking at the ecological impacts of the 2008 Kasatochi eruption; developing biochemical sampling capability on an autonomous underwater vehicle; implementing a community-based environmental monitoring project to collect water quality data from two sites in Eyak Lake, Cordova, an important juvenile salmon habitat; estimating freshwater fluxes into the Gulf of Alaska; using an indicator approach to look at climate forcing in Alaskan ecosystems; studying bowhead whale stable isotopes for tracking Arctic food web changes; and attaching instruments to moorings to observe ocean acidification in the Gulf of Alaska. Projects continued in 2009 and 2010 include the continuous plankton recorder and Seward Line long-term monitoring.

## FISH HABITAT

*OASES OF OCEAN LIFE*

Maintaining healthy habitats is essential to ecosystem-based management. To identify essential fish habitat, researchers must not just study where fish live, but also answer more complex questions of how fish production relates to a particular type and extent of habitat. The Board is helping fishery managers and the North Pacific Fishery Management Council address this challenge by funding fish habitat-related studies that look at ecosystem functions of habitat, habitat mapping and fishing effects. The 2009 and 2010 requests for proposals specifically looked for studies that would address the Bering Sea canyons and a comparison between canyon and slope habitats using existing data; Pribilof Canyon benthic habitat mapping; essential habitats for forage fish and demersal spawning fishes, and a habitat analysis in the Northern Bering Sea Research Area. Fish habitat projects by their nature tend to be expensive, and the Board funded one multi-year project in 2009 that is looking at ontogenetic patterns of abundance and distribution of Pacific halibut and Greenland halibut in canyon and slope habitats of the eastern Bering Sea.





## FISH & INVERTEBRATES

### ALASKA'S OCEAN BOUNTY

A major goal of the Board is to improve our ability to manage and protect the healthy, sustainable fish and wildlife populations that comprise the ecologically diverse marine ecosystems of the North Pacific, and provide long-term, sustainable benefits to local communities and the nation. For that reason, the 2009 and 2010 requests for proposals called for studies falling within topics that together address pressing fishery management issues and marine ecosystem information needs, such as stock assessment, ocean acidification impacts on fish, Pacific salmon, forage species, fish movement, and bycatch reduction.

Several of the 20 funded fish and invertebrate projects focus on crab, including reducing bycatch mortality, and looking at the impacts of ocean acidification on the reproduction of Tanner crabs, and induction of the *Hematodinium* parasite in that genus. Other researchers are looking at a comparison of three independent methods for estimating red king crab biomass in Southeast Alaska. Salmon studies are addressing salmon bycatch in Bering Sea and Aleutians fisheries, and delving into issues of Chinook survival and disease severity during marine migration. The Board also funded a number of pollock projects, including development of an age-zero index, using flow cytometry to assess the condition of larvae, and the cooperative and non-cooperative management of stocks straddling political boundaries in the Bering Sea. A small-scale population study of Atka mackerel is looking at movement, and another study investigates the fine-scale genetic structure of Pacific ocean perch. In the Aleutians, two studies were funded to tag octopus and conduct field studies to determine population structure, and a different study is focusing on the maturity of Aleutian Island rockfish. One groundfish study will explore alternative catch monitoring, while another project is testing an autonomous underwater vehicle for tracking acoustic-tagged pelagic and groundfish in complex marine environments in coastal Alaska. The larvae of some commercially important species can be difficult to identify, so researchers in two funded projects are developing molecular identification techniques for larvae and diet.

## MARINE MAMMALS

### SENTINELS IN THE SEA

The ecological and cultural role of marine mammals highlights how important it is to know how these species interact with other ecosystem components and how commercial fisheries and human activities impact their populations. In the 2009 and 2010 requests for proposals, the Board called for research on small or declining populations, ice-dependent pinnipeds, short-term Steller sea lion movement patterns, Southeast Alaska sea otters, and study designs for quantifying indirect local effects of fisheries on upper trophic predators.

Seven marine mammal projects were selected by the Board for funding in 2009 and 2010, ranging from sea otters and fisheries interactions in Southeast to predation and survival of young Steller sea lions in the Gulf of Alaska, and modeling northern fur seal vital rates. An ongoing look at sperm whale depredation on sablefish in southeast Alaska received more funding, and in Cook Inlet, a photo identification study of beluga whales is underway. The Board also approved funding for research into *Trichinellosis* in marine mammals and its transmission to man, and a community study of freshwater seals in Lake Iliamna.

## SEABIRDS

### WINGED INDICATORS OF CHANGE

Alaska's marine ecosystems support one of the world's greatest concentrations of seabirds. These widespread and numerous upper trophic level predators influence, and are influenced by, commercial fisheries and play an important role in overall ecosystem dynamics. For this reason, the Board requested proposals focusing on the influence of non-breeding season conditions on population dynamics; seabird – forage fish ecosystem relationships; and on declining or small populations of seabirds. The Board funded three projects focusing on phase 2 of the establishment of a new colony of short-tailed albatross; diets of threatened eiders; and the winter ecology of Bering Sea seabirds.

## HUMANS

### PEOPLE AND THE SEA

The NPRB Science Plan covers a wide array of topics related to humans, from policy analysis of living marine resource management, baseline assessments, resource protection and human health to potential impacts of climate variability and change. The annual requests for proposals during 2009 and 2010 called for projects delving into social and economic studies of bycatch and bycatch mitigation; pre- and post-implementation studies of management action; community adaptability to ecosystem change; and the cost-benefits of fishery enforcement services. In 2010, the Board funded a community involvement project, *Bering Watch*, and *Ingalimuit*: traditional knowledge of walrus in the Bering Strait.

## OTHER PROMINENT ISSUES

### OCEAN CHALLENGES

Encompassing a variety of topics, this research theme most recently has focused on contaminants and harmful algal blooms. However, the 2009 RFP sought proposals looking at marine diseases and biotoxins, while the 2010 RFP expanded the focus to invasive species, marine spatial planning and benthic studies. The Board funded six projects over the two years, ranging from tools for detecting PSP-causing organisms; the assessment of health conditions of subsistence fish and shellfish; and the understanding of the distribution and transmission of *Ichthyophonus* to improve Alaskan shellfish safety. Other studies are exploring the shoreline change on Sagavanirktok Delta and coastal erosion/accretion processes in Hooper Bay, Alaska.

## OTHER RESEARCH AND PARTNERSHIPS

### OCEAN CHALLENGES

NPRB members represent a broad array of federal, state, and other entities involved in research off Alaska. By its very composition and nature, the Board can provide coordination among research groups and encourage partnerships and other approaches to research. The *Science Plan* encourages cooperation with industry, and in the 2009 and 2010 requests for proposals, the Board sought proposals that partnered with both the fishing industry and the oil and gas industry. A total of five projects, some mentioned previously in their respective research theme categories, received more than three-quarters of a million dollars to study ways to reduce bycatch mortality in commercial crab fisheries; sperm whale depredation; shoreline change on Sagavanirktok Delta; alternative catch monitoring in Alaska and evaluating and comparing three independent methods for estimating red king crab biomass in Southeast Alaska.

## INTEGRATED ECOSYSTEM RESEARCH PROGRAMS

### FROM PHYSICS TO FISH

In the 2005 *Science Plan*, the National Research Council strongly urged the Board to develop integrated research programs for each of the large marine ecosystems off Alaska, with initial focus on the Bering Sea and Aleutian Islands.

## BERING SEA INTEGRATED ECOSYSTEM RESEARCH PROGRAM

NPRB's first integrated ecosystem program, the Bering Sea Integrated Ecosystem Research Program (BSIERP), was launched in 2007 as a six-year, \$16 million project (in-kind support from agencies) that partnered with the Bering Sea Ecosystem Study (BEST) at the National Science Foundation (NSF) to become the \$52 million Bering Sea Project. The goal is to improve our understanding of how the Bering Sea may respond to climate change, particularly as mediated through changes in seasonal ice cover.

Alaska's Bering Sea fisheries provide nearly half of the seafood consumed in the U.S., forming a powerful economic engine for fishing communities and the core of an ocean-based subsistence lifestyle. Climate changes and dynamical seasonal ice cover will significantly impact the Bering Sea ecosystem. This program seeks to understand the mechanisms that create and sustain this highly productive ecosystem, and how they might be altered over time. A downloadable Bering Sea Project "at-a-glance" brochure on the project website at [bsierp.nprb.org](http://bsierp.nprb.org) introduces and explains the program.

Three years of Bering Sea Project fieldwork concluded in early October 2010. A back-of-the-envelope tally works out to an astonishing 24,205 person-days of fieldwork! For scale, that translates to more than 93 years for one person working full time year-round. It reflects a tremendous effort from all involved in this massive, safe, and successful effort -- scientists, postdocs, students, technicians, ships' crews, research assistants, support staff, and volunteers!

To ensure synthesis across disciplines, and between observational and ecosystem modeling scientists, researchers have met annually to share their findings, revisit the core hypotheses, and describe headline-level conclusions. In Girdwood in October 2009, some initial observations about sea ice in the Bering Sea during two cold years indicated that:

- the northern Bering Sea will remain ice covered and cold,
- microzooplankton consume more primary production than originally thought and, together with other zooplankton, retain more production in the water column,
- overwinter survival of age-zero pollock is low in warm years, and
- seabirds, but not fur seals, follow changes in prey locations and availability each year.

A recent article in the American Geophysical Union's newsletter, *Eos Transactions* Vol. 91, No. 48 30 November 2010, "How Does Climate Change Affect the Bering Sea Ecosystem?" highlights findings to date. And a special Bering Sea Project issue of the journal *Deep Sea Research II* is in production for publication in 2011.

Education and outreach strategies for the Bering Sea project continue to focus on sharing information with regional and national audiences about how scientists and local communities are learning about changes in the vital Bering Sea ecosystem. NPRB arranged for teachers and journalists to join scientists in remote field sites and at sea, and helped scientists visit coastal communities. Many of their experiences were captured on the project website ([bsierp.nprb.org](http://bsierp.nprb.org)), which features the complexity of studying the Bering Sea. Some scientists catch murrens on remote cliffs to study their diets. Some crunch through thick sea ice with the U.S. Coast Guard to study the bottom of the sea. Some build an integrated model to attempt to explain this ecosystem and predict the future. Some report on their activities at scientific conferences and community events. Others visit village elders to get their perspective on how things are changing. The project website captures it all in near-real-time and changes with each new report from the field. Chief scientists, teachers at sea, radio journalists, and NPRB staff help tell the story of this innovative field science and ecosystem modeling partnership through blogs, photographs, and media reports.



## BERING SEA RESOURCES FOR EDUCATORS

Teachers and journalists from all over the country and in remote communities on the shores of the Bering Sea have participated in the six-year study, often working side-by-side with scientists in the field. They've shared their experiences with students in real time, and later through activities and classroom visits with scientists, and with national and regional media.

During a four-day workshop in October 2010, co-hosted by the Arctic Research Consortium of the U.S. (ARCUS), the North Pacific Research Board, COSEE Alaska and EARTH/MBARI, teachers who went to sea came back together with the researchers they worked with to create a collection of educational resources focused on understanding the impacts of climate change and dynamic sea ice cover on the eastern Bering Sea ecosystem. The online Bering Sea Ecosystem Resource Collection uses BEST-BSIERP hypotheses and focal areas as a guide and includes individual activities, lesson plans, videos, and presentations that will educate the next generation about this complex ecosystem study. (<http://www.polartrec.com/collections/bering-sea-ecosystem>)

## GULF OF ALASKA INTEGRATED ECOSYSTEM RESEARCH PROGRAM

In 2010, the Board launched a second integrated ecosystem research effort, this time focused on the Gulf of Alaska. The Gulf of Alaska is dominated by the strongest and most persistent currents found along either coast of North America. These conditions reflect the influence of weather and climate and provide the link to efficiently transfer physical and biological “signals” from lower latitudes of the North Pacific Ocean into the northern Gulf of Alaska.

From 2010 to 2014, the Gulf of Alaska Project will be looking at the gauntlet that commercially important young-of-the-year groundfishes face from oceanic conditions to predators. A total of \$17 million is available for the project. The North Pacific Research Board is contributing \$9 million, combined with \$8 million in matching/in-kind funds from the National Oceanic and Atmospheric Administration (Alaska Fishery Science Center and Pacific Marine Environmental Laboratory), the U.S. Fish and Wildlife Service, Dalhousie University and the U.S. Geological Survey.

More than 40 scientists from 11 institutions are taking part in this five-year interdisciplinary study of one of Alaska’s most productive marine ecosystems. They’re heading to sea in two field years (2011 and 2013) combined with analysis and synthesis and the development of ecosystem models. A Gulf of Alaska Board of Investigators (GABI) comprised of the lead scientists of each component will guide the overall efforts, working closely with the NPRB staff on project and data management.

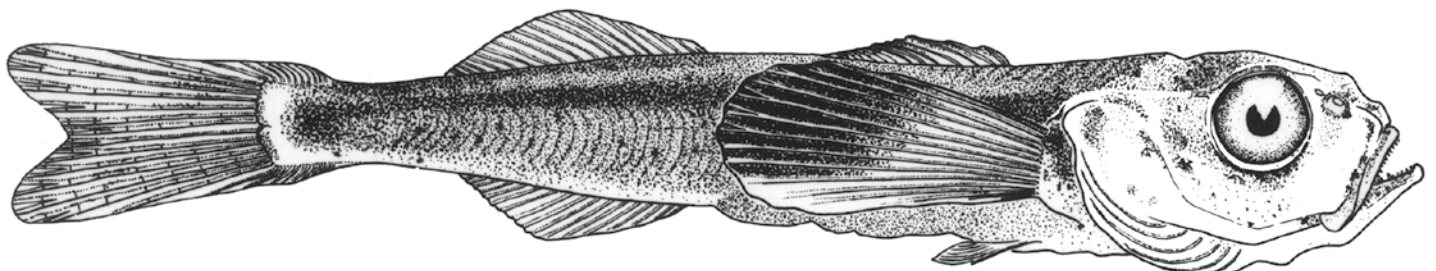
The program encompasses upper trophic levels, forage fishes, lower trophic levels and oceanography as well as ecosystem models. Three core hypotheses are driving the Gulf project:

- **The gauntlet:** The primary determinant of year-class strength for marine groundfishes in the GOA is early life survival. This is regulated in space and time by climate-driven variability in a biophysical gauntlet comprising offshore and nearshore habitat quality, larval and juvenile transport, and settlement into suitable demersal habitat.
- **Regional comparison:** The physical and biological mechanisms that determine annual survival of juvenile groundfishes and forage fishes differ in the eastern and western GOA regions.
- **Interactions:** Interactions among species (including predation and competition) are influenced by the abundance and distribution of individual species and by their habitat requirements, which vary with life stage and season.

In May 2010, researchers and graduate students met with the NPRB project team in Seattle to refine their objectives and establish detailed field plans amongst the different trophic levels. They also conferred with ecosystem modelers to ensure all the necessary observational data that would feed the models was to be collected. They also discussed plans for education and outreach, and NOAA team members set up a SharePoint site for efficient communication. A project website is under development at [www.gulfofalaska.nprb.org](http://www.gulfofalaska.nprb.org)

## GULF PROJECT COMMUNICATION, EDUCATION AND OUTREACH

As the science program got underway in the fall of 2010, the NPRB team began gathering photos and biographies of the scientists for initial communication tools, including a project website ([gulfofalaska.nprb.org](http://gulfofalaska.nprb.org)), a pop-up exhibit and a brochure. A survey of educational resources, videos, podcasts, and other media relating to the Gulf project was commissioned to enrich the website and set the stage for a professional development workshop to take place in the summer of 2011. Twenty-four teachers, informal educators, scientists, and communications experts will gather in Kasitsna Bay to create the “Gulf of Alaska Online Resource Collection” focused upon the core hypotheses of the project. The workshop, sponsored by NPRB and EARTH at MBARI, with COSEE Alaska and the Alaska Ocean Observing System, will also create synergies between research and outreach organizations in the Gulf region.



Juvenile sablefish.

Illustration by Henry Orr, NOAA

## ARCTIC PLANNING

Climate change is one of the most significant agents of change in marine ecosystems of the Alaska Arctic and beyond. Temperatures influence the geographic distribution of marine organisms, the flow of energy within the ecosystem, and ecosystem productivity and resilience. Over the next decade, most of the present ice-covered areas are likely to decrease in extent, especially in summer. These physical changes may lead to changes in primary and secondary production and have impacts on fish production. Areas in the Arctic occupied by benthic communities of Atlantic and Pacific origin likely will increase, displacing colder-water species, especially those with narrow temperature range preferences. A northward shift in the distribution of many species of fish is also anticipated, which could lead to extinction of some current Arctic species.

The Board has funded a number of projects throughout the years relevant to such Arctic issues, most notably #503, a synthesis of research issues and needs in the Arctic Ocean. Overarching research needs include data rescue and archiving, integrated analysis tools, interdisciplinary approaches, long-term time series, integration and collaboration among agencies, year-round observations, infrastructure support for research, modeling, and taxonomic expertise. As such, the synthesis has proven very helpful in identifying science issues related to the Pacific-Arctic Gateway region of the proposed Distributed Biological Observatory.

In 2009, NPRB partnered with the Alaska Ocean Observing System to facilitate an Arctic workshop as part of the Alaska Marine Science Symposium in January. Its goal was to share information and promote collaboration among entities with increasing activities in marine research and monitoring in the high Arctic. In September 2009, the Board received a workshop report and incorporated some of its priorities into the 2010 RFP.

In January 2010, the Board received a status report from staff that reviewed various initiatives that have increased momentum for Arctic research, and made the following observations:

1. Although NPRB most likely will be a minor player in Arctic research because of limited funds, some level of involvement is warranted.
2. The Board wants to be responsive to the needs of the Council fishery management plan, but there is not much going on in fisheries in the Pacific side of the high Arctic beyond minor amounts of Arctic cod and some salmon species. This will probably be true for some time to come.
3. NPRB's emphasis should be on building partnerships with major agencies, including NSF, and the Board should continue to coordinate and collaborate with other Arctic research providers.



Lisa Sheffield Guy

The following May, the Executive Director presented a draft Arctic strategy discussion paper and noted that roughly \$3 million could be made available from the Board's funds over the next six or so years for an Arctic program without unduly impacting other programs. In September, the Board discussed how to move forward while balancing increasing enthusiasm for Arctic research with the need for a strategic and well-coordinated approach, given the high logistics costs in the Arctic and the many overlapping planning efforts among agencies and institutions. A workgroup of Board members was formed to draft a possible long-term strategy. At the same time, the Board placed an Arctic focus section in its 2011 RFP with an emphasis on fish stocks, particularly Arctic cod, and fish habitat in the St. Lawrence Island to Barrow region proposed for the Distributed Biological Observatory. Other Arctic topics, such as monitoring from platforms and oil spill research were included as well. And of course, many of the other topics placed in the RFP could result in research projects in the Arctic marine ecosystem.

The Board's Arctic workgroup met in Anchorage in December 2010, and received information from other agencies on their plans and funding for 2013-14. Agency representatives summarized their programs and a report of recent workshops on a proposed Bering Strait Observatory was also presented. The NPRB Executive Director shared that in terms of an Arctic program, the Board has been focusing on the region of the proposed Distributed Biological Observatory that ranges from the northern Bering Sea through Bering Strait into the southern Chukchi Sea to Barrow. He also mentioned that there are opportunities for a number of agencies to come together in a partnership to support long-term monitoring and change detection, as well as to support a more comprehensive field program in 2013 or 2014. The Board workgroup meeting concluded with a lot of community support for moving forward with a comprehensive planning process and keeping synergies going through workshops and future meetings.

The \$3 million in projects that NPRB has funded thus far, related to the Arctic, comprises about 8.2 percent of NPRB's overall research funding. The Board may continue to fund Arctic studies through annual requests for proposals, but still needs to determine whether or not to move forward with a larger, more comprehensive program as noted above. Work on this issue will continue in 2011.

## COMMUNICATION, EDUCATION AND OUTREACH

The Board supports a robust program of education and outreach that shares research results with a variety of audiences, from scientists and resource managers to community members, educators, students, and the public. Staff visit communities and schools during careers fairs and as part of science classes, and NPRB funded-scientists share their research with audiences all over the country by working with schools, museums, and public aquariums. In the fall of 2010, the Communication and Outreach Director was invited to a North Pacific Marine Science Organization (PICES) FUTURE Advisory Panel on Status, Outlooks, Forecasts, and Engagement to share NPRB's program with international scientists.

**Communicating Ocean Science Workshop at the Alaska Marine Science Symposium:** This popular workshop for scientists, journalists, and educators once again launched the Alaska Marine Science Symposium in 2009 and 2010. Speakers from all over the U.S. shared best practices in communication, education, and outreach in the free workshop co-sponsored by NPRB, the Alaska Ocean Observing System and COSEE Alaska.

**Photo Contest, Calendars and Exhibits:** The annual photo contest brings in hundreds of images from amateurs, researchers and professional photographers each year, and finalists were featured in the 2010 and 2011 calendars produced during this report period. NPRB gives the calendar to scientific reviewers, participants in the Alaska Marine Science Symposium, and educators and students. A traveling exhibit of winning photographs appeared in a popular local café in August 2010, reaching more than 34,000 locals and tourists with NPRB's mission and research themes. The Alaska SeaLife Center also exhibits a dozen of the images in Seward.

**NPRB Foundation Report 2001-2008:** In the spring of 2010, the Board published a 286-page report summarizing the development of the research program and science management policies developed during the first eight years.

**Research Summaries:** Magazine-style research summaries for each ecological theme appeared in the NPRB Foundation Report and were reprinted as seven stand-alone publications in the summer of 2010 to share research results in a colorful format with popular audiences.

**Science Fairs:** To encourage students to pursue careers in ocean science, NPRB sponsors special awards at the Alaska State Science and Engineering Fair each year for elementary, middle school, and high school students. Awards include a cash prize and a behind-the-scenes tour at the Alaska SeaLife Center. Winners in 2009 and 2010 excelled in their presentations and content and include:

### 2009 State Science Fair Marine Science Award Winners:

#### Elementary School

**Sebastian Quin Szweda Middlestadt, Girdwood K-8**  
*Tidal Power vs. Indian Creek*

#### Middle School

**Kendall Masten, Kotzebue Middle School**  
*Where's the Salt?*

#### High School

**Kelsey Meacham, 9th grade, West High School, Anchorage**  
*Cook Inlet: Correlation between Air Temperature Trends and Intra-seasonal Sea Ice Extent Variability*

### 2010 State Science Fair Marine Science Award Winners:

#### Elementary School

**Jimmy Jones and Michael Hooton, Quinhagak**  
*Salmon Life Cycle*

#### Middle School

**Ben Cohen, Colony Middle School, Palmer**  
*Effect of Acidity on Shell Weight*

#### High School

**Kelsey Meacham, West High School, Anchorage**  
*The Effect of Increased CO<sub>2</sub> Emissions on Coastal Erosion Contributors in Alaska*



NPRB's Francis Wiese  
with Ben Cohen



Kelsey Meacham with  
NPRB's Carrie Eischens

Nora Deans (both)



## GRADUATE STUDENT RESEARCH AWARDS

Every year, NPRB offers five graduate student research awards of \$20,000 each to encourage students to pursue scientific and scholarly research that addresses management and ecosystem issues in northern seas. In both 2009 and 2010, the Board gave out six awards due to the excellent applications received and reviewed by the Science Panel, Advisory Panel and the Board. To help address a projected shortage of stock assessment scientists in 2010, the Board reserved and awarded two of the GSRA's for students pursuing quantitative stock assessment research.



## GRADUATE STUDENT RESEARCH AWARD WINNERS 2009-2010

Year	Name	Degree	University	Topic	Title
2010	Hannah Voorhees	PhD	Univ Pennsylvania	humans	Cultural and social impacts of environmental co-management in Northwest Alaska: an anthropological study of Inupiaq participation in scientific monitoring of "at risk" subsistence marine mammals
2010	Julie Raymond Yakoubian	PhD	Univ Alaska Fairbanks	humans	Salmon and identity in Alaska's Bering Strait region
2010	Matthew Sexson	PhD	Univ Alaska Fairbanks	seabirds	Spatiotemporal variation in the non-breeding habitat use of spectacled eiders
2010	Janelle Mueller	MS	Univ Alaska Fairbanks	fishes & invertebrates	Effects of the age-composition of spawning sockeye salmon on future returns of sockeye salmon to Bristol Bay, Alaska
2010	Jory Stariwat	MS	Univ British Columbia	humans	Lewis Point, a seasonal subsistence fish camp in transition: Negotiations in a mixed cash/subsistence economy 1980-2011
2010	Jonathan Richar	MS	Univ Alaska Fairbanks	fishes & invertebrates	Recruitment mechanisms of the Tanner crab in the eastern Bering Sea
2009	Nathan Jones	MS	San Jose State Univ / Moss Landing Marine Labs	seabirds	Foraging dynamics of thick-billed murres in the Bering Sea
2009	Megan Winton	MS	San Jose State Univ / Moss Landing Marine Labs	fishes & invertebrates	Age, growth, and demography of the rougtail skate from the eastern Bering Sea, with a revised model from the west coast of the United States using histology
2009	Jill-Marie Seymour	MS	Univ Alaska Fairbanks	marine mammals	Pacific walrus feeding ecology and possible links to trichinellosis
2009	Rachael Orben	MS	Univ California Santa Cruz	seabirds	Winter distribution and ecology of black-legged kittiwakes and thick-billed murres breeding at three Bering Sea colonies with differing population trends
2009	Helen Esch	PhD	MA Inst Technology / Woods Hole Oceanographic Institute	marine mammals	Monitoring marine mammal occurrence in the Bering Sea using passive acoustics
2009	Jodie Pirtle	PhD	Univ Alaska Fairbanks	fishes & invertebrates	Nursery habitat, predation, and survival of early benthic phase red king crab

## SCIENCE MEETINGS AND EVENTS

The North Pacific Research Board provides financial and in-kind support to a variety of ocean science related activities, including the annual Alaska Marine Science Symposium (AMSS). NPRB staff play a major role in organizing the Symposium, which draws scientists from Alaska, the Pacific Northwest, the rest of the U.S., Canada, and Russia. The 2009 conference drew more than 600 participants, with nearly 800 attending the 2010 conference. A record attendance was expected for the 2011 Symposium, with the majority of the planning ongoing through the fall of 2010. The AMSS is becoming one of the premiere ocean science conferences in the country. Each year, NPRB, along with Alaska Sea Grant, sponsors student awards for best master's and PhD oral and poster presentations to encourage graduate students to excel at communicating about their science.

During 2009 and 2010, the Board supported 14 science meetings as well as student and community resident travel to meetings for a total of \$254,326.

Activity	Date Approved	Meeting Date	Location	Support
Alaska Marine Science Symposium 2009		Jan-09	Anchorage, AK	\$28,000
International Arctic Fisheries Management Workshop	Apr-08	Oct 19-21, 2009	Anchorage, AK	\$32,826
Kachemak Bay Science Conference	Apr-08	Mar-09	Homer, AK	\$4,600
PICES Climate Change Effects on Fish and Fisheries: Forecasting Impacts, Assessing Ecosystem Responses, and Evaluating Management Strategies Conference	Apr-09	Apr 26-29, 2010	Sendai, Japan	\$30,000
Ecosystem Studies of Sub-Arctic Seas Open Science Meeting 2011	Sep-09	May-11	Seattle, WA	\$30,000
Alaska Marine Science Symposium 2010		Jan-10	Anchorage, AK	\$28,000
Travel grants for students to AMSS 2010		Jan-10	Anchorage, AK	\$6,329
International Sea Duck Conference	Jan-10	Sep-11	Seward, AK	\$10,000
World Seabird Conference	Jan-10	Sep 7-11, 2010	Victoria, B.C.	\$10,000
Rural resident attendance at Community and Subsistence Workshop regarding Northern Bering Sea Research Plan	Jan-10	Feb 24-25, 2010	Anchorage, AK	\$16,000
Student travel support to international symposium: Ecosystems 2010: Global Progress on Ecosystem-based Fisheries Management	May-10	Nov 8-11, 2010	Anchorage, AK	\$10,000
Annual Meeting of Western Association of Fish and Wildlife Agencies	Oct-09	Jul-10	Anchorage, AK	\$5,000
Retrospective Analysis of Regime Shift Data by Hare and Mantua in 2009	Part of BSIERP - approved for EMC in Sept 2008			\$23,571
PICES-ICES 5th Zooplankton Production Symposium	Sep-10	Mar 14-18, 2011	Pucon, Chile	\$4,000
14th Alaska Bird Conference	Sep-10	Nov 16-18, 2010	Anchorage, AK	\$1,000
NPAFC Production Trends of Pink and Chum Salmon International Workshop	Sep-10	Oct 2011 or April 2012	Nanaimo, BC	\$5,000
2010 Marine Mammals of the Holarctic Conference	Sep-10	Oct-10	Kaliningrad, Russia	\$10,000

# BOARD, COMMITTEE AND STAFF ENGAGEMENT

## SUMMARY OF BOARD MEETINGS

The Board met ten times during 2009-2010. Six meetings were in Anchorage, one was in Juneau, and three were by teleconference. Highlights of those meetings include:

### March 2-3, 2009 - Anchorage

The Board approved a new subaward compliance policy to append to all future requests for proposals and new subaward agreements. The other main item on the agenda was the review of nine pre-proposals received in response to its request for upper trophic level (UTL) pre-proposals for the Gulf of Alaska Integrated Ecosystem Research Program (GOAIERP). The Board decided to invite five full proposals for the GOAIERP UTL component.

### April 29-30, 2009 - Anchorage

The Board met mainly to review proposals received in response to the 2009 annual request for proposals. Of 85 submitted proposals, the Board funded 25 new projects for a total of \$3,466,235. The Board approved six graduate student awards for \$20,000 each. The Board also approved photo contest winners and received status reports on the budget, the integrated ecosystem research projects and various meetings and symposia.

### May 29, 2009 - Anchorage

The Board selected the full proposal for the UTL for the GOAIERP – the Moss *et al* proposal: “Surviving the Gauntlet: A comparative study of the pelagic, demersal and spatial linkages that determine groundfish recruitment and diversity in the Gulf of Alaska ecosystem.”

### September 17-18, 2009 - Anchorage

The Board finalized and approved release of the 2010 annual request for proposals with an overall funding target of \$3.8 million. The Board also received status reports on the integrated ecosystem research programs for the Bering Sea and Gulf of Alaska, as well as on developing a research strategy for the Arctic, and initiating a program review of NPRB using an external Committee of Visitors.

### January 6-7, 2010 - Anchorage

The main purpose of this meeting was to review full proposals for the remaining components of the GOAIERP. The Board set a cap of \$9 million for the overall program and proceeded to approve proposals to carry out research at the lower trophic and mid-trophic levels. Applicants for two modeling proposals were asked to resubmit revised proposals. The Board also received



**NPRB Board Meeting 2009:** Back row: Howard Horton, Gerry Merrigan, Dorothy Childers, Chris Oliver, Steve MacLean, Heather McCarty, CAPT Michael Cerne, Dennis Wiesenberg, John Hilsinger, Phil Mundy, John Gauvin, CDR Benjamin Reeder, Michelle Longo Eder, Paul MacGregor Front row: Ian Dutton, Clarence Pautzke, Leslie Holland-Bartels.

major reports on the external Committee of Visitors review and Arctic planning, and approved funding for several meetings. The Board approved a contribution of up to \$100,000 total for two years of monitoring work along the Seward Line, contingent on a consortium being successfully developed to provide the remaining funds necessary.

#### **May 4-6, 2010 - Anchorage**

The Board reviewed proposals in response to the 2010 RFP. Out of 112 proposals received, the Board recommended funding for 22 proposals, totaling \$3,927,532. The Board took further action to finalize most components of the GOAIERP and approved a modeling proposal as part of the \$9 million Gulf Project. The Board funded six more graduate student research awards for \$20,000 each. The Board received a report on a proposed Distributed Biological Observatory planned by NOAA for the region ranging north from St. Lawrence Island to Barrow and discussed how such an observatory might play a pivotal role in its Arctic planning. The Board also approved photo contest winners.

#### **June 18, 2010 – Teleconference**

The main purpose of this meeting was to further consider the Steller sea lion and seabird components of the GOAIERP. The Board retained the seabird component, revised the total cost of the program to \$9,027,429, and requested an expert group, under the auspices of the Science Panel, to fully evaluate the need and scope of a marine mammal component for the GOAIERP and report back to the Board in September.

#### **July 14, 2010 – Teleconference**

The purpose of this teleconference was to meet with the external Committee of Visitors regarding their serious concerns with the GOAIERP. These concerns focused on the Committee's perceptions that the individual proposals were not strong or well integrated and that choosing the UTL component first limited the intellectual involvement of the mid- and lower-trophic levels and modeling researchers. They also believed that the GOAIERP did not take into account or address the fact that the controlling factors are on a longer time scale than the proposed study time frame. These and other concerns were discussed by the Board after the COV left the teleconference, and a schedule was set for having the Science Panel review the concerns and report to the Board, before the proposed GOAIERP was submitted to the Secretary of Commerce for formal review and approval.

#### **August 25, 2010 – Teleconference**

The Board received recommendations of the Science Panel with regard to the issues raised by the Committee of Visitors, i.e., answering the question: should the Board submit the GOAIERP for Secretary of Commerce review? The Science Panel indicated that they did not agree with the Committee of Visitors' assessment that the GOAIERP was fundamentally flawed, but rather that most of the concerns had been identified and discussed by the Panel and were being resolved. The Science Panel thus did not see a reason for withholding the program from going

forward to Secretarial review. After thorough discussion with the Panel, the Board directed staff to submit the package to Secretarial review by August 31, 2010.

#### **September 22-24, 2010 – Juneau**

The main purpose of this meeting was to finalize the research priorities in the annual request for proposals for 2011, to be released in early October. The Board reviewed its budgets and set an overall target funding of \$3.55M for the 2011 RFP. It also decided to revise the RFP to be cyclical in nature, thus providing funding for some topics one year and emphasizing other major topics another year. This resulted in seabird work being dropped for 2011 in favor of marine mammal research, and the reverse will take place next year. Other topical areas were cycled as well. The Board approved release of the revised RFP on October 8, 2010. The Board also heard back from the Science Panel regarding the marine mammal component for the GOAIERP. The Panel concluded that, given the focus of the program, such a component was not necessary. The Board also was informed that the Secretary of Commerce had approved the GOAIERP as submitted. Status reports were given on the Bering Sea IERP and Arctic planning. The Board approved funding for several conferences.

#### **December 15, 2010 – Anchorage**

The Board interviewed final candidates for the executive director position upon the retirement of Dr. Clarence Pautzke in January 2011, and selected Dr. Cynthia Suchman.



BOARD MEMBERS 2009-2010

Name	Affiliation	Term	Office
Sue Aspelund	Alaska Department of Fish & Game	For Hilsinger (September 2009, September 2010)	
David Benton	North Pacific Fishery Management Council, Special Fishing Industry Representative	through March 2009	Chairman through March 2009
Nancy Bird	Oil Spill Recovery Institute	2005 through 2010	
Geron Bruce	Alaska Department of Fish & Game	For Hilsinger (May 2009)	
CAPT Michael Cerne	U.S. Coast Guard	2007 through 2010	
Dorothy Childers	Alaska (Environmental Interest)	2004 through 2010	
Dr. Douglas DeMaster	National Oceanic and Atmospheric Administration	2005 through 2010	
Dr. Ian Dutton	Alaska SeaLife Center	2008 through 2010	Chairman starting April 2009
Michele Longo Eder	U.S. Arctic Research Commission	2005 through 2010	
John Gauvin	Washington	2001 through 2010	
Dr. Peter Hagen	National Oceanic and Atmospheric Administration	For DeMaster (March 2009, April 2009, June 2010)	
John Hilsinger	Alaska Department of Fish & Game	2008 through 2010	
Dr. Leslie Holland-Bartels	U.S. Geological Survey	2004 through 2010	
Dr. Howard Horton	Oregon	2002 through 2010	
John Iani	Washington	2004 through 2010	
Paul MacGregor	Washington	2004 through 2010	
Steve MacLean	Alaska (Alaska Native Interest)	2008 through 2010	
Dr. Gary Matlock	National Oceanic and Atmospheric Administration	For DeMaster (March 2009, April 2009)	
Heather McCarty	Special Fishing Industry Representative	Started July 2009, first meeting September 2009	
Gerry Merrigan	Alaska (Fishing Interest)	2004 through 2010	
CDR Shane Montoya	U.S. Coast Guard	For Cerne (September 2009, May 2010)	
Dr. Phil Mundy	National Oceanic and Atmospheric Administration	For DeMaster (May 2010)	
Chris Oliver	North Pacific Fishery Management Council	For Olson (May 2010)	
Eric Olson	North Pacific Fishery Management Council	2007 through 2010	Vice Chair, April 2008 through 2010
Pam Pope	Alaska (Oil and Gas Interest)	2001 through 2010	
CDR Benjamin Reeder	Office of Naval Research	2010	
Diane Sanzone	Alaska (Oil and Gas Interest)	For Pope (September 2010)	
Dr. Denis Wiesenburg	Alaska (Academic Interest)	2004 through May 2010	



## COMMITTEES AND PANELS

NPRB committees and panels help identify science, management, and monitoring needs. Minutes of all committee meetings are available in the Board office and/or on the NPRB website at <http://www.nprb.org/meetings/index.html>

### Advisory Panel

The NPRB Advisory Panel serves as a bridge between knowledge derived through scientific research and the experiential understanding gained over time and shared by community members. This group represents broad constituencies associated with Alaska coastal areas and users of the marine environment. Advisory Panel members make recommendations to the Board to help it accomplish its overall mission of fielding a high-caliber, comprehensive research program that will improve our understanding of the Gulf of Alaska, Bering Sea and Aleutian Islands, and Arctic Ocean ecosystems and their fisheries, and help to sustain and enhance the living marine resources. The Advisory Panel met in April and September in 2009 and in May and September in 2010, immediately preceding the Board meetings. They also met a fifth time for a special meeting to discuss the Gulf of Alaska Integrated Ecosystem Research Program.

#### ADVISORY PANEL 2009 - 2010

Helen Chythlook	Dillingham	
Gary Freitag	Ketchikan	
Justine Gundersen	Nelson Lagoon	through May 2009
Ron Hegge	Grand Junction, CO	
Shirley Kelly	Anchorage	Vice Chair full time
Frank Kelty	Dutch Harbor	
Vera Metcalf	Nome	
Mike Miller	Sitka	
Jeff Stephan	Kodiak	
Arni Thomson	Anchorage	
Gale Vick	Fairbanks	Chairman full time
Kim Williams	Dillingham	

### Science Panel

Composed of experts in the fields of oceanography, ecosystems dynamics, fish ecology, marine mammal and seabird biology, and social sciences, as well as other disciplines, the NPRB Science Panel met in regularly scheduled meetings in April and August in both 2009 and 2010 to review proposals and advise regarding the annual request for proposal for the following year. Three additional meetings focused on the Gulf of Alaska Integrated Ecosystem Research Program.

#### SCIENCE PANEL 2009-2010

Dr. Vera Alexander	University of Alaska Fairbanks	2002 through 2010
Dr. Elizabeth Andrews	Retired, Alaska Department of Fish and Game	April 2009 through December 2010
Dr. Richard Beamish	Fisheries and Oceans Canada	December 2002 through 2010
Dr. James Berner	AK Native Tribal Health Consortium	December 2002 through 2010
Dr. Michael Dagg	Louisiana Universities Marine Consortium	March 2005 through September 2010
Dr. Robert Gisiner	Marine Mammal Commission	March 2009 through September 2010
Dr. Stewart Grant	Alaska Department of Fish and Game	starting January 2010
Ms. Pat Livingston	NOAA Alaska Fisheries Science Center	December 2007 through 2010
Dr. Seth Macinko	University of Rhode Island	March 2005 through 2010
Dr. John Piatt	U.S. Geological Survey	March 2005 through September 2010
Dr. Andre Punt	University of Washington	May 2005 through 2010
Dr. Cheryl Rosa	U.S. Arctic Research Commission	September 2008 through 2010
Dr. Tom Royer	Old Dominion University	December 2002 through 2010
Dr. Patricia Tester	NOAA-NOS Center for Coastal Fisheries and Habitat Research	December 2002 through 2010
Mr. Bill Wilson	Retired, North Pacific Fishery Management Council	starting May 2010
Mr. David Witherell	North Pacific Fishery Management Council	December 2002 through 2010
Dr. Douglas Woodby	Alaska Department of Fish and Game	December 2002 through 2010; Chairman full time 2008 through 2010

## POLICY REVISIONS

The Board adopted the following changes to standing policies:

### **Final Subaward Compliance Policy: March 2009**

This was adopted in March 2009 and was included in its entirety in the NPRB Foundational Years Report for 2001-2008, available on the website: [www.nprb.org](http://www.nprb.org)

### **Three-year Term Limit for Fishing Industry Seat Member on Executive Committee: March 2, 2009**

The Executive Committee, in choosing Heather McCarty for the special fishing industry seat on the ExCom, agreed that it was a term appointment and that any new member for that special seat could only serve one three-year term without standing down for at least a term.

### **Travel Reimbursement: April 2009**

Board revised its travel reimbursement policy. All future travel would be reimbursed on a per diem basis rather than actual costs to reduce difficulties in monitoring acceptable expenditures.

### **Advisory Panel Memberships: May 2010**

The Board approved a new Advisory Panel policy to allow for two consecutive three-year terms (versus two-year terms in the previous policy) and the appointments will be staggered to provide for the appointment of up to one-third of the membership of the panel each year. The Board will issue a public call each fall for nominations to serve on the panel for those appointments facing expiring terms.

## STAFF CHANGES

In 2009, Dr. Carrie Eischens was promoted to Program Manager, overseeing the regular science program, and Tom Van Pelt was also promoted to Program Manager for the Bering Sea Integrated Ecosystem Research Program.

In May 2010, founding Executive Director Dr. Clarence Pautzke announced his retirement effective January 28, 2011. After a national search for a new director, the Board interviewed candidates in the fall and selected Dr. Cynthia Suchman from the National Science Foundation (NSF) in Arlington, Virginia, where she has served as an associate program director in the Division of Ocean Sciences for the past three years. She will begin on June 1, 2011.

In the spring of 2010, Carolyn Rosner, Visual Information Specialist, left Alaska for Reno, Nevada and became a half-time virtual staff member, continuing to create publications and web designs and content for NPRB. Katie Blake joined NPRB in June of that year as a temporary assistant and joined the team fulltime as executive assistant in the fall. Nora Deans became Communications and Outreach Director in the spring, and assumed fulltime duties for NPRB in December 2010.

### **NPRB Staff 2009- 2010**

Dr. Clarence Pautzke, Executive Director  
 Dr. Francis Wiese, Science Director  
 Dr. Carrie Eischens, Program Manager  
 Tom Van Pelt, Program Manager  
 Nora Deans, Communication and Outreach Director  
 Igor Katrayev, Data Systems Manager  
 Carolyn Rosner, Visual Information Specialist  
 Katie Blake, Executive Assistant

### **Alaska SeaLife Center Financial Support**

Jeanette Hanneman, Grant Technician  
 Kellee Weaver, Grant Technician  
 Jilian Chapman, Grants and Contracts Manager  
 Dr. Tara Riemer Jones, Chief Operating Officer



# PERFORMANCE SUMMARY

## COMMITTEE OF VISITORS REPORT TO THE NPRB

During 2010, the Board invited a complete review of its programs, policies, and procedures by an external Committee of Visitors (COV):

- Dr. Linda Shapiro, Professor Emeritus, University of Oregon (Chair);
- Dr. M. Robin Anderson, Marine Habitat Research Scientist, Northwest Atlantic Fisheries Centre, Fisheries and Oceans Canada;
- Dr. Hal Batchelder, Executive Director, U.S. GLOBEC NEP Program, Oregon State University;
- Dr. Jim Harvey, Professor and Chair, Moss Landing Marine Laboratories, San Jose State University;
- Dr. Eileen Hofmann, Professor, Center for Coastal Physical Oceanography, Old Dominion University;
- Dr. Bruce Leaman, Executive Director, International Pacific Halibut Commission;
- Dr. Bill Peterson, NOAA Fisheries, Hatfield Marine Science Center and,
- Lisa Webb, COV Staff Support, Moss Landing Marine Laboratories, San Jose State University.

The Committee relied on interviews with staff, Board members, and volunteer members of the Advisory Panel and Science Panel, as well as on a survey conducted by Drs. Denise Lach and Brent Steel of Oregon State University, and on their own judgment. The Lach-Steel survey was conducted online during July and August of 2010. It reached 1,298 scientists and managers with 336 responses, a 26 percent response rate. The COV reported that NPRB was viewed favorably by most respondents, although those with negative responses identified several recurrent themes. The COV concluded that some of these may be founded in fact, but others are likely misconceptions based on an absence of information. The COV released their final report in December 2010, identifying programmatic strengths and weaknesses, which they used as a basis for recommendations intended to improve the performance of the NPRB program.

### Executive Summary

Overall, the COV reported that they found a very strong and productive program that is becoming a major source of scientific information in the North Pacific. They commended especially the *Science Plan*, the Alaska Marine Science Symposium, the Bering Sea Integrated Ecosystem Research Program (BSIERP), continued support of the Seward Line, the executive director and his staff, and the outreach and education program.

In the full report, the COV noted three areas of deficiencies, needing immediate attention and strong action on the part of the Board of Directors: 1) selection procedure for funding proposals under the Gulf of Alaska Integrated Ecosystem Research Program; 2) need for greater transparency in the generation of the annual request for proposals and the proposal review process, and 3) the lack of an appropriate conflict of interest policy. They emphasized that while the discussion of these deficiencies may appear critical, first and foremost, they commend an excellent program and the people who have fostered it. (For a copy of the full report, visit the NPRB website at [http://www.nprb.org/documents/meetings/COV\\_Report\\_2010.pdf](http://www.nprb.org/documents/meetings/COV_Report_2010.pdf))

### Next Steps

The full Board, Advisory and Science Panels met with the COV at a special meeting during the Alaska Marine Science Symposium in Anchorage on January 18, 2011 to discuss the findings and to develop a strategy to address these recommendations.

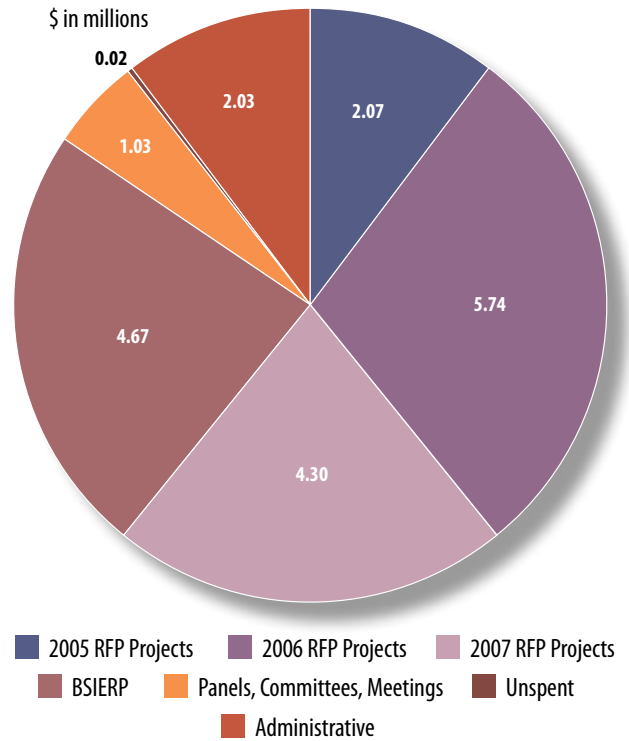
## FISCAL SUMMARY

**Summary of expenditures 2009-2010:** The Board operates under grants from NOAA that come from the interest earnings of the Environmental Improvement and Restoration Fund (EIRF). The 2009 and 2010 budgets, as in years past, are partitioned into two broad categories: administration and science. The administration category, capped at 15 percent but generally using 11-12 percent, covers staff salaries and benefits, travel for staff and Board members, office supplies, accounting and audits, office rent and furnishings, and supplies, i.e., all those things that keep the lights on and make the organization run and are normally included in overhead in research programs.

The science category is further partitioned into two subcategories. The first is termed non-RFP/IERP science. This includes support for panels and committees, education and outreach, data management, planning and coordination, and meeting and symposium support. In other words, all of the activities the Board supports to provide the infrastructure for good science and coordination, but not the actual research itself. The actual research is funded under the largest subcategory and covers all of the individual research projects funded under competitive RFPs through the years, and the integrated ecosystem research programs for the Bering Sea and the Gulf of Alaska.

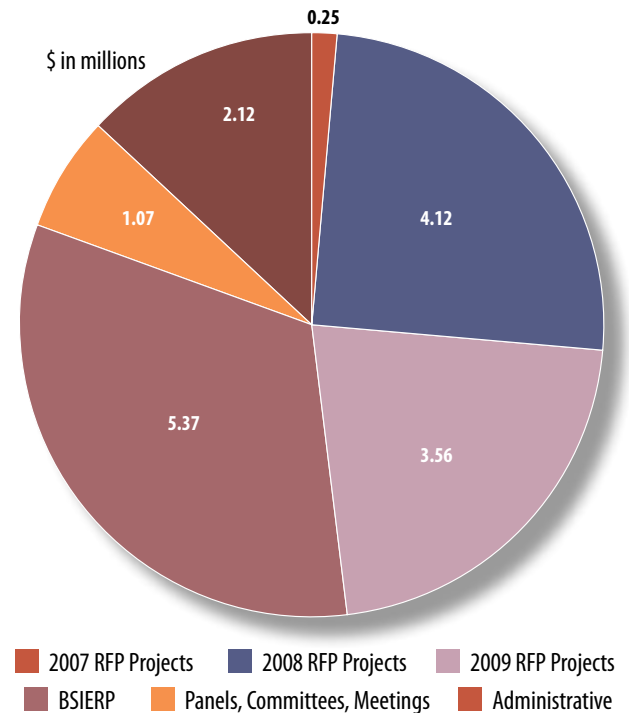
**Grant 2:** Grant 2 started on June 1, 2005 and ran through September 30, 2010. It is a mix of EIRF earnings in 2003–2005 and appropriations from 2005 and 2006. It was used to fund administration for a partial year in 2007 and for all of 2008. The amount spent on administration in 2007 was low because much of that year was charged to Grant 1. Therefore, while the Grant 1 administrative percentage came in at 14.9 percent, Grant 2 administration is 10.2 percent of the overall \$19,860,115 grant total. It should be noted that almost \$950,000 was transferred from under the 15 percent administrative cap to fund science-related activities. Science activities for Grant 2 include panel and committee support, education and outreach, data management, external meeting support, symposia, new research projects from 2005–2007, and significant support for the new Bering Sea Integrated Ecosystem Research Program. Grant 2 also provided the first support for graduate student research awards, which is now a continuing program of the Board to support budding scientists in their graduate careers.

**Grant 2: NA05NMF4721198  
\$19,860,115**



**Grant 3:** Grant 3 started on October 1, 2007 and will run until September 30, 2012. It is comprised solely of EIRF earnings from 2006 and 2007. This grant covered administrative costs for 2009 and 2010, totaling about 13 percent of the total \$16,489,294 in Grant 3. The science part of Grant 3 has been used to support one research project (#714) from 2007, and about \$7.9 million for all projects for 2008 and 2009 (800– and 900–series projects). Nearly \$5.4 million has been used to support projects, management, and education and outreach activities related to the Bering Sea Integrated Ecosystem Research Program. The remaining funds supported administrative activities and non-RFP science activities (panels, committees, meetings, and other expenditures, etc.) during FY2009 and 2010.

**Grant 3: NA07NMF4720082  
\$16,489,294**



**Grant 4:** Grant 4 started on October 1, 2009 and runs through September 14, 2014. It is comprised solely of EIRF earnings from 2008 and 2009. This grant covers administrative costs for 2011, anticipated to be about 10 percent of the total funding amount of \$18,962,866. Science activities for Grant 4 include projects funded in 2010 and 2011, significant support for the Bering Sea Integrated Ecosystem Research Program (BSIERP) and initial support for the Gulf of Alaska Integrated Ecosystem Research Program (GOAIERP). Other science activities include panel and committee support, education and outreach, external meeting support, and symposia.

**Audit Results:** The Board’s financial statements and federal grants are audited annually by KPMG. In February 2011, the Board received an audit report on its financial activities for FY2009 and 2010, and passed with flying colors. KPMG found no deficiencies or matters involving internal control and its operation that they consider to be material weaknesses. Copies of all audits are on file at the Board office.

**Grant 4: NA09NMF4720159**  
**\$18,962,866**

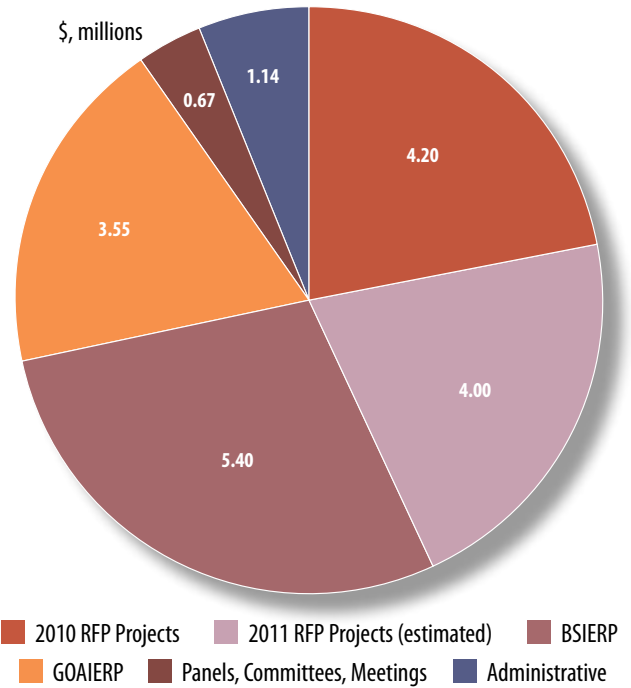


Photo Credit

## FUNDED RESEARCH PROJECTS 2009-2010

The first number in the project number relates to the calendar year in which the project was recommended for funding by NPRB and approved by the Secretary of Commerce. For example, project 0901 was funded in 2009.

#	Budget	Project Title	Investigators	Institutions
0901	\$104,000	Continued Development of the Alaska Marine Information System (AMIS)	Mark Johnson (PI)	University of Alaska Fairbanks
0902	\$15,701	PICES North Pacific Ecosystem Status Report - 2nd Edition	Michael Dagg (PI)	Louisianan Universities Marine Consortium
0903	\$50,000	Continuous Plankton Recorder	Sonia Batten (PI)	Sir Alister Hardy Foundation for Ocean Science
0904	\$251,559	The contributions of precipitation and glacial processes to freshwater fluxes into the Gulf of Alaska	David Hill (PI)	The Pennsylvania State University
0905	\$231,460	Ontogenetic patterns of abundance and distribution of Pacific halibut ( <i>Hippoglossus stenolepis</i> ) and Greenland halibut ( <i>Reinhardtius hippoglossoides</i> ) in canyon and slope habitats of the eastern Bering Sea	Lorenzo Ciannelli (PI), Janet Duffy-Anderson (PI), James Ianelli (CI), Timothy Loher (CI), William Stockhausen (CI)	Alaska Fisheries Science Center, International Pacific Halibut Commission, Oregon State University
0906	\$164,361	Field Studies in Support of Stock Assessment for the Giant Pacific Octopus <i>Enteroctopus dofleini</i>	Reid Brewer (PI), Elizabeth Conners (PI), Christina Conrath (CI)	Alaska Fisheries Science Center, University of Alaska Fairbanks
0907	\$154,040	Maturity of blackspotted ( <i>Sebastes melanostictus</i> ), rougheye ( <i>S. aleutianus</i> ) and shorttraker ( <i>S. borealis</i> ) rockfish in the Aleutian Islands: filling critical life-history data gaps for data-poor commercially important rockfishes	Paul Spencer (PI), Todd TenBrink (CI)	NOAA National Marine Fisheries Service
0908	\$296,236	Fine-scale population genetic structure of northeastern Gulf of Alaska Pacific ocean perch.	Anthony Gharrett (PI), Thomas Weingartner (CI)	University of Alaska Fairbanks
0909	\$289,367	Straddling the Line: Cooperative and Non-Cooperative Strategies for Management of Bering Sea Pollock	Keith Criddle (PI)	University of Alaska Fairbanks
0910	\$80,000	The development of a catalog of left-side digital images of individually-identified Cook Inlet Beluga Whales ( <i>Delphinapterus leucas</i> )	Megan Blee (CI), Chris Kaplan (CI), Tamara McGuire (PI), Guy Wade (CI)	LGL Alaska Research Associates
0911	\$188,265	Winter distribution and ecology of Black-legged Kittiwakes and Thick-billed Murres breeding at two Bering Sea colonies with differing population trends	David Irons (CI), dan roby (PI), Priscilla wohl (PI)	Northern Forum, Oregon State University, U.S. Fish and Wildlife Service
0912	\$202,547	Studying diets in threatened eiders using stable carbon isotopes of specific fatty acids: Validation of a new technique with controlled feeding experiments	Suzanne Budge (CI), Tuula Holmen (PI), Shiway Wang (CI), Matthew Wooller (PI)	Dalhousie University, Seward Association for the Advancement of Marine Science, dba Alaska Sealife Center, University of Alaska Fairbanks
0913	\$67,831	Induction of late stages of <i>Hematodinium</i> in Tanner crabs ( <i>Chionoectes bairdi</i> ) by hormonal manipulation: a mechanism to study bitter crab syndrome.	Joseph Morado (PI), Sherry Tamone (PI)	NOAA National Marine Fisheries Service, University of Alaska Fairbanks
0914	\$61,284	<i>Trichinellosis</i> in marine mammals as a zoonotic disease, and possible ways of transmission of <i>trichinellosis</i> to humans in the Chukchi Peninsula	Lidiya Bukina (PI), Anna Kolevatova (CI)	Vyatka State Agricultural Academy
0915	\$99,998	Disease severity and ties to Chinook salmon condition in the marine migration phase	Larissa Dehn (PI), Krista Nichols (PI), Maria Sepulveda (CI)	Purdue University, University of Alaska - Fairbanks
0916	\$99,923	Iliamna Lake Freshwater Seal Study: Characterizing Local Use Patterns, Local Traditional Knowledge, and Seal Population Ecology	Jennifer Burns (PI), Courtenay Carty (CI), Helen Chythlook (PI)	Bristol Bay Native Association, University of Alaska Anchorage

0917	\$158,863	Reduction of bycatch mortality for non-target crab species in the commercial snow crab ( <i>Chionoecetes opilio</i> ) fishery	Liz Chilton (PI), Earl Krygier (PI), Allan Stoner (CI), Dan Urban (CI)	Marine Conservation Alliance Foundation, NOAA National Marine Fisheries Service
0918	\$152,462	Reducing sperm whale depredation via decoy deployments and active deterrent testing	Jan Straley (PI), Aaron Thode (PI)	University of Alaska, University of California San Diego
0920	\$137,127	Shoreline Change on Sagavanirktok Delta by Prudhoe Bay, North Slope Alaska	Thomas Ravens (PI)	University of Alaska, Anchorage
0921	\$54,968	Storm Surge, Ocean Wave, and Weather Remodeling of Coastal Sandy Beach in the Eastern Bering Sea	Michael Smolen (PI), Richard Tuluk (PI)	Alaska Native Youth Institute, Purdue University
0922	\$98,949	Eyak Lake Community Monitoring Project	Lindsay Butters (PI), Alice Dou-Wang (CI), Kirsti Jurica (CI)	Prince William Soundkeeper, Prince William Sound Science Center
0923	\$265,200	Impacts of the eruption of Kasatochi volcano on terrestrial and marine ecosystems: an integrated evaluation of geological and biological effects.	James Bodkin (CI), Vernon Byrd (PI), Stephen Jewett (PI), Bronwen Wang (CI), Christopher Waythomas (PI)	University of Alaska, Fairbanks, U.S. Fish and Wildlife Service, U.S. Geological Survey
0924	\$89,018	Developing rapid, accurate, DNA-based identification of larvae and dietary components of commercially important species	Troy Buckley (CI), Michael Canino (PI)	Alaska Fisheries Science Center
0925	\$84,100	Improved Capacity for Ensuring Alaskan Shellfish Safety	Thomas Stewart (PI)	Mercury Science Inc.
0926	\$22,494	Assessing the condition of walleye pollock, <i>Theragra chalcogramma</i> , larvae in the eastern Bering Sea with muscle-based flow cytometry cell cycle analysis	Kevin Bailey (CI), Steven Porter (PI)	Alaska Fisheries Science Center
0927	\$95,320	Marine measurement technology development: Integrating in situ biochemical sampling on an autonomous underwater glider vehicle	Peter Winsor (PI)	University of Alaska Fairbanks
0928	\$61,093	Use of an autonomous underwater vehicle (AUV) for tracking acoustic-tagged fish in complex marine environments in coastal Alaska	John Eiler (PI), Nicola Hillgruber (PI)	National Marine Fisheries Service, University of Alaska Fairbanks
0929	\$55,748	WEBSEC-72 Beaufort Sea zooplankton communities	Russell Hopcroft (PI)	University of Alaska Fairbanks
1001	\$200,000	CPR Consortium	Sonia Batten (PI)	Sir Alister Hardy Foundation for Ocean Science
1002	\$100,000	Seward Line	Russell Hopcroft (PI)	University of Alaska Fairbanks
1003	\$67,829	Correlating Shifting Baselines in Arctic Food Webs to Long-Term Bowhead Whale Isotope Records	Mark Baumgartner (CI), Nadine Lysiak (PI)	Woods Hole Oceanographic Institution
1004	\$210,097	Moored Observations of Ocean Acidification in the Northern Gulf of Alaska including Resurrection Bay and Prince William Sound	Lauren Juranek (CI), Jeremy Mathis (PI), Christopher Sabine (PI)	Joint Institute for the Study of the Atmosphere and Ocean (JISAO), National Oceanic and Atmospheric Administration (NOAA), University of Alaska Fairbanks
1005	\$175,678	Tagging studies to estimate local biomass, growth, and natural mortality of Giant Pacific octopus ( <i>Enteroctopus dofleini</i> )	Reid Brewer (CI), Brenda Norcross (PI)	University of Alaska Fairbanks
1006	\$364,771	Assessing age-0 walleye pollock distributions for cohort strength and response to climate change	Lisa Eisner (CI), Ed Farley (PI), John Horne (PI), Sandra Parker-Stetter (CI)	NOAA Alaska Fisheries Science Center, University of Washington
1007	\$396,630	Small-scale Atka mackerel population abundance and movement in the western Aleutian Islands, an area of continuing Steller sea lion decline	Elizabeth Logerwell (CI), Todd Loomis (CI), Susanne McDermott (PI)	National Marine Fisheries Service, North Pacific Fisheries Foundation
1008	\$393,449	Characterization of the salmon bycatch in the Bering Sea and Aleutian Islands (BSAI) pollock fisheries and its effects	Milo Adkison (CI), Keith Criddle (PI)	University of Alaska Fairbanks
1009	\$302,262	Factors Affecting Winter Survival of Chinook Salmon in the Bering Sea	Nancy Davis (CI), Katherine Myers (PI) [retired from project and institute Dec. 2010], Robert Walker (CI) [took over as PI Dec. 2010]	University of Washington

1010	\$187,339	The effects of ocean acidification on maternal condition and reproductive success and larval condition and survival of Tanner crabs, <i>Chionoecetes bairdi</i> .	Robert Foy (PI), William Long (CI), Katherine Swiney (CI)	NOAA/NMFS/Alaska Fisheries Science Center
1011	\$342,955	The impact of predation on juvenile survival and population recovery of Steller sea lions in the Prince William Sound - Kenai Fjords region of Alaska	Markus Horning (PI), Jo-Ann Mellish (PI)	Alaska Sea Life Center, Oregon State University
1012	\$193,060	Sea otter recolonization and interactions with commercially important macroinvertebrates in southeast Alaska	Ginny Eckert (PI), Verena Gill (PI), Allison Rice (CI)	University of Alaska, University of Alaska Fairbanks, U.S. Fish and Wildlife Service
1013	\$99,895	Little Diomed Hunters and Elders Ecological Knowledge, Management Strategies, and Usage of Walrus ( <i>Odobenus rosmarus</i> ) in Bering Strait	Julie Raymond-Yakoubian (PI), Josh Wisniewski (CI)	Kawerak, Inc.
1014	\$168,258	Short-Tailed Albatross New Colony Establishment Phase 2: Post-Fledging Survival and Marine Habitat Use of Hand-Reared vs. Naturally-Reared Chicks	Gregory Balogh (CI), Tomohiro Deguchi (PI), Robert Suryan (PI)	Oregon State University, U.S. Fish and Wildlife Service, Yamashina Institute for Ornithology
1015	\$120,900	Distribution and transmission of the highly pathogenic parasite Ichthyophonus in marine fishes of Alaska: biogeographical and empirical studies	Paul Hershberger (PI), Maureen Purcell (CI)	U.S. Geological Survey
1016	\$177,135	Annotated checklist of bottom-trawled macroinvertebrates of Alaska, with an evaluation of identifications in the Alaska Fisheries Science Center bottom-trawl survey database	James Orr (PI), Theodore Pietsch (PI), Duane Stevenson (CI), Robert Van Syoc (CI)	Alaska Fisheries Science Center, California Academy of Science, University of Washington
1017	\$154,172	Alternative catch monitoring of Alaskan groundfish	Julie Bonney (PI), Jennifer Cahalan (PI), Craig Faunce (PI)	Alaska Fisheries Science Center, Alaska Groundfish Data Bank, Pacific States Marine Fisheries Commission
1018	\$177,192	Evaluation and Comparison of Three Independent Methods for Estimating Red King Crab ( <i>Paralithodes camtschaticus</i> ) Biomass in Southeast Alaska	Christopher Siddon (PI)	Alaska Dept. of Fish and Game
1019	\$49,947	Assessment of contaminant body burdens and histopathology of fish and shellfish species frequently used for subsistence food by Chugach Native Communities	Dennis Apeti (CI), John Davenport (CI), Stuart Hartwell (CI), James Hetrick (PI), Mark Myers (CI)	Chugach Regional Resources Commission, National Oceanic and Atmospheric Administration
1020	\$58,957	Online Community Based Ecological Monitoring in the Bering Sea	Stephen Insley (CI), Bruce Robson (CI), Phillip Zavadil (PI)	Aleut Community of St. Paul Island-Tribal Government, Community and Ecology Resources, Pacific Rim Biological
1021	\$99,894	Development of Rapid, Accurate, Quantitative PCR Assays for Identifying Toxic Alexandrium Species Responsible For Causing Paralytic Shellfish Poisoning	Richard Litaker (PI)	NOAA
1022	\$89,061	Data Rescue: Modeling Northern Fur Seal Vital Rates During the Second Half of the 20th Century	Alexander Burdin (PI)	University of Alaska Fairbanks
1023	\$49,727	Data Rescue: Burton Island – 1950s Historical Chukchi & Beaufort Sea zooplankton communities	Russell Hopcroft (PI)	University of Alaska Fairbanks
1024	\$94,954	Four decades of climate-biology covariation in Alaskan and North Pacific ecosystems: an ecosystem indicator approach	Michael Litzow (PI)	Blue World Research

## PUBLICATIONS FROM NPRB-FUNDED PROJECTS 2009-2010

\*Publication numbers not shown in this (2009-2010) numerical sequence reflect articles still waiting publication from their accepting journals. Those titles and complete list are available on NPRB's Publications list. <http://publication.nprb.org/list.jsf>

Pub #	Project	Reference
236	304	Woodby, Doug, Carlile, Dave, and Hulbert, Lee. 2009. Predictive modeling of coral distribution in the Central Aleutian Islands, USA. <i>Marine Ecology Progress Series</i> 397: 227-240. doi: 10.3354/meps08358
237	304	Heifetz, Jonathan, Stone, Robert P., and Shotwell, S. Kalei. 2009. Damage and disturbance to coral and sponge habitat of the Aleutian Archipelago. <i>Marine Ecology Progress Series</i> 397: 295-303. doi: 10.3354/meps08304
238	525	Jurado-Molina, Jesus, Livingston, Patricia A., and Ianelli, James N. 2005. Incorporating predation interactions in a statistical catch-at-age model for a predator-prey system in the eastern Bering Sea. <i>Canadian Journal of Fisheries and Aquatic Sciences</i> 62: 1865-1873. doi: 10.1139/F05-110
239	525	Jurado-Molina, Jesus, Gatica, Claudio, and Cubillos, Luis A. 2006. Incorporation of cannibalism into an age-structured model for the Chilean hake. <i>Fisheries Research</i> 82: 30-40. doi:10.1016/j.fishres.2006.08.018
240	301	Hurst, Thomas P., Abookire, Alisa A., and Knoth, Brian. 2010. Quantifying thermal effects on contemporary growth variability to predict responses to climate change in northern rock sole ( <i>Lepidopsetta polyxystra</i> ). <i>Canadian Journal of Fisheries and Aquatic Sciences</i> 67: 97-107. doi:10.1139/F09-171
241	631	Kelly, Brendan P., Badajos, Oriana H., Kunasranta, Mervi, Moran, John R., Martinez-Bakker, Micaela, Wartzok, Douglas, and Boveng, Peter. 2010. Seasonal home ranges and fidelity to breeding sites among ringed seals. <i>Polar Biology</i> DOI 10.1007/s00300-010-0796-x.
242	GSRA	Atwood, Elizabeth, Duffy-Anderson, Janet T., Horne, John K. and Ladd, Carol. 2010. Influence of mesoscale eddies on ichthyoplankton assemblages in the Gulf of Alaska. <i>Fisheries Oceanography</i> 19:493-507. doi:10.1111/j.1365-2419.2010.00559.x
243	306	Jensen, Pamela C., Califf, Katy, Lowe, Vanessa, Hauser, Lorenz, and Morado, J. Frank. 2010. Molecular detection of <i>Hematodinium</i> sp. in Northeast Pacific <i>Chionoecetes</i> spp. and evidence of two species in the Northern Hemisphere. <i>Diseases of Aquatic Organisms</i> 89: 155-166. doi: 10.3354/dao02193
244	BSIERP	Mathis, J.T., Cross, J.N., Bates, N.R., Moran, S.B., Lomas, M.W. and Stabeno, P.J. 2010. Seasonal distribution of dissolved inorganic carbon and net community production on the Bering Sea shelf. <i>Biogeosciences</i> 7: 251-300.
245	605	Laurel, Benjamin L., Copeman, Louise A., Hurst, Thomas P., and Parrish, Christopher C. 2010. The ecological significance of lipid/fatty acid synthesis in developing eggs and unfed larvae of Pacific cod ( <i>Gadus macrocephalus</i> ). <i>Marine Biology</i> DOI 10.1007/s00227-010-1445-1.
246	816	DiMaria, R.A., Miller, J.A., and Hurst, T.P. 2010. Temperature and growth rate effects on otolith elemental chemistry of larval Pacific cod, <i>Gadus macrocephalus</i> . <i>Environmental Biology of Fishes</i> 89:453-462. DOI 10.1007/s10641-010-9665-2
247	605	Copeman, L.A., and Laurel, B.J. 2010. Experimental evidence of fatty acid limited growth and survival in Pacific cod larvae. <i>Marine Ecology Progress Series</i> 412:259-272. doi: 10.3354/meps08661
248	605	Hurst, Thomas P., Laurel, Benjamin J., and Ciannelli, Lorenzo. 2010. Ontogenetic patterns and temperature-dependence of growth rate in early life stages of Pacific cod ( <i>Gadus macrocephalus</i> ). <i>Fishery Bulletin</i> 108:382-392.
249	642	Johnson, Scott W., Thedinga, John F., Neff, A.Darcie, Harris, Patricia M., Lindeberg, Mandy R., Maselko, Jacek M., and Rice, Stanley D. 2010. Fish Assemblages in Nearshore Waters of Prince William Sound, Alaska. <i>Northwest Science</i> 84:266-280.
250	524	Logerwell, Elizabeth A., Duffy-Anderson, Janet, Wilson, Matthew, and McKelvey, Denise. 2010. The influence of pelagic habitat selection and interspecific competition on productivity of juvenile walleye pollock ( <i>Theragra chalcogramma</i> ) and capelin ( <i>Mallotus villosus</i> ) in the Gulf of Alaska. <i>Fisheries Oceanography</i> 19: 262-278. doi:10.1111/j.1365-2419.2010.00542.x
251	923	DeGange, Anthony R., Byrd, G.Vernon, Walker, Lawrence R., and Waythomas, C.F. 2010. An Introduction to the impacts of the 2008 Eruption of Kasatochi Volcano on Terrestrial and Marine Ecosystems in the Aleutian Islands, Alaska. <i>Arctic, Antarctic, and Alpine Research</i> 42:245-249. DOI: 10.1657/1938-4246-42.3.245
252	923	Scott, William E., Nye, Christopher J., Waythomas, Christopher F., and Neal, Christina A. 2010. August 2008 Eruption of Kasatochi Volcano, Aleutian Islands, Alaska—Resetting an Island Landscape. <i>Arctic, Antarctic, and Alpine Research</i> 42:250-259. DOI: 10.1657/1938-4246-42.3.250
253	923	Waythomas, Christopher F., Scott, William E., and Nye, Christopher J. 2010. The Geomorphology of an Aleutian Volcano Following a Major Eruption: the 7–8 August 2008 Eruption of Kasatochi Volcano, Alaska, and Its Aftermath. <i>Arctic, Antarctic, and Alpine Research</i> 42:260-275. DOI: 10.1657/1938-4246-42.3.260

254	923	Wang, Bronwen, Michaelson, Gary, Ping, Chien-Lu, Plumlee, Geoffrey, and Hageman, Philip 2010. Characterization of Pyroclastic Deposits and Pre-eruptive Soils following the 2008 Eruption of Kasatochi Island Volcano, Alaska. <i>Arctic, Antarctic, and Alpine Research</i> 42:276-284. DOI: 10.1657/1938-4246-42.3.276
255	923	Talbot, Stephen S., Talbot, Sandra Looman, and Walker, Lawrence R. 2010. Post-eruption Legacy Effects and Their Implications for Long-Term Recovery of the Vegetation on Kasatochi Island, Alaska. <i>Arctic, Antarctic, and Alpine Research</i> 42:285-296. DOI: 10.1657/1938-4246-42.3.285
256	923	Sikes, Derek S., and Slowik, Jozef. 2010. Terrestrial Arthropods of Pre- and Post-eruption Kasatochi Island, Alaska, 2009-2009: a Shift from a Plant-Based to a Necromass-Based Food Web. <i>Arctic, Antarctic, and Alpine Research</i> , 42:297-305. DOI: 10.1657/1938-4246-42.3.297
257	923	Williams, Jeffrey C., Drummond, Brie A., and Buxton, Rachel T. 2010. Initial Effects of the August 2008 Volcanic Eruption on Breeding Birds and Marine Mammals at Kasatochi Island, Alaska. <i>Arctic, Antarctic, and Alpine Research</i> , 42:306-314. DOI: 10.1657/1938-4246-42.3.306
258	923	Jewett, Stephen C., Bodkin, James L., Chenelot, Heloise, Esslinger, George G. and Hoberg, Max K. 2010. The Nearshore Benthic Community of Kasatochi Island, One Year after the 2008 Volcanic Eruption. <i>Arctic, Antarctic, and Alpine Research</i> , 42:315-324. DOI: 10.1657/1938-4246-42.3.315
259	923	Drew, Gary S., Drago, Donald E., Renner, Martin and Piatt, John F. 2010. At-sea Observations of Marine Birds and Their Habitats before and after the 2008 Eruption of Kasatochi Volcano, Alaska. <i>Arctic, Antarctic, and Alpine Research</i> , 42:325-334. DOI: 10.1657/1938-4246-42.3.325
260	633	Gregg, Edward J., and Coyle, Kenneth O. 2009. The biogeography of the North Pacific right whale ( <i>Eubalaena japonica</i> ). <i>Progress in Oceanography</i> 80: 188-198. doi:10.1016/j.pocean.2008.12.004
261	642	Thedina, John F., Johnson, Scott W., and Neff A. Darcie. 2010. Diel differences in fish assemblages in nearshore eelgrass and kelp habitats in Prince William Sound, Alaska. <i>Environmental Biology of Fishes</i> 90:61-70. DOI 10.1007/s10641-010-9718-6
262	206, 409, 611, 801	Sydeman, William J., Thompson, Sarah Ann, Santora, Jarrod A., Henry, Michael F., Morgan, Ken H., and Batten, Sonia D. 2010. Macro-Ecology of plankton-seabird associations in the North Pacific Ocean. <i>Journal of Plankton Research</i> 0:1-17. doi:10.1093/plankt/fbq119
263	313	Heithaus, Michael R., Wirsing, Aaron J., Frid, Alejandro, and Dill, Lawrence M. 2007. BEHAVIORAL INDICATORS IN MARINE CONSERVATION: LESSONS FROM A PRISTINE SEAGRASS ECOSYSTEM. <i>Isreal Journal of Ecology &amp; Evolution</i> 53: 355-370
264	606	Liu, Hai, Ciannelli, Lorenzo, Decker, Mary Beth, Ladd, Carol and Chan, Kung-Sik. 2010. Nonparametric Threshold Model of Zero-Inflated Spatio-Temporal Data with Application to Shifts in Jellyfish Distribution. <i>Journal of Agricultural, Biological, and Environmental Statistics</i> . DOI: 10.1007/s13253-010-0044-4
266	303	Habicht, C., Seeb, L.W., Myers, K.W., Farley, E.V., and Seeb, J.E. 2010. Summer-Fall Distribution of Stocks of Immature Sockeye Salmon in the Bering Sea as Revealed by Single-Nucleotide Polymorphisms. <i>Transactions of the American Fisheries Society</i> 139:1171-1191. doi:10.1577/T09-149.1.
267	605	Laurel, Benjamin J., Hurst, Thomas P., and Ciannelli, Lorenzo. 2010. An experimental examination of temperature interactions in the match-mismatch hypothesis for Pacific cod larvae. <i>Canadian Journal of Fisheries and Aquatic Sciences</i> . 68:51-61. doi:10.1139/F10-130
268	709	Bartolino, Valerio, Ciannelli, Lorenzo, Bachelier Nathan M., and Chan, Kung-Sik. 2010. Spatiotemporal dynamics of a marine fish population: Ontogenetic and sex specific differences in density-dependent habitat selection. <i>Ecology</i> . doi: 10.1890/09-1129.1
269	301, 701	Ryer, C.H., Laurel, B.J., and Stoner, A.W. 2010. Testing the shallow water refuge hypothesis in flatfish nurseries. <i>Marine Ecology Progress Series</i> . 415:275-282. doi: 10.3354/meps08732
270	632	Burn, Douglas M., Udevitz, Mark S., Speckman, Suzann G., and Benter, R. Bradley. 2009. An improved procedure for detection and enumeration of walrus signatures in airborne thermal imagery. <i>International Journal of Applied Earth Observation and Geoinformation</i> 11:324-333. doi:10.1016/j.jag.2009.05.004
271	632	Udevitz, Mark S., Jay, Chadwick V., Fischback, Anthony S., and Garlich-Miller, Joel L. 2009. Modeling haul-out behavior of walrus in Bering Sea ice. <i>Canadian Journal of Zoology</i> 87:111-1128. doi:10.1016/j.jag.2009.05.004
272	711	Hammond, C.F. 2009 Using reflex action mortality predictor (RAMP) to investigate if trawl gear modifications reduce unobserved mortality of Chinooecetes species. MSc Thesis, University of Washington.
273	711	Stoner, Allan W., Rose, Craig S., Munk, J.Eric, Hammond, Carwyn F., and Davis, Michael W. 2008. An assessment of discard mortality for two Alaskan crab species, Tanner crab ( <i>Chionoecetes bairdi</i> ) and snow crab ( <i>C. opilio</i> ), based on reflex impairment. <i>Fisheries Bulletin</i> 106:337-347.

274	619	Sohn, D., Ciannelli, L., and Duffy-Anderson, J.T. 2010. Distribution and drift pathways of Greenland halibut ( <i>Reinhardtius hippoglossoides</i> ) during early life stages in the eastern Bering Sea and Aleutian Islands. <i>Fisheries Oceanography</i> 19:5: 339-353. doi:10.1111/j.1365-2419.2010.00549.x
275	632	Merrill, Tracie Erin, Konar, Brenda, and Bluhm, Bodil. 2010. A temporal comparison of a benthic infaunal community southwest of St. Lawrence Island, Bering Sea between 2006 and 1970-1974. <i>Polar Biology</i> . 33:1439-1444. DOI 10.1007/s00300-010-0845-5
276	709	Bailey, Kevin M, Abookire, Alisa A, and Duffy-Anderson, Janet T. 2008. Ocean transport paths for the early life history stages of offshore-spawning flatfishes: a case study in the Gulf of Alaska. <i>Fish and Fisheries</i> 9: 44-66
277	709	Spencer, Paul D. 2008. Density-independent and density-dependent factors affecting temporal changes in spatial distributions of eastern Bering Sea flatfish. <i>Fisheries Oceanography</i> 17: 396-410. doi:10.1111/j.1365-2419.2008.00486.x
279	808	Hoff, Gerald R. 2010. Identification of skate nursery habitat in the eastern Bering Sea. <i>Marine Ecology Progress Series</i> . 403:243-254. doi: 10.3354/meps08424
280	BSIERP	Smith, Joy N., Ressler, Patrick H., and Warren, Joseph D. 2010. Material properties of euphausiids and other zooplankton from the Bering Sea. <i>Journal of the Acoustical Society of America</i> . 128:2664-2680. DOI: 10.1121/1.3488673
281	712	Cahalan, J. A., Leaman, B. M., Williams, G. H., Mason, B. H., and Karp, W. A. 2010. Bycatch Characterization in the Pacific Halibut Fishery: A Field Test of Electronic Monitoring Technology. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-213
282	BSIERP	Satterthwaite, William H., Kitaysky, Alexander S., Hatch, Scott A., Piatt, John F., and Mangel, Marc. 2010. Unifying quantitative life-history theory and field endocrinology to assess prudent parenthood in a long-lived seabird. <i>Evolutionary Ecology Research</i> . 12:779-792.
284	632	Speckman, Suzann G., Chernook, Vladimir I., Burn, Douglas, M., Udevitz, Mark S., Kochnev, Anatoly A., Vasilev, Alexander, and Jay, Chadwick V. 2010. Results and evaluation of a survey to estimate Pacific walrus population size, 2006. <i>Marine Mammal Science</i> . DOI: 10.1111/j.1748-7692.2010.00419.x
288	401	Churnside, James H., Brown, Evelyn D., Parker-Stetter, Sandra, Horne, John K., Hunt, George L., Hillgruber, Nicola, Sigler, Michael F., and Vollenweider, Johanna J. 2011. Airborne Remote Sensing of a Biological Hot Spot in the Southeastern Bering Sea. <i>Remote Sensing</i> 2: doi:10.3390/rs20x000x
289	517, 602, 701	Stabeno, Phyllis, Napp, Jeffrey, Mordy, Calvin, and Whiteledge, Terry. 2010. Factors influencing physical structure and lower trophic levels of the eastern Bering Sea shelf in 2005: Sea ice, tides and winds. <i>Progress in Oceanography</i> . 85(3-4), 180-196. doi:10.1016/j.pocean.2010.02.010

## Metadata and Data

When projects are completed, transfer of metadata and data files to NPRB is required. This has been progressing very successfully now that NPRB has continuous support from USGS.

METADATA AND DATA SUMMARY TABLE  
(COMPLETED PROJECTS)

Status	Metadata	Data
Available At NPRB	112	32
Contact PI		82
In Progress	24	24
In Review	26	22
No response	1	2
Not Applicable	21	22
<b>Grand Total</b>	<b>184</b>	<b>184</b>



*Building a clear understanding of the North Pacific,  
Bering Sea, and Arctic Ocean ecosystems that  
enables effective management and sustainable  
use of marine resources.*



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