

North Pacific Fishery Management Council

North Pacific Research Board

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October 23, 2002

ADM James D. Watkins, Chairman
U.S. Commission on Ocean Policy
1120 20th Street NW, Suite 200 North
Washington, DC 20036

Dear Admiral Watkins:

Thank you for the opportunity to testify before the U.S. Commission on Ocean Policy at the Alaska Regional Meeting, August 21-22, 2002, in Anchorage, Alaska. I am providing a joint response from the North Pacific Fishery Management Council and the North Pacific Research Board to your September 30, 2002, request for additional information on specific topics of interest that arose during the presentations of the Arctic Issues and Historical Perspective panels. The attached response covers the following topics:

1. North Pacific Fishery Management Council Ecosystem-based Management
 - a. Overview and evaluation of current approach
 - b. Next steps in fishery ecosystem planning including development of indicators
 - c. Recommendations for national implementation of an ecosystem-based approach
2. North Pacific Research Board Activities
 - a. Funding, mission, and membership
 - b. Credible scientific advice
 - c. Research priorities
3. Addressing Overcapitalization in Fisheries off Alaska

We hope this information proves useful to the Commission in your review of ocean policy. We believe our combination of conservative, ecosystem-based fisheries management, founded on an ever increasing understanding of the ecosystem and its dynamics, will provide for sustainable management of the abundant resources of the North Pacific. Please do not hesitate to contact me should you need additional information.

Sincerely,



David Benton, Chairman
North Pacific Fishery Management Council
North Pacific Research Board

Attachments

1. North Pacific Fishery Management Council Ecosystem-Based Management

a. Overview and evaluation of current approach

A basic premise of the management approach in the North Pacific is a recognition that fishing influences the marine ecosystem. Fishing directly affects populations of fish and other ecosystem components by the timing and method of fish removals, as well as by vessel disturbance, changes in nutrient cycling, introduction of exotic species, pollution, unobserved mortality, and habitat alteration. The North Pacific Council's ecosystem-based management strategy is to minimize potential impacts on the ecosystem, while at the same time allowing the extraction of fish resources at levels sustainable for both the fish stock and other components of the ecosystem. The foundation of that ecosystem oriented approach is reflected in a reliance on the science which drives our fundamental exploitation strategies.

Strict catch quotas are set annually, based on the following sequence: (1) total biomass and acceptable biological catch levels (ABCs) are projected by stock assessment scientists from the Alaska Fisheries Science Center - these projections are based on extensive, annual stock surveys, and include natural mortality estimates for each species; (2) the Council's Groundfish Plan Teams, comprised of stock assessment and management experts, then review each stock assessment and provide their recommendations to the Council's Scientific and Statistical Committee (SSC), also comprised of stock assessment and population dynamics experts; (3) the SSC carefully reviews each stock assessment, and the recommendations from the Plan Teams, before making its recommendations to the Council on biomass, ABCs, and overfishing levels for each species; and, (4) the Council sets a total allowable catch (TAC) for each species, which is never above, and often well below, the ABC recommendations from the scientists.

The quota setting process contains an additional ecosystem oriented constraint, in the form of an optimum yield (OY) cap which is specified in the fishery management plans. For example, overall ABCs for the Bering Sea in 2002 were about 3.3 million mt; however, the total TAC for all species combined was constrained to 2 million mt, or a 40% decrease from what was determined to be biologically acceptable. Notwithstanding this conservative approach to basic fisheries exploitation, the North Pacific Council recently commissioned an independent review of basic harvest (exploitation) strategies by a panel of eight internationally recognized scientists. The purpose of this review is to evaluate our harvest strategies in the context of single species application, *and* in the context of overall ecosystem application. Results of that independent review are expected later this year. The North Pacific Council often conducts 'self-evaluations' relative to its management approach - other examples include a blue-ribbon panel commissioned in 2001 to evaluate Steller sea lion protection measures enacted by the Council, and an on-going review by the National Academy of Sciences of all available information relative to the Council's management measures to protect Steller sea lions.

Additional examples of incorporating ecosystem considerations are summarized below, in the context of the National Research Council's (NRC) recommendations. The NRC (an agency of the National Academy of Sciences) has recommended an ecosystem-based management approach for sustaining marine fisheries. The National Research Council defines an ecosystem-based approach as having the following elements:

1. Conservative harvest levels for single species fisheries
2. Ecosystem considerations incorporated into fishery management decisions
3. A precautionary approach to deal with uncertainty
4. Reduced excess fishing capacity and defined and assigned fishing rights
5. Marine protected areas as a buffer for uncertainty
6. Inclusion of bycatch mortality in catch accounting
7. Institutions to achieve goals
8. Research on structure and function of marine ecosystems

The fishery management approach taken in the North Pacific essentially mirrors the ecosystem-based management approach recommended by the National Research Council. A brief review of the North Pacific management system is provided below.

Conservative Catch Limits: In the North Pacific groundfish, crab, and scallop fisheries, the annual catch of each species is limited by total allowable catch levels. These catch limits are established using conservative harvest rates. All fish caught in any fishery (including bycatch), whether landed or discarded, are counted towards the annual catch limit. A comprehensive catch monitoring system including on-board fishery observers allows catches to stay within the specified limits. Fisheries are stopped for the remainder of the year when catch limits are approached.

Ecosystem Considerations: Many of the fishery management measures have been directly implemented to reduce the effects of fishing on ecosystem components. Examples include extensive time and area closures to reduce potential interactions with Steller sea lions and Pacific walrus, regulations for longline fisheries to reduce the incidental capture of seabirds, and a prohibition on fishing for forage species.

Precautionary Approach: There are many instances where the North Pacific Council has taken a more precautionary approach to address uncertainty. For example, the annual catch specifications are based on a system of tiers, so more conservative catch rates are established for stocks whose population dynamics is not fully understood. Total allowable catch limits are always set equal to or below levels determined to be biologically sustainable. Additionally, the total annual catch of the entire groundfish complex is constrained by an optimum yield limit in the FMPs; for example, total Allowable Biological Catch (ABC) limits in the Bering Sea in 2002 totaled over 3 million mt, yet the OY cap limited total catch to 2 million mt.

Fishing Capacity and Rights: All groundfish, crab, and scallop fisheries are managed under limited entry programs, which limit the number of active licenses, and restrict each vessel to specific area and gear endorsements. Halibut and sablefish fisheries are managed under a sophisticated Individual Fishing Quota (IFQ) program. The nation's largest volume fishery, the Bering Sea pollock fishery, is managed under a system of fishery cooperatives authorized under the American Fisheries Act. The Council recently adopted a rights-based system for Bering Sea and Aleutian Islands crab fisheries, that included IFQ for harvesters, quota shares for captains and crew, individual processor quotas, and measures to protect fishery dependent communities. Please see the separate discussion within this letter detailing how we address overcapitalization issues.

Marine Protected Areas: Large marine protected areas have been established in the North Pacific to protect habitat and maintain biodiversity. Over 90,000 square nautical miles of the EEZ have been closed to bottom trawling year-round. These areas equate to about 20% of the continental shelf area where trawling used to occur. Many more areas are closed on a seasonal basis, or are closed when a bycatch limit is reached. The Council is currently considering additional closure areas to reduce the effects of fishing on essential fish habitat, particularly in areas with benthic biota such as corals and sponges.

Reducing Bycatch and Accounting for Bycatch Mortality: Because the North Pacific boasts a comprehensive on-board observer program, bycatch is well monitored and is counted towards the total allowable catch limits for each species. In addition, many measures have been successfully implemented to reduce bycatch, especially of those species important in other fisheries (i.e., crab, salmon, herring, and halibut). Such measures include strict bycatch limits that, when reached, close the target fishery. Other measures include extensive area closures, gear limitations, or seasonal closures which move fisheries out of areas of high bycatch at critical times of the year.

Institutions: Decision making is deliberative, transparent, and incorporates diverse views from all user groups and the general public. Committees are formed to advise the Council on a variety of issues. One of these committees, the Ecosystem Committee, provides an educational forum for discussion of ecosystem-based management. In addition, an ecosystem chapter is prepared annually to supplement the groundfish Stock Assessment and Fishery Evaluation Reports. The ecosystem chapter provides an update on status and trends of ecosystem components and oceanographic changes to the ecosystem, as well as indicators of overall ecosystem conditions. This information is utilized by the Groundfish Plan Teams and the Council's SSC in the annual quota-setting process.

Research on Marine Ecosystems: A comprehensive ecosystem-based fisheries management approach would require managers to consider all interactions that a target fish stock has with predators, competitors, and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat. Although all of the information needed for full implementation of Fishery Ecosystem Plans is not currently available, these topics are priority areas of research for NOAA, NMFS, the University of Alaska, the North Pacific Research Board, and other institutions.

In summary, the existing program has the basic elements necessary for an ecosystem-based approach to managing fisheries. Because this firm foundation already exists, the North Pacific Council is in a good position to make additional advancements towards even more explicit incorporation of ecosystem considerations in its management program. We are currently in the process of developing an Environmental Impact Statement (EIS) to identify and protect essential fish habitat, as well as a Programmatic EIS for our overall fishery management plans which will evaluate a broad range of basic management approaches (including assessment of habitat, fisheries, marine mammals, community protections, and a host of other factors), and result in adoption of an overarching, long range policy framework for the future.

b. Next steps in fishery ecosystem planning including development of indicators

In 1999, the National Marine Fisheries Service Ecosystem Principles Advisory Panel released a report on application of ecosystem principles for fishery conservation and management. The panel developed a list of basic ecosystem principles and policies, and recommended that Fisheries Ecosystem Plans be developed as a first step toward a full ecosystem approach. The objectives of a Fishery Ecosystem Plan would be to provide the fishery management Councils and public with a description and understanding of the fundamental physical, biological, and human/institutional context of ecosystems, and direction on how this information can be used to set policies for ecosystem-based management options. Components of such a plan include food web models, habitat needs, estimates of total removals, an assessment of uncertainty and buffers, indices of ecosystem health and use, long-term monitoring plans, and an assessment of other elements.

Of particular importance are ecosystems indicators such as trends in oceanography (temperature, circulation, sea level pressure, etc.), habitat (trawl effort, bycatch of epifauna, etc.), catch of fish (target species, forage fish, and non-target species), marine mammal abundance, seabird production, and aggregate indicators (regime shifts, trophic level of catch). The ecosystems indicators section of the Stock Assessment and Fishery Evaluation documents for the groundfish fisheries have evolved since their introduction into the document in the mid-1990's. Earlier sections amounted to anecdotal articles on a variety of subjects from consumption of offal by various fish species to climatic changes and regime shifts. Over time the chapter has become much more organized and now systematically identifies 6-10 indicators for such broad topics as physical oceanography, habitat, target groundfish, forage fish, other species, marine mammals, seabirds, and aggregate indicators. As these indicators are further refined, they eventually will provide the basis for assessing the "health" of the ecosystem and what it means to the long term sustainability of fish populations. The North Pacific Council is in the early stages of assessing such indicators and their relationship to the fisheries.

While the concept of a Fishery Ecosystem Plan has obvious merit, it is critical to recognize that (1) the available science in any region of the U.S. may not yet allow for development of meaningful, explicit ecosystem plans, and could actually be counter-productive by establishing unrealistic requirements based on poor science, which could expose the process to additional litigation; and (2) the tools necessary to appropriately incorporate ecosystem considerations already exist, and many of the management measures in place in the North Pacific do so, either implicitly or explicitly, even if they are not always labeled as ‘ecosystem measures’. The annual ecosystem considerations chapter to the Stock Assessment and Fishery Evaluation Report, together with updated information in the draft programmatic groundfish environmental impact statement, already assembles most of the information required. Fishery Management Plans (FMPs) already incorporate this information and therefore move towards a more ecosystem-based approach to fisheries management. If guidelines are established to provide the Councils with further guidance about what is expected in either an explicit ecosystem approach to management in existing FMPs, or in new Fishery Ecosystem Plans, the North Pacific Council already has a strong foundation to meet these new requirements. However, it is essential to keep in mind the role of science in this endeavor. In the North Pacific, the existence of the North Pacific Research Board and its emphasis on fishery management information improve the outlook for sustained, long term research that will help to better characterize the ecosystems indicators and their relationship to the fisheries.

c. Recommendations for national implementation of an ecosystem-based approach

In addition to simply requiring each Council to use the tools already available, starting with basic institutional arrangements and scientifically established catch limits, we recommend the following practical steps be taken to implement a national ecosystem-based approach to fishery management prior to requiring explicit Fishery Ecosystem Plans. Steps 1, 2 and 3 can be taken immediately and steps 4, 5, and 6 could be taken in the next year or so. Step 7 will likely take additional time to complete, and step 8 would be ongoing.

1. First, get the basic foundation in place. Ensure that NMFS and each Council have the basic scientific programs (including robust stock assessment programs), institutional arrangements (such as Plan Teams composed of scientists and managers) including an active and broad based SSC, and reliable and transparent decision making processes in place.
2. Require each fishery management Council to report to Congress on how they are meeting the National Research Council’s eight recommendations to achieve sustainable fisheries using an ecosystem-based approach. This serves as a self evaluation for Councils to determine where changes should be made in the short term.
3. Require each Council to establish an Ecosystem Committee to provide a forum for information exchange on ecosystem research and ecosystem-based management.
4. Require NMFS to prepare an annual “status of the ecosystem” report for each region, similar to the requirement for stock assessment and fishery evaluation reports. This “status of the ecosystem” report should contain ecosystem indicators (socio-economic, environmental, ecological, and fishery indicators).
5. Require each Council and the respective NMFS regional office to develop technical guidelines for incorporating ecosystem considerations in Council fishery management plans, which include clear goals and objectives.
6. Require each Council to delineate its ecosystem approach (once the guidelines have been adopted) to serve as a foundation for all fishery management plans in the region.
7. Require NMFS to identify the research priorities needed for full implementation of an ecosystem approach, and for an explicit ecosystem plan.
8. Fund research identified in the previous step, and modify the ecosystem approach (and/or fishery management plans) as new information becomes available.

2. North Pacific Research Board Activities

a. Funding, mission, and membership

Funding. The North Pacific Research Board (NPRB) was created by Congress under Title IV of H.R. 2107, signed into law on November 14, 1997 as P.L. 105-83, and codified as 43 U.S.C. §1474d. NPRB is authorized to recommend marine research to the U.S. Secretary of Commerce (Secretary), who makes final funding decisions. Research is funded by part of the interest earned by the Environmental Improvement and Restoration Fund (EIRF) created under 43 U.S.C. §1474d. Each year, 20 percent of the interest earned and transferred to the EIRF is made available to the Secretary without further appropriation to carry out marine research activities. The enabling legislation calls for 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)... [with]...priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs.”

Mission. The mission of NPRB is 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, and will seek to avoid duplicating other research. NPRB establishes written criteria for the submission of grant requests through a competitive process and for deciding upon the award of grants. Grants are recommended on the basis of merit in accordance with NPRB research priorities.

NPRB also administers the North Pacific Marine Research Institute (NPMRI) at the Alaska SeaLife Center, pursuant to 33 U.S.C. §2738. The NPMRI’s enabling legislation requires research to be related to “...the North Pacific marine ecosystem, with particular emphasis on marine mammal, seabird, fish, and shellfish populations in the Bering Sea and Gulf of Alaska including populations located in or near Kenai Fjords National Park and the Alaska Maritime National Wildlife Refuge.”

Membership The statutory composition of the Board and its current members are as follows:

- Secretary of Commerce - Designee: James Balsiger, National Marine Fisheries Service, Juneau
- Secretary of State - Designee: Stetson Tinkham, U.S. Dept. of State, Washington, DC
- Secretary of Interior - Designee: William Seitz, U.S. Geological Survey, Anchorage
- Commandant of the Coast Guard - Designee: CAPT Rich Preston, USCG, Juneau
- Director, Office of Naval Research - Designee: Steve Ramberg, ONR, Washington, DC
- Commissioner, Alaska Department of Fish and Game - Frank Rue, Juneau
- Chairman, North Pacific Fishery Management Council - David Benton, NPRB Chairman, Juneau
- Chairman, U.S. Arctic Research Commission - Designee: Garry Brass, Arctic Research Commission
- Director, Oil Spill Recovery Institute - Designee: Walter Parker, Anchorage
- Director, Alaska SeaLife Center - Tylan Schrock, NPRB Vice Chair, Seward

- Five members nominated by Governor of Alaska and appointed by the Secretary of Commerce for the following areas of interest:

Fishing interests	Jev Shelton, fisherman, Juneau
Alaska Natives	Robin Samuelsen, Bristol Bay Native Assoc., Dillingham
Environmental interests	John White, Dentist, Bethel
Academia	Phil Mundy, Gulf Ecosystems Monitoring Program, Anchorage
Oil and gas interests	Pamela Pope, BP Exploration Alaska

- Three members nominated by the Governor of Washington and appointed by the Secretary of Commerce:
John Gauvin, Groundfish Forum, Seattle
John Roos, fishery scientist emeritus, Seattle (Now in Virginia)
Jack Tagart, Washington Department of Fish and Wildlife, Olympia
- One member nominated by the Governor of Oregon and appointed by the Secretary of Commerce:
Howard Horton, Oregon State University, Corvallis
- One member who shall represent fishing interests and shall be nominated by the Board and appointed by the Secretary of Commerce:
Trevor McCabe, At-Sea Processors Association, Anchorage

The members of the Board must be individuals knowledgeable by education, training, or experience regarding fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, or Arctic Ocean. Members appointed on the basis of state governor nominations serve three-year terms and may be reappointed.

b. Credible scientific advice

The mission of the North Pacific Research Board is to fund research to provide credible scientific advice to a variety of resource managers, user groups and the public. To accomplish this mission the Board is in the process of developing a long term science plan and the institutional arrangements necessary for a durable and credible long term research effort. Credible scientific advice will be ensured in four ways:

- The Board has enlisted the help of the National Research Council in the development of a comprehensive science plan,
- A blue-ribbon science panel will ensure high quality science planning and research,
- All proposals for research will receive independent technical reviews from peer scientists,
- Publication in peer reviewed scientific literature.

National Research Council Science Plan. The Board approved funding in early June 2002 for the National Research Council (NRC) to help it develop a high quality, comprehensive, long range science plan for the North Pacific, Bering Sea, and Arctic Ocean region. This NRC initiative will be completed over the next two years and will include site visits to several rural Alaska communities to gather ideas on research. NRC will appoint a study committee that will assist the Board in developing a science plan that:

- Is comprehensive and long range (10-20 years),
- Identifies major research themes, with emphasis on marine resource management issues,
- Is flexible, dynamic, and able to adapt to new research and monitoring findings,
- Is responsive to the vision, mission and goals of the Board and addresses the elements of a science plan identified as important by the Board,
- Builds on past and ongoing research programs of the Federal government, the State of Alaska, universities, and other relevant entities,
- Has a high probability of achieving the goals and objectives of the Board and maintaining awareness of the need to sustain a variety of marine resources, and
- Is consistent with Board enabling legislation.

In addition, the committee will consider questions such as the appropriate balance between process studies and time-series studies, the role of modeling, the availability and usefulness of proxy and historical data, coordination with other activities (including international activities), and any other issues related to assuring the program has a strong strategic vision and sound management and oversight. To guide the Board in developing its science plan, the committee will:

- Identify broad research themes in the North Pacific, Bering Sea, and Arctic Ocean region, through discussions and a workshop,
- Conduct a series of site visits in Alaska to gather further input on the research themes,
- Provide supporting information and recommendations for achieving the desired attributes of the plan,
- Prepare an interim report that outlines the components of a successful long-term science plan and provides guidance to the Board as it develops its plan, drawing on insights gained from past reviews of similar science plans to help the Board avoid known difficulties and pitfalls, and
- Subsequently review the science plan drafted by the Board in light of the identified research themes and overall guidance provided in the interim report, making any necessary suggestions for improvement.

Science Panel. The Board is in the process of establishing a 6-10 member science panel to help it shape a comprehensive research program, review specific research proposals, and provide other scientific advice. The panel's membership will be drawn from experts in fields of science most relevant to the Board's interests, such as oceanography, ecosystems dynamics, fish ecology, marine mammal and seabird biology, fisheries management, and socioeconomics. The Board will have access to all areas of knowledge necessary to the development of its research program through the combination of the expertise of the panel and its supporting peer review process. The science panel will have the following duties:

- Advise the Board on science planning and identification of research priorities,
- Help develop a science plan that includes a conceptual foundation, central hypotheses and questions for research,
- Advise the Board in identification, development, collection, and evaluation of statistical, biological, oceanographic, ecological, economic, social and other scientific information relevant to the Board's mission,
- Review proposals and technical evaluations received by the Board,
- Review reports and advise the Board on how to ensure the quality of reports and other products generated by funded research,
- Provide annual reviews of funded research to ensure stated goals and milestones of the research are on schedule, and
- Provide other scientific advice as requested by the Board.

Members of the science panel will be appointed for staggered three-year terms. The call for nominations for membership went out in early October and the Board will review nomination packages on October 30-31, 2002. The Board also will convene smaller working groups on an ad hoc basis to advise the science panel and Board on specific areas of research and science planning.

Technical Peer Review of Proposals. The Board will ensure that all proposals are subjected to up to three technical peer reviews. A scoring system has been established and incorporated in the request for proposals that is released each year. The technical scores and comments on each proposal are furnished to the science panel and the Board, but remain confidential to others. After the Board makes its final decisions on accepting or rejecting proposals, unsuccessful applicants may request copies of technical reviews of their proposal, and these are scrubbed of names of the technical reviewer.

Peer Reviewed Literature. All principal investigators are strongly encouraged in their contracts with NPRB to submit their results to a scientific, peer-reviewed journal within one-year of completion of NPRB-funded projects. The Board will track this issue closely to ensure high quality science is accomplished with Board resources. Scientists who do not publish over time will be discouraged from applying for support from NPRB.

c. Research priorities

The North Pacific Ocean and waters off Alaska are among the most productive marine regions in the world and support abundant populations of fish, seabirds, and marine mammals. The fisheries provide over 40% of the U.S. fisheries harvest. Components of the marine ecosystem and their environment vary over time, and improving the understanding of their dynamics will enhance resource managers' ability to protect the healthy, sustainable fish and wildlife populations that comprise these ecologically diverse marine ecosystems.

NPRB's enabling legislation calls for EIRF funds to be used for the purpose of carrying out marine 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), with priority on cooperative research efforts designed to address pressing fishery management or marine ecosystem information needs.

Through its science planning process, the Board is developing a set of research priorities. These priorities will draw from the NPRB authorizing legislation, the results of other research planning efforts, stakeholder input, and management needs as identified by such regulatory bodies as the North Pacific Fishery Management Council and the Alaska Board of Fisheries. The NPRB also recognizes that research priorities will of necessity change and evolve over time. As such, the NPRB is developing mechanisms for periodic re-evaluation of research plans and priorities to ensure the best, most relevant science possible.

Research Priorities. Based on earlier research plans for the North Pacific Ocean, Bering Sea, Aleutians and associated waters, and on statutory criteria, the Board has identified the following seven broad categories of research priorities for its current request for proposals (no priority is implied among the categories):

Marine Ecosystem structure and processes

1. Factors affecting marine productivity, including nutrient transport and availability, water column stability and the role of sea ice,
2. Influence of climate variability on physical, chemical, and biological processes; unusual occurrences of specific organisms such as the coccolithophorid blooms,
3. Development of ecosystems models that will aid resource managers,
4. Origins and impacts of invasive species,
5. Long term monitoring of biophysical parameters and phytoplankton and zooplankton.

Endangered and stressed species

1. Factors, including fisheries, affecting survival of stressed and endangered species, particularly marine mammals, seabirds, and seaducks,
2. Responses to ocean climate trends and prey availability.

Fish habitat

1. Habitat mapping and substrate classification, including documentation of the presence of corals or other sensitive substrates, studies of factors affecting habitat including physical forcing, variations in energy flux, and overwintering conditions,
2. Impacts of fisheries and other human influence on benthic habitat and its capacity to support communities of organisms, including adaptive management research,
3. Fishery management tools to facilitate fish habitat protection.

Fishery management and economics

1. Economic implications of fishery management approaches, including rights-based system and fishing capacity reductions.

Bycatch

1. Studies that assess the impacts of, or lead to reductions in, bycatch, especially in the groundfish fisheries, and including gear designs to improve selectivity,
2. Stock composition research on bycatch species, including salmon, in GOA and BSAI groundfish fisheries,
3. Improve methods of estimating bycatch mortality, including unobserved mortality.

Stock assessment and recruitment processes

1. Studies of factors affecting salmon stock dynamics, mortality and migration throughout their range and life cycle, particularly for Western Alaska salmon stocks,
2. Improve genetic identification of salmon stocks,
3. Studies to develop or improve fish stock assessment techniques, including estimates of all sources of fishing mortality, and quantifying estimates of natural mortality,
4. Research on interdependence of fisheries or stocks of fish.

Contaminants

1. Studies of sources, transport, and accumulation of contaminants in subsistence, recreational, and commercial species, and other ecosystem components,
2. Effects on ecosystem structure and function,
3. Effects of climate change on contaminants,
4. Studies of pollution from oil spills, increased run-off as a result of logging and other coastal development, and development of predictive models.

As a final point, it is important to note that the NPRB is not operating in a vacuum, and that there are numerous other marine science programs and initiatives in operation in the North Pacific. Many of these organizations and programs are represented on the NPRB. This has the obvious advantage of providing the opportunity for the NPRB to work in close consultation and coordination with these other programs and initiatives. To further this goal, NPRB periodically will meet jointly with the boards of the *Exxon Valdez* Oil Spill Trustee Council and its associated Gulf Ecosystem Monitoring program, and the Northern Fund established by the Pacific Salmon Agreement with Canada. Each of these programs has funding for research initiatives off Alaska. Working together, the NPRB will strive to develop and implement a comprehensive, high quality science and research program that contributes the information necessary for sustainable management of the fisheries resources while protecting the ecosystem.

3. Addressing Overcapitalization in Fisheries off Alaska

Overcapacity can have significant implications for resource conservation, or it can be primarily an issue of economic and management efficiency. With firm catch quotas established for each fish stock in the North Pacific, overcapitalization is less of an issue relative to resource conservation, but is nevertheless a critical issue for many other reasons, including economic efficiency, orderly management, and safety at sea. Given the sound scientific basis for the TAC setting process in the North Pacific, this Council has been able to devote a significant amount of its time and resources to issues involving allocation of fisheries resources and reductions in capacity. Management measures addressing overcapitalization have been an integral part of our fishery management plans since the mid 1980s, when we began development of management measures to end the derby situation in the halibut and sablefish (black cod) longline fisheries. Seasons had shrunk from several months down to a few weeks in the sablefish fisheries, and down to 24 hour derbies in the Gulf of Alaska halibut fishery with up to 3,000 vessels participating, many of those very small vessels operating in often very dangerous conditions.

After extensive analysis, public hearings, and dozens of Council meetings over a three-year period, an Individual Fishing Quota (IFQ) program was approved by the Council in 1991. The program was implemented in 1995, and fishermen now enjoy a nearly year-round fishery where they can time their fishing effort to market consideration and to avoid adverse weather conditions. The number of vessels participating has been reduced dramatically, as has the number of vessel sinkings and fatalities in these fisheries.

With regard to other groundfish and crab fisheries off Alaska, the Council approved a vessel moratorium in 1992 (allowing no further vessels to enter these fisheries in federal waters), followed by a more restrictive license limitation program approved in 1995. The license limitation program restricted the number of eligible vessels to those meeting historical and recent participation requirements, and included endorsements by gear type and sub-management areas. Further restrictions subsequently have been approved and implemented, including species endorsements for the Bering Sea Pacific cod fisheries, which further limit the number of vessels allowed to participate in those fisheries, and include additional gear and area restrictions.

One of the most dramatic examples of addressing overcapitalization occurred in 1998, with the passage of the American Fisheries Act, which specifically addressed the Bering Sea pollock fisheries. Implemented by the Council and NMFS in 1999, the provisions of that Act included specification of the vessels and processors eligible to participate in the pollock fisheries, and allowed for the formation of fishery cooperatives. As a result, the catcher/processor (factory trawl) fleet has consolidated from 25 vessels down to 14, and catcher vessel participation (delivering primarily to onshore processors) is down from 115 to about 80 vessels. Allocations are made to nine separate cooperatives, with vessels operating essentially as they would under an IFQ program. Product recovery rates (pound of product per pound of raw fish caught) have increased significantly, and bycatch of non-target species (already among the lowest in the world in this fishery) has been reduced to the point that these fisheries catch about 99% pollock in an average tow.

The most recent example of Council action to address overcapacity is in the Bering Sea crab fisheries. After several years of development and debate, the Council approved, in June of this year, a rationalization program for these fisheries, which consists of IFQs for harvesters, individual processor quotas (or IPQs) for processors, quota allocations to skippers and provisions for crew member participation, and community protection (or regionalization) requirements to maintain coastal community interests in these fisheries. Pending Congressional authorization, and approval by the Secretary of Commerce, this program could be in place as early as 2004, thus ending the race for fish in what is regarded as the single most dangerous fishery in the world.

The Council is also in the process of developing further rationalization programs for the remaining groundfish fisheries, with particular focus on the Gulf of Alaska. Current measures in place to protect Steller sea lions, including vast time and area closures, compel an added urgency to provide fishermen the flexibility required to adhere to these protection measures, and still be economically viable. All of the capacity-related programs developed by the Council include provisions to protect and ensure continued viability of coastal communities in these fisheries. Explicit programs in this regard have also been implemented by the Council, either separately or in conjunction with overcapitalization projects. Examples include: the Community Development Quota (CDQ) program, which allocates up to 10% of each Bering Sea crab and groundfish species to 65 remote communities on the Bering Sea coastline, and a recent amendment to our halibut/sablefish IFQ program which allows coastal communities in the Gulf of Alaska to purchase quota shares.

With regard to overcapitalization in other regions, we continue to believe that the regional Council system, and its inherent flexibility to tailor specific programs to regional needs and issues, provide the mechanisms to address overcapacity issues at regional and national levels. We believe that in the North Pacific we employ a 'systemic approach' to fisheries management, which considers all aspects of the system, including the participants in the fisheries. Addressing overcapitalization should be an integral part of any management system. However, it is important to stress that measures to reduce overcapacity are not a suitable means to address basic conservation goals, such as limiting overall catch. Addressing overcapitalization can only be accomplished successfully as an overlay to a basic system of overall catch limitation.