

### **Gulf of Alaska Integrated Ecosystem Research Program**

The North Pacific Research Board is developing an Integrated Ecosystem Research Program (IERP) for two Large Marine Ecosystems (LMEs), the Bering Sea and the Gulf of Alaska. The Board is implementing an IERP for the Bering Sea with an RFP scheduled for release in October 2006. The release of an RFP for the Gulf of Alaska IERP is scheduled for the fall of 2007.

The Gulf of Alaska (GOA) program will be funded by the NPRB with a target total amount of approximately \$5M over six years with no more than \$1M allocated in any given year. An implementation planning team (IPT) for the GOA IERP was formed in April 2006. The planning team consists of academic and agency scientists, and resource managers. A meeting was held in Seattle on May 2-3, 2006 to begin developing an implementation plan and the following approach was recommended.

#### Recommended Approach

To guide the development of a GOA IERP, the IPT recommended the following statements of vision, mission, and goals:

The vision of the IERP is "to gain knowledge through research on the fundamental science underlying management issues critical to the development of long-term sustainability in the production and exploitation of marine resources".

The mission of the IERP is to: "to foster theoretical and empirical research in marine science that will support the development of predictive ecosystem models in the GOA"

The goals include "1) The development of local and regional ecosystem models, based on historical field and remote sensing observations, that will allow the identification of key research areas where new observational and/or theoretical efforts are required, 2) The implementation of these research initiatives, 3) The evaluation of the capabilities of these improved ecosystem models to predict responses of ecosystems to environmental changes.

The following overarching question for the Gulf of Alaska was proposed:

*How do environmental processes affect the various trophic levels and dynamical linkages among trophic levels, with particular emphasis on fish and fisheries, marine mammals, seabirds, and humans within the Gulf of Alaska, and how do they in turn, help determine ecosystem state and resilience?*

Considering the limited funds available for the IERP, the IPT recommended an important interim effort in preparation for an IERP implementation. This "Phase 1" will promote assembly, analysis, and interpretive modeling by multidisciplinary and multi-institutional collaborators directed toward addressing important questions in integrated ecosystems research and specifically how existing scientific datasets can be utilized to address the management issues listed below. The IPT recommended that the NPRB seek projects that address the testing of important ecological ideas and concepts as they relate to identified management issues using existing data, cutting-edge analysis of ecological information, research on data access and use, and the use of sound ecosystem-based science in policy and management decisions. Then either in the fall of 2007 as recommended by the Board, or at the completion of the Phase 1 effort as suggested by the IPT, the second phase will solicit proposals for IERP field projects either partially or fully informed by the results of Phase 1.

### Management issues

The NPRB is particularly interested in understanding dominant causes of ecological variability as they relate to specific coastal and offshore fishery and other natural resource management issues. One major goal of the IERP is to make scientific data and research findings relevant to these issues. The IPT identified the following key management questions as potentially tractable examples of the types of issues that could be addressed within the scope of a Gulf of Alaska IERP:

- Regime shift: What are the physical and/or biological processes (tipping points) that result in large-scale ecological shifts of important coastal marine ecosystems specifically including the transition from crustaceans to gadids around Kodiak?
- Large whales: Are there significant ecological implications of recovering populations of the great whales for fisheries and for conservation of listed marine mammals such as Steller's sea lion and harbor seal?
- Depressed herring stocks: What are the contributions of disease mortality, predation mortality, and fishing mortality to Pacific herring population dynamics, and how do shifts in Pacific herring populations contribute to ecosystem dynamics?
- Endangered beluga whales: What are the contributions of disease mortality, predation mortality, and subsistence harvest to Cook Inlet beluga whales and how do these sources of mortality differ in other areas of the Gulf of Alaska?
- Depressed crab stocks: How do ecosystem processes interact to enhance or inhibit recovery of many previously important invertebrate species such as red king, Dungeness, and Tanner crabs in the Gulf of Alaska?
- Paradox of a productive downwelling system: What are the fishery implications of climate forcing on primary productivity and its transfer up the food chain to fished populations in the Gulf of Alaska? For example, what are the direct and indirect effects of the timing and magnitude of fresh water inputs and wind forcings on water column stability and how will these influence primary and secondary production (type, timing, magnitude) in the Gulf of Alaska?
- Marine protected areas: On the basis of developing knowledge of physical circulation patterns, population status, larval duration, and relevant adult behaviors of fishes in the Gulf of Alaska, are there any good candidates for fishery conservation, restoration, or enhancement for which use of a Marine Protected Area is clearly justified?

### Next steps

The next step in the development process is to hold a public workshop at the Alaska Marine Science Symposium to introduce the science community to the GOA IERP and the topical issues identified by the planning team. The goals will be to 1) identify additional or alternative topical issues, and 2) notify the community of the conceptual direction and timeline for the IERP implementation.

Following the symposium workshop, the NPRB staff may schedule community workshops in key GOA coastal communities to introduce the IERP and to further refine the topical issues.

The ultimate goal of this public vetting process is to provide the NPRB with a short list of topical issues that could or should be included in the RFP for the GOA IERP. In this regard the GOA IERP is taking a different direction from that of the BS IERP. Both IERPs will be vertically integrated through the ecosystem but the upper levels of the GOA IERP will be more constrained by the key topical issues identified in the planning process.