

## Bering Sea Integrated Ecosystem Research Program

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. WHALES, SEALS AND SEABIRDS TRAVEL FROM AFAR TO FEED AND MATE HERE. FUR SEALS BREED ON ISLAND ROOKERIES, WHILE WALRUS HAUL OUT ON SEA ICE TO BEAR YOUNG.

Climate change and reduced ice cover could 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.

### Initiation

Planning for the Bering Sea Integrated Ecosystem Research Program (BSIERP) began in spring 2005. The Board's draft Science Plan had been reviewed by the National Research Council and was in production. In its 2005 RFP, the Board attempted to attract a proposal for a workshop to develop an implementation plan for the BSIERP, but there were no submissions. In March 2005, the Board approved the staff moving forward with establishing a planning team and coordinating with an interagency group. The Alaska Fisheries Science Center reported on its efforts to put together a study of climate change and loss of sea ice in the Bering Sea and how they might impact fish stocks and fisheries.

The Board heard back from the planning group in September 2005. The group identified the central scientific issue: How the Bering Sea and its living marine resources

may be impacted by potential changes in climate, mediated to great extent by the anticipated reduction in or overall loss of seasonal sea ice cover over the next 30 years. They recommended that in the absence of a fully-developed implementation plan, the 2006 RFP focus on retrospective, process, and modeling studies on six key research questions focused on components of the Bering Sea ecosystem and how they might respond to climate change. They also noted the potential for collaboration with the National Science Foundation and its recent call for proposals for the Bering Ecosystem Study (BEST), which referenced NPRB in the announcement.

After reviewing this report and recommendations from the Science Panel, the Board placed a \$1.2 million research priority in the 2006 RFP for one- to two-year retrospective and modeling studies to examine climate change impacts on the Bering Sea ecosystem. The Board also approved funding for planning teams for each of the two core regions, the Bering Sea and Gulf of Alaska, to develop the details of five-year implementation plans for input into the 2007 RFP. It also approved funding for a Bering Sea ecosystem modeling committee that would develop standards for statistical robustness of the models and validation of model results.





John Pratt

Sand lance are an important forage fish in the Bering Sea.



Ryan Kingsberry

Kittiwakes along the cliffs of St. George Island.

### Implementation Plans

In March 2006, the Board received a draft implementation plan and discussion document for the Bering Sea study, along with a plan for the Loss of Sea Ice (LOSI) program at the Alaska Fisheries Science Center. A draft discussion paper on Gulf of Alaska ecosystem planning was also presented. The Board decided to move ahead with further planning for the Bering Sea study, but to delay the Gulf study by at least one year. It approved establishing a scientific steering committee to further develop the Bering Sea study, refine the main research themes, and draft a call for pre-proposals for review in September. They provisionally adopted a five- to six-year schedule for the potential study that would include one year of planning and synthesis, three years of field work, and one to two years of integration and reporting.

In September 2006, the Board reviewed the draft BSIERP implementation plan and draft call for pre-proposals for the study that would run from 2007–2013 (later adjusted to end in late 2012). It also heard the first report of the Ecosystem Modeling Committee and of an opportunity to partner with the National Science Foundation (NSF). William Wiseman, Program Manager for Arctic Natural Science at NSF, was present to answer questions and offer clarifications as necessary. The Science Panel had raised a number of issues when it initially considered the idea of a partnership with NSF at the panel's meeting in late August. Between the panel meeting and the Board meeting, the staff worked

with NSF to provide answers to these issues, which the Board then reviewed. These included concerns over differing policies on data ownership, whether applied science could be supported, fiscal risk for each agency, collaboration of scientists funded by different agencies, processes for making course corrections, and how to split up the research efforts and questions between NSF and NPRB.

The Board concluded that the issues were being addressed satisfactorily, and unanimously endorsed establishing the partnership with NSF. It then instructed staff to work with NSF in resolving all remaining issues and draft a letter of agreement for the Board to review on October 18, 2006. The Board recognized that this was a unique opportunity and that the goal should be to get as close as possible to having one team, working seamlessly and guided by tight protocols, under the twin banners of NPRB and NSF. The Board also approved release of the BSIERP call for pre-proposals at a funding level of \$14 million once they completed a teleconference on October 18, 2006 to review the NSF partnership concerns. The RFP was released on October 23, 2006. The Science Panel met in November to review the three pre-proposals, one having three variants. The Board then met on December 5, 2006 to review the proposals and the Science Panel recommendations and called for full proposals from two main groups: the NOAA Alaska Fisheries Science Center—University of Alaska Fairbanks group, and one from the University of British Columbia.

Climate change and reduced ice cover could significantly impact the Bering Sea ecosystem.

This historic partnership seeks to understand the mechanisms that create and sustain this highly productive ecosystem, and how they may be altered over time as the climate changes.

### BSIERP Becomes Reality

Two full proposals to the BSIERP RFP were received by March 15, 2007. The two proposals underwent anonymous technical reviews, and were then subsequently reviewed by a joint NSF-NPRB science panel the week of June 11th in Washington, D.C. The Board and William Wiseman of NSF met on June 26-27, 2007, received the joint science panel recommendations and proceeded to fashion the BSIERP, based mainly on the full proposal received from the NOAA-UAF group. They capped the study at \$14 million, but approved specific components adding up to only \$13.2 million. The remaining funds would be made available to fill in identified gaps or to help support the marine mammal patch dynamics study from UBC.

The study was further fleshed out at meetings in September and December 2007, when the Board approved additional funds for comparative patch dynamics studies involving northern fur seals around the Pribilofs and Bogoslof Island, and one study focusing on benthic feeding walrus at St. Lawrence Island. The Board also approved other components involving local and traditional knowledge, epibenthos, and microzooplankton studies and ecosystem modeling. As a result of these funding decisions, the Board had approved a total of \$15,992,043 for the BSIERP. NSF had contributed about \$21 million and NOAA and other Federal agencies about \$14.9 million, bringing the partnership total to nearly \$52 million.

NPRB also organized and supported the first meeting of the principal investigators for the joint BEST-BSIERP program in Seattle on September 17-19, 2007, where nearly 100 scientists and program management staff reviewed the scope and details of the program, worked toward achieving full program integration, and discussed how to coordinate the field studies and cruise planning for this ambitious effort. They also worked on program management issues and a management plan. A full-time program manager for the combined BEST-BSIERP project, Tom Van Pelt, was hired in June 2008. Nora Deans, as principal investigator for the Education and Outreach component, produced a detailed communication and outreach plan focused on sharing news from the field component among a variety of audiences, including coastal communities and national media. Carolyn Rosner created a dynamic website with constantly changing news for both the scientific

community and the public. For details, visit the project website at [www.bsierp.nprb.org](http://www.bsierp.nprb.org).

### First Field Year: 2008

The first field year for the BSIERP commenced in March 2008 with a cruise of the United States Coast Guard icebreaker *Healy* from Dutch Harbor to St. Lawrence and back to study ice conditions, the benthic prey fields and walrus distribution. Other field activities took place in 2008, including more *Healy* and NOAA cruises and patch dynamics studies on the Pribilofs with exploratory work on Bogoslof Island, along with further model development and interactions with the Ecosystem Modeling Committee. Status reports were presented to the Board at its April and September 2008 meetings. At the September meeting, the Board approved an additional \$120,000 for the Ecosystem Modeling Committee (EMC) to apportion to retrospective or modeling studies at its discretion. It also approved the idea of a BEST-BSIERP advisory group that would function as a big picture program evaluation group and as a go-between for the different panels and the Board. It would include two advisory panel members, three science panel members, and the chair of the EMC. The Board also received a presentation on education and outreach activities surrounding the BEST-BSIERP program, which include a dynamic website, media and outreach campaign, public radio programming, potential for an exhibition at the Smithsonian's Ocean Hall, and community outreach. In mid-October, BSIERP-BEST principal investigators met in Girdwood, Alaska, for the second annual principal investigator meeting, focusing on summaries of the 2008 field seasons, planning for 2009 field and modeling work, and identification of "headline" results and key points for further integration work across project components.



Icebreaker *Healy* cruise March 2008.

## FEATURE PROJECT

### Bering Sea Program Highlights

Nearly 100 federal, state, university and private institution scientists are studying a range of issues in the Bering Sea, from atmospheric forcing and physical oceanography to humans and communities, including the attendant economic and social impacts of a changing ecosystem. Both organizations are supporting ecosystem modeling and data management.

Studies supported by the National Science Foundation include:

- Climate, oceanography, and lower trophic level—benthos, primary production near sea ice, nutrients, modeling, micro- and meso-zooplankton, euphausiids, biophysical moorings, and physical oceanography
- Social science research—relationships between a changing marine environment and Bering Sea communities

Studies supported by the North Pacific Research Board include:

- Climate, oceanography, and lower trophic levels—benthos, micro-zooplankton, biophysical moorings, and physical oceanography
- Forage species—euphausiids, myctophids and capelin
- Fish—arrowtooth flounder, Pacific cod, and walleye pollock
- Marine mammals—fur seals, walrus and broad-scale whale distribution
- Seabirds—thick-billed murres, black-legged kittiwakes, and broad-scale seabird distribution
- Local and Traditional Knowledge (LTK—subsistence harvest and LTK ecosystem perspectives
- Education, outreach, and communication



For more details and to follow along with the field science, local and traditional knowledge research, ecosystem modeling and communication, education and outreach as it unfolds, visit the dynamic project website ([www.bsierp.nprb.org](http://www.bsierp.nprb.org)) and download the richly illustrated Bering Sea program brochure.

