

## EXECUTIVE SUMMARY

During a three day workshop held September 9-11, 2014, economists from the National Marine Fisheries Service (NMFS) discussed economic issues related to protected resources (PR). This was the first NMFS workshop focused exclusively on the economics of PR. The primary goal was to *initiate the process* of identifying national PR social science research needs and best practices. Attendance included economists from NMFS headquarters, the NMFS regional offices and science centers in the Northeast, Southeast, Northwest, Alaska, Southwest, and Pacific Island regions, the Marine Mammal Commission, and Fisheries and Oceans Canada. A special presentation was made by the chair of the Protected Resources Science Investment Planning Process (PRSIPP) steering committee, while a member of the PR staff at the Southwest Fisheries Science Center presented concerns with the Mexican Vaquita porpoise.

The group identified future research priorities based on NMFS's 25 years of protected resource regulatory history (1990 to 2014); current and future PR social science needs articulated by Division Chiefs from NMFS's PR Regional Office and Office of Protected Resources prior to the workshop; and a review of current research in PR economics by NMFS economists. Workshop participants created a common understanding of past and current work. We anticipate the proceedings from this workshop will bridge the communication gap between economists and non-economists who collect PR-related data and who conduct PR-related research; and initiate the development of a "PR economics roadmap" in support of PR economics becoming an integral and appropriately valued part of PR science (i.e., data and research to support conservation and management of protected species).

Summary observations about the economic analyses conducted to support PR regulatory actions include the following (Tables 1 and 2):

1. Of the 72 identified PR regulatory actions, approximately one-third of economic analyses were done in support of critical habitat designation, and were, in whole or in part, outsourced to external economic consultants; two-thirds were completed by NMFS economists.
2. Each region has provided economic regulatory support for 4 to 5 taxa, although the majority of support has been dedicated to large whales (25%), turtles (24%) and fish (19%).
3. Approximately 50% of the PR regulatory actions mitigated commercial fishery interactions deemed a threat to PR. The remaining actions addressed a broad range of threats such as tourism, offshore energy development, subsistence harvesting, and dam removals and mining.

In terms of research activities, efforts have been highly correlated with the threats addressed through regulatory actions, with the majority addressing commercial fisheries. Research presentations focused on:

- The benefits of holistic management along with unintended consequences of unilateral management for transboundary species;
- Risk pools as an alternative approach to rare-event bycatch management;
- Counterfactual studies to understand our policy instrument choices;
- Economic value of scientific information;
- Compliance behavior; and,
- Economic valuation studies of protected resources.

## Workshop Recommendations

Following a review of past analyses and research, along with future regulatory and information priorities identified by regional PR managers, participants developed a set of recommendations. The recommendations were not prioritized and are not considered comprehensive, but are topics discussed at the workshop concerning issues that PR economics can address in the near to medium term. Each recommendation incorporates several potential PR economic projects, and the potential benefits or contribution these analyses can make to PR science, research and management. At the end of the document, Workshop Recommendations, examples of research and management presented, are listed with specific recommendations, in order to navigate the reader to other portions of this document. The recommendations, not in any prioritized order, are as follows:

1. **Conduct a comprehensive, high level strategic assessment.** (a) Identify, inventory, and assess all threats, by species and stock; and conduct a gap analysis on information needs; (b) conduct a similar assessment on regulatory and economic instruments used to reduce threats to PR locally, nationally, and internationally. *Benefit:* This will help identify research needs and relevant policy problems; determine what we can do now with current data/methods and categorize future needs to look holistically at protection and recovery from an economic perspective.
2. **Improve Benefit-Cost-Analysis (BCA) guidance and expand usage.** (a) Develop additional guidance on the use and application of BCA to ensure national consistency of economic analyses in support of PR actions; (b) include all relevant threats, national and international in BCA; (c) consider adopting the Millennium Ecosystem Assessment (MEA) framework (2005) within a BCA framework as NMFS moves towards ecosystem based management (EBM). *Benefits:* A more comprehensive BCA improves the likelihood of choosing an efficient outcome, avoiding unintended consequences, and identifying an alternative with a greater likelihood of success. Consistent and proper application of this more comprehensive BCA in PR-related analyses would enhance the defensibility of results.
3. **Conduct value of scientific information studies.** Quantify or describe the economic benefits of reducing uncertainty in various aspects of protected resources management (e.g., species population assessments, impacts of human activities on protected species,

predicted economic impacts of management actions). *Benefit*: This type of analysis can help to inform decisions on research, funding, and priorities.

4. **Improve and invest in ecosystem services valuation.** (a) Link PR valuation efforts with the needs of PR policy in support of legal mandates; (b) invest in expanding benefit-transfer methods for use when valuation studies are absent for the particular species; (c) conduct additional valuation studies, which are needed to improve decisions involving PR species (e.g., quantify subsistence cultural values, and ecosystem level valuations versus individual species); and (d) identify biological research needs to support economic benefit valuations to demonstrate the effects of regulations, conservation and other management actions. *Benefits*: Improved non-market value estimates allow for better decisions based on comparisons of the full scope of benefits and costs. They allow decision makers to assess options under an economic efficiency criterion and select the option that increases social welfare. In the absence of economic benefit estimates, the option that generates the greatest total net benefit to the nation may not be identified.
5. **Inventory and assess legal and institutional barriers to regulatory change** (a) Identify what is mandated and what could be modified; consider regional versus cross-regional policies, management, and governance; and (b) develop cost-recovery methodologies and participate in recovery plan development in support of lawsuit settlements or insurance design. *Benefit*: Identifying the institutional barriers that may be limiting current PR conservation efforts has the potential to provide immediate research returns, but longer term research is needed to address legal barriers.
6. **Assess current modeling/analytical methods** (a) Assess and inventory analytical methods (e.g., discuss assumptions, robustness checks, uncertainty of estimates, identification problems); and (b) identify data and methodological gaps. *Benefit*: Supports the need for “state-of-the-art” data, modeling techniques, analysis, and results to improve information necessary to assess and design recovery options.
7. **Conduct post-implementation regulatory policy analysis.** (a) Conduct a high level post implementation economic evaluation of previously adopted PR and non-PR (e.g., fisheries) regulations to identify regulatory instrument strengths and weaknesses, inconsistencies, and inefficiencies across regions; (b) identify current and potential compliance problems and metrics to measure behavioral changes; and (c) identify and prioritize PR regulatory policy for relevant evaluation analyses (e.g. back-casting counter-factual studies). *Benefit*: Evaluation of previous actions with back-casting and counterfactual analyses improves our understanding of policy instrument choices to support better forecasting, which is needed for regulatory policy analysis and recovery planning.
8. **Improve two-way communication of PR economic research and management** (a) Communicate our ideas to a broader audience, identifying opportunities for economists and other social scientists to learn about the biology of protected species and management needs; (b) find a common language to explain the importance of what we

do, what it means and why it matters to non-economists at various levels; and (c) demonstrate the advantage of involving economists early in the development of policies and regulations. *Benefits:* Earlier involvement by economists can result in stronger analyses and the development of more robust alternatives. Broader understanding of economics within the agency, particularly in PR, can help non-economists understand the role economics can play in the policy process, resulting in earlier involvement in the process and new multi-disciplinary approaches.

9. **Integrate economics into the PR Science Investment Planning Process (PRSIPP).** A NMFS PR Economic Working Group has been established to support the needs of the PRSIPP and to continue the work identified in these proceedings. *Benefits:* A formalized Working Group will build on the momentum of the workshop and move the recommendations forward. Being part of the PRSIPP will ensure PR economics funding needs are considered in the planning process.

Workshop participants agreed that an ad hoc approach has been the typical route taken in determining what is, and is not being done in relation to economic analyses and research related to PR at NMFS. An alternative would be to follow a more formal process, similar to the PRSIPP approach presented by Lisa Ballance, PRSIPP Chair (Southwest Fisheries Science Center), with the development of a research portfolio. The group agreed a more formal prioritization process with senior management support would be helpful. These proceedings represent only what was discussed at the workshop. Future efforts that may contribute to moving these recommendations further along include a special session on PR Economics (“Key Challenges with Ecosystem-Based-Management”) at the North American Association of Fisheries Economics biennial forum in May 2015, and a special issue of *Frontiers in Marine Science: Marine Affairs and Policy*, entitled “The Economics of Protected Marine Species: Concepts in Research and Management.” A NMFS PR Economic Working Group has been established to support the needs of the PRSIPP and to continue the work identified in these proceedings.