

Annual Report for Period:04/2005 - 04/2006

Submitted on: 07/24/2006

Principal Investigator: Hunt, George L.

Award ID: 0518226

Organization: U of Washington

Title:

Planning Activities for Bering Ecosystem Studies (BEST)

Project Participants

Senior Personnel

Name: Hunt, George

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Hyrenbach, K David

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Hyrenbach is working closely with me to coordinate all planning activities for BEST. He attends meetings in my stead, helps to develop agendas for workshops and leads discussions. He is also involved with the development of a website for BEST that will be hosted at the University of Washington.

Post-doc

Graduate Student

Undergraduate Student

Technician, Programmer

Other Participant

Research Experience for Undergraduates

Organizational Partners

Duke University Marine Laboratory

Dr. David Hyrenbach, a research scientist at the Duke University Marine Laboratory, has been working on the Project Planning Activity.

Other Collaborators or Contacts

Dr. David Hyrenbach has been collaborating on this project as a senior researcher.

Activities and Findings

Research and Education Activities:

While the performance period of this first year report spans April 1 2005 - March 31 2006, BEST planning activities have been ongoing since 2002. Previous planning efforts, initiated under NSF proposal ARC-0226371 'Workshop to Assess Research Priorities in the Bering Sea', focused on the formulation of the BEST Science Plan. Starting in March 2005, NSF proposal ARC-0518226 'Planning Activities for Bering Ecosystem Studies (BEST)' has supported ongoing planning efforts, including the establishment of the BEST Planning Office (BEST PO)

housed at the University of Washington in Seattle (UW).

A) BEST Implementation:

In March, 2005, NSF assembled a BEST Science Steering Committee (BEST SSC) to formulate an Implementation Plan for BEST. At the start of the current planning grant (April 1, 2005), the writing of the BEST Implementation Plan was well underway. Thus, the first major task of the BEST PO was to support this process so that material would be available to NSF in time to draft a BEST Announcement of Opportunity (AO) for release in the fall of 2005. To this end, the BEST PO, worked with the BEST SSC and with representatives of government and non-governmental research and funding organizations, to assemble a BEST Implementation Plan.

A draft version of the BEST Implementation Plan was presented to the community via the BEST web-site, hosted by the Arctic Consortium of the United States (ARCUS) (http://www.arcus.org/Bering/Downloads/best_imp_plan.9.27.pdf), and subsequently at a workshop in May 2005, during the GLOBEC / PICES 'Climate Variability and Sub-Arctic Marine Ecosystems' symposium in Victoria, British Columbia. This day-long workshop was attended by over 130 participants, who were able to their provide input through a variety of means, including written comments / emails, small break-out groups, large plenary sessions, and invited / contributed oral presentations. The BEST PO and BEST SSC reviewed these recommendations and comments at a follow-up conference call (June 2, 2005) and incorporated the relevant recommendations into the final version of the Implementation Plan during a two-day meeting in Seattle (June 13 û 15, 2005). The BEST PO completed the Implementation Plan revisions during the summer, and delivered the final version to NSF in September 2005, for use in the BEST Announcement of Opportunity (AO).

B) Inter-agency Collaboration:

To ensure that the available resources are used in the most effective way possible, the BEST PO has worked with national and international research and funding organizations to coordinate BEST activities with other research programs working in the Bering Sea, the North Pacific, and other sub-Arctic Seas. These collaborative efforts have addressed three partners: (A) domestic and international research and funding organizations working in the Bering Sea, (B) synergistic activities of BEST within the framework of SEARCH, and (C) contributions of BEST to the international ESSAS (Ecosystem Studies of Sub-Arctic Seas) program.

In the Bering Sea, the BEST PO, in collaboration with seven domestic partners [North Pacific Research Board (NPRB), the National Oceanographic and Atmospheric Administration (NOAA), the Alaska Ocean Observing system (AOOS), the U.S. Arctic Research Commission (USARC), the U.S. fish and Wildlife Service (USFWS), the U.S. Geological Survey (USGS), the University of Alaska Fairbanks (UAF)] established the Bering Sea Interagency Working Group (BIAWG) to promote collaborative research in the Bering Sea. This working group met quarterly during the winter û summer of 2005, and assembled a white paper outlining recommendations for a multi-institutional approach to climate change research for the Bering Sea. This white paper, published in February 2006 as Alaska Fisheries Science Center report 2006 û 01, entitled 'Climate Change and the Bering Sea Ecosystem: An Integrated, Interagency / Multi-Institutional Approach', is publicly available on NOAA's Alaska Fisheries Science Center web-site (<http://www.afsc.noaa.gov/Publications/ProcRpt/PR%202006-01.pdf>).

In addition to contributing to BIAWG activities, the BEST PO has also participated in four workshops to design an integrated and collaborative research program for the Bering Sea. In November 2005, we held a one-day workshop at the University of Washington with seabird researchers working in the Bering Sea (USFWS, USGS, SeaGrant, NOAA fisheries) to share information about ongoing and future research plans. We undertook a similar outreach effort at the Alaska Marine Science Symposium, held in Anchorage in January 2006. During this meeting, we participated in three synergistic activities: (i) a workshop on 'Satellite and In-situ observations of Alaska's seas' seeking to identify the remote sensing needs for Bering Sea research, (ii) an NPRB-sponsored workshop on 'Bering Sea Indicators', and (iii) a meeting to discuss the implementation of NPRB's research plan for the Bering Sea. We also attended the Pacific Seabird Group (PSG) annual conference in Anchorage, where we participated in an NPRB-sponsored workshop devoted to the use of 'Seabirds as Ecosystem Indicators', with emphasis on the Bering Sea and the Gulf of Alaska. In an effort to coordinate the BEST program with work by the Pribilof Cooperative (PIC), we participated in a panel discussion on research needs and priorities, held in Homer in February 2006. At all of these workshops, we have presented overviews of the BEST program's objectives and priorities, with the aim of developing a broad-based understanding of the 'ecosystem indicators' and 'research needs' for the Bering Sea.

To ensure BEST maintains a connection with the SEARCH (Study of Environmental Arctic Change) program, Dr. Hunt attended a meeting of the SEARCH SSC in May 2006 in Arlington (VA), to discuss synergies between BEST and SEARCH. These collaborative efforts are reinforced by the programmatic synergies between BEST and the research activities planned for the International Polar Year (IPY).

BEST is the major U.S. contribution to the ESSAS program. Thus, developing programmatic synergies between both research programs has been a major priority of the BEST PO. As a member of the ESSAS SSC, Dr. Hunt has been involved in discussions to integrate the BEST and ESSAS research programs. During the last year, BEST PO representatives attended two international ESSAS workshop held in Victoria, B.C. (May 2005) and the PICES (North Pacific Marine Science Organization) annual meeting in Vladivostok, Russia (September, 2005), where we

presented information on BEST and ESSAS to the PICES Governing Council and several committees. These efforts have established a strong partnership between BEST, ESSAS, and PICES, which provides a firm foundation for future collaborations. PICES has indicated that future collaborations with ESSAS and BEST are of high priority in their development of comparative research programs in the North Pacific (PICES annual Report 2005, SB Endnote 7, Page 89). PICES will also play a vital role helping to organize future international symposia and regional comparative workshops. GLOBEC and the North Pacific Research Board (NPRB) have also supported BEST and ESSAS activities. The ability to leverage funding from domestic and international organizations illustrates the strong support of the international scientific community for the BEST and ESSAS programs.

Findings:

N/A

Training and Development:

N/A

Outreach Activities:

During the last year, the BEST PO has engaged in three outreach activities through three main avenues: (A) presenting BEST goals and priorities to the broader scientific community at meetings and public lectures, (B) developing a publicly-available BEST web-site, and (C) establishing partnerships for developing outreach and educational products.

A) Presentations: During the last year, we have given ten oral and two poster presentations on the BEST program and changing marine ecosystems of the Bering Sea:

- Oral Presentations at Scientific Meetings:

Hunt, G.L., Jr. The Bering Sea Ecosystem Study (BEST). GLOBEC / PICES Climate Variability and sub-Arctic Marine Ecosystems Symposium. Victoria Conference Center, B.C., Canada. May 16, 2005

Hunt, G.L., Jr. The Eastern Bering Sea Shelf: A Changing Marine Ecosystem. Marine Mammal Commission Meeting. Anchorage, AK. October 14, 2005

Hunt, G.L., Jr. The Bering Sea Ecosystem Study (BEST) Program. Presentation to the PICES Research Board. Annual PICES meeting, Vladivostok, Russia. October 4, 2005

Hunt, G.L., Jr. . Presentation to the PICES Science Board. Annual PICES meeting, Vladivostok, Russia. October 4, 2005

Hunt, G.L., Jr., Fitzhugh, B., & Hyrenbach, K.D. The Bering Sea Ecosystem Study (BEST). Alaska Marine Science Symposium, Anchorage, AK. January 22-25, 2006

Hyrenbach, K.D., & Hunt, G.L., Jr. Marine Bird Communities At-Sea as Indicators of Spatial and Temporal Oceanographic Variability. Pacific Seabird Group Annual Conference 2006. Girdwood, AK. February 15-19, 2006

Hyrenbach, K.D., & Hunt, G.L., Jr. Bering Sea Ecosystem Study (BEST). Pribilof Island Cooperative Seabird Workshop. Homer, AK. February 21-22, 2006

- Poster Presentations at Scientific Meetings:

Hunt, G.L., Jr., Stabeno, P.J., Napp J.M., & Hyrenbach, K.D. The Bering Sea Ecosystem Study (BEST). Ocean Sciences Meeting. Honolulu, HI. February 20-24, 2006

Hyrenbach, K.D., Hunt, G.L., Jr., Stabeno, P.J., & Napp J.M. The Bering Sea Ecosystem Study (BEST). Pacific Seabird Group Conference. Girdwood, AK. February 15-19, 2006

- Public Lectures:

Hunt, G.L., Jr., Climate Change and Energy Flow in the Eastern Bering Sea. Guest lecture in Dr. Terri Klinger's marine affairs course, School of Marine Affairs, UW, Seattle. November 17, 2005

Hunt, G.L., Jr., Climate Variability and Ecosystem Function in the Bering Sea. Ecology lunch Seminar. University of New England, Boston. March 22, 2006

Hunt, G.L., Jr., Climate change and energy flow in the eastern Bering Sea. Biological Oceanography lunch seminar. Oceanography Building, UW, Seattle. March 28, 2006

B) BEST Project Web-site: We have developed a publicly-available web-site, including background and outreach information on the BEST project and the marine ecosystems of the Bering Sea, housed at the University of Washington's School of Aquatic and Fishery Sciences (SAFS): <http://fish.washington.edu/best>

C) Outreach Contacts: As the clearing-house for BEST project information and outreach materials, the BEST PO is exploring several collaborations for the development of educational materials. In January 2006, Dr. Hunt attended a workshop to plan the new 'North Pacific Ocean' gallery at the Aquarium of the Pacific, in Long Beach (CA) (<http://www.aquariumofpacific.org/EDUCATION/index.html>). He has also been working with Soames Summerhays, a nature film-maker based in San Diego (CA), who is interested in developing a combination of educational materials, including large format (IMAX) and DVD films, on the marine ecosystems and the fisheries of the Bering Sea (<http://www.oceanosis.org/behindthescenes/summerhays.html>). These films would be designed for public broadcasting at IMAX theaters and museum exhibits, as well as for use in the classroom.

We have also discussed the feasibility of working with award winning writer and illustrator, Sophie Webb, to do one or more children books on the BEST project and the effects of climate change in the Bering Sea ecosystems. Ms Webb has already published two science books for children, one is based on an NSF-Sponsored Antarctic trip, and the other one is based on an expedition to the Aleutian Islands with Dr. Hunt.

Finally, we are also developing contacts with reporters from major newspapers who are developing articles on the effect of climate change on the Bering Sea ecosystems and communities of the Bering Sea. Additionally, we cooperated with David Lawrence who is developing an article for the Northwest Science & Technology magazine, as part of a class project.

Journal Publications

Hunt, G.L., Jr. and Drinkwater, K., "GLOBEC symposium on climate variability and sub-Arctic marine ecosystems.", GLOBEC Newsletter (http://www.pml.ac.uk/globec/products/newsletter/news11_2.pdf), p. 14, vol. 11(2), (2005). Published

Drinkwater, K. and Hunt, G.L., Jr., "PICES hosts GLOBEC symposium on "Climate variability and Sub-Arctic Marine Ecosystems" in Victoria.", PICES Press (http://www.pices.int/publications/pices_press/Volume13/July_2005/pp_06_09_ESSAS.pdf), p. 6, vol. 13 (2), (2005). Published

Books or Other One-time Publications

Bering Sea Interagency Working Group, "Climate Change and the Bering Sea Ecosystem: An Integrated, Interagency / Multi-Institutional Approach", (2006). NMFS Processed Report, Published

Editor(s): NOAA, National Marine Fisheries Service

Collection: Alaska Fisheries Science Center Processed Report 2006-01

Bibliography: <http://www.afsc.noaa.gov/Publications/ProcRpt/PR%202006-01.pdf>

Web/Internet Site

URL(s):

<http://fish.washington.edu/best>

Description:

We have developed a publicly-available BEST project web-site, including background and outreach information on our project and the marine ecosystems of the Bering Sea. This web-site is housed at the University of Washington's School of Aquatic and Fishery Sciences (SAFS).

Other Specific Products

Contributions

Contributions within Discipline:

The GLOBES / PICES symposium, the Open BEST Implementation Workshop, and the NPRB indicators workshops have raised the interest of the scientific community in the changes taking place in the Bering Sea ecosystem, and have helped to publicize the ongoing and future research efforts. The developing outreach efforts undertaken by the BEST PO will disseminate this information to the public at large, raising the general awareness of the plight of the Bering Sea ecosystem and communities in the U.S. and abroad.

Contributions to Other Disciplines:

Contributions to Human Resource Development:

Contributions to Resources for Research and Education:

Contributions Beyond Science and Engineering:

Special Requirements

Special reporting requirements: None

Change in Objectives or Scope: None

Unobligated funds: \$ 0.00

Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Any Product

Contributions: To Any Other Disciplines

Contributions: To Any Human Resource Development

Contributions: To Any Resources for Research and Education

Contributions: To Any Beyond Science and Engineering