

Report to the North Pacific Research Board

Committee of Visitors

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Committee of Visitors Members

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EXECUTIVE SUMMARY

The review of the North Pacific Research Board program (NPRB), undertaken by the Committee of Visitors (COV), identified programmatic strengths and weaknesses, which are detailed below. These characteristics were used as a basis for recommendations intended to improve the performance of the NPRB program.

The overall finding from the COV is that the NPRB supports a strong and productive program. The Science Plan, the monitoring along the Seward line, the Alaska Marine Science Symposium, the Bering Sea Integrated Ecosystem Research Program (IERP), and the outreach and education program were identified as quality programs that have made significant contributions.

Three areas of deficiencies, needing immediate attention and strong action on the part of the Board of Directors, were identified in the COV review. The first was the selection procedure for funding proposals under the Gulf of Alaska Integrated Ecosystem Research Program (GOAIERP). This deficiency was considered serious enough to warrant discussion with the NPRB Board and Science Panel prior to completion of this report. The COV appreciates the response from the Board and Science Panel to our preliminary report on the GOAIERP. Still, concern remains that the underlying deficiencies in this IERP have not been addressed. Specific recommendations intended to improve this process are given.

The second area of deficiency identified was the need for greater transparency in the generation of the annual Request for Proposals (RFP) and the proposal review process. The Committee believes a good working process is in place, but it is not well documented in writing. Therefore the process is not visible to proposers (and reviewers). Specific recommendations intended to improve this process are given.

The third area of deficiency identified in the review was the lack of an appropriate conflict of interest policy. This was considered by the COV to be the most serious. The NPRB must bring its conflict of interest policy into national compliance and follow the National Academy of Sciences "Conflict of Interest" recommendations. All federal agencies have accepted these guidelines. The guidelines require that during proposal review and funding discussions, an individual who might personally benefit, or whose organization might benefit, from the funding of a proposal must recuse him or herself from any discussion of that proposal. They must not be privy to the discussions of others on the conflicted proposal or contribute to any such discussions. Failure to develop and implement a strong conflict of interest policy will undermine and call into question the fairness of the proposal selection process. It will also undermine the integrity of the results and products that come from NPRB-sponsored research. Specific recommendations intended to improve this process are given.

The COV review also identified a number of other areas where improved performance is possible. Recommendations that provide guidance for doing this are provided. These recommendations follow, listed in the order of the sections of the COV report.

General Directives

The COV recommends that the NPRB:

- support a workshop to develop and adopt a cohesive policy on long-term monitoring and commit to a long-term strategy of consistent annual support for monitoring.
- support long-term monitoring programs that include ecosystem indicators useful to stock assessments, as well as provide basic information that increases knowledge of Alaska marine systems.
- give clear guidance to the Science Panel on expected recommendations so that the Science Panel reviews solely on the basis of scientific merit without fitting tier rankings to the budget. This replaces the current approach in which the Science Panel provides rankings of proposals that have funding allocation implications, rather than simple scientific recommendations.
- place scientific merit as a prime criterion for funding and ensure that when alternative criteria are used in the Board's funding decisions, the selected programs be designed to standards sufficient to produce scientifically valid conclusions.

Research

The COV recommends that the NPRB:

- develop a formal, transparent process for identification of research needs and priorities, and ensure that this framework be used to guide priorities and thematic allocations for funding.
- require a section in final project reports that contains recommendations for future research that might be used, as appropriate, to guide development of future RFPs.
- establish a staff or consultant position for local and traditional knowledge (LTK) to assist with the NPRB proposal submission interface, and possibly develop a different proposal process that is not necessarily hypothesis driven.
- review funding of the human-related theme to improve the number and quality of proposals submitted for this theme and add a social scientist to the Science Panel to help critique human-related proposals.
- sponsor a workshop to determine long-term monitoring needs and subsequently fund long-term monitoring projects that provide fundamental data needs for the scientific community.

Annual Proposal Process

The COV recommends that the NPRB:

- allow a minimum of three months for proposal preparation and submission (same as NSF) after release of a RFP.
- advertise RFPs in a wide range of publications and publication methods in order to reach the widest possible audience. The COV provides a list of sources (Appendix II).
- document the proposal review process more completely; specifically the Science Panel must develop clear guidelines on how technical reviews and Science Panel internal reviews of proposals are integrated and incorporated into panel recommendations.

- engage more proposal reviewers from outside the Alaska science community.

Impacts

The COV recommends that the NPRB:

- document outreach and engagement at the project PI level by requiring that final project reports include a breakdown of outreach categories (e.g. conferences, workshops, newspaper articles, etc.)
- implement the NOAA Sea Grant practice of retaining within the NPRB offices the funds from the “Publications” line on grants, then paying any resulting publication costs directly. This will permit authors to publish results using NPRB funds after a project has been completed.
- compose an annual report of research findings specifically relevant to fisheries management and forward this report to the North Pacific Fishery Management Council, the National Marine Fisheries Service, and the Alaska Department of Fish and Game.
- include in proposal guidelines a “Results From Relevant Prior NPRB Research” section to be completed by proposers who have been previously funded by NPRB. This will provide reviewers with quick access to the proposer’s record of success, and will provide staff with a quick update of publication and outreach data.

Accessibility

The COV recommends that the NPRB:

- assume responsibility for tracking the submission of data, metadata, and publications, and continue this after the completion of projects. PIs of completed projects should be queried annually for three to four years after project completion for updated information on publications, data, and metadata resulting from the project funding.
- award the new contract for joint NPRB/AOOS etc. data management and serving, and migrate submitted data from funded and completed projects into the system.
- ensure that data sets resulting from NPRB funding be archived on appropriate servers controlled by the NPRB offices in Anchorage, and that basic web interfaces be used to provide direct online access to these data.
- continue the one-day education/outreach workshops associated with the Alaska Marine Science Symposium, which have been useful and well attended, through solicitation of proposals to run these workshops. Leaders of these workshops should develop metrics for gauging and reporting their success.
- continue the strong and greatly appreciated outreach, engagement, and education activities, and continue to support these activities both within individual projects and in an omnibus (cross-project) format.

Governance

The COV recommends that the NPRB:

- develop a Policy and Operations Manual that codifies all current administrative policies and operating procedures and keep the manual up to date and modified whenever policies and operating procedures are changed.
- document the decision-making process and policy in the Operations Manual as well as the basis for the annual RFP funding allocations by thematic area.
- develop a proposal review procedure that clarifies the information the Board wants from the Science Panel, and ensures that the NPRB staff instructions reflect Board intent.
- implement a mechanism to develop stronger connections that will improve communication between the Science Panel (SP) and Advisory Panel (AP) and provide greater transparency to decisions of interest to both Panels. The Advisory Panel and Science Panel should meet jointly each year, perhaps at the annual Marine Science Symposium.
- foster improved communication between the Advisory and Science panels by allowing the Chair of the Advisory Panel to participate in Science Panel meetings, including proposal reviews, similar to the current procedure of allowing the Chair of the Science Panel to attend the Advisory Panel meetings.
- appoint members of the Advisory and Science panels for specified terms not to exceed four years, with terms staggered so that the panels always contain both new and experienced members.
- undertake an open review of the functions, responsibilities and relationships of the Advisory Panel, the Science Panel, and the board through a facilitated, joint discussion of issues.
- monitor staff operations closely during the adjustment period that is sure to happen after the departure of the present Executive Director to ensure that NPRB program needs are being met. Recognize that it may be necessary to hire additional personnel during the transition.

Conflict of Interest

The COV recommends that the NPRB:

- institute a stringent Conflict of Interest policy for the Board of Directors, and the Advisory and Science panels. The current conflict of interest policy is considerably less stringent than that of other government agencies. Policies that reflect national standards should be adopted, recognizing that a conflict exists if the presence of a person could affect the openness of the discussion and create an unfair competitive advantage for an individual or organization.
- ensure that persons who have a personal or organizational conflict recuse themselves from the discussion and not be present during discussion of the conflicted proposal with the following two caveats, which will provide greater breadth of discussion and fewer recusals during discussion of conflicted proposals:
 1. Because of the scientific interests and corresponding high submission rate of scientists from Alaska NMFS, the legislatively mandated Secretary of Commerce position on the Board should not be the NMFS Regional Administrator for Alaska, the Director of the Alaska Fisheries Science Center, or anyone who reports directly or indirectly to those individuals.

2. Because of the scientific interests and corresponding high submission rate of scientists from certain universities in the northwestern region of the United States, the Board member(s) who represent academic interests should not be affiliated with universities that currently have high NPRB funding rates. We recommend that faculty from universities receiving more than 10% of NPRB's science funding not be permitted to sit on the Board.
- disallow a person who has submitted a proposal for the current year's call as a reviewer of other proposals to the same call because that person has a conflict of interest.

The Integrated Ecosystem Research Programs (IERPs)

The COV recommends that the NPRB:

- suspend the current GOAIERP process and re-compete the program as a fully integrated IERP, modeled on the conceptual framework of the BSIERP.
- have only one ongoing integrated ecosystem research program at a time to avoid competition for limited resources (e.g., ship time, scientific expertise).
- plan integrated research programs as an ongoing activity with a basis in current NPRB research so that future programs can be defined far enough in advance to allow incorporation into the long-range plans of potential partner organizations. This is particularly important for programs that are dependent on ship availability, especially ships with icebreaking capability.
- partner with other agencies and work under a memorandum of understanding for development of future IERP programs
- focus on the science needed to address overarching research questions in development of RFPs rather than on providing funding for specific groups, laboratories, or individuals. This would facilitate some latitude in interpretation of the relevance and responsiveness of particular proposals to the request of proposals.
- recognize inherent differences in regions in the development of RFPs for integrated research programs. For example, the Gulf of Alaska is not a single system but rather at least four different ecosystems that interact.
- recognize that IERP funding levels allow broad but not complete investigation. As a result, the IERP objectives should have tractable products commensurate with funding level and relevant to the specific questions posed by the program.
- consider development of a management structure, similar to the outside committee convened to oversee the ecosystem modeling program of BSIERP, for future IERPs.
- solicit a higher percentage of reviewers from outside the Alaska science community for IERP proposals.

INTRODUCTION

We, the Committee of Visitors (COV), were asked to review the North Pacific Research Board (NPRB) program, identify strengths and weaknesses, and provide recommendations for improving the performance of NPRB's program.

In drawing up this report, we relied on interviews with staff, Board members, and volunteer members of the Advisory Panel (AP) and Science Panel (SP), on a survey conducted by Drs. Denise Lach and Brent Steel of Oregon State University, and on our 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% response rate. NPRB was viewed favorably by most respondents, although those with negative responses identified several recurrent themes. Some of these may be founded in fact, but others are likely misconceptions based on an absence of information. In either case, these recurrent themes are discussed below and require your attention. The survey summary is appended to this report as Appendix I.

We thank the Executive Director Clarence Pautzke and his staff for their assistance in providing access to materials and answering our many questions about protocols and procedures.

Overall, we find a very strong and productive program that is becoming a major source of scientific information in the North Pacific. We commend especially the Science Plan, the Alaska Marine Science Symposium, the Bering Sea Integrated Ecosystem Research Program (BSIERP), your continued support of the Seward Line, the Executive Director and his staff, and especially the outreach and education program.

The NPRB is fortunate to have had Clarence Pautzke as the founding Executive Director. Much of the program structure and management is a product of his vision. The Committee cannot, at this point, predict the effect of his departure. However, the Committee cautions that he is a very efficient and energetic administrator who will not be easily replaced. If an outstanding candidate has not yet applied, consider appointing an Acting Executive Director while you continue your search.

The COV was overwhelmingly enthusiastic about Nora Deans' program in Communication, Outreach, and Education. Her presentation materials are excellent and she has a genuine knack for communicating with people of various backgrounds. We commend her and her predecessor's innovation in developing programs such as the photo contest and SEASWAP video.

We have had less opportunity to interact with other members of the staff, but note that the program runs very well, which is a credit both to the Executive Director and to the individual staff members. The hard-working volunteers on the Advisory Panel and Science Panel should also be commended.

The Science Plan provides a good foundation for the program, laying out basic information needs and approaches, but leaving sufficient flexibility so that it continues to serve as a program foundation. The Alaska Marine Science Symposium has been an overwhelming success and has become a second foundation of the program. Survey respondents familiar with the Symposium expressed strong support, and other anecdotal comments to COV members described the Symposium as the best available platform for Alaska science, and as NPRB's greatest contribution to Alaska science.

We commend the NPRB for continuing the Seward Line and encourage them to expand and institutionalize their commitment to long-term monitoring.

The Bering Sea IERP has been a very effective program, enthusiastically endorsed by participating scientists and by managers at BEST and NSF. It can serve as a model for IERP program development, although we believe that with sufficient lead-time, a memorandum of understanding with an appropriate governmental agency could lead to even better cooperation and integration. We encourage you to begin planning new IERPs by exploring appropriate partners and developing memoranda of understanding. Much of the annual proposal and review process also works well and is regarded positively. Even those proposers who applied and were denied BSIERP or annual funding generally regard the process positively. However, we do note that greater transparency and more effective communication of the review process is required.

NPRB's website is attractive, informative, and easily navigated. It provides useful information to scientists, managers, and students at all education levels. To further improve the website, we suggest creation of an easily navigated interface between your website and data and metadata sets resulting from NPRB funding.

In the remainder of this narrative, we discuss three very serious problems we encountered that demand your immediate attention. We provide detailed suggestions for remedying the problems. We also offer a long list of suggestions for improvements to what is, overall, an excellent program. We want to stress that although the remainder of this report is both longer and more critical than this brief preamble, first and foremost we commend an excellent program and the people who have fostered it.

CHAPTER 1 RESPONSIVENESS TO DIRECTIVES

The NPRB did not evolve from pre-existing research bodies and its organization has benefited from a clear legislative statute upon which to base its mandate and mission. A detailed background document, “The Foundational Years” (NPRB 2010), provides a rich history of the origins and development of the Board as well as its subsidiary bodies. That report also provides a great deal of information on the Board’s funding of research by thematic area since its inception.

The 1997 legislation creating the Board outlined its mandate as follows:

“The Board is authorized to recommend marine research to the U.S. Secretary of Commerce (Secretary), who makes final funding decisions...The enabling legislation requires EIRF funds to be used to conduct research activities on or relating to the fisheries or marine ecosystems in the north Pacific Ocean, Bering Sea, and Arctic Ocean (including any lesser related bodies of water). Research priorities and grant requests are reviewed by the Board which will seek to avoid duplicating other research and will place a priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs.” (NPRB 2010)

The Board developed its statements of Vision, Mission, and Supporting Goals in 2001. These are:

Vision Statement:

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

Mission Statement:

To develop a comprehensive science program of the highest caliber to enhance understanding of the North Pacific, Bering Sea, and Arctic Ocean ecosystems and fisheries. It will conduct its work through science planning, prioritization of pressing fishery management and ecosystem information needs, coordination and cooperation among research programs, competitive selection of research projects, increased information availability, and public involvement.

The Board also adopted supporting goals for its Mission Statement:

- *Improve understanding of North Pacific marine ecosystem dynamics and use of the resources*
- *Improve ability to manage and protect the fish and wildlife populations that comprise the ecologically diverse marine ecosystems of the North*

Pacific, and provide long-term, sustained benefits to local communities and the nation

- Improve ability to forecast and respond to effects of changes, through integration of various research activities, including long-term monitoring*
- Foster cooperation with other entities conducting research and management in the North Pacific, and work toward common goals for North Pacific marine ecosystems*
- Support high quality projects that promise long-term results as well as those with more immediate applicability*

Standard Operating Principles were developed by the Board in 2003 and, with the assistance and guidance from a contracted National Research Council panel of experts, adopted its first Science Plan in 2005 (NPRB 2005). The Science Plan provides the primary vehicle for implementation of the Board's mission. Given the significant effort and external expertise devoted to its development, it is very coherent with the Board's Mission.

The COV believes the Science Plan developed by the Board provides an excellent basis for the development of its research program. It is comprehensive in its consideration of biophysical and anthropogenic influences on resource dynamics. It also included the development of Standard Operating Principles and Procedures (SOPP) governing the operations of the subsidiary bodies tasked with implementing the elements of the plan. The three overarching premises (natural variability, anthropogenic influences on natural resources, and the impacts of both on humans), the four research approaches (monitoring, process studies, retrospective studies, and modeling), and the eight research themes (lower trophic level productivity, fish habitat, fish and invertebrate populations, marine mammals, seabirds, humans, other prominent issues, and integrated ecosystem research programs) encompass the necessary scope of activities contemplated in the Board's Mission Statement. Review of the Science Plan is completed every five years, which the COV regards as an appropriate frequency.

As noted, the Science Plan outlines very broad categories of research and within the Plan identifies needed research for each thematic area. However, the Plan lacks specifics concerning the relative priorities and levels of funding for each thematic area. Instead, an annual Implementation Plan governs the relative levels of funding by thematic area and this Plan guides the annual RFP process. **In this sense, it is difficult for the COV to draw any conclusions about the adequacy of allocation of funding to science projects and programs by the Board, since there do not appear to be specific underlying guidelines on priorities or allocation of resources to thematic areas.** The COV hastens to add its view that the science supported by the Board has addressed all thematic areas; however, the COV was unable to address the issue of funding adequacy in the absence of guidelines for priorities and allocation. The Board does not appear to have a formal and comprehensive process to solicit input from stakeholders and scientists concerning the development of annual priorities and the content of the RFPs. This will be explored further in Chapter Two of this report. Studies of fish and invertebrate populations have garnered the bulk of research funding, but there has also been healthy funding of lower trophic levels and marine mammal studies. Fish habitat and seabirds form the next lower tier of funded projects, with other thematic areas comprising the lowest level of funding.

While funding of thematic research areas by the NPRB appears to have been reasonably balanced and appropriate, the impacts of that research do not appear to be broadly known outside of the NPRB research community. The survey conducted by the COV indicates that among funded researchers, 55-60% of researchers could identify projects or products that have positively influenced fishery or ecosystem management. Among researchers who have not been funded by the NPRB, there is far less awareness (27-33% of respondents) of the positive influence of NPRB supported research.

A separate category for funding concerns integrated ecosystem research programs. To date, one such program is underway (BSIERP) and a second is at the decision stage for funding. In general, the Board should be complimented for its recognition of the need for these integrated studies and for its partnering with the NSF for the BSIERP.

The COV does not believe the Board has successfully resolved its divergence of views and support for long-term monitoring programs. While the structure of NPRB funding would appear ideal for supporting long-term monitoring, and the Board has expressed support for the general concept of long-term monitoring, it remains divided on its ongoing operational support for such monitoring programs. **The importance of such monitoring to the understanding of ecosystem processes cannot be overstated and the COV recommends that the Board work to reach consensus and commit to a strategy of support for long-term monitoring.** Such a strategy is required to avoid the Board's frequent debates on the relative merits of monitoring vs. resource management needs.

In terms of revisions to its broad Mission, the Board has initiated a review of its function and performance, of which this COV report is one component. The COV finds that the Board recognizes the value of such periodic review. Concerning the application of SOPPs, the COV has concerns on several fronts. First, the Board has not fully incorporated the NRC panel's recommendations on Conflict of Interest at the Science Panel and Board level. Second, **the Science Panel should develop clear guidelines on how technical reviews and Science Panel internal reviews of proposals should be incorporated into decisions made.** While the Science Panel offers narrative on its views of these technical reviews, and outlines some of its internal rationales, a clear statement of procedures (perhaps with appropriate metrics) would serve the interest of transparency in decision making. The COV survey indicates that researchers believe the overall NPRB review process is generally adequate but could be improved in terms of transmitting technical comments to proponents. Some respondents also expect that scientific merit will be the prime determinant in success of proposals but have found the Board's decisions to occasionally be based on issues other than scientific merit. While such decisions are fully within the Board's mandate, survey responses indicate that the Board should undertake additional extension work with the research community to improve the understanding of its decision-making.

Third, **the Board should give clear guidance to the Science Panel on what recommendations it expects from the Science Panel.** The Science Panel currently provides rankings of proposals, which have funding allocation implications, rather than simple scientific recommendations. At present, Science Panel members voice discontent about Board decisions that do not conform to the Science Panel tier-based rankings but it is unclear if the Board has requested such rankings. As noted, the Board is not constrained to approve research on the basis of scientific merit alone, but also to consider management needs, as well as regional and social issues. Lastly, **the overall relationships of the Advisory Panel, Science Panel, and Board should be reviewed openly.** All groups labor very hard to make

the Board processes work and are dedicated to its success. However, inherent conflict over proposal reviews and a limited level of dialogue among the Board and its subsidiary bodies appears to generate some simmering discontent. **The COV recommends that a facilitated, joint discussion of issues among all bodies be undertaken.**

CHAPTER 2 RESEARCH PRIORITIZATION, RFP DEVELOPMENT, AND QUALITY AND BALANCE OF RESEARCH

2.1 Research Priority Development

From early 2002 to mid-2005, the NPRB funded in order: General Ocean and Ecosystem Studies (Bering Sea; 22 %), Fish Habitat (18%), Marine Mammals (16%), Fish and Invertebrates (15%), and Lower Trophic Level (LTL) and Salmon (13%) with the remainder going to miscellaneous small projects (Science Plan 2005). From 2006 to 2010, the Science Panel (SP) recommended 36% of the funding for Fish and Invertebrates, 14% for Oceanography and LTL, and 12% for Marine Mammals (Fig. 1), whereas the Board funded 41% for Fish and Invertebrates, 10% for Oceanography and LTL, and 12% for Marine Mammals (Fig. 2). The Science Panel and Board seemed to spread the funding fairly well among the thematic areas, although the Board funded a greater proportion of fish/invert and marine mammals than recommended by the Science Panel and funded less oceanography/LTL, fish habitat, seabirds, and prominent issues than recommended by the Science Panel. Associated with this distribution of funds, there have been some researchers who have voiced concern regarding the manner in which the RFP is written: that it affects the types and numbers of proposals on seabirds. The COV did not determine if this impression was valid. **The COV recommends that a gap analysis be conducted that might identify key factors or issues that still need funding in the Bering Sea, given that a large amount of research has recently been completed in that area.**

The COV determined that in large part the major research themes have been adequately funded, but the NPRB may want to consider funding proportionally more local and traditional knowledge (LTK) studies. These studies, though valuable, may not compete well with more typical scientific studies when reviewed by scientists accustomed to the more typical scientific format. **The COV recommends that you establish a staff or consultant position for LTK to assist with the NPRB proposal submission interface.** You may also want to consider, after consultation with the LTK community, a different proposal process that is not necessarily hypothesis driven.

It was not apparent to the COV how past research and findings guided future Request for Proposal (RFP) development. A logical approach would be that as research projects are completed and reports submitted, new directions of research would flow from past work. Asking each research team to have a section of their report that identifies new research potential may assist in RFP development.

The COV recommends that the NPRB provide a better and more complete description of how the RFP development process works. The COV recommends that the Alaska Marine Science Symposium provide input into the development of RFP topics.

Proposals are originally reviewed by the NPRB staff as to whether they are responsive to the RFP. Once a proposal is classified into a certain theme, it is judged and competes within that theme. The COV believes this framework may be restrictive and limit integrated proposals that cover multiple themes.

2.2 Rotation of Thematic Areas in RFPs

The COV considered, but did not favor, rotation of themes as a good solution for balancing the science program. Further, there is some evidence that the Board has not

funded some themes in proportion to the Science Panel recommendations. **The Board should consider more funding in the Oceanography/LTL theme, especially since these data will inform research needs of other themes.**

2.3 Balance of Research in Thematic Areas

From 2006 to 2010, 55.7% of proposals were submitted in only three thematic areas: Fish/Invertebrate (28.7%), Marine Mammals (15.8%), and Oceanography/LTL (11.2%). Of the 436 submitted proposals from 2006 to 2010, only 12 (2.8%) were for Human issues, 7.1% for Seabirds, and 7.8% for Prominent Issues. The Human theme in particular seemed to be underfunded, with only 0.6% of funding dollars to this theme, although the NPRB did fund 25% of the proposals, the same proportion as recommended by the Science Panel. Overall, there might be a slight bias toward Fish/Invertebrate funding and slight bias against funding in the Fish Habitat theme. Given that one of the four research approaches is process studies, and that oceanic processes are fundamental to upper trophic levels, it seems more emphasis should be placed on funding additional Oceanography/LTL proposals.

The COV recognized that there is no expertise in Human Issues on the Science Panel, thus there might be some bias regarding proposal review. Those writing proposals to be submitted under the Human Issues theme might not be familiar with proposal writing, especially proposals that will be reviewed by a largely “scientific” panel. Thus it seems that the NPRB might consider providing expertise or consultants that could assist those writing proposals for the Human Issues theme.

The COV recommends that the NPRB consider methods that would improve the quality of proposals for the Human Issues theme, such as providing consultants that could assist with proposal development, and adding some expertise in Human Issues on the Science Panel.

2.4 Geographic Balance

For the most part funding has been approved for studies conducted in the Bering Sea and Gulf of Alaska, with some designated for specific areas (e.g. Pribilofs and Aleutians). Coverage changes as the Integrated Ecosystem Research Programs (IERPs) rotate to the different areas; hence more funding is going into the Gulf of Alaska now that the BSIERP is ending. It is often difficult to assess this question because research may be confined to a specific location but the inference space is much larger. For instance, is research conducted in Norton Sound indicative of the eastern Bering Sea? We would need to examine all of the research reports to determine the actual spatial coverage of the research and then estimate the inference space. This is a difficult question to answer given the great disparity in funding between the Bering Sea, which has received a great deal of additional funding from NSF, and Gulf of Alaska, which has received much less funding.

2.5 Long-term Monitoring Needs

It was the consensus of the COV that long-term monitoring should be a priority for the NPRB because the NPRB has stable funding and a long-term interest in the North Pacific. The NPRB program does not appear to place an emphasis on long-term monitoring. The COV feels strongly that a certain amount of funds should be dedicated to long-term monitoring, and that an RFP be placed to encourage ideas regarding the most important monitoring efforts and then funding provided to begin and maintain these monitoring efforts.

For instance, data regarding change will not necessarily be forthcoming via process-oriented studies but requires long-term monitoring. Another value of long-term data sets is that the data often provide insights as to what process-related studies are important. Perhaps the NPRB could leverage funds for long-term monitoring that would attract other funds such as NSF funds to establish a Long-Term Ecosystems Research sites in the North Pacific.

The COV recommends that core long-term monitoring programs should be identified and funded (e.g. the Seward line or various moorings). The COV also recommends that the NPRB sponsor a workshop on long-term monitoring so that long-term plans can be formulated. These long-term monitoring plans should be dependent on value-added actions, such that they are assessed as to their value to other research programs and themes.

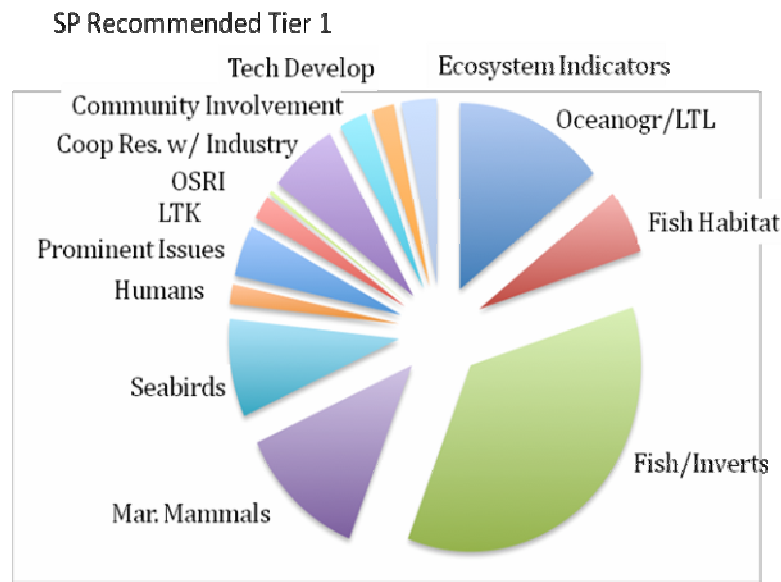


Figure 1. Proportion of proposal dollars (2006 – 2010) recommended for funding in Tier 1 by the Science Panel in various Research Themes and other initiatives.

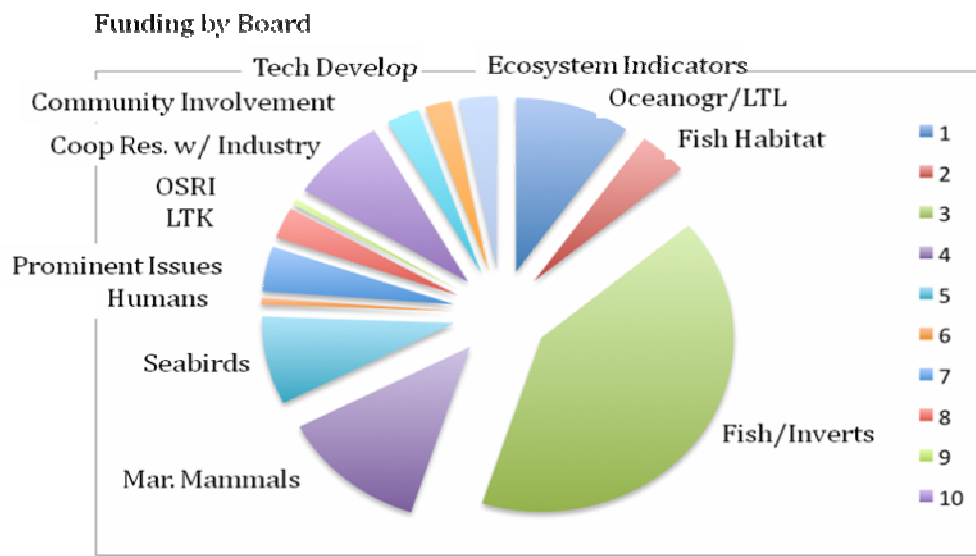


Figure 2. Proportion of proposal dollars (2006 – 2010) recommended for funding by the NPRB in various Research Themes and other initiatives.

CHAPTER 3: PROPOSAL REVIEW AND APPROVAL PROCESS AND PROGRAM MANAGEMENT

3.1 Integrity and Adequacy of the Proposal Process

The proposal review process itself appears to be fair. Prior to sending proposals out for technical review, NPRB staff and a subcommittee of the NPRB Science Panel conduct an initial screening to determine if the submitted proposals are responsive to NPRB's enabling legislation and criteria and adequately address the current RFP research priorities under which they were submitted. Proposals that are found not to be responsive or that do not comply with the formatting requirements outlined in the RFP can be rejected without processing. A goal is that each proposal deemed compliant be reviewed by at least two external referees and evaluated by the Science Panel.

Of 199 survey responses, 72% of those who had received funding felt that the comments of the Science Panel were communicated clearly; two-thirds (64%) of those not funded felt that they received clear comments. These percentages dropped when asked if comments from the Review Board were communicated clearly: only 60% of those funded and 63% of those whose applications were declined felt they received a clear message from the Review Board. About a quarter of the respondents felt that the comments were unclear. As for the scientific soundness of the reviews, of those receiving funding, 73% felt that the review process was scientifically sound whereas only 50% of those who did not receive funding felt the review process was sound. Similarly, when asked if the NPRB process was similar to those of other agencies, 74% of those receiving funding thought that NPRB was very good compared to other agencies; only 57% of those not receiving funding that that NPRB was very good. 19% and 38% respectively felt that the NPRB compared poorly to other agencies.

3.2 Review Process Efficiency and Effectiveness

The COV found the review process to be adequate and appropriate. NPRB staff maintains a database of referees who have either reviewed proposals in the past and/or who are willing to help when asked. At or near the time of every call for proposals, potential referees listed in the database are contacted via email and asked if they are still willing to review proposals in that particular year. Once proposals are received, if there are proposals that match a particular referee's expertise, those referees are once again contacted and asked if they are still willing to serve.

Everything is done through the web (that is, potential referees need only click on one of two URLs given in the email message to indicate if they can or cannot take on the review of one or more proposals). In addition, the NPRB uses online evaluations of proposals that significantly reduce the time necessary to complete reviews. Reviewers are never asked to review more than three proposals, and often only one. Thus, it is the COV's view that the review process allows the best proposals to rise to the top whereas the poorer proposals no longer receive consideration.

3.3 Technical Reviewers

The COV did not examine the technical reviewers' adherence to RFP review criteria in detail, but it seemed clear that the reviewers are provided with sufficient information to evaluate proposals.

3.4 Information Provided to Science Panel

All of the COV members read over a number of proposals for the years 2006-2010 that fell within their area of expertise. All felt that for the most part, the reviews provided sufficient information for Science Panel evaluation. There was (and always will be) the odd review that contains little helpful information. In these cases, it is hoped that NPRB staff flag these reviews and either not use such referees in the future, or at the least, remind these referees that a more thoughtful review would be appreciated. It is clear that the NPRB staff take the task of reviewing seriously. However, we could not determine how the staff handles those referees who produce reviews of low quality. Several survey respondents noted that they felt that their projects were unfairly declined funding because of low-quality reviews.

3.5 Quality of Proposals

For the most part, the COV agreed that proposals judged to be Tier One were far better than those judged to be Tier Three. Tier Two proposals were more difficult to evaluate in terms of the “Tier” into which they were placed. There was a clear trend toward better proposals recently. However, the COV also noted that lots of the proposals suffered from lack of detail in the “Methods” and “Analysis” sections, which was judged as a weakness. **The COV recommends that future RFPs and web submission processes ask for greater detail in the "Methods" sections from proposers as this information is essential for proper evaluation of proposed research.** If one cannot determine exactly what the proposers plan to do, how can you evaluate the potential for success or failure?

3.6 Information Provided to Investigators

The COV found that the technical reviews provide sufficient information for Science Panel review in most cases. Each member of the COV reviewed 10-20 proposals selected from the 2006-2010 pool. We generally agreed with the panel recommendations.

Based on results of the survey, respondents who received funding noted the comments from the Science Panel were very clear (72%), but that comments from the Review Board were viewed as “clear” by only 60%. About a quarter of all respondents noted that the summaries from both panels were “very unclear.”

3.7 Conflicts of Interest

The proposal and review process does not recognize and prevent conflicts of interest in all cases. The general policy of Board members being allowed to be present when they are clearly in conflict needs to be revisited. **In no case should a Board member be present in the room during discussion of proposals in which they are in clear conflict.** As outlined elsewhere in Chapter Five of this report, there is a need for a clear and concise statement of “Conflict of Interest” that applies to all proposal referees, Science Panel members and the Board.

3.8 Adherence to Recommendations

The COV evaluated proposals submitted from 2006-2010. During 2006 there were, in our opinion, far too many proposals elevated by the Board from Tier Three to Tier One (a total of six “Tier Three” proposals were funded). After 2006, recommendations of the

Science Panel were, in most cases, followed by the Board (Table 1). Only a single proposal was elevated from Tier 3 to Tier 1 in 2007 and 2008, and none in 2009 and 2010. We did not evaluate proposals before 2006 so have no knowledge of how closely the Board followed the Science Panel's recommendations. Averaged over the years 2006-2010, the Board funded 84% of the Tier One proposals. No more than four Tier One proposals were declined funding in each year (with the exception of six in 2010). In each of the five years, 2006-2010, between two and six Tier Two proposals were funded.

3.9 Changes Needed to the Annual Schedule of Proposal Review and Approval

The committee felt that the time between RFP release and proposal due dates was quite tight. For example the 2009 RFP was released on 1 Oct 2009 with full proposals due on 4 Dec 2009, which is only nine weeks. Scientists working in the Gulf of Alaska region are probably well aware of these deadlines as they are similar each year, so for them is not likely to be any problem. In fact, the results of the survey revealed that 86% of those who received funding thought that the lead time was "very adequate" and perhaps more telling, 95% those who did not receive funding noted that the lead time was "very adequate." However, the COV noted that "outsiders" who are unfamiliar with the goals of the NPRB and who wish to submit a proposal might find this deadline tight. **The COV recommends that a period of at least three months should elapse between publication of the RFP and deadline for receipt of proposals.** This is similar to policies of the National Science Foundation. Moreover, **the COV recommends that the NPRB publish their RFP in the Federal Register** and advertise RFPs in a wide range of publications and publication methods in order to reach the widest possible audience. The COV provides a list of sources appended to this report as Appendix II..

3.10 Program Management

The COV did not have a clear sense as to whether there is a sufficient level of accountability in processing proposals, assigning reviewers and providing unbiased information to the Science Panel and Board. "Accountability" is the key word here. The COV did not gain a high enough level of familiarity of the duties of the NPRB staff, Science Panel and Board to determine who was "accountable" for what.

3.11 Program Monitoring

Based on examination of the "Project Browser" on the NPRB website, the COV found that projects are, indeed, being monitored at the appropriate level. Anyone can check on funded projects and read their annual and final reports. Further, each project is categorized by "Large Marine Ecosystem," "Ecosystem Components," "Key Words," and "Research Priorities." Thus it is easy to compare projects as well.

Results of the survey clearly suggest that grants management (GM) is very good. That is, of those who have received funding (138 respondents), 80% thought GM was very good, whereas only 7% thought it was very poor.

3.12 Staffing and Staff Responsiveness

Certainly, the staff at Seward appears to be extremely capable and was happy with their situation. But that was the "money" end of things. As for the "programmatic" side, the COV only became acquainted with a few members of the staff (chiefly Francis Wiese, Science

Director and Nora Deans, Senior Outreach Manager). The COV wishes to express concern that with the departure of Clarence Pautzke, a man of seemingly boundless energy, that the NPRB may need to hire additional staff.

Based on responses to the survey, the staff has been responsive to regular calls for proposals. However, there was discontent expressed with the development of the GOAIERP project. In the view of the COV, the GOAIERP overwhelmed the NPRB staff, chiefly due to lack of leadership within the scientific community. This lack, in turn, was most likely a consequence of the segregated and sequential RFP process. Unlike BSIERP, where leadership was integral to the process, the sequential GOAIERP process did not encourage team building and scientific leadership. Leadership then defaulted to NPRB but the ultimate leaders of the planning and prosecuting the research should have come from the scientists in a bottom-up management and planning approach. This problem is discussed further in Chapter Six of the COV evaluation.

There was agreement from survey respondents that the annual Alaska Marine Science Symposium was very good at communicating science: 67% felt it was very good, 31% did not know and only 3% thought the Symposium was not good at communicating science results.

3.13 Areas for Improvement

The COV had no strong opinions here other than the general conflicts of interest (discussed in the Executive Summary and Chapter Five). This must be dealt with immediately.

Table 1. Number of times a proposal ranked as Tier 1 by the Science Panel was not funded by the NPRB (SP YES/NPRB NO) and frequency that a proposal not ranked as Tier 1 by Science Panel was funded by NPRB (SP NO/NPRB YES) for years 2006-2010 evaluated by the affiliation of the principle PIs.		
PI AFFILIATIONS	SP YES / NPRB NO	SP NO / NPRB YES
University	9	9
Federal Government	9	6
State Government	0	2
Private/Local Government	3	3
Mixed	12	5
TOTALS	33	25

CHAPTER 4: ACCESSIBILITY AND IMPACTS OF RESEARCH RESULTS

In this chapter, the COV evaluates the accessibility of NPRB-supported research results to the wider scientific community and assesses the contributions of NPRB science programs. There are several aspects to this topic, which will be dealt with independently in subsections below. For accessibility, there are three aspects that we comment upon:

- Dissemination of data from the NPRB investigations to interested users
- Report and publication accessibility
- Use of NPRB project information in education and outreach activities

Related questions on the impacts of NPRB research results are considered by commenting on the following issues: how the scientific results are being used by others in the science community; presentation of NPRB research at conferences; use of scientific results by other stakeholders such as managers, resource users, and industry; effective translation of NPRB science into functional management; constraints imposed on management agencies by limited or no access to NPRB funded research; and, the contribution of NPRB to building research capacity in Alaska.

Prior to summarizing performance of NPRB on these issues, it is necessary to define the target audiences for NPRB data, information, and knowledge (hereafter, DIK). Federal agencies that fund applied science have summarized the process as (1) collection of data that (2) goes through processing and statistics to create information that (3) gets synthesized to create knowledge that (4) gets integrated into the political/management process to inform and enable action which (5) hopefully will result in societal benefit (From a presentation by Elizabeth Turner [NOAA, 2006]). It is the COV's opinion that the first three steps of this series are the direct responsibility of the funded marine scientists. While marine scientists may contribute to the subsequent steps, the fourth step is primarily a responsibility of the communication and outreach activities of the NPRB office and policy scientists. To the extent that NPRB funds policy science activities, this then also becomes a responsibility of the funded social, economic and policy scientists.

NPRB has defined its audience to include marine scientists, marine resource managers, policy makers and legislators, commercial and subsistence users, teachers and students, Alaska coastal communities, non-governmental organizations, the media, and the general public. In other words, just about everyone. But the mechanism to communicate DIK needs to be tailored to the audience however, as some audiences are more receptive to some mechanisms and not others.

4.1 Data and Metadata Dissemination and Accessibility

Principal investigators funded by NPRB are required to provide datasets and metadata records for all data collected. NPRB has a data systems manager to aid the process of ensuring that all data are available and metadata records that facilitate access and use of these data are created. Third-party data used (unaltered) in a funded NPRB project are data that were not originally collected or generated directly as a result of NPRB funding. In such instances, the metadata associated with the data must be provided to NPRB. If the third-party data are modified, improved or materially altered in any way by investigators in a funded

NPRB project, both metadata and the modified data should be submitted to NPRB. For modeling projects funded by NPRB, input files, code and output products should be submitted to NPRB. A link on the NPRB web site (www.nprb.org/projects/metadata.html) provides specific information about NPRB requirements for metadata and data. This site also provides contact information for the data system manager.

An examination of the awardee compliance with the data and metadata submission requirements of the NPRB (as of July 2010) indicated that 79 of 141 (56%) completed projects for which metadata are expected were submitted. Thus, a substantial number of projects have been completed and have not submitted metadata. The COV revisited this in October 2010. Of the 173 projects in the database with start dates from 2002-2007 (inclusive), 93 (54%) had submitted both metadata and data. For metadata submission only, compliance was only slightly better (55%). In assessing data submission, the COV considered instances of “available at NPRB” and “Contact PI” as being in compliance, whereas all other categories were considered non-compliant. Data listed as “Contact PI” are generally considered available (by written request) from the PI after a two-year exclusive use period following award completion. NPRB should assume responsibility for tracking the submission of data and metadata. **PIs of completed projects should be queried annually for three to four years after project completion for updated information on data, and metadata resulting from the project funding.**

Finally, most datasets produced as a result of NPRB funding are not directly accessible through the electronic database system. Instead, it appears that a formal request (procedure is not clearly stated) for data “Available at NPRB” must be made to obtain these data. This is contradictory to text in “The Foundational Years, 2001-2008” publication which states (p. 180) “*Over time, it was decided that there should be two major data systems. One would be at the Board office, overseen by our data manager, and would contain data and metadata just for NPRB-funded research.*” A second, more comprehensive data portal would be hosted by UAF, and called the Alaska Marine Information System (AMIS). On 16 July 2010, the AMIS data portal went down, and is not available. In late July 2010, most of the links on <http://amis.nprb.org/#> were inoperative or broken. Therefore, it was not possible for the COV to access the NPRB data (not metadata) to determine general availability and accessibility. A new website for AMIS was available when accessed 31 October 2010. However, the site is incomplete, with some nonworking links. One new addition is a Metadata button on the top of the NPRB homepage (www.nprb.org) that when clicked takes the visitor to the National Biological Information Infrastructure website (prefilled with NPRB as provider) that shows 130 documents available. Many of these are metadata only, but some have direct links to data available electronically, and others indicate data that are available by request, with information on whom to contact.

An email inquiry to the NPRB data manager regarding how to access NPRB funded data—most of which is not electronically available via the web, resulted in the response:

It does look that there is no direct link to download a dataset from the NPRB project browser web site (<http://project.nprb.org>). However few metadata documents contain distribution information that would provide a link for downloading data online. For instance see project# 0208 <http://project.nprb.org/view.jsp?id=9d832f27-1cf5-43c0-8707-f6cbbd1cdc13>. It is true that datasets for the most of the project accessible by request and not

available online for immediate download. I am working on publishing datasets with relatively small size online.

Although the NPRB Project Catalog/Browser is useful, it would be more useful if the following features were implemented: 1) capability to search on start and end dates of projects, 2) searchable for completed projects only, and 3) an inventory of datasets/products produced by each project with a brief description was searchable. NPRB has made a long-term commitment of \$100,000 per year (inflation adjusted) to support AMIS. If fiscally and logistically possible, providing on-line access to NPRB data directly from the NPRB offices in Anchorage for all interested audiences should be pursued.

4.2 Report and Publication Accessibility

4.2.1 Accessibility

As of July 2010, the NPRB inventory of papers resulting from NPRB funding listed 256 papers. Of these, 192 are listed as published, 60 as “in press” and four as “in review.” It is likely this database is somewhat out of date. Since then an additional 14 papers have been added to the publication database (270 papers listed in October 2010; 201 listed as published). A total of 187 papers were published in the years 2005-2009 (inclusive), from a total of 68 projects initiated from 2002-2008. In these seven years, there were 201 funded NPRB projects. Ignoring future publications, 66% of NPRB projects in 2002-2008 have not yet published a peer-reviewed paper, or the database of publications maintained by NPRB staff is woefully out-of-date. In many cases, but not all, PDFs of the published papers or manuscripts in press are available electronically from a link shown on the web inventory.

A subset of final (and semiannual progress) project reports was examined in an *ad hoc* fashion. Final project reports are comprehensive, and often long (some exceeding hundreds of pages), while semiannual progress reports tend to be much shorter (two to a few tens of pages). Progress reports provide sufficient information to the NPRB to evaluate whether the project is making the expected progress. Many final reports appear well done, and may include manuscripts that are “in press” or “in review” as well as lists of already published papers. Overall though, the quality of final reports varies considerably between projects. It is difficult to extract consistent data on impact from them. Final reports from 2005 and later projects are improved, however the level of detail on outreach is variable. **A breakdown of categories (e.g. conferences, workshops, newspaper articles, school visits, community meetings, stock assessment meetings, websites etc.) would be useful in this regard.**

There is often a lag between project initiation/completion and publication. Some final reports indicate manuscripts that are “in preparation,” but a search of the Aquatic Sciences and Fisheries Abstracts (ASFA) did not provide a corresponding publication. **The COV recommends that NPRB consider using the Sea Grant model of retaining “publication” funds within NPRB to ensure that project findings are published in peer-reviewed journals.** In addition, there is a need for increased staff monitoring of publications and other products on an annual basis for several years post-completion of the award. **The NPRB staff should contact the lead investigator of every completed project annually, for several years, for updates on submitted and published papers, and new data and metadata products.**

4.2.2 Integration by the Scientific Community

NPRB research is being published as indicated above. Citation rates of NPRB research are similar to those of a comparison group, the US GLOBEC Northeast Pacific Coastal Gulf of Alaska program, suggesting similar integration by the scientific community (Fig. 3). NPRB-funded research is being presented at scientific conferences locally, nationally and internationally. Reporting of conference presentations in interim and final reports has improved since 2006. Much of the research is presented at the Alaska Marine Science Symposium and a large portion is also presented at national and international conferences and symposia. The NPRB has also sponsored a number of high quality symposia. A number of projects also report significant community and education outreach. However, accounting for these activities is not consistent among projects.

4.2.3 Use of NPRB Information for Resource Assessments

There is a general sense from the community surveyed that the products of NPRB-funded research are being used and applied in Alaskan marine resource management. This is particularly the case for fish stock assessments, fish habitat protection and endangered species. For other management issues, such as harmful algal blooms, invasive species and environmental assessments, NPRB-derived results appear to be less well integrated. Overall, little of the NPRB research results are cited in stock assessments, environmental assessments and other resource management advisory documents. In many cases these documents rely more extensively on older publications. Active participation in stock assessment processes by NPRB funded scientists indicates that the knowledge gained from their research serves to inform the process. Researchers supported by NPRB contribute as authors to many of these assessment and advisory documents, but the reporting of these authorships is inconsistent among projects. This type of integration will be a short-term contribution since over the longer term “if it is not published then it doesn’t exist.” The NPRB will have a more significant long term impact on the policy and management of Alaskan marine resources if the findings of NPRB supported research are published in the peer reviewed literature.

4.2.4 Contribution to the Research Capacity of Alaska

The NPRB’s contribution to the research capacity of Alaska is evident in the success of and high praise for the Alaska Marine Science Symposium. The symposium is viewed as a high quality forum for exchange of new learning, results and ideas, and for networking amongst researchers. Other contributions such as graduate student and postdoctoral fellow training and the subsequent job opportunities are not currently captured in the NPRB databases. **The COV recommends that the training and professional fate of NPRB supported students and postdoctoral scholars be tracked as a metric of capacity building and networking.**

4.3 Education and Outreach

Since its beginnings, the NPRB has emphasized the important role of information availability and public involvement. This is exemplified within the NPRB mission statement as “*The work of the NPRB will be conducted through...enhanced information availability and public involvement.*” From COV conversations with NPRB and Advisory Panel (AP) members, it is clear that the NPRB staff have been doing an excellent job at communication, education and outreach. Advisory Panel members specifically noted the improvement in

these aspects when Nora Deans was hired as the senior outreach manager on the NPRB staff. Early NPRB actions in this arena were enhanced video documentation of NPRB research, provision of seed money for marine science education, internships and workshops in marine science and teaching programs, and development of a Bering Sea exhibit at the Alaska SeaLife Center.

Many scientists are not particularly adept at outreach and education outside of a formal classroom setting. Consequently, it was important and significant that the NPRB as early as 2004 dedicated funds to Communication, Education and Outreach from their core funds. First Michael Illenberg, and more recently Nora Deans, led efforts to disseminate NPRB information to diverse audiences. Funding of about \$150,000/year, including ca. \$50,000/yr for education and outreach support the production of documents like the bookmarks, the calendar photographic competition, the two-page project syntheses, and longer brochures like those for the Seabirds and the Marine Mammals.

The NPRB recognized that a visually appealing and easily navigated website was key to providing information to the scientific community and general public. As time has passed, mandatory outreach and education requirements in proposals increased from \$500 per project to \$2,000 or more per project. Projects are not restricted to this amount, but it is expected that some time and effort be devoted to outreach and/or education. For the IERPs, funds for outreach and education aspects were built directly into the projects. For the BSIERP, this was \$100,000 over the five years. This is being used to create mini-posters, an active (polished and frequently updated) website (<http://bsierp.nprb.org/>) with stories from the field and field notes, and to highlight in the media (radio, news) significant findings or interesting stories from the BSIERP field studies. Several scientists have visited and interacted with citizens from Alaskan communities to provide information about climate change, ocean and ecosystem conditions and hear about specific concerns of these communities.

Everyone familiar with NPRB commented that the Alaska Marine Science Symposium (AMSS) held in Anchorage every year is a significant event for marine scientists, Alaskan citizens and the media. This is THE marine science event in Alaska, and the NPRB staff is commended by everyone for organizing an extremely valuable meeting. All of the Advisory Panel members with whom we met felt strongly that the AMSS is a strong outreach and engagement element of NPRB, especially because it is attended by the media and by many non-scientists. As one Advisory Panel member put it, *“The ideas come out when people from the communities and scientists are brought together. This is what the NPRB was formed to do.”* Members of the Science Panel also praised the quality and disciplinary breadth of the AMSS. At the AMSS-2010 meeting, a special workshop on “Communicating Ocean Science” was held immediately prior to the meeting, and was well attended. One-day workshops on communicating ocean science began in 2007, but have become much more significant in recent years with the addition of other partners (Alaska Ocean Observing System; Centers for Ocean Sciences Education Excellence; SEANET Network of Scientists). It is unclear how the success of these workshops is being or could be assessed. **The COV recommends that the NPRB develop quantitative metrics for assessing success for future workshops.**

The Advisory Panel members commend the NPRB staff for outreach and engagement of young and old citizenry of Alaska—*“They do a tremendous job simplifying complex concepts and materials into information that is understandable by most Alaskans.”* This communication occurs through visits to communities, through published materials and

through the website. One Advisory Panel member noted that outreach could be improved by greater statewide focus rather than regional focus and further noted that some citizens in remote communities do not have good internet access and only become engaged when they meet scientists or NPRB staff face to face.

For inspiring and engaging young scientists, the NPRB has sponsored marine science awards for elementary, middle and high school science fair projects, and for postgraduate education, has begun to award up to five (sometimes more) fellowship awards (of ca. \$20K) to worthy graduate students working on Alaska issues. The graduate student fellowship applications are based on merit and are reviewed by the Science Panel and Advisory Panel.

Community involvement in research and monitoring exemplifies another form of education and outreach. Over the years, the NPRB has supported a number of projects where interested members of the general public or specific concerned communities are trained as observers and monitors. In addition to educating individuals, such involvement raises awareness of marine science activities and findings within the community, thereby representing a grassroots approach to science outreach. Examples of such projects include the COASST- Alaska Program (NPRB Project 0612), studies of paralytic shellfish poisoning (Project 0644), Pribilof Island communities ocean monitoring (Project 0733) of Eyac Lake (Project 0922) and community monitoring by Bering Sea villages (Project 1020).

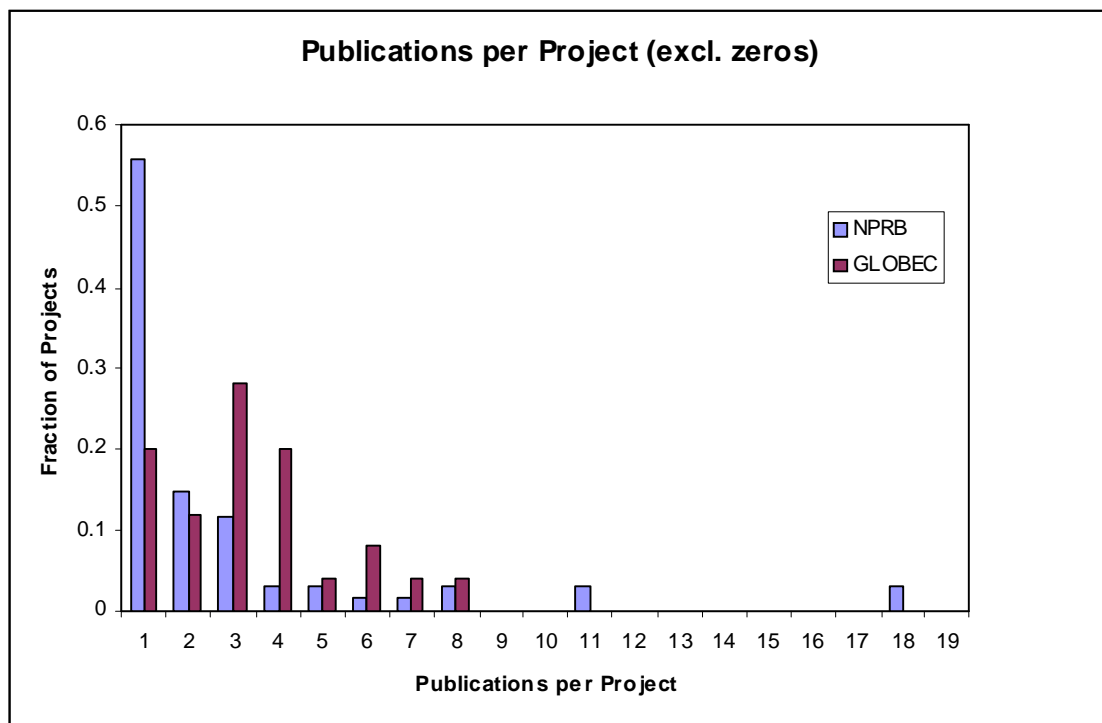


Figure 3. Comparison of the number of publications per project for NPRB (n=68) and GLOBEC (n=25) publications during 2005-2009. Projects that did not publish any papers in that interval are excluded. Statistics for NPRB (Mean: 2.75; SD: 3.5; Min: 1; Max: 18; Median: 1) and GLOBEC (Mean: 3.36; SD: 1.91; Min: 1; Max: 8; Median: 3).

CHAPTER 5: GOVERNANCE

5.1 General Governance

The NPRB is governed by a 20-member Board of Directors (Board). The Board has organized two panels to advise it, the Science Panel (SP), set up in 2002, and the Advisory Panel (AP) set up in 2003. The Science Panel, as the name implies, provides the Board with scientific advice while the Advisory Panel represents the user community and provides advice from that perspective. Interactions among these separate entities are generally limited and good. However, there is some strain in regard to proposal review and decision-making.

The Committee found that although NPRB was viewed favorably by most respondents, those with negative responses identified several recurrent themes. Some of these may be founded in fact, but others are likely misconceptions based on an absence of information. That absence could be countered by greater transparency in the generation of the annual Request for Proposals (RFP) and the proposal review process. Although a good working process is very likely in place, it is not well documented in writing and therefore not visible to proposers (and reviewers). You would be well served by developing a **Policy and Operations Manual that codifies all current administrative policies and operating procedures, especially those related to RFP development and proposal review, and by keeping the manual up to date and modified whenever policies and operating procedures are changed.**

The COV believes Clarence Pautzke runs a very efficient operation and staffing is sufficient for the current tasks under his direction. If additional tasks are delegated to the NPRB staff, such as management of in-house NPRB servers for data archives, annual tracking and updates to data, metadata, and publication records, there may be need for additional staff. **The direct oversight of the modeling component of the BSIERP and the COV-recommended higher level of oversight for the GOAIERP place additional, unanticipated demands on the Board's science staff. Moreover, Pautzke's departure will usher in a period of adjustment and the Board should monitor staff operations closely during that period to ensure that program needs are being met.**

5.2 Proposal Review and the Science Panel

The Board has ultimate responsibility for recommending proposals to Secretary of Commerce. It seeks recommendations from the Science Panel, which, in turn, seeks recommendations from outside technical reviewers. The Science Panel reviews each proposal in turn, and considers recommendations of the outside reviewers.

The Science Panel is instructed to rank proposals on scientific merit, as Tier 1 (fund), Tier 2 (fund if additional funds become available) and Tier 3 (do not fund). Staff annually instructs the Science Panel to ensure that the sum of Tier 1 requests reflects the total amount of funds available for that RFP, and thus, considerable effort goes into fine-tuning the final recommendation. Although the specific wording may differ slightly from year to year, the overall message to the Science Panel is clear. For example, in 2007 it was instructed as follows:

Based on the consensus ranking the Science Panel needs to determine which proposals to recommend for funding under the \$3.895 million RFP target. These proposals should be coded as Tier 1. As in previous meetings, the Panel may also consider a set of Tier 2 proposals for an additional \$600K

should the Board decide to exceed the initial RFP target at their April meeting.

The Board considers other criteria such as affirmative action and geographic balance in selecting its package, however, and may opt to fund a Tier 2 proposal even though it generally displaces a Tier 1 proposal. Overall, the Board has funded approximately 90% of the proposals recommended by the Science Panel, only occasionally funding a Tier 2 proposal at the expense of one from Tier 1. That percentage is well in line with funding decisions of other federal granting agencies and implies a recognition of scientific merit as a primary criterion in awarding grants.

In 2010, however, the Science Panel placed 22 proposals in Tier 1, recommending them for funding. Only 15 of these were chosen for funding by the Board, with the balance of available funds used to fund Tier 2 proposals. Thus, approximately one-third of the Science Panel recommendations were rejected at the Board level in favor of Tier 2 proposals, with little or no explanation to the Science Panel. This has resulted in considerable discontent within the Science Panel, and a sense that its efforts have been requested and then ignored. The COV recognizes that the Board's legislative mandate specifies that it consider factors other than scientific merit and the requirements of the RFP in assembling the final package. However, this proportion of reversals seems to be a very large commitment to these other factors, and a denial of scientific merit as the primary criterion of proposal selection.

The COV sees two problems here. **First, the Board should clarify the instructions given to the Science Panel. If the Board prefers to make allocation decisions, it should inform the Science Panel that it requires only evaluation of whether a proposal is fundable or not fundable.** This would result in considerably less Science Panel effort and also input.

Second, the Board should consider the effect of its selection criteria on the larger community. There already is an impression, voiced by some survey responders, that political influence affects proposal decisions. Although the survey showed that overall, the NPRB is well regarded, it should protect itself from such impressions in order to attract the best science to the program. To do this, the decision-making process should be transparent and evident to anyone considering a proposal submission.

The COV also noted that when Tier 2 proposals are chosen over Tier 1 proposals, the selections usually favor fisheries management needs over marine ecosystem information needs, and short-term specific answers over longer term growth in understanding. Some survey responders questioned the ultimate relevance of the RFP to the final selection of proposals. If it is the Board's intent to favor fisheries management and short-term specific answers, it should be reflected in the RFPs.

5.3 Proposal Review and the Advisory Panel

Early in the NPRB history, it was decided that the Advisory Panel would help in the drafting of the RFP, but have no role in reviewing the resulting proposals. The Advisory Panel continues to ask for a role in proposal review, and although this issue has been visited many times, it remains a source of discontent. The COV is itself divided on this issue. Some members feel proposals should be reviewed solely on scientific merit, with adjustments for other significant factors being the rarely used prerogative of the Board. They fear that Advisory Panel review would move selection further from scientific merit and increase the

bias for fisheries over ecosystems and the tendency to seek short-term answers. Other members feel there is a role for the Advisory Panel if the result of the Science Panel review is a ranking allocation. The COV considers ranking allocations to be the prerogative of the Board. If, however, the Science Panel's Tier 1 and Tier 2 rankings reflect its views on the relative importance of the proposals to the Science Panel's interpretation of the Board's mission, then the Advisory Panel should have authority to rank proposals that have been judged as scientifically sound by the Science Panel according to the Advisory Panel's interpretation of the Board's mission. This issue could be resolved through clear instructions from the Board.

In addition, **the Board should consider Science Panel and Advisory Panel joint discussions on proposals, following the Science Panel review.** At present, there is little or no dialogue on proposals, resulting in a stultified environment in which there is little learning or evolution of expertise between the Advisory Panel and the Science Panel.

5.4 Advisory and Science Panel Interactions

The overall relationships of the Advisory Panel, the Science Panel, and Board should be reviewed openly. All groups labor to make the Board processes work and are dedicated to its success. However, inherent conflict over proposal reviews and limited dialogue among the Board and its subsidiary bodies appears to generate some simmering discontent. The COV recommends that a facilitated, joint discussion of issues among all bodies be undertaken.

To foster communication, the COV recommends implementation of a mechanism such as a professional facilitator to develop stronger connections between the Science and Advisory panels. The goal is to improve relationships and provide greater transparency to decisions of interest to both Panels. The Advisory Panel and Science Panel should meet jointly each year, perhaps at the annual Marine Science Symposium.

To further foster improved communication between the Advisory and Science panels, and since the Science Panel Chair comes to Advisory Panel meetings to present Science Panel recommendation and answer questions, **the Chair of the Advisory Panel should be allowed to participate in Science Panel meetings, including proposal reviews.**

5.5 Terms of Office

Science and Advisory panel members serve for unspecified terms. Some members of the Science Panel have served since that panel's inception in 2002. Some members of the Advisory Panel have served since that panel was established in 2003.

Despite the lack of turnover, Science and Advisory panels appear to be functioning well internally and the COV does not intend that the following recommendation be taken as a criticism. However, we note that turnover would provide opportunities for new ideas and approaches and this larger view would serve the NPRB well. In fact, panel turnover can serve informally as an ongoing external review. Although panel members display no apparent sign of fatigue, these people work hard and the potential for burnout is best avoided by rotations and staggered terms of office. **The COV recommends that panel members be appointed for specified terms with a maximum of four consecutive years. Terms should be staggered so that the panels always contain both new and experienced members.**

5.6 Conflict of Interest Policy

The Board of Directors, and to a lesser extent the Advisory and Science panels, operate under Conflict of Interest policies considerably less stringent than those of other government agencies. We recommend that you pattern a policy that is similar to that of NOAA, for example http://www.cio.noaa.gov/Policy_Programs/NOAA_PRB_COI_Policy_110606.html, which states that persons should not serve on committees if that service could create an unfair competitive advantage for any individual or organization.

The NPRB should adopt policies that reflect national standards, recognizing that a conflict exists if the presence of a person in the room could affect the openness of the discussion or create an unfair competitive advantage for an individual or organization. During discussions of specific proposals, persons who have a personal or organizational conflict must recuse themselves from the discussion and leave the room during discussion of the conflicted proposal.

The COV recognizes that in specific cases, such recusals could make it difficult for the Board to conduct its business. **We strongly recommend the following two caveats that will provide greater breadth of discussion and fewer recusals during discussion of conflicted proposals:**

1) Because of the scientific interests and corresponding high submission rate of scientists from Alaska NMFS, **the legislatively mandated Secretary of Commerce position on the Board should not be the NMFS Regional Administrator for Alaska, the Director of the Alaska Fisheries Science Center, or anyone who reports directly or indirectly to those individuals.** Our suggestions include the Director of NMFS-Northwest Fisheries Science Center, in Seattle, the Director of the NOAA NERR in Homer, the Director of Alaska's NOAA Sea Grant in Fairbanks (if not too close to UAF), the Director of Alaska's NOAA Weather Service in Anchorage, or a representative based in the DC area such as the Director of NOS.

2) Because of the scientific interests and corresponding high submission rate of scientists from certain northwestern universities, **the Board member(s) who represent academic interests should not be affiliated with universities that currently have high NPRB funding rates.** The COV recommends that faculty from universities receiving more than 10% of NPRB's science funding not be permitted to sit on the Board. At present and historical funding levels, academics/administrators from UAF and UW should be excluded from Board membership. Other colleges or universities should represent academic interests.

A person who has submitted a proposal for the current year's call should not be a reviewer of other proposals to the same call since that person has a conflict of interest.

CHAPTER 6: INTEGRATED ECOSYSTEM RESEARCH DEVELOPMENT

6.1 Bering Sea Integrated Ecosystem Research Program (BSIERP) and the Bering Ecosystem Study (BEST)

6.1.1 Program Background

Significant changes occurring in the marine ecosystems of the Bering Sea and the possible linkages of these to climate forcing resulted in recommendations from the science community for development of multi-disciplinary marine research programs focused in this region. This interest led to workshops, which in 2002 produced a Science Plan that outlined a Bering Ecosystem Study (BEST) Program. This Science Plan provided science questions that could serve as guidelines for integrated, interdisciplinary studies of the marine ecosystems of the eastern Bering Sea. The science questions required studies that extended from the physical environment, through the lower trophic levels, and included upper trophic level consumers up to humans. An Implementation Plan for the BEST Program was published in 2005, which led to development of a request of proposals (RFP) from the National Science Foundation, Arctic System Science (ARCSS) Program. Subsequently, a small number of projects focused on lower trophic levels and one modeling project were funded. A second RFP from the NSF ARCSS program the following year resulted in funding additional studies that expanded the scope of the overall program. However, the NSF-funded projects retained a focus on lower trophic level dynamics and modeling.

Concurrent with the development of BEST, the NPRB developed its first Science Plan and a four-year Implementation Plan that outlined how to realize the goals set forth in the Science Plan. Both plans called for integrated research programs. In 2006 the Board released a request for pre-proposals (total of \$14 million) and selected projects for full proposals. Those were used to develop the Bering Sea Integrated Ecosystem Research Program (BSIERP). The BSIERP projects focused on higher trophic levels and fisheries.

During the BSIERP program development, the NPRB developed a partnership with the NSF ARCSS program, which resulted in coordination of the BEST and BSIERP projects. Each organization focused on its strengths in research funding. The NPRB provided funding for fisheries-related studies that are not traditionally funded by the NSF. Similarly, the NSF funded studies not typically funded by the NPRB, and importantly for the program, provided access to oceanographic research ships for field studies in the Bering Sea. Combining the programs resulted in a stronger, more integrated effort in the Bering Sea. Also, the partnership between NPRB and the NSF resulted in about \$52 million in funding for the studies in the Bering Sea.

The combined BEST-BSIERP program is now ongoing. The BSIERP is designed as a six-year project with the current projects scheduled to finish in 2011.

6.1.2 BEST-BSIERP Program Structure

The BEST-BSIERP Program involves about 42 funded projects, a data management component and an education and outreach component. The distribution of projects has the majority focused on commercial and subsistence fishes (seven projects, NPRB funded), zooplankton and lower trophic levels (seven projects, NSF funded), and benthic processes (seven projects, NSF and NPRB funded). Other components of the ecosystem are

represented by projects focused on seabirds (three), cetacean distributions (one), and human impacts (two). Environmental information is obtained from moorings deployed in the Bering Sea (one project). Integration across trophic levels is provided by two projects focused on trophic interactions and one project focused on predator-prey patch dynamics. Additional integration and extensions to climate effects are from projects focused on atmosphere and ocean effects (five projects) and ecosystem modeling (six projects).

6.1.3 BSIERP Program Development

The projects funded by the NPRB were based on proposals submitted in response to the RFP, recommendations by the Science Panel, and decisions by the Board. Each is discussed below.

However, as noted above, the BSIERP is ongoing, so these comments are intended to inform development of future integrated research programs.

Proposal Development -NPRB

Development of proposals by the research community was based on the information in the RFP. Some of the scientists who responded to the RFP indicated that the RFP text was specific enough to identify the individual/organization to be funded (e.g. need to study by-catch). Some perceived that this arose because scientists from agencies (e.g. NOAA, USGS) have specific tasks and research objectives that may not fit within a more general RFP. As a result the perception was that the BSIERP RFP was not “a level playing field.” Also, the specificity of the RFP was regarded by some as not allowing for scientific creativity and more of a request for a contract than a request for a science proposal such as the RFPs issued by NSF.

Proposers felt constrained by the demands of the proposal format and the need to include sufficient information for reviewers and the review committee to evaluate the proposal.

The development of the BSIERP proposals was considered awkward because of the initial request for pre-proposals, which were then used to select a small number to be invited for full proposals. The “winner take all” approach resulted in funding of projects with deficiencies in their responsiveness to the RFP. One proposal (Trites, predator-prey patches) was funded after the fact, although it was not considered to be directly relevant to the RFP or to the other funded projects. This resulted in conflict from the outset, which compromised cooperation within the BSIERP program. The various research groups are now working better together, but there are still separate, non-integrated programs because the programs are focused on different scales, use different approaches, and address different questions. The injection of politics by the Governing Board made it difficult for collaborative research from the outset.

Review Process - NPRB

Initially the BSIERP proposals were sent for external review. Following this review, the BSIERP proposals were reviewed and ranked by the Science Panel and recommendations for funding were sent to the Governing Board. The Governing Board made the final selection for proposal funding. External review of the proposals was completed via a small review community. As a result, there was the perception of conflict of interest that arose when individuals who had pending proposals were also asked to review

proposals. **The COV recommends that the NPRB develop a pool of reviewers from a wider community.** Going outside of the Alaska community was considered to be good for improving scientific quality of the external review process.

The larger concern expressed about the review process was the potential for abuse at the Governing Board level. Some recommendations from the Science Panel were ignored or reversed. If there is a record of decision reversal, the NPRB runs the risk of limiting who is willing to propose to RFPs from the NPRB. In particular, the perception is that only scientists from agencies (e.g. NOAA) will apply, thereby limiting the influx of ideas and approaches from scientists not constrained by agency needs. **The COV recommends that a code of ethics for proposal review be established and that these include the recommendation that reversals of recommendations made by the Science Panel (including inputs from external reviewers) not exceed 10% of the funds available for the RFP.**

There was concern expressed about the inclusion of representatives of agencies on the NPRB Governing Board. These individuals are regarded as having bias towards agency needs, which may or may not be in the best interest of programs such as BSIERP.

Proposal Development and Review Process – NSF

The funding for the BEST program was fast tracked in order for the U.S. community to have a contribution to the International Polar Year. Thus, the NSF started the BEST program in 2006 with a small number of funded proposals and without NPRB participation. The short initiation period for a Bering Sea project meant that there was insufficient time to develop a memorandum of understanding between NSF and NPRB. As a result, it was not possible to have a joint RFP and mix funds from the two organizations. Thus, the NSF and NPRB had separate RFPs and separate reviews. However, the NSF did get subsequent approval for coordinated solicitations. This allowed the NSF and NPRB to have joint panels to give advice on proposals. Each organization appointed a panel and there was overlap in the designated individuals. Panel members from one organization left the room while proposals from their organization were discussed.

The joint panel was an attempt to ensure coordination and non-overlap of proposals funded by the two organizations. The NSF focused on lower trophic levels. The NPRB focused on upper trophic levels, and took advantage of the relationship the NPRB has with the fishing industry in the North Pacific. Some overlap in proposals occurred at the infauna and euphausiid levels, but the proposals were complementary. After the first BEST science investigator meeting, gaps were identified in the science program. Proposals submitted to the regular Arctic sciences core program were selected to fill these gaps. The partnership with NPRB allowed support of worthy science that NSF was not able to fund because of lack of funds.

Summary

The advantages/disadvantages of melding separate proposals into a program versus large group proposals can be debated. The final outcome for the BSIERP worked and resulted in a productive and successful program. However, the COV recommends combination of large group proposals and individual proposals. One suggestion was to allow the option of replacing weak components in a group proposal once a clear view of project goals was established. The weak components could be replaced with individual

proposals or through an additional call for specific types of research. The latter model has been used with some NSF-sponsored programs.

Subsequent partnerships with agencies such as the NSF should be developed with enough lead time (e.g. 18-24 months) to allow for establishment of a memorandum of understanding.

6.1.4 What Has Worked Well

Development of a Coherent Science and Implementation Plan

The BEST and BSIERP studies were developed around three overarching hypotheses that were developed with community inputs, although the actual writing of the Science Plan was done by a limited number of individuals (e.g. Jim Schumacher and George Hunt). The availability of a well-structured Science Plan that was developed around community consensus of the important 'big picture' science questions ensured that the two programs did not go in different directions.

BSIERP Program Management

The dedication of the NPRB staff to the BSIERP was given high marks. The science community recognized that the NPRB staff was committed to making the program a success. The NPRB staff sought outside help from oversight committees, paid attention to the committee recommendations and were supportive of the science. The NPRB staff invested considerable time and energy in program communication and funded an annual PI meeting. The staff has worked to integrate the BSIERP and BEST programs.

Science Support

Funding of the mooring work (Stabeno, NOAA) is regarded as critical to realizing the BSIERP research objectives. The long-term data provided by the mooring deployments established the basis for hypotheses about the response of the Bering Sea ecosystem to climate variability, which in turn has led to additional research. The NPRB has the flexibility in funding to continue the mooring program and doing so was considered to be a priority.

Much of the research recommended by the Fisheries Management Council has been funded by NPRB. This research has direct impacts on fisheries management and is outside the purview of traditional funding agencies such as the NSF. This is an area where NPRB-funded research has made an important contribution and should be continued.

NPRB Communication with Science Community

The NPRB has put significant management resources into facilitating the BSIERP program. Funding was provided for an annual meeting of the BEST and BSIERP science investigators. The NPRB staff worked diligently to get people to talk to one another and to exchange ideas and results. The annual Alaska Marine Science Symposium provides a forum for discussion of all aspects of marine science around Alaska and as a result provides an important outlet for advancing science. The presentations and posters from the annual meeting are posted on a website maintained by NPRB staff. A NPRB staff member was designated to do outreach and education, which helps push forward the BSIERP and BEST programs and provides visibility for both. The willingness of NPRB to put management

resources into advancing the BSIERP program was considered to be a reflection of how seriously the program is taken and a measure of support from NPRB.

In addition to the annual science meeting, the NPRB supports monthly teleconferences between the science steering committees for BEST (three people) and BSIERP (three people). NSF representatives are invited to participate in these calls. This has allowed the science program to stay in contact with the program managers and vice versa. Similarly, the modeling committee meets frequently via teleconference. The level of communication support by the NPRB staff received outstanding reviews from program managers and scientists.

Establishment of Modeling Committee

The NPRB set up an ecosystem modeling committee charged with providing oversight to ensure that models developed for the Bering Sea are consistent with and include the data sets from the BEST and BSIERP studies. Those doing modeling and fieldwork interact at regular intervals to determine what data are needed for the models and how the needed data can be obtained. The committee has been successful and the NPRB staff has supported the recommendations of the committee. For example, the lack of zooplankton data was identified as a problem for the modeling studies. To obtain the needed zooplankton data, the NPRB staff requested additional funding for zooplankton data from the National Science Foundation. These requests were successful and resulted in an additional \$1-2 million. Although the additional funds were targeted for observational studies, these funds provided valuable data sets that supported the modeling effort. The NPRB staff has worked to ensure that the modeling effort has the needed resources and one staff member has been assigned to help the modeling committee.

Support of Synthesis

The NPRB funded two years of analysis and write-up that were out of phase with fieldwork. This is a value added component of the project. The NSF is now soliciting proposals for BEST synthesis studies.

6.1.5 What Has Not Worked Well

NPRB Program Structure

The initial science planned for the Bering Sea had a focus on marine mammals such as whales because one of the science questions was related to how much of the rise in Pollock stocks is due to the removal of baleen whales. However, cetacean research was not initially funded; rather funding was allocated for studies of predator-prey interactions at small scales. It was not clear that results of this type of study were relevant in the context of BEST and BSIERP larger science questions that focused on understanding climate-induced changes in fish stocks in the Bering Sea. The decision to fund small-scale patch studies rather than cetacean surveys, for example, resulted in the perception that the individuals judging the program had lost sight of the central issues. Also, funding a group that championed natural change versus fisheries-induced changes resulted in the perception of conflict of interest, especially since the group has received funding from the fishing industry. Such rumors, right or wrong, cause problems and can compromise the final results. **The COV recommends that future decisions about funding be transparent and documented.**

NPRB Funding Decision Structure

The Science Panel comprises agency scientists and some academics. The perception is that the agency representatives tend to back projects that have direct management implications for fisheries. This sets up tensions that may compromise the science that is funded. The NPRB Governing Board is perceived as being more political and biased towards agency needs, such as funding research through the Alaska Fisheries Science Center.

Program Timing

Coordination between BEST and BSIERP activities has been an issue. The NSF BEST program is funded for four years. The NPRB BSIERP program is funded for six years. The NSF is trying to extend the analysis phase of BEST through solicitation of additional proposals. Better coordination of the timing of the start of the programs would have prevented the out of phase nature of the current synthesis activities.

6.1.6 Ship Issues

The NPRB has been a catalyst for developing opportunities to ensure that good science is done in the Bering Sea. The NPRB is unique in that it can dedicate funds to specific types of research. However, the NPRB does not have sufficient funds to pay for oceanographic research vessels, such as UNOLS vessels. Ship scheduling for BEST and BSIERP has been an issue from the start. NOAA ships were provided as matching and yearly budget reassessments have resulted in cutbacks on promised ship resources. The NOAA partners have made concerted efforts to maintain the ship time, but it has been a continuing issue for them. From the NSF side, obtaining time on ships with icebreaking capability has been difficult. Time was provided on ice-strengthened UNOLS vessels, but these ships were not able to get into some research areas, which was not optimal for the science objectives. The logistics of ship scheduling caused problems for the NSF because ships initially promised were taken out of service for maintenance or other uses. The UNOLS vessels have multiple demands on them and it is difficult to delay large coordinated multidisciplinary programs relative to individual investigator programs.

The COV recommends the NPRB work out a matching process with the NSF to share vessel costs on joint projects. The new UNOLS vessel that is coming on line for the Arctic makes this a priority. Access to NOAA vessels allows some types of science to be supported, but some needed capabilities are not available on these vessels. Chartering commercial vessels (e.g. fishing boats) limits the number of people and type of science (e.g. multidisciplinary studies) that can be done. Therefore, it is desirable to develop mechanism for the NPRB to pay for “at sea” work.

6.1.7 Summary

Overall, the BSIERP program is regarded as successful on many levels. The science is of high quality and management of the program sets a standard for future multidisciplinary studies. The NPRB staff is to be commended for having the flexibility and

foresight that has allowed BSIERP to develop into coordinated and well managed research program.

6.2 Gulf of Alaska Integrated Ecosystem Research Program (GOAIERP)

NOTE: The NPRB undertook final decision on its recommendations concerning the GOAIERP during the period of the COV review. To assist in decision-making, the Board requested the COV's preliminary draft of this chapter prior to completion of the final report. That draft was forwarded to the Board in early August 2010. It is updated briefly here. Subsequently, the Board requested comments on the COV draft from its Science Panel (SP). The Science Panel comments are included as Appendix III to this report and a brief COV response to those comments is included as an Addendum to this chapter.

Our review of the GOAIERP encompasses more detail than the BSIERP both because the Board is in the process of decision-making on the GOAIERP and the letter from the COV (sent June, 2010) to the Board, which expressed concern about this program. The GOAIERP is the second such program initiated by the Board, but its genesis was quite different than the previous program. We divide our commentary into five broad categories:

- Concept and clarity of purpose
- Proposal generation process
- Content of proposals
- Review process and decision making
- Evaluation and recommendations

6.2.1 Concept and clarity of purpose

The GOAIERP Implementation Plan (2008) arose directly from recommendations by the 2005 NPRB Science Plan, which identified integrated ecosystem research as critical to the NPRB's mission. The BSIERP, which was underway at the time of development of the GOAIERP, in large measure acted as a guide for a similar program in the Gulf of Alaska (GOA). However, the Board was constrained in this second effort by a smaller budget and the absence of a significant partner to share in program development and funding. In addition, differences in the oceanography and ecosystems of the GOA and Bering Sea, as well as identified gaps in scientific understanding in the GOA, dictated a different focus for research activities. As a result, the Board focused efforts on understanding the driving forces governing trophic level dynamics, particularly upper trophic levels, as well as the influences of climate change and anthropogenic activities such as fishing on dynamic linkages among trophic levels.

The general concept to be addressed by this program was extremely broad, as stated in the Implementation Plan:

How do environmental and anthropogenic processes, including climate change, affect various trophic levels and dynamical linkages among trophic levels, with particular emphasis on fish and fisheries, marine mammals and seabirds within the Gulf of Alaska?; and,

...to determine and quantify the processes driving upper trophic level populations and to better understand observed and potential future variability therein as they affect key management issues in the North Pacific.

The Plan provided only general guidance as to how the program should address these needs. However, it is clear that understanding the influences on upper trophic level species dynamics is the key objective. Two veteran concepts from the 1970s, ecosystem resilience and the match-mismatch concept, were advanced as meriting attention by investigators. The Plan was also influenced by ideas of top-down control of lower trophic levels by top predators, or the “cascade hypothesis” concerning sensitivity of ecosystems to changes within upper trophic levels. In addition, the budget for GOAIERP was substantially smaller than that of the similar program in the Bering Sea and therefore required maximum leverage of resources in existing monitoring, assessment, and modeling programs.

COV Comment

The concept advanced by the Board contained few, if any, specifics about which “key management issues” were to be addressed by the proposals. For example, guidance as to whether the key management issues were associated with topics such as optimizing yield from directed fisheries, maintaining biodiversity, enhancing populations of protected species, was lacking. As such, the proposers were given freedom to identify their own issues and there was no requirement for proposals to address particular identified (or unidentified) key issues. A greater specificity of issues and clarity of purpose by the Board would have been desirable at this stage, in particular to avoid retrofitting components of the adopted program with elements that the Board subsequently identified as necessary. Further, the number of concepts advanced in the Implementation Plan may have created confusion or uncertainty about what elements of ecosystem function investigators might fruitfully consider. Studying ecosystem resilience in response to trophic level changes generated by either environment or anthropogenic activities might reasonably be considered under the Plan but could still be unresponsive to the management issues of concern to the Board if the appropriate species are not considered. Again, greater specificity by the Board would have been helpful, without constraining intellectual development of proposals.

6.2.2 Proposal generation process

Partial review of the BSIERP proposal process led the Board to develop an alternative approach in the GOA. The Bering Sea program was developed from the proposal stage as a fully integrated, multi-trophic level program. However, this presented the Board with an “all-or-nothing,” “take-it-or-leave-it” proposal process, resulting in only a few large proposals for the research. For the GOAIERP, the Board used an alternative process that was intended to stimulate broader competition, access a wider suite of recipient expertise, and potentially improve the resulting program through a synthesis of stronger individual components. However, strong vertical integration of the program components was stressed as critical to overall program success. Board staff outlined this to the Science Panel (SP) in August 2007, as follows:

Having gone now through the proposal selection process with BSIERP, the Panel reflected upon the approach taken and lessons learned. There was general consensus to not repeat the large group, winner-take-all approach, but to also not follow the NSF individual

proposal approach. Instead an intermediate strategy that is directed, has more control, but still is competitive, should be explored. Staff suggested a modular approach where all modules that would make up an IERP are previously identified by the NPRB and roughly defined (like was done for LTK and patch dynamics components of BSIERP). Modules would be process oriented and could be competed openly, followed up by focal meetings like those done for the patch dynamics and LTK components, which proved to be extremely valuable and productive. Such an approach would give control, ensure competition, leave space for creativity within defined modules and prevent any group or institution from dominating. Such a modular approach could also deal with the issue of insufficient funding, depending on available partnerships, as well as ensuring a high quality, comprehensive and integrated program comparative to BSIERP. Core modules could be identified to be funded together in a first instance with additional modules designed ahead of time to be added as more funding becomes available. The Panel endorsed this idea and added that relevant long-term datasets should be identified and their availability determined to ensure a level playing field in terms of data access for all applicants.

Accordingly, the Board developed a segregated or modular approach to generating proposals for the GOAIERP. As outlined by the Science Panel in August 2008, the proposal process would follow in stages:

1. The RFP should call for pre-proposals focused on upper trophic species of management interest but also including a non-quantitative description of how critical drivers including feeding and lower trophic linkages could be addressed.

2. Proposals must clearly identify management applications of the proposed outcomes of the study.

3. Following review and selection of pre-proposals for the upper trophic level focus, full proposals for the upper trophic level studies would be invited concurrent with invitations for full proposals to address key drivers of the target upper trophic species, with a focus on the forage base. (Emphasis added by COV)

The emphasized text indicates that the approach to full proposals would be concurrent, not sequential. The four components would be vertically integrated as a post-proposal process, through discussions among investigators. This approach was endorsed by the Science Panel (August 2008) and the Board (September 2008).

The RFP for Upper Trophic Level (UTL) pre-proposals resulted in nine responses. Following review by the Science Panel in February 2009, four were selected for an invitation to submit full proposals. Subsequently, in March 2009, the Board added an additional, more restricted proposal, primarily concerning Steller sea lions (SSL). This was done despite the Science Panel review that this proposal did not fit the RFP and involved no data collection for the fish species involved. At its March 2009 meeting, the Board also debated whether to follow, “...its originally-intended process of calling for full proposals for all components of the IERP at once.” Ultimately, the Board decided to follow a sequential, rather than concurrent RFP process, stating:

...it was better to engage in a two-step process and get past the decision of selecting the UTL component before asking the lower components to write their full proposals to fill in the vertically integrated program. This will make it easier on them and likely result in better, more focused proposals to flesh out the scope and content of the IERP. If for some reason,

fiscal resources need to be repositioned to any of the lower components to have a viable integrated study, then that will be negotiated with the UTL component.

The five selected UTL pre-proposals were invited to submit full proposals. Subsequently, the SSL proposal of Atkinson et al. was combined with that of Moss et al. The Bailey et al. pre-proposal was withdrawn, leaving three full UTL proposals.

Following selection of the UTL component (Moss/Atkinson et al.) in March 2009, the RFP for the remaining three components (middle trophic level [MTL]; lower trophic level [LTL]; modeling) of the IERP was released in June 2009 (followed by an amended version in July 2009). The response to this RFP was extremely low – a single MTL proposal, two for the LTL component, and two for the modeling component.

COV Comment

The COV understands how the rationale used by the Board in its approach to RFP generation for the GOA IERP was developed. Review of the BSIERP program suggested to the Board that a segmented proposal approach might be superior to a comprehensive integrated proposal approach. However, the results for the GOA approach demonstrate that the issue of “take-it-or-leave-it” proposals from the BSIERP was not eliminated by the segmented RFP process for the GOA – it was simply propagated down to the next level. Once the UTL component was chosen, proponents for the remaining components were forced to fit their proposals to the UTL, i.e., “take-it-or-leave-it.” The COV believes that this process limited the intellectual development of the remaining components. In our view, this is the primary reason response to the RFP for the remaining program components was unacceptably low. The goal of fostering competition was clearly not achieved for these other components. This is a significant flaw in the process and resulted in an inadequate suite of poorly linked proposals.

The segmented approach sacrificed the invaluable processes of team building, joint intellectual development of concepts and approaches, and integrated problem solving that were necessary to the BSIERP. While not perfect, that integrated BSIERP proposal approach yielded functional linkages among components *at the design stage*. Obliging investigators to design integrated programs from the outset imposes a requirement for the conceptual and operational linkages that are missing in the GOA IERP proposals (see following section). A *post hoc* process of integration, while anticipated in the original Implementation Plan, has proved to be difficult and has highlighted fundamental incompatibilities among the IERP components. Indeed, at the principal investigators meeting in February 2010, the PIs experienced significant difficulty matching program components and undertook a process of joint budget cutting among these program components in an attempt to rationalize components with budgets and objectives. Throughout the period subsequent to the selection of the proposals, there have been repeated concerns, expressed by the Science Panel and during investigator meetings, that the component programs are not well integrated and that mutually dependent information either cannot be collected, will not be collected, or the information that is collected does not address the processes under study.

On a positive note, the RFPs for all components were relatively well written in terms of subjects to be addressed and, for some components, contained a great deal of detail on metrics of performance whereby the programs would be evaluated. The modeling component of the Plan was particularly strong on criteria to be considered. Surprisingly, this component had perhaps the least suitable proposals submitted. We believe that the 12

modeling Objectives (a) to (l) in the RFP (p. 8-9) set an impossibly high standard that could not be achieved by any model team for the \$1M available. In fact, neither of the two “vertically-integrated” modeling components included all of these 12 elements, as noted in Science Panel discussions (Nov 2009). The Science Panel recognized that a model encompassing all of the aspects recommended by the Ecosystem Modeling Committee (EMC) might not be possible for the funds available.

6.2.3 Content of proposals

Our review of the proposal contents focuses mainly on the UTL component and its underpinnings because this component both defined and, more importantly, circumscribed the scope of investigation by the other components. In this section we examine several of the elements of the proposals to determine whether the proposals address the objectives of the Implementation Plan and whether these elements provide scope for testable hypotheses, hence understanding of underlying processes.

The Implementation Plan stressed the need to understand environmental and anthropogenic control of UTL abundance and trophic linkages, and to understand future variability. Addressing these needs therefore requires measurement and analysis of environmental driving forces and anthropogenic activities, and their effects, over a time frame sufficient to incorporate background variability into predictive ability. The IERP proposals focused on environmental and ecological influences but examination and understanding anthropogenic factors was relegated to a request for simulation exercises (which cannot be validated) in the modeling component. The modeling component proposal does not examine fishing as a forcing factor; rather its focus is on impacts of bottom-up processes on focal species dynamics. The introductory text of the UTL proposal indicates that the proposal may not even incorporate a clear understanding of the expected dynamics of harvested stocks under the influence of fishery management: “*We focus on recruitment success because large swings in abundance of these species have occurred despite precautionary fishing levels.*” Precautionary fishing levels, as implemented in the North Pacific through fixed proportional harvest rates, are not intended, nor can they be expected to keep harvested populations stable. Underlying dynamics of populations in response to environmental forcing occur as a component of these harvest strategies.

The focus of the UTL proposal, and by extension the other proposals, is understanding the causative factors for recruitment variability of five focal groundfish species. The proposal outlines three primary hypotheses to be examined:

a. *Early life survival of marine fish is influenced by climate driven variability in a biophysical gauntlet described by offshore and nearshore productivity, larval and juvenile transport, and settlement into suitable demersal habitat. The probability of survival is linked to health and condition as reflected in instantaneous growth and consumption rates of fish travelling the gauntlet.*

b. *Differences in survival of fish among years and areas results in fluctuations in available prey, which directly affects the dietary preference and foraging strategy of top level predators such as seabirds [and Steller sea lions]. (Note: bracketed text deleted from 3/31/2010 revision to the UTL proposal).*

c. *Environmental and biological variability are less pronounced in the eastern GOA than the central GOA and the greater stability and higher species diversity in the eastern GOA make the region more ecologically resilient to climate change and human forcing.*

While descriptive, these hypotheses are somewhat vague and largely untestable. To illustrate, we isolate some of the hypothesized mechanisms and examine the proposals for data collection or analysis elements that would permit the hypotheses to be tested.

Hypothesis a) The proposal identifies early life as having two components: an offshore to nearshore pelagic stage and a nearshore settlement stage. Survival during these two stages is hypothesized to be critical to recruitment success. Further, this survival is influenced by climate (i.e., long-term) variability. The study must therefore measure survival during these early life stages and do so over a temporal scale sufficient to incorporate climate-scale variability and its influence on this survival. Populations of most of the focal species are characterized by infrequent, strong cohorts that dominate the populations during their presence and are critical to long-term population maintenance. Indeed, this observation is general for most temperate water groundfish and is key to understanding recruitment variability. This type of hypothesis is best addressed via modeling but it requires collection of appropriate data for the modeling exercise.

It is a deep criticism of the IERP proposals that the investigations will neither measure survival of cohorts directly, nor do so over a time frame sufficient to encompass the events leading to generation of such strong cohorts. Instead, survival can only be inferred from bioenergetic models of highly artificial laboratory performance of individuals, without detailed knowledge of prey fields or feeding performance (on a cohort level) in the wild over the entire time frame. Nearshore settlement survival will be determined on the basis of abundance estimation of predatory fish, seabirds, and marine mammals, as well as the distribution and abundance of habitat deemed suitable for recruitment. A critical unresolved issue is predation by nearshore predators on young of the year (YOY) of the focal species – the proponents have not identified a linkage to this specific life stage of the focal species, particularly for arrowtooth flounder, sablefish, and Pacific ocean perch. It appears unlikely that this is feasible, yet the project relies upon this segment as the defining component of recruitment success. This is a critical point of integration that is not well developed.

Hypothesis b) This is not a hypothesis that permits any critical testing relevant to the central theme of recruitment determination for the focal species. Most extensive diet studies demonstrate predator switching behavior in response to prey availability. The ‘hypothesis’ is vague and identifies no specific mechanism or process. If predators switch prey items, it requires detailed knowledge of spatial and temporal changes in prey availability and understanding of preference expression by predators. Even given such knowledge, the predator behavior must still be shown to exhibit mortality sufficient to determine recruitment success of the target species. A significant criticism of this component is the lack of demonstrated connection (and an inability to determine it) between predator diets and the life stages of interest to this study, i.e., YOY of the focal species. This is particularly acute for the rockfish species. While the response of the investigators to this criticism from reviewers — that the nature of research is to find such linkages — both the COV and other technical reviewers have questioned the idea of any significant spatial and temporal overlap between these life stages and the predators identified.

Hypothesis c) Testing this hypothesis requires extensive knowledge of the relative impacts of climate and anthropogenic forcing. The sole component to examine this in any meaningful way is the modeling component, but it will be largely a simulation exercise with limited validation capability. Indeed, given the nature of its investigation, one could reasonably question the value of much of the empirical data collection for the simulation

process since the data are wrong in temporal scale. The technical reviews also questioned how this hypothesis could be tested and whether the research could separate cause and effect when comparing recruitment variability for two spatial areas with different underlying ecosystem characteristics, as well as different forms of environmental forcing.

Lastly, the integration of the IERP components concerning testing these hypotheses is poorly described. Most analyses lack details concerning how program elements will be combined and integrated in the analyses.

The COV views the Middle Trophic Level (MTL) proposal as the best prepared and technically sound of the component elements. Hypotheses are clear and, for the most part, testable. However, the Lower Trophic Level (LTL) component has some significant conceptual flaws concerning estimation methodology for productivity measurements and iron sampling, which are likely to compromise the results. The intent of the LTL project is to compare rates in two regions, one a High Nitrogen – Low Chlorophyll region that is probably iron-poor and dominated by assemblages of small (<5 um) phytoplankton, and one that is relatively iron-rich and dominated by assemblages of large phytoplankton (>5um). These two types of communities have very different iron requirements and trace metal toxicity sensitivities. The lack of trace-metal clean techniques for collecting water, incubating, and processing the water chemistry and photosynthesis work could very likely invalidate the results. The proposers acknowledge this deficiency, and plan to submit a proposal to NSF Ocean Sciences in August 2010 to fill this gap. However, the low success rate of proposals (8-10%) submitted to NSF Ocean Sciences, especially for first submissions, suggests that obtaining the funds is doubtful. In the absence of very strict trace metal-clean techniques, any measured rate differences cannot be extrapolated to *in situ* differences. Without useable photosynthesis rates, or some other measurement of phytoplankton growth rates, uptake of iron and trace metals cannot be calculated.

As mentioned above, we believe that the standards established for a successful model proposal were set impossibly high, given the projected \$1M funding level. Thus, it is not surprising that both ecosystem modeling proposals were evaluated to have deficiencies, especially by the Ecosystem Modeling Committee review. Each of the proposals received had individual strengths (and weaknesses) that largely did not overlap. The COV believes that the responses received to the modeling component should have triggered a significant response from the Board concerning the viability of the overall program. Many of the objectives for the overall program were to be addressed through the synthesizing and evaluation framework of the modeling component, not within the individual program components. This was clearly identified in the initial decision on the UTL proposal. We believe the fact that the subsequent proposal process did not result in a satisfactory modeling component should have generated a re-assessment of the GOAIERP process.

6.2.4 Review of proposals and NPRB decision-making

The COV views the review and decision-making processes for the GOAIERP with considerable concern because: (i) technical concerns raised by reviewers were not given sufficient consideration; (ii) concerns about incomplete integration of the components were expressed at multiple points in the review process; (iii) the Science Panel appears to lack clear operating principles on how to deal with external technical reviews and internal reviews in its decision making; and (iv) the Science Panel conducted its own internal ranking of

proposals but the criteria for and application of them in ranking the proposals are either undocumented or, if documented, not made available for review.

The Board appeared well served by its technical reviewers for the full proposals. These reviews were generally thorough and insightful. The COV does question why technical review of the pre-proposals was not undertaken, even though these pre-proposals were brief. Consistency and transparency might have been more readily apparent if such reviews had been solicited. Concerning the full UTL proposal reviews, the Science Panel did not appear to interpret some of the technical reviews with the reviewers' intents. Two of the reviewers made recommendations to not fund the Moss et al. proposal that was eventually recommended by the SP. In addition, the Science Panel took the technical reviews as rankings, and then conducted its own ranking to arrive at its decision on the UTL component. A similar issue occurs in the disparity of the technical and science panel ranking of the two ecosystem modeling proposals. Greater transparency in the Science Panel process that resulted in the final decision is needed as, overall, the selected modeling project fared worse on technical reviews. The basis for the ranking and eventual decision was not well documented. Lastly, at no point did the Science Panel or Board appear to consider or interpret the extremely low response rate to the MTL, LTL, and modeling components.

Evaluation and recommendation

The COV attempted to understand the background, formulation, review process, and decision making for the GOAIERP. The focus on understanding the determination of recruitment strength placed the program into an arena which has had notable lack of success not only in the northeast Pacific but worldwide. Against this backdrop, it is clear that the Board was prepared to entertain both a new proposal generation process and new conceptual approaches. The former led to very strong momentum, once the UTL proposal had been selected, and may have compromised an objective evaluation of the degree of integration required with subsequent program elements. After the low response to subsequent RFPs for these other components, the COV believes that the Board should have evaluated both the viability and merit of the component programs generated through the segregated process. The Board's willingness to consider new approaches, while scientifically laudable, should not substitute for due consideration of valid concerns raised by peer reviewers and internal Board processes. The COV believes that the GOAIERP as currently structured has a low probability of addressing the Board's objectives. We believe that the Board should suspend its current process and re-compete the program as a fully integrated IERP, modeled on the conceptual framework of the BSIERP.

6.2.5 ADDENDUM

The previous chapter contained the collective scientific evaluation of the GOAIERP process and results by the COV. The COV appreciates the comments on the preliminary draft of this chapter provided by the Science Panel (Appendix III). Given that the Board has chosen to proceed with the GOAIERP as currently structured we do not believe there is further merit in a point-by-point response to the Science Panel comments. However, we do wish to provide some additional comment on several items in the Science Panel letter.

Proposal Generation

The Science Panel comments that the process would have stopped if the Science Panel felt that the proposals received contained fatal flaws. However, we note that neither of the modeling proposals received was deemed acceptable by the Science Panel or the NPRB's Ecosystem Modeling Committee. The modeling component was a critical component in synthesizing and evaluating the results of all other components, yet the decision to proceed with other components was made in the absence of a viable modeling component.

Time Scale

The Science Panel comments that the limited temporal scale of the program meant that there would be a strong emphasis on retrospective analysis to address climate-level effects. We find it difficult to understand how such retrospective analyses can be conducted in the absence of historical data collections comparable to those which will be undertaken during the current program.

Hypothesis Testing

The COV report identified specific concerns about the program's ability to examine the hypotheses proposed. While the Science Panel cannot be expected to respond on behalf of the PIs, the COV does not believe the concerns expressed in our report have been addressed.

Review Process

The COV understands that the internal review of proposals is an intensive and lengthy process. We do not imply that the scientific evaluations conducted have been deficient and we are pleased to note the Science Panel understands that greater transparency and formalizing of procedures would improve external perception of the review process.

Evaluation and Recommendation

The COV understands the Board's and the Science Panel's support of the GOAIERP process. We have expressed our scientific evaluation and the Board has made the decision to proceed with the program as currently structured. We regret that is the case but respect that the decision is the Board's to make. However, we caution that the Board should exercise a high level of oversight of this Program, particularly as to assuring the provision of the necessary data and information from the individual components to the modeling component, so that the testing of the hypotheses of the GOAIERP can be achieved.

Appendix I

Summary of Survey for NPRB Review Committee

Introduction

Oregon State University (OSU) researchers oversaw development and implementation of a survey to aid the external review of the North Pacific Research Board (NPRB) during the summer of 2010. The survey was sent to 1,298 individuals and 334 responses were received (26% response rate). The survey had two distinct purposes and parts. The first part of the survey was developed to satisfy informational needs of the NPRB Review Committee. Survey questions were designed in conjunction with the External Review Committee and NPRB staff. Each section of the survey dealt with particular aspects of the NPRB funding and research process.

Questions from the second part of the survey replicated other studies conducted by OSU researchers. The questions asked respondents about their preferred role of scientists, policy makers, private industry, interest groups, and the public in the natural resource policy process. Some questions also targeted values as they relate to natural resource management.

Approach and Methods

The survey was administered online between July 22 and August 16, 2010 using a proprietary software program called SurveyMonkey. Potential respondents were contacted via email with a live link to the survey. The sample was compiled from two sources:

- Alaska and Washington government agencies (state and federal), environmental groups, fishing cooperatives, NGOs and other private enterprises with relevant ties to the interests of the NPRB were identified using individual websites and online directories;
- The NPRB provided a list of individuals who had applied for funding from the NPRB over the past three years.

50% of respondents who filled out the survey received funding from NPRB, 20% of respondents applied, but didn't receive funding, and 30% of respondents fall in the "other" categories with a pretty even distribution among agency, NGO, other potential users.

For most questions, respondents were instructed to choose between several options on a scale typically ranging from positive to negative. Respondents were directed to provide more information for questions they had answered with a negative response.

The survey was designed so that questions were used to direct respondents to appropriate sections of the survey. For example, respondents who had applied for and received funding were asked to complete the entire survey; those who had reviewed proposals but never applied for funding were directed to the "proposal review" section of the survey and didn't see any of the questions about grant management. All respondents— except those who disagreed with the terms on the first page—were asked to complete the second part of the survey, regardless of their affiliation with the NPRB.

Responses from the survey were transferred directly to a statistical software package (SPSS) for

more detailed and substantive analysis. Open-ended questions were analyzed and coded.

Response Bias

Because responses were anonymous - we could not connect responses to specific names - it is impossible to determine response bias (i.e. whether respondents are different than non-respondents). However, we can get some sense of potential response bias comparing the demographics of the 26% who responded to the survey with those who didn't respond. We randomly selected 100 names from the full sample list of 1,298, and then looked for a website that included their gender, education level and professional affiliation. Overall for the three variables, it appears that non-respondents were very similar to respondents in terms of gender, education level, and professional affiliation.

Overview of Quantitative Responses Regarding the NPRB Experience

In general, respondents tended to report positive experiences with and perceptions of the NPRB and its proposal process. However, some exceptions were expressed in the open-ended portions of the survey.

Interestingly, for almost all of the forced choice questions, respondents who had received funding were more likely to report a negative experience than those who had applied but not received funding when describing perceptions of expectations and responses from the NPRB. This makes sense since the latter respondents have likely had no extensive relationship with NPRB.

Overview of Qualitative Responses Regarding the NPRB Experience

Suggestions from respondents for improving the review process generally fall under the following themes:

- Increase transparency of the entire application and review process
- Explain final funding decisions more thoroughly
- Increase the quality and number of reviewers
- Address the perception of political influence in final decision making
- Provide greater clarification of NPRB objectives and expectations

Responses to open-ended questions were collected from respondents who chose a negative option on a forced choice question, and tended to be generally critical but still constructive. In addition, some of the open ended questions reflected more positive experiences than was reflected in the negative answer on the forced choice question.

Overview of Section Regarding Expectations for Science in Resource Decision Making

The second section of the survey asked respondents about their preferred role for scientists, policy makers, private industry, interest groups, and the public in the natural resource policy process. Other questions asked respondents about their values as they relate to natural resource management.

Survey respondents were asked to answer questions meant to measure their orientations toward science. These responses were cross-evaluated with questions from the survey that reflect perceptions about the scientific soundness of the NPRB review process (Q30) and general quality of NPRB grant management (Q34). Those most critical of traditional science tend to be less positive of the NPRB review process and are more likely than others to report they “don’t know.” This pattern is reversed, however, when asked about managing grants; those most critical of traditional science were more likely than other respondents to report positive perceptions of NPRB grant management.

Respondents were also asked to choose their preferred role for scientists in natural resource policy decision making: only report findings, interpret findings, integrate results, advocate for specific decisions, or make natural resource decisions. The question was cross-evaluated once again with questions 30 and 34 from the survey. While the majority of respondents, regardless of their preferred role for science in management, find the NPRB review process to be sound, there appears to be a trend that those respondents with a preference for a more “active” role for science are more likely to find the NPRB review process sound. This overall pattern is also true when asked their perception of grant management, although there are more “don’t know” responses indicating that many respondents may not be actively involved in the management of the grant from which they receive funding.

“New Environmental Paradigm,” (NEP) questions were used to measure attitudes and general orientations toward society and the environment. NEP scores were also cross-evaluated with questions 30 and 34 from the survey. While respondents’ tend to reflect high or moderate support for the new ecological paradigm, this does not seem to have had any differential impact on their perception of the soundness of the NPRB review process or the management of NPRB grants.

Tribal Survey Responses

A version of the survey with reformatted questions was distributed to members of the BSIERP LTK/Subsistence project “Regional Advisory Board” that is organizing work in five villages (Savoonga, Emmonak, St. Paul, Togiak, and Akutan). Only five surveys were returned from the potential respondents. However, no noticeable dissimilarities were noticed in comparison to the online survey. Questions were added to this version to address specific tribal community issues, and respondents reported that:

- The NPRB is not well known among tribal communities (40%);
- The NPRB doesn’t communicate research results very well to tribal communities (40%); and
- Half of respondents saw the NPRB as a somewhat likely source of science funding for rural communities, while the other half reported this as unlikely.

Conclusion

Overall, survey responses were generally positive. However, for respondents dissatisfied with particular aspects of the NPRB funding process, several key themes were repeated. Respondents requested (1) increasing transparency for proposal reviews and general aspects of the funding process; (2) simplifying proposal requirements; and (3) ensuring consensus between the review board and the science panel reports.

Appendix II

List of Sources for Increased RFP Distribution

1. American Geophysical Union (AGU) publishes EOS, its weekly "newspaper", and a notice can be published in it. It is widely read by physical oceanographers, but others as well. There may be a small charge for such a notice. Also see the AGU website <http://www.agu.org/>
2. American Society of Limnology and Oceanography (ASLO) <http://www.aslo.org/> will place a notice on their website. Contact webmaster@aslo.org. An ad may be placed in their monthly e-journal, the Bulletin, which is sent to all members.
3. The Ecological Society of America maintains a bulletin board where RFPs may be posted. It is not exclusively marine, but is used by many marine ecologists. <http://www.lsoft.com/scripts/wl.exe?SL1=ECOLOG-L&H=LISTSERV.UMD.EDU>
4. Ocean Carbon Biogeochemistry (OCB) office at Woods Hole Oceanographic Institution sends many email announcements. The OCB program home page is at: <http://www.us-ocb.org/index.html> and partway down the page is a link under OCB Information Resources to subscribe and/or post to the OCB email list. A link to information about the mail list is <http://mailman.who.edu/mainman/listinfo/ocb-all> and archives of notices from the past several months are available at <http://www.us-ocb.org/archives/index.html>
5. American Fisheries Society (AFS) has a monthly publications, 'Fisheries', http://www.fisheries.org/afs/docs/pub_fisheries_ed.pdf. See <http://www.fisheries.org/afs/aboutus.html>
6. Pacific Seabird Group (PSG) will reach most seabird biologists in the North Pacific and may post RFPs <http://www.pacificseabirdgroup.org/>
7. Society for Marine Mammalogy (SMM) will reach marine mammalogists. See <http://www.marinemammalscience.org/>
8. MARMAM listserv also reaches marine mammalogists <http://whitelab.biology.dal.ca/marmam.htm>
9. Aquatic Commons <http://aquaticcommons.org/> is a site administered by IAMSLIC (International Association of Aquatic and Marine Science Libraries and Information Centers).
10. Libraries and Information Centers)Canadian Conference for Fisheries Research (CCFFR) has a listserv <http://www.phys.ocean.dal.ca/ccffr/>
11. Canadian Meteorological and Oceanographic Society (CMOS) <http://www.cmos.ca/>

12. ArcticNet is the big Canadian Arctic research network that may have place for this type of posting <http://www.arcticnet.ulaval.ca/>
13. Canadian Arctic Resources Committee (CARC) <http://www.carc.org/>
14. Scientific Committee on Oceanographic Research (SCOR) <http://www.scor-int.org/> has a Canadian chapter CNC/SCOR <http://www.cmos.ca/scor/scorindexe.html> and may also have a U.S. chapter
15. Arctic Monitoring and Assessment Program (AMAP) <http://www.amap.no/>

Appendix III

Comments from Science Panel to Committee of Visitors

Gulf of Alaska IERP

August 2010

August 30, 2010

Professor Lynda Shapiro, Chairman
Committee of Visitors for NPRB Program Review
4895 NW Barnes Rd
Portland, OR 97210

Dear Dr. Shapiro:

The NPRB Science Panel (SP) would like to express its appreciation for the diligence of the Committee of Visitors (COV) in reviewing the proposed Gulf of Alaska Integrated Ecosystem Research Program (GOAIERP). Many of the issues raised by the COV have been topics of discussions and deliberations by the 17-member Science Panel and focused consideration by the Ecosystem Modeling Committee over the past 3 years as the GOAIERP has evolved. In many instances where the COV identified problems, NPRB's Science Panel and staff recognized the same issues as opportunities to move the boundaries of ecosystem research to a new level of integrated ecosystem research. We would like to address the concerns of the COV in a systematic way that will encourage the Board to continue their support and the time line of the GOAIERP.

Based on deliberations at our August 23-25, 2010 meeting, we respond to the issues raised in five 'categories' in the COV review document dated 3 August 2010:

Category 1: Concept and clarity of purpose

COV review: RFP should have been more specific

Given the diversity of management issues outlined in the NPRB Science Plan, and the limited budget available for the program, the intent in the NPRB GOAIERP call for proposals was to cast a wide net, to give responders room for creativity. While the COV saw this as a lack of specificity, the SP felt this left the call open so that proposers could demonstrate their creativity given the budget limitation and the expertise of the proposers.

Category 2: Proposal generation process

COV review: Process resulted in a non-competitive process in all levels but the UTL, there is lack of integration between the components and the modeling 'objectives' were impossible to achieve.

Lack of competition and sequential process: The COV states that by choosing a sequential process, i.e. selecting the UTL component first and subsequently the other three components, the NPRB limited the intellectual creativity and involvement of the MTL, LTL, and modeling components. The SP understands this concern, but views the sequential process as a means of focusing the intellectual development of the GOAIERP, rather than limiting it. With a limited budget the need for a focus for the other three components was deemed critical to achieve the desired goals of the program. The SP shares the disappointment expressed by the COV in the low number of proposals received for the non-UTL components, but does not feel that this was an outcome of the proposal generation process. Instead, the SP views this degree of response as a result of (1) a team proposal approach, rather than individual PI proposals, and (2) a limited number of experts available to conduct this work within the Gulf of Alaska. Had the SP felt the proposals received contained fatal flaws, the process would have stopped then. Instead, there were viable proposals among those received.

Lack of integration: The process was purposefully designed to have four components which would be integrated through a series of meetings once the proposals were selected. This decision was based on

lessons learned from BSIERP, in which only a small number of proposals were received from large teams. Efforts to integrate the component research and researchers started in February 2010 and will continue throughout the program. Reports from the May PI meeting reflect a strong spirit of collaboration and integration among all four program components and support our decision to foster collaboration on an ongoing basis.

Modeling objectives: The objectives referred to by the COV were intended to be evaluation criteria, not 'objectives'. In defining those criteria, the Ecosystem Modeling Committee (EMC) was aware that a high standard was being set. However, the SP and the EMC believe these are important criteria for any modeling program to strive for. It should be noted that the BSIERP program was and is being held to the same standard. As part of its management plan and approach to integration, just as with BSIERP, the NPRB staff is and will continue to work with the modeling group to satisfy these criteria.

Category 3: Content of proposals

COV review: Inappropriate time scale of the study, vague and untestable hypotheses

Time scale: The Science Panel recognized and discussed the temporal aspects of these proposals during several meetings. As pointed out by the COV multi-decadal drivers cannot be addressed within the data collection effort of this or any other program as they would necessarily have to span several decades. The PIs seem to also be fully aware of this and as a result the overall program has a strong emphasis on retrospective analyses.

Hypotheses: The COV described the three primary hypotheses of the UTL proposal as vague and largely untestable. Below we organize our response by the a-c hypotheses as listed in the COV document:

Hyp A:

Direct measurement of fish cohort survival through all life stages up to recruitment is effectively beyond the reach of any integrated ecosystem program, including GOAIERP. However, the Science Panel is confident that this new multi-disciplinary, integrated approach will gain much new information by looking at the spatial and temporal scales of fish recruitment that have been selected.

Hyp B:

The SP has previously recognized the general issue of connectivity between predator diets and the YOY life stage of interest to this study, and does not disagree with the COV. In fact, this issue is central to the ongoing discussion of marine mammal inclusion in the study. Through active involvement of NPRB staff and the Science Panel, connectivity between top predator diets and YOY life stages of GOAIERP target species has been questioned and the program has been correspondingly modified. This is an ongoing process and work with PIs continues to more clearly define the connectivity.

Hyp C:

The Science Panel recognized that validation for some parts of the modeling aspect will be difficult when the proposals were reviewed. The SP and an EMC expect to work with the PIs to identify and develop approaches to validate as many aspects of the models as feasible. The validation process for BSIERP has also involved a similar iterative process between the modeling PIs, EMC and NPRB staff.

Category 4: Review of proposals and decision making

COV review: (i) concerns by technical reviewers not sufficiently considered, (ii) integration between components a concern, (iii) SP appears to lack clear SOPs in regards to technical reviews, (iv) SP does not have a clear system to rank proposals.

The COV viewed the review and decision making process for the GOAIERP with concern. The COV listed four items in relation to the Science Panel proposal review process which are addressed individually as follows:

(i) The SP disagrees with the COV regarding the consideration of the technical reviews received. The Science Panel gave full consideration to technical reviews provided. However, the proposal evaluation process for an integrated ecosystem approach also requires a balance of the technical aspects of the proposals and overall program integration. External or technical reviewers see proposals in isolation, but then it is the responsibility of the SP to interpret the technical reviews within the context of the overall program. As a result, the overall recommendation of the SP sometimes differs with the opinion of the technical reviewers. Recognition of both the scientific quality of a proposal and its role within the overall program is key component of the SP review process.

(ii) As noted by the COV, the SP has had its own concerns about integration within the GOAIERP and, together with NPRB staff involvement, continues to actively address integration issues. The first full GOAIERP PI meeting in May 2010 was an important and productive step in this direction.

(iii) The SP has clear operating procedures, although many are not in the form of a SOP document. Review and ranking procedures are described in the RFP and in most meeting minutes where proposals were considered, and are also fully disclosed to the Board. The SP notes that in many cases, the procedural guidance for particular circumstances such as the GOAIERP is contained in the form of Action Memos for specific meetings, rather than a general SOP. The SP agrees with the COV that the procedures could be made more transparent to those outside the SP. Thus, the SP will request that NPRB staff formalize existing SP evaluation procedures into a SOP document that can be provided to interested parties.

(iv) The SP disagrees with this assessment and feels that the internal ranking of proposals used is adequately documented within the meeting summaries.

Category 5: Evaluation and recommendation

COV review: The Board should suspend the current program and start over using the BSIERP model

The SP finds the COV's suggestions to re-compete the program as a fully integrated IERP modeled on the conceptual framework of BSIERP rather surprising, since the current approach has been based on lessons learned from the BSIERP process. That BSIERP is seen as "the model" to emulate speaks well of NPRB's ability to use the experiences of planning and administering that program to guide the GOAIERP. The SP strongly disagrees with the final recommendation made by the COV to suspend the current GOAIERP process. The SP is not unaware of the issues raised by the COV. However, we are confident that the teams that have been selected will be able to produce a product of value to the NPRB and the greater scientific community. Several of the issues raised by the COV have already been resolved and staff and the SP will monitor the as yet-unsolved issues with concern and diligence.

The Science Panel thanks the COV for providing a snap shot of how NPRB is perceived from outside the process and for flagging what they interpret as program deficiencies. We understand the difficulty of trying to evaluate weeks of deliberations by the SP and EMC and months of efforts by the NPRB staff to communicate and coordinate program objectives and requirements. NPRB's departure from the NSF style of grouping single investigator proposals requires much more communication and directed coordination within ecosystem teams to achieve truly integrated ecosystem research. The early success of BSIERP is strong evidence that NPRB has both the skills and vision to administer and guide the GOAIERP successfully. We assure the COV that the NPRB will strive for periodic course corrections as appropriate

within the current constraints as the program moves forward. BSIERP and GOAIERP with their differing approaches are works in progress and will need to be evaluated for their future applications to IERPs.

Sincerely,

A handwritten signature in blue ink, appearing to read "D Woodby". The signature is fluid and cursive, with a long horizontal stroke at the end.

Doug Woodby, Ph.D.
Chairman, NPRB Science Panel