

Summary  
North Pacific Research Board  
Science Panel Meeting  
Seattle, Washington  
July 20-21, 2004

The Science Panel met at the NOAA/NMFS Alaska Fisheries Science Center in Seattle on July 20-21, 2004 to review the draft science plan and consider initial implementation steps. The meeting was chaired by Rich Marasco and the following other panel members were in attendance: Vera Alexander, Dick Beamish, Don Bowen, Dan Goodman, Anne Hollowed, Gordon Kruse, Tom Royer, Pat Tester, and David Witherell. The meeting was staffed by Clarence Pautzke and Misty Ott. Science plan team members included Jim Schumacher, David Fluharty, and Loh-lee Low (Gordon Kruse and Clarence Pautzke also are on the plan team).

For each major chapter and section of the draft plan, the Science Panel received an overview and then asked clarifying questions, discussed the draft section and developed recommendations as listed below. Minor editorial revisions were also recommended and will be addressed by the team in the next draft of the plan. The Panel then discussed ideas for implementation presented for each component.

**Chapter 1 – Introduction**

Section 1.3. Add further rationale for characterizing geographic region as three large marine ecosystems, though they do not exactly fit definitions in the scientific literature. They do, however, provide a convenient organizing principle that links directly to the way resources are managed and areas are viewed by managers, resource users and the public.

Revise line 5 p. 9, to read “The Board recognizes that the plan will be successful **particularly** if those who use the resources....”

Section 1.4. Expand explanation of “sufficiently broad”, to convey that the plan is sufficiently general so that there is flexibility to study a diverse array of issues in the coming years without having to revise the plan. Also explain that the plan is not meant to be a “bible” of science, but rather a broad overview of current concepts. Every assertion does not need to be backed up with literature citations as is done in scientific literature to make a case. Rather the plan is a strawman view of how we think the ecosystem and its components function and interact with one another, and the intent is for this understanding to change as new scientific knowledge is developed.

**Chapter 2 – Scientific Foundations**

Section 2.2.1.1. Add several lines about global warming to the atmospheric climate features section.

Section 2.2.1.3. Add paragraph on inner, middle, and outer fronts in the Bering Sea, and also discuss the differences between the continental shelves of the GOA and BSAI, the former being a deeper feature, and the latter more shallow.

Fig. 2-6. Add one-way arrow from sea ice box to fauna box because sea ice has a large one-way impact on fauna in the Arctic.

Section 2.3. Change title to *NPRB Goal and Overarching Philosophy*. The three broad hypotheses are really more like premises, because they are so broad, and there is little debate over whether they are true.

Their purpose is to form an umbrella under which more discreet hypotheses may be formulated and tested. Also note that some levels of knowledge are more developed than others, and that the plan remains on the more general level to enhance its longevity, but will attempt to identify key issues in each section that will drive research. Need to state that the ecosystem and its components are being influenced by many different forces and that it is very heterogeneous. Also add organizational chart of NPRB and its advisory bodies, and flow of information and decisions.

### **Chapter 3 – Research Themes**

**Section 3.1. Introduction.** Delete references throughout plan to ecosystem “health”, in favor of “states.” Ecosystems do not have health. They constantly change and do not necessarily return to a specific equilibrium. Also add reference under monitoring to development of ecosystem indicators or indices, and add examples that cover upper trophic levels, as well as lower levels. Also need to note that a 20-year stream of high quality monitoring data could be one of the most important contributions the Board ever makes to science in the North Pacific.

For each of the ecosystems components sections, discussed further below, attempt to apply a consistent structure, for example, an introduction, overview and then a section on research needs and strategies. This will not necessarily require significant new information, as much as recasting of the sections and moving species snapshots and other detail to appendices. The sections will then provide a more compressed discussion of major research themes and strategies, without making the reader wade through descriptions of each species or species groups. That type of information will be available in the back for reference to future readers and reviewers. The laundry list of research needs and strategies listed under each component needs to be condensed into a few concise paragraphs or shorter list that describes the main research topics common to most or all species within that component.

Table 3-1. Either add more explanation or delete.

**Section 3.2. Lower Trophic Level Productivity.** This section should be revised to remove some of the detail and most of the bulleted questions under each major geographic area.

**Section 3.3. Habitat.** Maintain a broader discussion of different types of habitat that does not solely emphasize EFH and fisheries problems. For example, there are many types of habitat, such as coral gardens, which may be important to protect as unique, biodiverse epifaunal communities, that may not provide significant EFH. These could be directly impacted by fishing activities, and associated research will not necessarily move information content to levels 3-4, but still could lead to protection as sensitive areas. Also expand discussion of habitat types past those with vertical structure and complexity to the more homogeneous areas such as muds, sands, etc, where many fish are found. Look at habitat as a substrate and discuss assemblages of organisms that use that substrate. In effect, recast the section in terms of broader issues that include non-managed resources and their habitat needs. Also add as research needs, recovery times of various benthic substrates and related communities and describe assumptions made in the literature about recovery of habitat types from fishing and natural disturbance. Also, need to add something about research on the management consequences of restricting some or all fishing in certain areas, i.e. establishing closed areas or marine reserves.

**Section 3.4. Fish and Invertebrates.** In the introduction on p. 43, inform the reader that even with well known species, many assumptions, sometimes very tenuous, are made in determining population status and trends. More information is needed on all species, not just little known ones. Move much of the detailed stock information back to an appendix. Delete Section 3.4.4 on Species of Special Concern, because most fish species could be of special concern to someone, not just those listed on p. 58. It also

could be problematic to raise issues about those species listed when in fact no species except Bering Sea snow crab and Pribilof blue king crab are on the NMFS “overfished” list.

For salmon, keep relevant parts of GLOBEC for salmon. What are salmon and fish responses to regime shifts? Do the stock recruitment relationships change in response to ocean variability?

Sections 3.5 and 3.6. Marine Mammals and Seabirds. As with previous sections, move detailed snapshots of species to appendix. Add discussion of terms of residence times in the Arctic, trophic guilds in which species fit. Also try to reframe the list of research priorities so it is more general and applies to all species of marine mammals instead of specifying a shopping list of research needs for each species group, particularly for those under USFWS-managed species as on p. 80-81.

Section 3.7. Integrated Ecosystem Research Programs. The themes for the various LMEs and subregions need to be reworked and expanded to include the entire food web, rather than weighted toward the lower food web and oceanographic features. A preamble is needed that indicates the Board does not want to encourage single factor hypotheses: the entire ecosystem needs to be considered, as well as the interactions of its spatial-temporally heterogeneous components. The sections need to be collapsed to a more generic approach with one or two examples. The Board should seriously consider a comprehensive integrated study of the anticipated development of the new Adak pollock fishery and how it impacts the surrounding ecosystem, since this area has been relatively untouched in the past as far as major fisheries are concerned. This is a unique opportunity to study how the ecosystem will change over time. Other examples of IERPs should be added to the text, including the experience with FOCI.

Section 3.8. Contaminants. A key strategy on risk assessment needs to be added. New technologies allow more precise measurement of very low concentrations of contaminants, but the larger issue is to what degree populations are at risk from those low concentrations. Just because they can be measured does not necessarily mean they have a significant health ramification.

Section 3.9. Longer Term Issues. Under harmful algal blooms in Section 3.9.1, provide a few lines describing the potential impacts of HABs on siting of aquaculture facilities.

## **Chapter 5 Policies and Procedures**

Section 5.1. Scientific Quality and Integrity. Explain on line 1, p. 134, that the Science Panel makes recommendations to the Board on proposals to fund. Add a time limit of 4 years on whether a Science Panel member or technical reviewer may be associated with an applicant when considering whether a conflict of interest exists. Other entities such as NSF have a similar time limit. On Line 26, p. 135, allow 2 (not 1) years for submission of paper to journal publication.

Section 5.2 Data Management. Data archiving will need to include raw as well as processed data. For example, for acoustic analysis of benthic habitat, the raw data are processed through algorithms to show bottom type. Future algorithms may be different and the raw data should be available to future researchers so they can be reprocessed with the improved algorithms. The Board will need to consider the different levels of sharing of data between principal investigators: some will only want the maps while others will want the raw data to analyze.

The Board needs to explore where sample archiving is done and how to partner with those facilities, for example with Auke Bay Lab in Juneau.

## Implementation

### Lower Trophic Level Productivity

In point #3, recognize that ecosystems indicators are needed at all levels of the food chain, not just the nutrient-phytoplankton-zooplankton (NPZ) level.

### Fish and Invertebrates

Forage fish studies need to be funded annually, not just periodically. These represent a very key component of the marine ecosystem and need to be studied thoroughly. As mentioned earlier, we also need to consider how stock recruitment relationships will change with changes in climate and oceanography. Also broaden point #5 to look at non-commercial fish stocks.

### Marine Mammals

The Board should consider carefully whether Steller sea lions really should be its signature piece when so much other money is flowing into its research. The suggested synthesis meeting on Steller sea lions should be moved to 2006 when more of the research will have been completed and the data analyzed. Need to make sure we are going after the right questions on Stellers, i.e., what are the impacts of fisheries on the populations? Need to design research program for Adak and the coming impacts of the developing pollock fisheries. If Steller sea lion research is funded, the Board needs to ensure that it is studied in context of the broader ecosystem. Need to properly specify questions and design a study of impacts of fisheries and natural variability on Stellers.

### Seabirds

Add study of how seabirds respond to discards of flatfish, since full retention of all flatfish is not required in the commercial groundfish fisheries. Add bullet in second paragraph on seabirds as indicator species.

### Contaminants

Add a reference to the need for risk assessment and determine if some of this research could be rolled into human dimensions? EPA should be approached about doing the risk assessments because they are very good at it.

### Integrated Ecosystem Research Plan

The Board also should consider completing a study of alternative HAB impact scenarios in nearshore areas. Also consider funding comparative studies within an LME, structured around hypotheses that examine how different features are causing differential impacts on ecosystem components within the same LME.

If the Board commits to supporting an IERP, it should do so over a period of at least 10 years, and the study should be multidisciplinary. A possibility would be funding a comprehensive study of fur seals as a cornerstone species, examined within an overall ecosystems context and how it is impacted by natural and human-induced variability.

The Board also should consider entering into a dialogue with the North Pacific Fishery Management Council on what types of research are needed to allow the Council to ramp up for ecosystems-based management, which is gaining considerable momentum from the U.S. Ocean Commission.

Science panel is comfortable with the implementation steps offered and will work closely with the Board and science team in its further development. The Panel recognizes that the Board is in a start-up phase and that many of the implementation details will need to be added after various synthesis meetings and workshops are held in 2005. They noted that only the science plan will be sent to the NRC, not the implementation plan.

Science Panel members also indicated that they would like to be involved in synthesis activities and workshops to be more knowledgeable when recommending further actions on particular research areas. It was suggested that Panel members could serve on wrap-up panels at synthesis meetings.

### **Revised Forage Fish Proposal**

The Science Panel recommends funding the revised forage fish project. They noted that the research is not intended to provide a comprehensive assessment of forage fish, but rather the appropriate methodologies for completing such an assessment. The Panel commented that the concept and plan are good, the methods and sampling are described well, the budget is reasonable, and the team has very capable scientists. If the Board approves this revised proposal now, work will commence this coming October on cruise preparation for next spring.

### **Next Meeting**

The Science Panel will meet in Anchorage on September 13-14, starting at 10 a.m. the first day. They will review the final science plan and implementation plan, and help develop the 2005 RFP.