

North Pacific Research Board: 2007 Request for Proposals**2007 RFP Regular Research Priorities
for
Projects Commencing in 2007****INTRODUCTION**

The North Pacific Research Board (NPRB) was created by Congress in 1997 to recommend marine research activities to the Secretary of Commerce, funded through a competitive grant program using part of the interest earned from the Environmental Improvement and Restoration Fund. These funds must 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). NPRB must strive to avoid duplicating other research activities and must place priority on research designed to address pressing fishery management or marine ecosystem information needs. The Board's long-term vision is to build a clear understanding of the marine ecosystems off Alaska that enables effective management and sustainable use of marine resources.

The Board, guided by its [Science Plan](#), has funded 139 projects totaling over \$24 million as a result of five requests for proposals released since early 2002. Descriptions of the projects can be found at <http://project.nprb.org/> and fall into seven broad categories as shown in Table 1.

Table 1. NPRB-supported research initiated in 2002-2006.

<u>Categories of Research</u>	<u>Projects</u>	<u>Total Funding</u>	<u>Percent</u>
Ecosystem Studies	34	\$6,180,606	26
Fish and Invertebrates	37	\$5,941,577	25
Salmon	9	\$2,290,037	9
Fish Habitat	12	\$2,715,664	11
Marine Mammals	24	\$3,818,154	16
Seabirds	9	\$1,986,646	8
Humans	14	\$1,231,816	5

The subject of this current notice constitutes the regular 2007 RFP. It is similar in form and content to past NPRB requests for proposals, with research priorities structured around the 2005 Science Plan. It calls for **full proposals due December 1, 2006**. The table below summarizes the priorities and funding targets in this year's RFP. Explanation of the research priorities begins on p. 4.

A special RFP to implement NPRB's Bering Sea Integrated Ecosystem Research Program (BSIERP) will be released later in October. It will envision a 6-year comprehensive program from 2007 through 2012-2013, run by a multi-institutional, multi-disciplinary team, and may include a partnership with the National Science Foundation. It will involve integrated research to improve our understanding of ecosystems processes that underpin the highly productive resources of the Bering Sea Large Marine Ecosystem and their response to natural and human-induced variability. The BSIERP RFP will entail a call for pre-proposals due 22 November and then formal invitations for full proposals.

2007 Request for Proposals: Research Priorities (Total: \$3.895 million)

PLEASE CAREFULLY READ THE EXPLANATORY PARAGRAPHS (p. 4-15) FOR THE RESEARCH PRIORITIES SUMMARIZED BELOW AND BE AWARE THAT ALL SECTIONS HAVE FIRM CAPS ON THE INDIVIDUAL PROPOSAL FUNDING AMOUNTS. PROPOSALS EXCEEDING THOSE CAPS WILL NOT BE PROCESSED.

Table 1. 2007 RFP Regular Research Priorities and target amounts totaling \$3.895 million.

<u>Research Priorities</u>	<u>Target Amount</u>
1. Specific Research Needs	\$235,000
a. Establish a comprehensive sea ice database for the Bering Sea/Bering Strait region	\$100,000
b. Compilation and analysis of chlorophyll data	\$75,000
c. Design Arctic baseline survey north of Bering Strait	\$60,000
2. General Research Priorities on Ecosystems Components	\$3.1 M
a. Lower Trophic Level Productivity	\$400,000
i. Coupling between shelf and inland waters in the ACC as well as the importance of freshwater runoff	
ii. Seasonal and interannual variation in primary and secondary production in southeastern GOA	
iii. Long-term ocean monitoring	
iv. Benthos	
v. Processes driving secondary production	
b. Fish Habitat	\$300,000
i. Effects of commercial fishing on essential habitats of groundfish	
ii. Recovery and resilience of fish habitat	
c. Fish and Invertebrates	\$1,200,000
i. Local impacts of fishing on prey availability for top trophic level consumers	
ii. Bycatch estimation and gear-induced injury and mortality	
iii. Life history, ecology and fluctuations in BSAI crab stocks	
iv. Squid and shark assessment	
v. Other fish and invertebrate research	
d. Marine Mammals	\$500,000
i. Sea otters	
ii. North-Pacific Right Whales	
iii. Cook Inlet beluga whales	
iv. Polar Bears	
v. Fur Seals	
e. Seabirds	\$500,000
i. Seabirds as indicators of forage fish	
ii. Beached bird monitoring program	
iii. Stressed and Endangered Species Survival	

Table 1. Non-IERP research priorities continued

f. Humans	\$100,000
g. Contaminants	\$100,000
i. Shipping risk assessment	
ii. Other contaminants research	
3. Local and Traditional Knowledge	\$100,000
4. Coordination and Partnerships	\$150,000 NPRB (\$300,000 Total)
a. Alaska Ocean Observing System	\$100,000 total
b. Oil Spill Recovery Institute	\$200,000 total
5. Cooperative Research with Industry	\$250,000
a. Topics for Fishing Industry	
b. Topics for Oil and Gas Industry	
6. Community Involvement	\$60,000
TOTAL	<u>\$3.895 million</u>

1. Specific Research Needs**\$235,000**

- a. Establish comprehensive sea ice database for the Bering Sea/Bering Strait region \$100,000

Regional sea ice changes for the past 50+ years in Alaska's coastal seas are important drivers of the coastal ecosystems and can impact the entire ecosystem from primary productivity to marine mammals, fisheries and communities. Despite this importance, detailed statistical trends are unavailable for sea ice extent and concentration, seasonal and annual rate of change of sea ice coverage, thickness, type (i.e. first year, multi-year, and fast ice), and sea ice habitats. NPRB is requesting proposals that will conduct rigorous 'trend analyses' using regional sea ice charts (~50 years), satellite imagery (~30 years), and other available quantitative information with the ultimate aim of producing a 'standard package of sea ice trend information' useful to researchers and stakeholders alike. **Individual proposal funding cap is \$100,000.**

- b. Chlorophyll *a* in the Bering Sea and Gulf of Alaska \$75,000

Evaluate the utility of remote sensing to quantify chlorophyll *a* concentrations in the Bering Sea and the Gulf of Alaska. Develop and implement regionally-specific algorithms for ocean color satellite imagery in both areas at 1, 10 and 100 km resolution depending on data availability. Algorithms will include the ability to mask cloud cover, quantify real estimates of surface chlorophyll concentrations, identify anomalies against pixel-by-pixel time-averaged values and detection of eddies. Within each region, identify areas where ocean color is not reliable either because of colored dissolved organic matter (CDOM), particle scattering or excessive cloud cover. Existing chlorophyll *a* and optical data bases should be used for validation. Analyses may include linking of chlorophyll time series to the physical environment (e.g., winds, SST, sea ice) and other biological distribution patterns (e.g., fish, mammal or seabird distributions). **Individual proposal funding cap is \$75,000.**

- c. Design Arctic baseline survey north of Bering Strait \$60,000

Proposals are requested to design a comprehensive inventory of marine species in the northern Bering Strait/Chukchi Sea region that would serve as a baseline for comparison as the area is impacted by climate change and anticipated recession and eventual loss of sea ice. It would be a significant contribution to IPY during 2008. Such a survey may be funded every 5 years for future comparisons. Proposals would provide a detailed examination of other surveys and inventories in the area, prospective partners, survey objectives, and statistical methodologies including power analysis to detect change over time. **Individual proposal funding cap is \$60,000.**

2. General Research Priorities on Ecosystems Components**\$3,100,000**

Research Priorities outlined below follow the structure of the Science Plan. It is strongly suggested the Plan be consulted for clarification of appropriate research to be conducted under each heading.

a. Lower trophic level productivity

\$400,000

The NPRB expects to fund several projects under this general category with emphasis given to the first four topical areas. **As a result, the individual proposal funding cap is \$250,000.**

- i. Coupling between shelf and inland waters in the ACC as well as the importance of freshwater runoff

Significant volumes of freshwater (snow and glacier melt, and precipitation) are discharged into the Gulf of Alaska, coastal embayments, and inland waters from coastal watersheds. Near the coast, surface waters are typically fresher and less dense than waters farther offshore. The Alaska Coastal Current (ACC), an along-shore current (coast to the right when looking downstream), is the dynamical response to this cross-shore density gradient. Water exchange between deep bottom water, the ACC, and coastal embayments may be the primary physical process influencing the abundance and distribution of plankton that provide food for schools of herring and other small fishes as well as out-migrating juvenile salmon. Yet we have a limited understanding of how much water is actually exchanged, at what frequency, and at what times during the year. Proposals in this category should aim at better understanding the relationship between shelf and inland waters and to provide an improved description of the mixing dynamics and the spatial and temporal variability of flow through straits connecting coastal embayments with the GOA, including southeast.

- ii. Seasonal and interannual variation in primary and secondary production in the southeastern GOA

We have a limited understanding of the relationship between circulation variability and biological variability, particularly the processes causing seasonal and interannual variation in primary and secondary production in the southeastern GOA that may create areas of aggregation of food for upper trophic level species. Proposals are solicited for studies of the spatial and temporal patterns of mixing and circulation particularly as these physical processes relate to the spatial (vertical as well as horizontal) and temporal distribution of nutrients, phytoplankton, and zooplankton. Proposals are solicited that will address seasonal and interannual variation in primary and secondary production in the southeastern GOA, coastal embayments, and inland waters in relation to circulation patterns and creating hotspots for upper trophic level species.

- iii. Long-term ocean monitoring

Proposals are requested to design and implement collection of marine observations to monitor changes in ocean characteristics and marine life within one or all of the three Alaska large marine ecosystems. Priority will be given to monitoring those parameters deemed critical to the determination of ecosystem status. Proposals may maintain or enhance existing monitoring efforts or introduce new approaches to long-term monitoring.

- iv. Benthos

Recent research suggests that climate change will influence the standing stock of benthic species (Grebmeier et al. 2006). Climate impacts on the exchange of energy from the pelagic system to the benthos may contribute to these changes. Indices of the distribution and abundance of benthic

species are needed to evaluate these hypotheses. NPRB seeks proposals that advance our understanding of the role of climate in controlling the coupling between the pelagic and benthic systems with specific emphasis on the response of benthic species to different types of energy partitioning. NPRB will also consider proposals that provide the basis for the development of index surveys designed to assess interannual to decadal trends in the distribution and abundance of benthic species.

v. Processes driving secondary production

The NPRB will consider supporting research that examines the processes that drive and maintain secondary production at the base of the food web from one year to the next, as well as those examining ecosystem implications resulting from changes in community structure, i.e. loss in the dominant species of Calanus. In addition, projects that investigate feeding and reproductive rates of micro and macro-zooplankton relevant to upper trophic level species will be considered. Understanding of such processes will be needed to improve understanding of ecosystem dynamics and the ability to forecast how climate change might impact the transfer of energy to the upper trophic levels.

b. Fish Habitat

\$300,000

The NPRB expects to fund several projects under this general category with emphasis given to the first four topical areas. **As a result, the individual proposal funding cap is \$250,000.** Also please note that no mapping proposals will be supported this year because NPRB is awaiting the workshop report from the recently funded project on mapping technologies (#615). Fish habitat research proposals are requested for the following two categories:

i. Effects of commercial fishing on essential habitats of groundfish

New research is needed to improve the knowledge base used to assess habitat impacts. This element focuses research on four key issues:

- a. Trends over time in spatial distribution and fishing intensity in various habitats.
- b. Determine appropriate spatial and temporal scales to be able to assess the impacts of fishing on habitat.
- c. Magnitude of impacts relative to their potential to influence the sustainability of fish populations.
- d. Evaluation of fish/habitat associations at multiple spatial scales with emphasis on managed fish species throughout their bathymetric range.

ii. Recovery and resilience of fish habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires managers to assess and mitigate impacts of fishing on fish habitat. Based on the fact that fish habitat has been and continues to be impacted by natural changes and anthropogenic activities, proposals should focus on quantifying the recovery and resilience of different fish habitats on several spatio-temporal scales.

c. Fish and Invertebrates

\$1,200,000

The NPRB expects to fund several projects under this general category with emphasis given to the first four topical areas. **As a result, the individual proposal funding cap is \$250,000.**

i. Local impacts of fishing on prey availability for top trophic level consumers

There is a continued need for studies that measure the impact of commercial fishing on the foraging success of top trophic level consumers. NPRB requests proposals that are designed to address this issue. Potential investigators should provide a description of the power of their analysis to differentiate responses of prey and predators to fishing and natural effects as well as a statement regarding the applicability of their results to other areas and seasons.

ii. Bycatch estimation and gear induced injury and mortality

Proposals are solicited that will improve bycatch estimates and examine gear induced injury and mortality for non-target and prohibited species. Innovative sampling techniques are needed to estimate species composition of non-target species without diminishing the quality of the sampling for the target species, as well as to assess gear induced injury and mortality to species not necessarily brought aboard. NPRB requests proposals for field projects that lead to the design and implementation of a statistically credible catch estimation system for species captured incidentally in target fisheries. Proposals should also address how the observer program may best allocate effort to reduce measurement-error variance and/or to incorporate aspects of process error variance into estimates. NPRB is also looking for proposals that will lead towards a more accurate quantification of gear induced injury and mortality, particularly to species not brought onboard.

iii. Life history, ecology and fluctuations in BSAI crab stocks

King, Tanner and snow crab are a major resource in the Bering Sea and Aleutians and yet there is much uncertainty about their current stock assessments. The NPRB is seeking proposals to develop and improve current stock assessment methodologies, and understanding of life history, ecology, and fluctuations in crab stocks.

iv. Stock assessment and life history of squid and sharks

Squid and sharks form part of the 'other species' category used by the North Pacific Fishery Management Council. There is insufficient life history and stock assessment information for these species to be properly managed. The NPRB is seeking proposals that will research and develop improved stock assessments for those stocks that are difficult to assess with current methodology, and to fill gaps within our current understanding of their life history, as well as their distribution and abundance. Studies could include process studies to understand population fluctuations of squid and sharks, but priority will be given to projects that address the concerns listed above.

v. Other fish and invertebrate research

While the above four topics are emphasized in this RFP, NPRB also will consider proposals that address priorities identified in Table 3-4 of the science plan, particularly those also identified by the NPFMC at http://www.fakr.noaa.gov/npfmc/misc_pub/ResearchPriorities06.pdf.

